

Costs and benefits of education and training for the economy, business and individuals

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Australian Government
Department of Education and Training



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About the research

Costs and benefits of education and training for the economy, business and individuals

Tabatha Griffin, National Centre for Vocational Education Research

Understanding the costs and benefits of vocational education and training (VET) provides a basis for making decisions about investing in training. Having this understanding is important for many stakeholders in the VET system including individuals, businesses and government. This review paper aims to summarise the recent research investigating the costs and benefits of VET, considering the topic from each of the three perspectives.

This review paints a complicated picture; there are numerous ways to measure the costs and benefits of training, resulting in varied estimates of the return on investment. However, some overarching conclusions can be made at each of these levels based on recurrent findings in the research.

Key messages

- At the economic level, research on the return on investment in VET falls into two broad categories:
 - determining the return on the investment for spending that has occurred
 - investigating the potential return should spending/funding be altered.

Both of these approaches have demonstrated the value of VET to the economy through increases in employability and, to a lesser degree, increases in productivity. Education and training have also been shown to bring other, non-financial, benefits to society such as improved health and reduced national crime and drug use.

- For individual businesses, analyses of the return on investment in training result in highly variable estimates. This may be because the methods used appear to be more suited to industries where increases in productivity are easier to define and measure (such as in manufacturing, where some very high returns were reported, compared with service-based industries). It is particularly difficult to untangle the financial and non-financial benefits of training to business, as many improvements, such as reduced staff turnover, absenteeism, and positive changes to workplace culture, may also result in economic pay-offs for the business.
- For the individual student, higher-level VET qualifications, such as advanced diplomas and diplomas, are consistently demonstrated to provide a good return on investment. We can also be reasonably confident that students will experience a return on their investment at the certificate III and IV levels, as demonstrated in a majority of the studies reviewed. The individual returns from VET are mostly generated through increased participation in the workforce. Lower-level qualifications (certificates I and II) consistently resulted in low financial returns, although these qualifications may result in other benefits, such as further study or improved self-esteem and wellbeing.

This review has identified the complexities associated with assessing the costs and benefits accruing from investment in VET. This paper consequently concludes with some practical guidelines on how to plan (or interpret) an analysis of the costs and benefits of training. Readers may also be interested in the support document to this piece of work. Prepared as part of a broader program of work being undertaken cooperatively with UNESCO, the support document outlines an evaluative framework focused on the methods and processes of measuring the return on investment in training. Also of potential interest is the report *Data on total investment in VET: what needs to be collected* by Gerald Burke released by NCVET.

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Executive summary

The aim of this paper is to summarise and provide analyses of the considerable body of research that investigates the costs and benefits of vocational education and training (VET). It does so from three different perspectives:

- the government (at the economy level)
- business (or industry at a broader level)
- the individual (or groups of individuals).

This paper considers a broad array of costs and benefits accruing to each of these perspectives, broadly dividing them into two categories: financial (market) or non-financial (non-market). It also describes some of the challenges encountered in investigating the costs and benefits and estimating the return on the investment in VET.

Understanding the costs and benefits associated with VET enables decisions about investing in education and training. For government, analyses of the return on investment provide feedback on the performance of the system and programs and enable justification of, or changes to, existing funding levels. For business enterprises, understanding the costs and benefits of training allows for informed decisions about how to best utilise their training expenditure. Understanding the costs and benefits of training helps individuals make informed decisions about studying.

This paper will be of use to those who are looking to gain an overall understanding of the current state of research in this area, but also to those who wish to better understand the complexities of measuring and analysing the costs and benefits of VET.

Findings

This review of the literature shows that there is no single or definitive answer. There is no magic formula explaining the return on investment for the economy, business or the individual. Nor is it possible to generalise non-financial benefits to all situations. The many different factors involved, and how they influence the findings of analyses conducted, limit our ability to generalise the outcomes. However, with these caveats in mind, we can make the following broad conclusions.

Government/economy

Most of the Australian research investigating the return on investment in VET can be categorised according to the two main aims of the research: determining the return on investment for spending that has occurred; or predicting the potential changes to returns should funding levels be altered through policy and funding reforms. While there is only a small body of recent work tackling these questions, these do provide some evidence suggesting that VET does deliver a substantial return on investment. This is attributed to VET generating an increase in employability (and, to some degree, increasing the productivity of workers). It should be noted, though, that it is difficult to distinguish the returns due to government investment from those made by business or individuals.

In addition to the financial benefits seen in the economy, an international body of research has demonstrated that education (in general) brings a number of other benefits to society, such as improved health, increased democratisation and human rights, improved environment, and reduced national crime and drug use. Vocational education, in particular, has long been used to improve social

equity, as is reflected in Australian research, much of which has focused on the benefits of VET for disadvantaged groups.

Business/industry

Analyses based on individual businesses or industries appear to be highly context-specific, resulting in extremely variable estimates of the return on investment. The methodologies used to measure increases in productivity seem to be more effective in some industries than in others, leading to uncertainty about the reliability of findings. Some examples of very high returns on investment were uncovered in the literature, especially in businesses focused on manufacturing where training is often highly specific.

It is not easy to untangle the financial (market) and non-financial (non-market) benefits of training at the business level, as improvements in measures such as staff turnover, absenteeism and even positive changes in workplace culture can all have economic pay-offs for the organisation. Nonetheless, the research has likened businesses to small societies or communities in which the social benefits from VET are experienced.

Individuals

There is a substantial body of Australian research examining the return from VET to individuals, more so than for the economy as a whole or at the business level. This review highlights that the different data and methodologies used in these studies have led to much variability in the findings, making it problematic to be confident about any of the specific returns on investment reported. The returns experienced by individuals are influenced by a number of personal characteristics and contextual factors, also adding to the difficulty of generalising. However, we can make some broad conclusions.

Higher-level VET qualifications, such as advanced diplomas and diplomas, are consistently shown to provide individuals with a good return on their investment. This is likely to be due to a combination of an increase in participation (employment) and productivity (higher wages), an important distinction as productivity increases are not always seen with lower-level qualifications.

