Chapter 5

In this chapter, attention turns to the role and growth of business R&D. The HGF concept is typically applied to firm performance measures such as turnover, employment or productivity. However, the concept can also be extended to R&D growth, which may signal a growing commitment by firms to pursue new to market innovation.
Growth in business R&D activity

- **12%** in business expenditure on R&D in 2015–16 compared to 2013–14
- **3 industries** account for 75% of R&D HGFs by number, but sectoral composition is changing
- **67%** of firms showing high R&D growth worldwide are located in the US and China; Australian firms only represent **0.5%**
- R&D expenditure tends to have a positive effect across all industries on growth in turnover, labour productivity and wages, but a negative effect on employment growth
- The median R&D intensity between 2001–02 and 2012–13 was about **8%**

KEY POINTS

- Australian businesses spent $16.7 billion on R&D in 2015–16 compared to $18.9 billion in 2013–14, a decrease of 12 per cent in current prices.

- Australia’s BERD investment grew strongly — from a relatively low base — in the 1990s and 2000s. But the BERD-to-GDP ratio has declined sharply from its peak in 2008–09. The ratio of gross expenditure on R&D (GERD) to GDP followed a similar growth pattern and has also declined since 2008–09.

- In 2014–15, R&D HGFs comprised 15 per cent overall of total industry R&D, down from 33 per cent in 2004–05.

- Three industries account for 75 per cent of R&D high-growth firms by number, but their composition has changed since 2004–05 when Manufacturing contributed over half the HGFs.

- By 2014–15 high R&D growth was much more evenly distributed across the leading industries. R&D high-growth firms are dominated by mature firms and SMEs.

- R&D expenditure tends to have a positive effect across all industries on growth in turnover, labour productivity and wages, but a negative effect on employment growth. These effects have become more pronounced over time.

- Globally, the growth in BERD is highly concentrated in a small number of corporations in just three or four key industries. In terms of investment in BERD, few Australian firms are significant players on the world stage.

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**Definition 5.1: R&D and R&D HGFs**

R&D involves the creative and systematic work undertaken in order to increase the stock of knowledge — including knowledge of humankind, culture and society — and to devise new applications of available knowledge. R&D is conducted in all sectors of the economy (business, higher education, government and not-for-profit), but sectors differ in the balance of their R&D activity between basic research and applied or experimental kinds of R&D.

R&D HGFs are all firms undertaking R&D which achieve at least 20 per cent compound average annualised growth in R&D expenditure over a three-year period. R&D HGF proportions are calculated for all firms undertaking R&D which have five employees or more.
5.1 R&D plays an important role in the innovation system

R&D is a key input to innovation, particularly in the development of new products and technologies. The importance of R&D varies by industry. For many service industries, a substantial part of firms’ innovation effort does not rely on R&D. Given that service industries jointly contribute more than 60 per cent of Australia’s national output, the importance of R&D to Australia’s innovation performance is likely to be different from other economies with different industrial structures.

In those industries where R&D is important to innovation, R&D serves a dual function for the firm:
- the new knowledge generated by R&D is an input to the firm’s innovation
- it enhances the firm’s ability to assimilate and exploit existing information, which builds its ‘absorptive capacity’. Absorptive capacity is important as it supports the learning that underpins future R&D efforts.

Business expenditure on R&D (BERD) measures the effort and resources that the business sector devotes to R&D activity.

Historically, advanced economies such as the US, Switzerland and Germany had some of the highest BERD to GERD ratios, with roughly 70 per cent of GERD performed by business enterprise in 1981. By 2015, the countries with R&D investment most driven by BERD were Israel (85 per cent), Japan (78 per cent), Taiwan (78 per cent), Korea (78 per cent) and China (77 per cent).

The share of R&D undertaken by business in Australia is well below that of the leading countries. When Australian business R&D data was collected for the first time in 1981, business expenditure on R&D was only 25 per cent of GERD while government and higher education R&D comprised the majority of GERD. However, by 2008–09, Australia’s BERD/GERD ratio peaked at 61 per cent before retreating to 53 per cent in 2015–16. GERD also grew strongly during this period, with the ratio of GERD to GDP increasing from 1.48 per cent in 2000–01 to a peak of 2.25 per cent in 2008–09, then falling to 1.88 per cent in 2015–16. As a result, Australia’s ratio fell further below the OECD average of 2.38 per cent and below that of China (which has risen to 2.07 per cent), and its ranking on this indicator fell to 19th among the 35 OECD countries.