As demonstrated in a majority of the studies reviewed, we can be reasonably confident that students will experience a return on investment at the certificate III and IV levels. The research also showed that the financial returns at all levels are higher for students studying part-time compared with full-time, due to the lower opportunity costs associated with part-time study.

Lower-level qualifications (certificates I and II) consistently resulted in low financial returns, but the research suggests that these qualifications may result in other, non-financial, benefits to students, such as leading to further study or improved self-esteem, self-confidence and wellbeing. These non-financial benefits are not exclusive to lower-level qualifications though, and can be experienced by VET students at all levels.

The challenges in measuring and analysing costs and benefits

This review highlights the difficulties in measuring and analysing the costs and benefits of education and training at each of the levels investigated in this study. While analyses at each of these levels have their own challenges, there are some difficulties that span all three. One very fundamental challenge is how to define what is meant by 'training'. Most studies consider qualification level as a measure of training, but many scenarios would benefit from a consideration of training more broadly, including informal and/or non-accredited training. Another common challenge is how to take the less

tangible costs and/or benefits into account. These are not straightforward to measure or quantify but, as the research has demonstrated, they can be important in determining the financial return on investment, or they may be resultant benefits in their own right. Other challenges include determining the variables and methodologies to use, and how to interpret the subsequent findings.

Based on the problematic issues observed, this paper concludes with some practical suggestions on how to plan an analysis of the costs and benefits of training. These suggestions are also relevant when attempting to interpret or transfer findings from an existing analysis to a different context. The considerations to be taken into account include:

- defining the purpose of the analysis and the perspective that will be taken (is the analysis looking at individuals, groups of individuals, business, an industry, the economy, or several countries?)
- deciding the elements or variables to be included and the methodology to be used. This will include investigating whether the data are available or if elements of interest are measurable
- thinking about how the findings will be interpreted. This will be based on the limitations and context of the analysis and any assumptions made.

Introduction

An understanding of the costs and benefits of vocational education and training allows for some consideration of whether the costs of participating in, or providing, education and training are worthwhile relative to the benefits they bring. This is useful on a number of different levels. For government, ongoing feedback on the performance of the system is important in justifying existing levels of public expenditure – or if changes are contemplated. For business enterprises, understanding the costs and benefits of training helps them to make decisions about how to use their training expenditure most effectively, while individuals are assisted to make an informed choice about participating. This paper summarises and aims to make sense of the recent research that investigates the costs and benefits of training in Australia at these three levels: the economy, business and the individual. It also explores the challenges faced when conducting these types of analyses.

While there is a reasonably large body of work investigating the different kinds of costs and benefits of education and training in Australia for each of these groups, there are few comprehensive reviews that collate the somewhat disparate information. One recent Australian publication (Australian Workplace and Productivity Agency 2013) explored the impact of education and training on the productivity of individuals, firms and the economy, but a consideration of the costs or other potential benefits was out of scope and therefore not covered in any detail. For a broader consideration, the international literature provides some useful examples. A paper by Hoeckel (2008), published as part of the Organisation for Economic Co-operation and Development's (OECD) policy review on VET, aimed to identify the different costs and benefits involved in the provision of initial VET and the difficulties involved in assessing and comparing them across OECD countries, including Australia. The paper discusses the costs and benefits from the perspectives of the government, employers and the individual, and also outlines the methodological limitations in measuring some elements and making comparisons, especially across different countries.

Another useful overview published by the European Centre for the Development of Vocational Training (Cedefop 2013) brings together information on the benefits of VET for individuals, organisations and society as a whole, and covers a number of countries in Europe. While this report does not consider the costs of education and training (and hence covers only one side of the cost–benefit equation), it provides a discussion on the benefits for individuals, business and the economy. Following the categorisation used by McMahon (2004), the report describes benefits as either market or non-market, both of which can be either private or external. Private market benefits are those delivered through the labour market to individuals and include higher wages and better employment opportunities. Private non-market benefits are not provided through the labour market and include non-monetary benefits such as increased self-confidence and longer lives. External benefits are mostly the indirect effects of education and training. For example, financial benefits may accrue to a business investing in education and training for their employees, but may also lead to gross domestic product (GDP) growth nationally (this would be an external market benefit). External non-market benefits may include improved public good (reduced crime and improved civic behaviour) and non-monetary benefits to individuals. This report will adopt a similar framework, particularly in the consideration of both the market and non-market costs and benefits.

Despite growing literature on the costs and benefits of VET, some aspects have certainly received more attention than others. This is not surprising, given that some elements are more difficult to

measure than others. For example, there has been a considerable amount of research that investigates the private financial returns from VET – the findings of which are summarised in this report. Readers will see that researchers have drawn on numerous datasets and different methodologies to examine what (if any) financial gains are made by students who undertake VET. These analyses often compare different VET qualifications and, in some cases, compare VET with higher education qualifications. On the other hand, much less information is available on the less-tangible non-monetary returns to individuals. Likewise, relatively little research has explored the non-financial benefits realised for employers who have invested in education and training for their employees. These benefits can be difficult to quantify and separate from other variables that affect performance and productivity (Hoeckel 2008).

Readers should note that the three levels considered in this paper – the individual, business, and the economy – are not necessarily independent of each other. Benefits seen at one level can flow through to other levels, especially if generated on a large scale. Improved productivity at an individual level, for example, can potentially increase productivity at the firm level and, by extension, in the wider economy. However, this is not always the case and some benefits for individuals may not apply at a population or societal level (Cedefop 2013). Hence, research addressing the costs and benefits of VET to the economy, business and the individual is presented separately for each of these three levels in this paper.



Analysis of the costs and benefits

Costs and benefits to the economy

Education, at all levels, is an important policy area with a large public expenditure. At the broad economic scale, for education and training to be a worthwhile investment for government, any increases in employment and productivity and any positive influence this has on gross domestic product and net social benefit would need to offset any government spending.