While Australia’s BERD/GDP ratio has been declining since 2008–09, a small proportion of firms — R&D high-growth firms — accounted for a disproportionate share of BERD (see Section 5.7). Evidence shown in the Australian Innovation System Report 2015 suggests firms that performed R&D were more likely to be employment, turnover or profit ‘gazelles’.

5.2 R&D intensity has a positive effect on turnover growth

Firms with high turnover growth appear to be better able to capitalise on R&D expenditure (Figure 5.1). Firms at the 90th percentile of the turnover growth distribution benefit by increasing their R&D intensity (i.e. R&D expenditure divided by total turnover) about 13 times more than the median firm. There is evidence that firms at the lower end of the turnover growth distribution experience a negative impact on turnover from increasing R&D intensity. On average, R&D intensity is positively related to turnover growth.

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(z) See the Glossary for the definition of a ‘gazelle’.

(aa) Quantile regression analysis was performed to examine the impact on high-growth firms of R&D intensity (the control variable). We considered a one-year gap between R&D intensity and turnover growth but the model was also tested for two and three year gaps without significant change in the results.

(ab) These results are similar to those found for the UK by Coad and Rao (2008).

(ac) These results are based on the most conservative estimates that we obtained through econometrics.
Box 5.3: Analysis of the impact of R&D intensity on firm growth

This study examined the impact of R&D intensity (as measured by R&D expenditure divided by turnover) on firm turnover growth. The dataset used for this research is based on the ABS Business Expenditure on Research and Development data in BLADE. Before 2011–12, the data covered all businesses that spent $100,000 or more on intramural R&D. From 2011–12, the R&D survey was based on a random sample of businesses stratified by industry and R&D expenditure. The data set covered the period 2001–02 to 2012–13. To remove the volatility associated with small firms, the data focussed on firms with five or more employees.

The study is based on econometric analysis using quantile regression and panel data techniques. Quantile regression can be used to characterise the entire conditional distribution of a dependent variable (in this case, turnover growth), given a set of independent variables. Quantile regression allows the study of how R&D intensity affects turnover growth, and is robust to outliers. Regressions were based on a total of 29,673 observations and 7,030 businesses.

All the standard control variables in the literature, including size, age, industry effects and time effects were used in the regressions. Panel data techniques including Fixed Effects were used to test for robustness. These included Fixed Effects which controlled for the firm’s capability.

Further, for this analysis, high R&D intensity firms are those that have R&D intensity above the median value (which is 7.9). Conversely, low R&D firms are those with an R&D intensity lower than the median value.

Figure 5.1: Impact of R&D intensity on turnover growth by quantile, 2001–02 to 2012–13.

![Impact of R&D intensity on turnover growth by quantile](image_url)

Note: Results based on quantile regressions (Majeed (forthcoming))

There are several plausible explanations for the large variation in the effect of R&D intensity on turnover growth:

- Coad and Rao (2008) suggest that firms that innovate and fail may be commercially worse off than firms that do not innovate at all.\(^{11}\)

- R&D intensive firms are susceptible to imitation of their innovative products or processes from rival firms.\(^{12}\) These imitations can reduce potential growth in turnover and market share for the firm undertaking R&D.

- Low or negative turnover growth may be expected where firms are attempting to capture market share or their research is yet to be commercialised. For example, biomedical and pharmaceutical firms may be focussed on clinical trials to establish whether a new product/technology has commercial potential. A similar effect may occur for firms in mineral exploration which are likely to be bought out by large mining firms.\(^{13}\)

- Evolutionary economics suggests that while firms innovate and spend on R&D to improve their profits, only a few of these firms are ultimately successful.\(^{14}\) This selection process happens in a competitive environment where more successful firms grow at the expense of the less successful ones. There is no optimal amount of R&D that guarantees firm growth or even survival.

### 5.3 R&D intensive firms had higher returns

In general, firms with high R&D intensity have a higher return from R&D expenditure compared to low R&D intensity firms. There is a wide variation in R&D intensity among firms undertaking R&D. During 2001–02 to 2012–13, the median R&D-active firm spent about 8 per cent of its turnover on R&D expenditure and the distribution of R&D spending was skewed to the left (Figure 5.2). The bottom 10 per cent of the firms spent less than 0.5 per cent of their turnover on R&D expenditure, while the top 10 per cent of the firms spent more than 87 per cent of their turnover on R&D expenditure.

The impact on turnover growth was larger for high R&D intensity firms compared to low R&D firms (Figure 5.3). These results are based on two different methods of econometrics — Ordinary Least Squares and Fixed Effects (see Methodology 4.1). Results based on these methods show that the impact of R&D on turnover growth for high R&D intensity firms is between 5.9 to 7.3 times higher than for low R&D intensity firms.

**Figure 5.2: Distribution of R&D intensity of all firms, 2001–02 to 2012–13**

<table>
<thead>
<tr>
<th>Percentile</th>
<th>R&amp;D intensity (per cent)</th>
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<tr>
<td>0</td>
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<td>80</td>
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<td>90</td>
<td>100</td>
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Notes: Firms in the BERD data within BLADE. See Methodology Box 2.1

**Figure 5.3: Impact on turnover growth of high and low R&D intensity, analysis by fixed effects and ordinary least squares, 2001–02 to 2012–13**

<table>
<thead>
<tr>
<th>Impact on turnover growth (percentage points)</th>
<th>High R&amp;D</th>
<th>Low R&amp;D</th>
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<tbody>
<tr>
<td>Fixed Effects (FE)</td>
<td>***</td>
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<tr>
<td>Ordinary Least Squares (OLS)</td>
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</tr>
</tbody>
</table>

Notes: High R&D intensity firms are those that have R&D intensity above the median value (which is 7.9). Conversely, low R&D firms are those with intensity lower than the median value.

*** means that the values are greater than zero at the 1 per cent significance level.
5.4 R&D activity and its impact on firm growth

Overall, R&D activity appears to have an important impact on firm performance. Analysis of four indicators of growth (turnover, employment, labour productivity and wages) for a cohort of 2008–09 firms after one, three and five years revealed noticeable differences between R&D-active firms (defined here as those registered for the R&D Tax Concession) compared to all firms.\(^{(ad)}\)

R&D-active firms had substantially increased growth in turnover and wages compared to all firms (Figure 5.4). Growth in the turnover, labour productivity and wages of R&D firms was more pronounced over time, demonstrating the relatively long-term impact of R&D. Employment growth for R&D firms had a larger decrease after five years compared to all firms.

In Manufacturing, compared to all firms, R&D-active firms in the 2008–09 cohort:

- had higher labour productivity growth after five years, with only marginal differences in turnover and wages growth (Figure 5.5)
- had a larger decline in employment growth after the first year, but after three and five years this difference reduced.

In Professional, Scientific and Technical Services (PSTS), despite an initial negative turnover growth after one year, R&D firms in the 2008–09 cohort:

- had higher turnover after three and five years compared to all firms (Figure 5.6)
- had a larger decline in employment growth after three and five years compared to all firms, despite similar trends in wages growth.

\(^{(ad)}\) The benchmarks shown in Figures 5.3, 5.4 and 5.5 were created for comparative purposes, but they are not perfect counterfactuals.
Figure 5.4: Firm performance growth of R&D-active firms and all firms benchmark, 2008–09 cohort


Figure 5.5: Firm performance growth of Manufacturing R&D-active firms and all Manufacturing firms benchmark, 2008–09 cohort

During the upsurge in BERD in the previous decade, growth by R&D HGFs in the first half of the 2000s occurred at roughly the same pace as total R&D growth across the economy. As business R&D expenditure took off, the absolute number of R&D HGFs grew rapidly and the share of R&D HGFs in total R&D firms increased to a peak of 38.4 per cent in 2005–06. This declined markedly during the GFC, but recovered by 2010–11 to 29.7 per cent. By 2014–15, however, the share of R&D HGFs in total R&D had declined again to 15.1 per cent.\(^{(ae)}\)

5.5 Trends in R&D high-growth firms

In the last decade, the business sector has become a more substantial contributor to Australia’s national R&D effort (Methodology 5.1). BERD tripled between 2000–01 ($5 billion in current prices) and 2007–08 ($15 billion), with the ratio of BERD to GDP increasing from 0.7 per cent to 1.3 per cent. However, after peaking in 2008–09 at 1.4 per cent, the BERD to GDP ratio has since fallen sharply to 1 per cent ($16.7 billion) in 2015–16.\(^{15}\)

Figure 5.6: Firm performance growth of PSTS R&D-active firms and all PSTS firms benchmark, 2008–09 cohort

Notes: Median values are used.