The challenge of measuring the return on public expenditure

Obtaining an accurate picture of how government investment in VET contributes to economic growth is challenging for a number of reasons. Firstly, while the public funding of VET is captured through the National Centre for Vocational Education Research's (NCVER) VET Finance Collection, the investment in VET is not borne by government alone. In addition to government funding, VET costs are also paid by students and business, and these contributions are not easily captured. These various sources of funding were recently explored by Burke (2016). In his report, Burke provides a three-way classification for financial data based on: providers (to whom spending is made – registered training organisations [RTOs] or other); services (core education and training services, versus 'not core'); and sources of funding (governments, enterprises, households and rest of the world). The feasibility and potential means for collecting data on the various forms of investment are also considered.

It has been suggested that the private investment in skills development (much of which may be non-formal and non-accredited, as further elaborated below) may be at least as large as the expenditure on formal VET by government (Noonan et al. 2010), making it difficult to attribute any benefits seen in the economy to the investment made by government alone. Public expenditure on VET can also occur indirectly through other government incentives, which are more difficult to incorporate into any estimation of return on investment. These indirect investments may occur through schemes such as payroll tax rebates, workforce development programs, completion bonuses for employers of apprentices and other (often finite) policy initiatives (Noonan et al. 2010). Despite these difficulties in understanding the overall public expenditure and attributing any economic benefit of VET solely to government investment, it is still valuable to measure the broad economic benefits in order to gauge the effectiveness of the VET system.

The second challenge in measuring the return on public expenditure is that participation in formal training and/or the completion of a qualification – the main focus of public spending – only partly contributes to the influence of VET on the economy. People develop skills through many different mechanisms, such as formal education and training, structured but non-accredited training, and through informal and incidental learning in the workplace (Noonan et al. 2010). Skills per se are challenging to measure, and most analyses are therefore based on the participation and completion of formal training, ignoring skills that are not formally certified (Cedefop 2013). This may lead to an overestimation of the benefit that formally accredited training (on which government spending is focused) brings to the economy as skills developed via other forms of training are not excluded. The challenge of accounting for all training, or even measuring some forms, is difficult to overcome. At the very least, determining how it is defined is helpful in ensuring a fair comparison.

The return on investment to the economy

Despite these challenges, there is a strong interest in estimating the return on investment to the economy and there have been some attempts to do so, especially in terms of measuring the impact of policy reform or determining whether further investment in the sector might be warranted (table 1, also see appendix A). For example, in 2012 the Australian Productivity Commission reported on an analysis of the economic impacts and potential benefits of the Council of Australian Governments' (COAG) VET reform agenda. This analysis estimated that attainment of the 2020 qualification targets would increase the GDP by two per cent compared with the baseline level used in the model. Being a forecast, an investigation into the current return on investment by the government was not part of the research.

While the types of analyses that explore the effect of changes to funding are not the focus of this paper, some published research in this area includes baseline estimations that are relevant. A recent example is the report prepared for TAFE Directors Australia (TDA) assessing the potential benefits an increase in VET funding would bring to the economy (Independent Economics 2013). The authors highlight that this particular estimation includes a number of elements not commonly considered in analyses of this type, arguing that this results in a more accurate estimate. Their analysis included module completers (not merely students attaining full qualifications) and modelling the benefits of study at the same or lower level than previously held qualifications (where other research has only considered study at higher levels). The resulting analysis estimated that the return on investment for costs invested by governments, students or businesses is 18% for the Australian economy. This is a substantial rate of return, noting that it is the return on total investment, not merely that by government.

Table 1 Two Australian studies investigating the return on investment of training to the economy

Study	Methodology used	Findings
Independent Economics 2013	Cost-benefit analysis to estimate the return of increased funding in VET	The committed 5.6% increase in funding was predicted to result in an 18% internal rate of return to the economy.
Universities Australia and KPMG Econtech 2010	A system of five models to capture economic costs and benefits (see appendix A for details of the five models)	The internal rate of return for universities and the tertiary sector as a whole (university and VET) was 14% and 15% respectively.

Caution is required when comparing estimates based on different data and methodologies. However, it is interesting to note that this return on investment is higher than the estimated rate of return for the university sector (14%) and the tertiary sector as a whole, including VET (15%), as reported by Universities Australia and KPMG Econtech (2010). The latter study did not investigate the returns from VET alone so a comparison for that sector is not possible.

Mechanisms by which education and training influences the economy

There are two main ways by which education and training can influence the economy – through improvements in employability and through increased productivity (Independent Economics 2013). While definitions can vary slightly between studies, employability tends to refer to levels of participation in the workforce, such as employment versus unemployment and full-time versus part-time employment. Increased productivity is demonstrated through more highly skilled occupations and the higher wages associated with those. The studies discussed above found that the benefits to the economy were largely through increased employability; however, large increases in productivity (and subsequently, earnings) also played a role for university qualifications (Independent Economics 2013;

Universities Australia and KPMG Econtech 2010). This finding, that the employability benefits from VET are larger than the productivity benefits, is consistent with other studies (for example, see Leigh 2008).

In terms of employability, it is not surprising that upskilling – where people study at a higher level than their previous qualification – can result in greater employability. Interestingly, Independent Economics (2013) also found this to be the case for reskillers – those who study at the same or a lower level. This finding is important as it suggests there is value in the government supporting the provision of training for people who may need to move into different areas of work, either for personal reasons or due to structural adjustment in the workforce.

Most studies investigating the impact of education and training on employability and productivity focus on the completion of qualifications (or modules) via formal training, thereby ignoring skills that are not formally certified. This is because of the aforementioned difficulty of measuring skills. To overcome this in a study looking at the relationship between skill types and productivity levels in seven European countries, Cedefop (2013) uses a skills measure that takes into account certified and uncertified skills. Productivity growth was shown to occur due to the build-up of skills, especially high- and intermediate-level skills. The authors make an interesting point: that to achieve higher productivity, countries require both high- and intermediate-level skills – one skill level is not more effective than the other. Furthermore, the research shows that the economic returns on different skill mixes and types of skill acquisition vary between sectors and countries. These differences may be driven by different combinations of sector specialisation and skill use.