Manufacturing leads R&D HGFs, but sectoral composition is changing

In recent years, there has been a clear compositional shift of R&D HGFs, moving from Manufacturing towards Professional, Scientific and Technical Services (PSTS), and Information Media and Telecommunications (IMT). These three industries accounted for 75 per cent of all R&D HGFs in 2015. However, the share of Manufacturing R&D HGFs declined from 56 per cent in 2004–05 to 35 per cent in 2014–15. On the other hand, PSTS and IMT have grown to each account for around 20 per cent of R&D HGFs in 2014–15 (Figure 5.7).

Figure 5.7: R&D HGF proportions in top four industries, 2005, 2010 and 2015


Share of R&D HGF expenditure decreasing

The level of R&D expenditure by R&D HGFs grew strongly during the first half of the 2000s. R&D expenditure by R&D HGFs grew from $2.1 billion in 2003–04 to $4.1 billion in 2006–07 before the GFC set growth back, with pre-crisis levels of expenditure reached again in 2009–10. However, more recently, R&D HGFs have been a much less significant contributor to Australian industry’s total R&D. In 2014–15, R&D HGFs comprised 15 per cent overall of total industry R&D, down from 33 per cent in 2004–05.

While R&D expenditure in Manufacturing continued to grow during the last decade, the share of expenditure by Manufacturing R&D HGFs has fallen. Manufacturing’s R&D expenditure grew from $1 billion in 2003–04 to $5.3 billion in 2014–15. However expenditure by Manufacturing R&D HGFs dropped from 30 per cent in 2003–04 to 11 per cent in 2014–15.

R&D expenditure by Mining R&D HGFs doubled between 2005 and 2010, making it the leading industry for R&D expenditure ($1.6 billion). However, R&D HGFs in Mining’s total R&D spending fell to $418 million by 2015, contributing just 15 per cent of Mining’s total R&D expenditure (Figure 5.8).

There has been a clear structural shift in the industry composition of R&D HGFs’ expenditure. With the passing of the mining investment boom, Manufacturing has returned to its former position as the highest R&D spending industry, and is the leading HGF industry.

In 2003–04, Manufacturing contributed 48 per cent of R&D HGFs’ expenditure; but by 2014–15 this dropped to 25 per cent. Mining’s contribution increased from 24 per cent in 2004–05 to 32 per cent in 2009–10, but by 2014–15 it made up just 16 per cent of R&D HGFs.

Increased contributions have come from Professional, Scientific and Technical Services (PSTS, 14 per cent in 2014–15), Information, Media and Telecommunications (IMT, 14 per cent) and Financial and Insurance Services (FIS, 12 per cent). These changes show the Australian economy is diversifying and shifting towards industries using human capital more intensively.

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Figure 5.8: Real R&D expenditure by R&D HGFs in top five industries, 2005, 2010 and 2015

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R&D is in real 2010 values (deflated by the ABS’s Production Price Index).

Most R&D HGFs were older

The majority of R&D high-growth firms are aged five years or more and the share of older firms over five years old, at 93 per cent in 2014–15, is the same as in 2004–05. This contrasts with the findings for HGFs by turnover which found that firm age negatively impacts on growth, with Turnover HGFs on average two years younger than non-HGFs (see Section 2.3).

The overrepresentation of older firms among R&D HGFs may in part reflect that R&D relies on cumulative learning and the building up of knowledge and capabilities in the firm. The definition of HGFs as firms that have experienced three consecutive years of growth precludes very young firms. Young firms may initially face borrowing constraints which would limit their ability to spend on R&D.

Most R&D HGFs were SMEs

Most R&D HGFs were SMEs rather than large firms. The proportion of R&D HGFs that were SMEs steadily increased, from 69 per cent in 2005 to 85 per cent in 2015. This was commensurate with the ratio of SMEs in firms registered under the R&D Tax Incentive programme (Figure 5.9).

The growth in R&D HGFs that are SMEs is likely attributable in part to changes in policy. In 2011 the R&D Tax Incentive was introduced, replacing the previous R&D Tax Concession and providing increased incentives for SMEs to perform R&D. SMEs now receive an after-tax benefit of at least 13.5 cents in the dollar (and some as high as 43.5 cents in the dollar) for eligible R&D investments, compared to 7.5 cents in the dollar under the R&D Tax Concession.
5.6 Global R&D trends

In the 1990s, R&D was considered one of the less mobile economic activities in the international business supply chain. R&D operations were thought to be too integral to the firm’s performance to be separated from a company’s headquarters. But more recent analysis shows that multinational corporations are now relocating R&D activities to fast-growing, emerging economies such as China and India.