Following this line of thought, the influence that education and training might have on the economy is likely to depend on what sectors play a significant role and how responsive those sectors are to skill development. Independent Economics (2013), in their forward-looking analysis, modelled the effect of increased VET funding on the composition of the workforce, exploring which occupations showed growth or declined. Technicians and trades workers, for example, showed a 0.3% increase under an increased funding scenario, while the employment of Labourers is 0.2% lower. The authors conclude that increased VET funding results in a more skilled workforce due to an expansion of the industries that are relatively dependent on VET skills. In Australia these industries include manufacturing, automotive repair and personal services (such as hairdressing).

The above describes the direct influences of education and training on the economy. Education can also benefit the economy and society through ‘spillover’ effects. A recent estimate showed that for every 1000 university graduates, 120 new jobs are created for people without a university degree (Cadence Economics 2016). This influence was also demonstrated through wages, where the wages of workers without a university degree rose due to new university graduates entering the workforce. This analysis was limited to the spillover effects of university graduates and did not consider VET graduates, but it is possible that VET graduates could have a similar effect in the economy, at least to some degree.

Non-market benefits to society

Most research investigating the utility of VET has been through an economic lens; that is, determining the market value of earning a qualification or estimating the financial return associated with undertaking further education and training. It has been recognised, however, that education (including VET) can result in non-market benefits. Compared with research on the economic implications of VET, research on the non-market benefits is relatively scarce, especially in Australia.

Looking to the international literature, we can find examples of research that have investigated the non-market benefits of education at the country or society level. As summarised by Cedefop (2013), the main benefits that have been explored in Europe include improved health, democratisation and human rights, improved environments and reduced national crime and drug use. VET specifically has not received as much attention as education more generally, although Cedefop (2011a) explores two mechanisms by which VET might produce macro-social benefits: by increasing the overall level of human capital; and through a positive influence on education equality. Although limitations in the data make it difficult to be conclusive, the effect of VET on various measures of human capital tended to be insignificant and was not different from that of general education. However, VET was found to bring macro-social benefits by improving social equity.

This role of VET (or education more broadly) in social equity is supported by the Australian study undertaken by Buddelmeyer, Leung and Scutella (2012), which investigated the relationship between education and social exclusion. Through the use of a multi-dimensional measure of social exclusion, education was found to be a powerful marker of social exclusion. Similar to Cedefop (2011a), Buddelmeyer, Leung and Scutella (2012) found that improving basic educational levels (which can be through VET) is a useful way of reducing social exclusion, albeit in this case at the individual level.

Other Australian research concentrates on various disadvantaged groups, such as Indigenous Australians and people with disability. Non-market benefits can be particularly important and valuable for these groups of people, who are often susceptible to social exclusion. Deloitte Access Economics (2011), in work produced for the National VET Equity Advisory Council, provides an overview of the key social benefits that education (in general) can bring to society (some of which are mentioned above). These are:

- increased social cohesion, inclusion and tolerance
- reduced crime rates
- strengthened social capital
- increased quality of civic life (active citizenship, civic and political participation)
- increased charitable giving and participation in community service
- technological change (that is, improved ability to adapt to and use technology) (Deloitte Access Economics 2011, p.42).

Overall, it is likely that VET does result in non-market benefits for communities and the country, but the issues encountered in measuring, quantifying and sometimes even defining these less tangible outcomes means there is little direct evidence to support this. It is therefore very difficult to incorporate non-market benefits into any all-encompassing cost–benefit analysis.

Costs and benefits to business and industry

There is a scale of interest considered in this section: from individual employers, with businesses that vary in size, up to the industry level. The process of measuring costs and benefits and the challenges faced in this are likely to vary along this scale.

How employers approach thinking about, and measuring, the costs and benefits of training is variable and likely to depend on various characteristics such as the size of the enterprise. In addition to considering the costs and benefits of providing training to employees, firms may also contemplate the issue from a different perspective – the costs of *not* having adequately skilled employees.

Data from the 2015 Employers' Use and Views of the VET System demonstrate this point (NCVER 2015a). Of the employers surveyed, 33.8% reported having employees who were not fully proficient at their job and this can have a number of negative effects on the organisation (as listed in table 2). The most commonly reported effects are increased workloads for other staff (83.0%) and increased operating costs (58.7%). It is also interesting to note that some effects potentially impact on the ability of firms to innovate and remain competitive; for example, delays in developing new products or services (30.8%), difficulties in introducing technological change (38.4%), and loss of business or orders to competitors (30.9%). The shortage of adequate skills that prevents businesses from fully thriving can also have flow-on effects to national growth (Guison-Dowdy 2012).

Table 2 Effect on the organisation if employees are not fully proficient at their job in 2015 (% of employers with employees not fully proficient at their job and where this is impacting on how the organisation performs)

	%
Delays in developing new products or services	30.8
Difficulties in introducing technological change	38.4
Difficulties in meeting customer service objectives	48.9
Difficulty in introducing new working practices	41.9
Difficulty in meeting quality standards	49.8
Increased operating costs	58.7
Increased workload for other staff	83.0
Loss of business or orders to competitors	30.9
Need to outsource work	19.7
Not able to take on as much business as you would like	37.7
Withdrawal of certain products or services altogether	11.0

Source NCVER (2015a).

Does this suggest that the opposite is true – that having fully competent staff can have a positive effect on productivity at the firm level, as well as on the culture of the workplace? And do businesses measure this? Many employers may not be interested in conducting a detailed analysis of the return on investment in training, particularly if they see little value in training in the first place (Billett 1998). Even if there is some interest in a cost–benefit analysis, many businesses, especially small-to-medium enterprises, may not have the time, expertise or the resources to undertake a sophisticated assessment, particularly given the challenges described below.

The challenge of measuring costs and benefits of training for businesses

Accessing or collecting relevant and accurate data in order to assess the costs and benefits of training at the business level can be difficult (Australian Workforce and Productivity Agency 2013). The business investment in training is largely unknown, but is likely to be significant. The Training Expenditure and Practices Survey, last conducted by the Australian Bureau of Statistics (ABS) in 2002, showed that the private investment in skills development is large, probably at least as large as the expenditure by government on formal VET (Noonan et al. 2010). Estimating this cost is challenging however, especially when much training may be non-accredited or informal learning that occurs on the job. Adding to the costs borne by business is the time spent by workers in training which is not always taken into account in such analyses (Richardson 2004).

Measuring the potential pay-off from investing in education and training has its own challenges too. Firm performance can also be influenced by other factors, such as technology change and human resource management. Issues associated with teasing apart these various influences affect capacity to

attribute any improvements to the investment in education and training alone (Australian Workforce and Productivity Agency 2013).

Despite these challenges, it is a reasonable assumption that businesses would be unlikely to invest in workforce development without some assurance their investments will pay off (Australian Workforce and Productivity Agency 2013). Although Billett (1998) reports that training is often treated as an annual budget item or an act of faith, increasingly, business owners are demanding some level of accountability from their training investment and want to understand the pay-off (Bailey 2007). These disparate reports suggest it is likely that the desire and ability to give thorough consideration to the potential return on investment in training varies widely amongst businesses.

It should also be noted that employers provide training for their staff for a number of different reasons. In fact, Smith, Oczkowski and Hill (2009) demonstrate that the process of making decisions about training is complex and influenced by a wide variety of factors such as: meeting legislative or licensing requirements; responding to the demands of new technology; and countering recruitment difficulties. Not all motives for providing training are directly concerned with raising productivity and, as such, probably eventuate through different decision-making processes.

Market benefits of education and training for business

Similar to those for the economy as a whole, the benefits for business can be described as market (those that are financial, such as the effects on productivity) and non-market. Most published studies do not consider both types of benefits, usually focusing on one of these areas. The effect on productivity has captured the most research interest.

The Australian Workforce and Productivity Agency (2013) provides a summary of studies from the literature that investigate the effect of education and training on business productivity. This collection of work shows that there has been very little recent Australian research in this space and there is a need to look internationally, although comparisons can be difficult due to diverse economic contexts. Overall, the studies cited show a wide variance in the impact of training on firm productivity, ranging from zero (no significant association) to a return of 13% (although much higher returns have been reported in other studies; more on this and the possible reasons for these differences are explored below).

Two Australian studies are cited in the above report (summarised in table 3), both of which explored potential methodologies for investigating the return on investment employers might gain through the training of their employees. Blandy et al. (2000) conducted a number of pilot studies, mostly surveys based on larger international examples, to examine the relationship between training and the profitability and productivity of Australian firms, while Maglen, Hopkins and Burke (2001) tested a case study approach in four industries to investigate the management processes and work practices and how these might interact with any correlation between training and firm productivity.

Both of these studies reported positive impacts from the investment in training on business productivity and profitability, although the findings were not universal. Examples of high returns on investment were found, especially in manufacturing enterprises and where training is highly specific, accomplished quickly, and is related to the introduction of new technology or new work processes (Blandy et al. 2000; Maglen, Hopkins & Burke 2001). The results were less clear in the service-based industries investigated. In these cases training had little influence on productivity levels, although it was surmised that the methodologies used to assess the effect on productivity levels may have been less effective in these types of industries.

Another piece of research looking at Australian enterprises was that conducted by Doucouliagos and Sgro (2000; also shown in table 3). This work also aimed to develop a training-evaluation process, using a variety of statistical techniques, which could help enterprises to determine the value of their training investment. Another objective was to quantify the net gains derived from training programs for a number of organisations with varying profiles, including those that are for profit, non-profit, private and government-owned. The analysis found that the financial and other returns from well-designed training programs were substantial, with the return on investment from training ranging from 30% to 7000% (this latter and extremely high estimate was the result of much lower staff turnover, resulting from workshops on recruitment and employment relations). The authors of the study stress that the diversity of the case studies and training programs used means it is not useful to compare the returns for the different organisations. The take-home message, therefore, is that all included organisations enjoyed substantial returns on their investment.

Table 3 Three Australian studies that aimed to investigate methods to assess the relationship between training and productivity

Study	Methodology used	Findings
Blandy et al. 2000	Surveys (based on larger international examples) and a small number of in-depth case studies.	10% increase in training resulted in a 1% increase in productivity growth. Training quantity and quality were positively associated with profitability.
Maglen, Hopkins and Burke 2001	Case studies	Increased productivity due to training was found in the manufacturing enterprises investigated. The footwear manufacturing industry showed a return of \$58 for each dollar invested in training, while the wire manufacturing industry showed a return of \$190 for each dollar invested. The methods used were, in the most part, ineffective in service-based industries.
Doucouliagos and Sgro 2000	Seven case studies and a variety of statistical techniques depending on data availability	The return on investment ranged from 30% to 7000%.

These studies provide some Australian evidence of how the link between training and productivity can be measured at the firm level, while acknowledging that some of the methods used were more effective in some industry types than others. However, these studies are relatively dated and it should be noted that business conditions and the economy have changed since they were conducted, potentially limiting the current applicability.

In the international literature, Cedefop (2013) summarises studies in Europe that explored the market benefits for organisations (a difficult task due to the different ways that organisations and researchers measured training). They found considerable evidence in the literature that organisations investing in adult learning experienced increased productivity and technological innovation. They point out, however, that the impact on profitability is complicated because, while training may increase productivity, wages may also increase, potentially negating any financial benefit seen by the business.

The Australian Workforce and Productivity Agency (2013) also summarises some more recent work from the international literature. Most of the included studies demonstrated the positive effects of training on the productivity of firms. Studies from Canada (Bernier & Cousineau 2010), Italy (Columbo & Stanca 2008), Germany (Zwick 2006) and the UK (Dearden, Reed & Van Reenan 2005) found that a one per cent increase in training was associated with increases in firm productivity ranging from 0.07% to 1.7%. Furthermore, these increases in productivity were larger than the effects on wages, suggesting that both workers and firms shared the productivity gains from training (and that all benefits seen by the firm are not consumed by the increased wages paid to employees).

Again, it is not sensible to compare the productivity pay-offs experienced by different firms, as there are a number of factors that can influence the effect of training. These might include the industry in which the business is operating and the human resource management systems in place. The quality of training is also likely to be variable, possibly also contributing to the varied influence on productivity. This may be especially pronounced when investigating the link between productivity and non-certified learning, as was the focus in the studies cited by the Australian Workforce and Productivity Agency (2013).