Globally, R&D is dominated by a small cadre of firms, especially multinational companies. In 2012 the top 2,000 companies accounted for around 90 per cent of the total business R&D expenditure of OECD countries plus Argentina, China, Romania, the Russian Federation, Singapore, South Africa, and Taiwan.

The phenomenon of R&D growth at the firm level is also highly concentrated. Analysis of the top 2,500 R&D performing firms collected by the European Commission shows the United States and China dominate R&D HGFs by number (Figure 5.10). Sixty-seven per cent of all R&D HGFs are concentrated in these two countries (41 per cent in the US and 26 per cent in China).

By industry, R&D HGFs were predominantly found in:
- Pharmaceuticals/Biotechnology (27 per cent)
- Software/Computer Services (19 per cent)
- Technology Hardware (10 per cent)
- Electronics (7 per cent).

Most of the R&D high-growth firms shown in the EU dataset have significant expenditures in R&D, with an average of $412 million (and a median of $90 million).

Medium-sized, newly industrialised economies like Taiwan and South Korea show a number of domestic firms leading their R&D growth. In contrast to the US, most of the R&D HGFs in these countries are in technology, especially electronics. China’s R&D spending pattern is more diversified, including companies in Chemicals, Automobiles and Construction. It appears these countries are not relying on multinational corporations to invest in R&D; domestic firms see R&D as a critical factor for competitiveness and are investing themselves.

Note: Number of firms recording 20 per cent or higher annual growth in R&D for three consecutive years to 2015.

Feature Article: Australia’s venture capital and private equity market

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Over the last few years, the Australian innovation landscape has changed dramatically — start-ups, incubators, and accelerators have emerged across the country. Savvy investors are increasingly seeing the commercial value of new technologies buoyed by the success of local companies like Atlassian, Canva and Hatchtech. At the same time, innovation has been widely recognised as central to Australia’s future prosperity.

While much of the focus has been on the burgeoning start-up sector, a vital part of the national economy has remained somewhat misunderstood: the role of high-growth companies in driving an enduring value-creating economic transition.

Graduating from a start-up

These companies are neither two-person operations with bright-eyed founders hoping to gain a slice of a market, nor big businesses looking to pivot and adapt in the face of technology-driven disruption.

Rather, these companies — ‘scale-ups’ — are businesses that have graduated from the initial start-up phase with a proven product and market opportunity and now need further funding and expertise to hire staff, drive sales and invest in R&D.

Typically, these scale-ups require a capital injection of $5 million to $20 million to finance their critical expansion stage and realise their potential.

As Australia transitions away from its traditional reliance on natural resources, the success of these high-growth companies will be critical to the nation’s success. Currently, seven out of Australia’s top ten goods and services exports come from minerals, energy or agriculture.19 This must broaden if Australia is to succeed in the 21st century.

Investing in high growth

The majority of private equity (PE) and venture capital (VC) investment is directed towards small and medium-sized enterprises (SMEs) and high-growth companies, which often struggle to attract financing from traditional lenders, and may lack the experience or networks to accelerate their expansion and capitalise on opportunities in domestic and global markets.

Over the financial years (FY) 2013 to 2016, the average PE investment in a company was $41.5 million, concentrated in small and mid-market companies, while the average VC investment ($3.4 million) was focussed on early stage companies.20 PE and VC funds regularly meet critical funding and experience gaps, providing crucial support at varying stages of a company’s life cycle.

Industry data shows that start-ups and SMEs are currently witnessing a wave of investment across all industries, with venture capital “dry powder” at an all-time high.

PE fundraising in FY2016 was $2.55 billion, down slightly from the previous year. However the total was higher than the combined PE fundraising recorded in FY2014 and FY2015. This capital is currently being deployed into mainly Australian businesses, and will continue to be over the coming years.21

The benefits of such investment for Australia are clear. Deloitte Access Economics analysis shows the average workforce for a PE-backed company grew from 378 to 1,636 FTE jobs over a five-year period, representing an annual compound growth rate of 27.6 per cent.22 These results are the dividend of the innovation and transformational change brought about through PE investment.
While PE has steadily increased its footprint in Australia since its emergence around 25 years ago, over recent times the VC sector has also come of age, with AVCAL’s June 2017 report, The Venture Capital Effect, highlighting progress. For example, in FY2016, $568 million was raised by VCs, more than tripling the amount raised in 2013. This momentum has been carried into FY2017, with conservative estimates suggesting that more than $1 billion has been raised.23

This boost in fundraising has partly been driven by improved VC returns in recent years, along with renewed investor appetite from large Australian superannuation funds for exposure to cutting-edge technology.