Non-market benefits for business

The non-market benefits that business gains through the provision of education and training for employees have received much less attention in the research than market benefits. This is likely because market benefits are more tangible and therefore easier to measure, and business is almost always likely to consider them to be more important than non-market benefits. However, these non-market benefits, while potentially valuable in their own right, can also translate into increased productivity.

Cedefop (2013) likens organisations to small societies or communities that can benefit from the social, non-market effects of VET. Vocational education does not only develop human capital; it also develops identity and social and cultural capital. It not only increases skills; it can change behaviour, which is important because ability is not just what you know; it is knowing how to use it (Cedefop 2013).

Wellbeing from VET has been acknowledged as accruing to individuals and society as a whole, but how it can accrue to organisations and exert a positive influence on their culture and economic performance if they have not received as much attention? The positive effects that VET can have on job satisfaction, for example, can change behaviour at work, strengthening cooperation throughout an organisation's workforce (Cedefop 2011b). These flow-on effects have not been widely investigated.

Other non-market benefits for organisations that invest in VET include: reduced labour turnover, absenteeism, redundancies and voluntary exits; developing employees who can progress into higher-level roles; producing fully trained workers who are steeped in the values of the business; and developing a reputation as an employer of choice (Cedefop 2013). As mentioned above, many of these may translate into market benefits, having economic pay-offs for the organisation.

While recent Australian research in these areas is relatively sparse, Kennett (2013) investigated how different forms of employer-provided training can influence staff turnover. The study found that general training tended to increase employee mobility and issues of 'poaching', while firm-specific training was associated with lower staff turnover. This is not surprising, as general skills are more transferable than highly firm-specific skills. However, the study also found that the relationship between training and staff turnover was more complex than this somewhat broad explanation. When training involved external tertiary education, staff retention was initially higher but there was no longer-term effect. This research also supported earlier studies demonstrating that models of training that used high-performance work practices and encouraged the use of teams, information-sharing, encouraged organisational commitment and increased job satisfaction reduced employee turnover (Kennett 2013).

Summary – where to from here for business?

The studies described above indicated that the degree to which an organisation benefits from training is unsurprisingly variable. Cedefop (2013) suggests that the benefits realised depend on several factors such as: the characteristics of the organisation, training and trainees; the resources allocated; and how VET is integrated with other human resource practices. They argue that creating the right conditions will maximise the positive outcomes from the investment in VET. This requires a long-term strategic view of the workforce, taking a broad approach to VET, combining general and organisation-specific training, and using VET as an incentive and part of a long-term process of professional development which is integrated into broader human resource management practices. This is not how some businesses go about training, with many adopting a reactive approach – training existing workers as specific needs arise (Mawer & Jackson 2005).

This discussion confirms that many of the important benefits from VET are difficult to measure and express in monetary terms. Organisations may therefore fail to account for them adequately in any cost–benefit analysis underpinning their decision to invest in training. A broader framework, one that takes both market and non-market benefits into account, is recommended (Cedefop 2013). The sparse literature in this area, particularly in Australia, suggests there is still much to learn about the different ways businesses may benefit from their investment in training.

It is worth noting here that organisations are not just beneficiaries of training. Business organisations play a pivotal role in generating the benefits of training for both individuals and the economy through higher wages for trained individuals, economic growth via increased productivity, individual wellbeing through job satisfaction, leading to better health and less crime (Cedefop 2011b, 2013). In this sense, organisations are an important key to enabling benefits through the other levels discussed in this paper.

Costs and benefits to individuals

This section turns to the costs and benefits experienced by individuals. In terms of the three levels discussed in this paper – the economy, business and the individual – there has been considerably more research at the individual level, especially investigations into the private return from education and training.

Estimating the private return from VET involves considering the costs incurred by the student as an investment, with any resultant increases in income expressed as a rate of return on that investment. The private return from VET is important in determining whether VET courses provide potential students with sufficient financial incentives to enrol. These analyses are sometimes very sophisticated, taking a number of diverse factors into account. Individuals themselves, however, are likely to be less specific in the calculations they make. Potential students might consider the length of the course, the cost, and the job prospects afterwards. They may also weigh up less tangible aspects relating to whether they'll like the course or the job they get at the end (Long & Shah 2008).

This section of the paper explores recently published work investigating the return on investment for individuals, including a consideration of the difficulties in measuring it. Work on other costs and benefits to students is then summarised.

Challenges in estimating the private return on investment

The private return from education and training is based on the economic costs and the gains for the individual. The return on investment studies included in this paper show considerable variability in the findings. Long and Shah (2008) describe a number of reasons why estimates of private return on investment vary. These include differences in:

- the nature of the data being analysed
- the population of interest
- how earnings or employment are measured (gross or after-tax income or earnings, per hour or per week)
- how educational qualifications are classified or measured (for example, pre-Australian Qualifications Framework or after; highest level of education or using multiple qualifications)
- the levels of educational attainment compared
- the control variables used
- the statistical techniques employed
- the measurement of time.

Decisions about comparison groups, the degree of disaggregation of education levels, datasets and the statistical techniques used all have an impact on the results. The variables used – noting that not all are available in all datasets – make a difference.

In terms of how returns from VET have been estimated in Australia, Lee and Coelli (2010) explain that there have been two main approaches.¹ The first is based on calculating an internal rate of return (IRR) from investing in education. An alternative approach is to estimate a Mincer equation for labour market earnings.

Regardless of the approach used to estimate the private return from VET, complexities in the VET system make it difficult to input accurate training costs (Long & Shah 2008). Much VET provision occurs through government-supported places, but there is a substantial proportion of privately provided VET that is reliant on fee-for-service activity. Until very recently, data on privately funded VET have not been collected in a comprehensive manner and have therefore been missing from studies on the private return from VET. Additionally, some forms of VET, such as non-accredited training conducted in house by private companies, are also missing from calculations. Again, clarity around the definition of training and what is in scope for any given analysis are important.

The introduction of various student entitlement models and VET FEE-HELP increases the complexity of who pays for training and when costs are incurred and raises questions about how these might influence the private return from education and training. Given that these funding changes in the VET sector have been relatively recent, it is too early to determine empirically what the impacts have been (if any). However, in terms of income-contingent loans, research that looked at how the introduction of Higher Education Contribution Scheme (HECS) influenced the private returns from higher education found it had little discernible effect (Chapman, Rodrigues & Ryan 2007).

¹ Definitions are provided in appendix B.

VET tuition costs (which can be borne by government, students and/or business) are only one type of cost that can be incurred and hence considered in estimations of the return from VET. Other costs include opportunity costs (forgone or reduced earnings while studying) and non-completion costs, where a student enrolls and does not obtain a qualification and hence does not obtain the full, or possibly any, financial benefit from their incomplete study (Long & Shah 2008). A distinct characteristic of the VET sector is that large numbers of students do not complete a qualification (Karmel & Nguyen 2006). For example, the completion rate of government-funded VET programs at certificate I and above that were commenced in 2013 was 34% (NCVER 2015b). Many students seek to gain specific skills and may choose to complete only the modules relevant to them, possibly limiting the potential financial benefit that might come with the full qualification. These non-tuition costs of education and training can be difficult to estimate.

Other factors can influence estimates of the returns from education, such as individual ability. Leigh (2008) explains that an individual who undertakes more education may possess traits that would have led them to perform better in the labour market irrespective of whether they had completed higher levels of education. Several studies are cited that showed various degrees of ability bias, ranging from around 9% upwards to the order of 40%. These types of less tangible factors are not routinely taken into account in estimations of the return from education and training.

The discussion above described the level of variability and complexity involved in estimating the private return from VET. While a large array of variables potentially influences the private returns, the incorporation of these into analyses is limited by their availability in different datasets, and indeed, how measurable they are in the first place.

The following section summarises the main findings from a number of research studies that have investigated the private returns from VET.

The private return from VET²

The value of completing a VET qualification varies – some students experience positive wage returns from completing a VET qualification, while others do not (Karmel & Nguyen 2006). Teasing out the factors that make a difference between a positive return and no return is the focus of many of the published pieces of work considered through this review of the literature.

Understanding the mechanisms underpinning the ways by which VET might result in positive wage returns is helpful in interpreting the findings from the wide variety of research studies. There are two main potential benefits of VET that boost the pre-tax earnings of students (Long & Shah 2008; Independent Economics 2013). Firstly, the most significant benefit is that VET can improve the employability of students. VET graduates are generally more likely to participate in the workforce, are less likely to be unemployed, and more likely to work full-time compared with those with no post-school education. Secondly, VET can improve the productivity of students, allowing them to work in more highly skilled occupations, which command higher wages.

These two factors were teased out by Leigh (2008), who investigated the extent to which returns from education were due to increased productivity or participation. He found that the productivity and participation benefits varied across qualification level. In terms of productivity, gains were highest for

² A table detailing the recent research estimating the private return to VET is provided in appendix A.

Year 12 completion and bachelor degree completion. For VET qualifications, the effects on productivity and participation depended on whether the comparison was Year 11 or Year 12 schooling.

All three levels of VET qualifications (certificate I/II, certificate III/IV and diploma) were associated with participation increases when compared with Year 11 schooling, but only certificate III/IV and diplomas showed productivity increases. Compared with Year 12, however, certificate III/IV had no effect on productivity or participation, while completion of a diploma still demonstrated some increased productivity and participation. Adding a further level of complexity, Leigh (2008) found that the magnitude of benefits gained through both productivity and participation varied across the earnings distribution. Generally, those at the lower end of the earnings distribution gained a larger participation benefit, while those at the higher end gained a larger productivity benefit from education.

Noonan et al. (2010) also highlight the immediate employment outcomes and higher wages as some of the positive outcomes generally experienced from VET. In addition to these, other benefits include longer-term workforce participation and higher satisfaction levels by the student and employer. However, these benefits are often not as strong at lower qualification levels, or where individuals do not complete qualifications (Noonan et al. 2010), further demonstrating how variable and nuanced the outcomes of VET can be.

Other studies have demonstrated how estimates vary according to the characteristics of both the individual and the study they have undertaken. Long and Shah (2008), for example, incorporated a number of these factors into their modelling, investigating the effects of different qualification levels, gender, age, level of schooling and full- or part-time VET study. In their estimations, the rates of return for advanced diplomas and diplomas (considered together) and for certificates III and IV (together) are similar, but there was some variation when taking other elements into account. For example, the rates of return for males who completed Year 12 studying a shorter (one and a half years) advanced diploma or diploma full-time were higher than for a certificate III or IV. However, the rates of return for a certificate III or IV studied part-time are generally higher than the corresponding rates for advanced diplomas and diplomas. And similarly, the rates of return for persons whose highest schooling was Year 10 are generally higher for a certificate III and IV than for an advanced diploma or diploma. In this particular study, estimates of the rates of return for lower-level qualifications (certificates I and II) were found to be very sensitive to small changes in either benefits or costs, their instability making comparisons with higher-level qualifications problematic. These findings illustrate the difficulty in making broad conclusions based on qualification level alone.

The study showed that the rates of return are not consistently higher for males or females, and that age at the time of study only makes a small difference to the rate of return. However, part-time and full-time study differed substantially. The rates of return for part-time study were higher than for full-time study due to the lower loss of income while studying part-time (that is, a lower opportunity cost) – this difference can be quite large. For example, the rate of return from a one-year, low-cost certificate III or IV for a 19-year-old male who has completed his schooling is 130.5% for part-time compared with 23.6% for full-time. Long and Shah (2008) conclude that, overall, the rates of return for higher-level VET qualifications provide students with ample incentives to enrol, particularly part-time.

The variability in the private returns from VET demonstrates that an individual cannot assume that a VET qualification will necessarily result in a financial return for them. This is further illustrated in a study by Lee and Coelli (2010) that showed that a financial return to the individual was dependent on

educational background and the level and field of the qualification being undertaken. Unlike some other investigations (such as Karmel & Nguyen 2006 and Long & Shah 2008), this estimation did not show any employment or earning benefits in completing a certificate III/IV relative to Year 12 completion. For those who had completed Year 12, employment and earnings benefits were only gained by completing a VET course at the diploma level. For individuals who have not completed Year 12 however, benefits can be gained by completing a VET qualification at any level.