While this resurgence is welcome, there remains great potential to grow the VC sector much further, with Australia’s market remaining less than half the size of the OECD+ average.24

Of course, critical to the ongoing growth of the sector, and the broader economy, will be the scaling-up of promising Australian companies into world leaders.

The success of SafetyCulture

An example of what Australian businesses can achieve is VC-backed technology company, SafetyCulture. Aimed at tackling workplace safety, the iAuditor app has had over one million downloads and is the most used checklist inspection app in the world. Launched just five years ago, crucial to the rapid growth of the company was an investment of capital and expertise from Blackbird Ventures which helped the firm to bring on a team and open an office in Townsville in just eight weeks. Today, Blackbird, and other investors, including VCs from Silicon Valley, have helped Safety Culture to open new offices in San Francisco, Kansas City, and Manchester, employing over 120 people.25

Hatchtech matches innovation and commercialisation

Hatchtech, an Australian pharmaceutical company, developed an innovative product tackling the age-old scourge of head lice. Stemming from University of Melbourne research, and backed by local VC firms (Uniseed, GBS Ventures, One Ventures and Blue Sky Ventures), Hatchtech developed an innovative treatment which tackled the dual problems of both head lice and their eggs, providing the company with a competitive differentiator in the market. Actively developed over ten years, Hatchtech signed an A$279m commercialisation agreement with Dr Reddy’s Laboratories in September 2015.26

Potentially significant for the health of children worldwide, Hatchtech demonstrates the opportunity for the university and VC sectors to partner on the commercialisation of world-leading research.

Vaxxas transforms vaccine delivery

Similarly, Vaxxas — arising from University of Queensland research — has developed a unique Nanopatch vaccine delivery solution which promises to transform the way in which medicine is administered worldwide. Recognised in 2015 as one of just 24 World Economic Forum Technology Pioneers, Vaxxas has benefited from investment and advice from investors including OneVentures and Brandon Capital, who are helping to guide the company towards a clinically proven, marketable product.27

Supporting scale-ups supports our economy

While Safety Culture, Hatchtech and Vaxxas each showcase the potential of Australian innovators, there remain too many high-growth companies which are missing out on the capital and expertise they need.

Currently, a lack of VC funding opportunities at this vital scale-up stage pushes many abroad, and in some cases, to the brink of existence. Making sure these scale-ups receive support has economy-wide implications, including for Australia’s ability to drive future productivity and employment growth.
Over FY2011 to FY2016, only 25 per cent of Australian VC-backed companies received later/expansion stage funding, down from 29 per cent of companies in FY2007-11. This can be contrasted with Europe and the US where around 45 per cent of all VC deals take place in that stage.

So why does this matter? Because scale-ups lie at the heart of future employment growth, and Australia’s ability to successfully transition to a more competitive economy that can continue to grow its footprint in the global marketplace.

Australian Government research shows that start-ups (aged 0–2 years) were the largest contributor to job creation in Australia representing 90 per cent of net positive job creation over recent years (2004 to 2011), despite the Global Financial Crisis. These companies created more than 1.2 million jobs in that period, contributing $164 billion to the Australian economy.

Australia must learn from its overseas counterparts if we are to compete with, and eventually surpass other comparable developed markets. In November 2015, research from Stanford University and the University of British Columbia highlighted the contribution of VC to the US economy, particularly in funding innovative companies. In 2014, VC-backed companies accounted for 44 per cent of the total R&D spending of US public companies, despite only representing 17 per cent of them by number, and 21 per cent by market capitalisation.

Indeed, three of the five largest US public companies by market capitalisation — Apple, Google, and Microsoft — all received most of their early external financing from VC. The employment dividend of such investment is clear: since 1974, 25 per cent of net job growth for publicly listed US corporations came from VC-backed companies.

If we can ensure that Australian high-growth companies receive the support they need, there is every reason to believe we can achieve similar results and thrive in the new economy.