Most studies that estimate returns from VET focus on students who graduate with a full qualification. However, a significant portion of students choose to only complete modules within the qualification. Karmel and Fieger (2012) investigated the benefits to students who completed a VET qualification, by comparison with those who did not. Looking at a variety of outcomes, the authors find that completion of a qualification pays off in terms of employment (highest for those not employed before training) and further study (particularly for those undertaking a certificate I/II). In terms of wages, there was a substantial number of students for whom completion did not lead to higher wages if already in a full-time job (around 40%). There were two groups of students who experienced higher wages after course completion: those undertaking diplomas and above; and those who were not employed before training and who were undertaking a certificate III/IV. The benefits to module completers vary depending on the level of the modules completed. In an earlier study, Karmel and Nguyen (2006) showed that module completers at the diploma or advanced diploma level generate around 70% of the benefits that graduates generate. Module completers at the certificate III or IV level generate around 50%.

While the completion of a qualification (or a module) has been the focus of most studies investigating the private return from education and training, skills are likely to be important in determining the earnings of an individual. Chesters, Ryan and Sinning (2013) explored this issue by examining the relationship between literacy skills and income. They found that both literacy skill levels and educational qualifications were important in determining income. Interestingly, they found that income increased with education level, and *within* education levels, income increased with literacy skill level.

The examples cited above demonstrate the difficulty in making any broad conclusions about the economic benefit of VET to individuals. However, the evidence suggests we can be confident that higher-level VET qualifications (advanced diplomas and diplomas) provide individuals with a good return on their investment. We can also be reasonably confident that certificate III and IVs provide students with a return on investment, especially when completed part-time. These returns are due to increased participation in the workforce and, to a lesser degree, increases in productivity. The returns from lower-level qualifications (certificates I and II) were consistently low, but completion of these may result in other, non-financial, benefits (discussed in the next section).

Non-financial benefits of education and training for the individual

While much attention is focused on the economic benefits of undertaking VET and higher education, there are additional, and often less tangible, benefits – those not of a financial nature. Of course, an individual may undertake study for a combination of reasons, both financial and other. Measuring the non-financial benefits of training is not straightforward as they are often difficult to quantify. For individuals, the non-market benefits of VET are commonly measured by positive effects on motivation or attitudes, such as increasing self-esteem and self-confidence, especially among unemployed people (Cedefop 2013). For people in employment, job satisfaction is often one focus, along with

opportunities for career advancement, although these are difficult to separate from the financial benefits that might also be generated.

The economic focus is understandable, considering that the majority of individuals who undertake training do so for employment-related reasons (84.6% in 2015; NCVET 2015c). However, individuals may take more than the potential financial pay-off into account. Considerations about whether or not they will enjoy the course and/or the resultant job are also likely (Long & Shah 2008). The Student Outcomes Survey (NCVER 2015c) indicates that a proportion of students specifically enrol in a course for reasons that are not employment-related, such as for further study opportunities and personal development (table 4). When students have enrolled for these reasons, a high proportion of graduates fully or partly achieve the desired outcome.

Table 4 Main reason for undertaking training (2015 government-funded graduates)

Main reason for training	%	% fully or partly achieved their main reason for training
Employment-related	84.6	78.1
Further study	4.1	90.9
Personal development	11.3	92.2

Source: NCVET (2015c).

Lower-level VET qualifications, in particular, may be undertaken as a pathway to other qualifications. The financial returns from lower-level VET qualifications have been shown to be low (Karmel & Fieger 2012; Long & Shah 2008), but these qualifications may be valuable to students as stepping stones to higher-level qualifications (which may eventually result in both financial and non-financial benefits). But this is only the case if they *complete* the low-level qualification. Karmel and Fieger (2012) show that those who drop out of a certificate I/II are very unlikely to go onto further accredited training, demonstrating the importance of completion. VET qualifications, at any level, can also be used as a pathway to higher education (Independent Economics 2013), further illustrating the example of further education as a benefit of VET.

Research on the non-financial benefits of VET appears to be further advanced internationally than in Australia, as highlighted by a substantial research effort by Cedefop to investigate both the economic and social benefits of VET. Cedefop (2011c) reports on a study conducted to examine VET's non-market benefits to individuals across Europe. They found that both initial VET (undertaken below 25 years of age) and continuing VET were linked to increased membership of voluntary organisations and higher job satisfaction. Initial VET was also associated with better health as measured by self-rated health and the lack of chronic health conditions. The presence of these benefits differed by country, demonstrating that context is a strong influence on how VET might benefit individuals.

Research in Australia has also demonstrated the link between education and health. Universities Australia and KPMG Econtech (2010) summarise research that explored the relationship between education and health-related issues such as smoking and obesity. The evidence suggests that more highly educated people are less likely to be current smokers or obese. However, Universities Australia and KPMG Econtech (2010) conclude that, while the connection between education and health levels is well documented, the causal relationship between them is not well tested. Studies that quantify this relationship are scarce. A further constraint to our understanding is the limited research that looks at the health benefits of VET specifically. One notable exception is the research by Stanwick, Ong and Karmel (2006) that explored the relationship between education, including VET, and health and wellbeing for individuals. This study found that individuals with diplomas/advanced diplomas as their highest qualification tended to be more likely to have better physical and mental health by

comparison with those with Year 11 and below, although the size of the effect was not as large as that for people with degrees. There was no effect for those with certificate-level qualifications (by comparison with Year 11 or below). Their analysis also highlighted the importance of the indirect effects of education on health, particularly through its influence on employment and income. These need to be taken into account to understand the full effect of education on health.

There has been a focus in Australia on the potential benefits of VET to individuals who are considered as disadvantaged in the labour market, such as Indigenous Australians, people with a disability, people of low economic status and those with low educational attainment. Deloitte Access Economics (2011) in a report prepared for the National VET Equity Advisory Council presented a list of socially oriented benefits that are potential outcomes of education (see the box below). Again, this summarised evidence from research focused on education generally, not necessarily VET.

Figure 1 Socially-oriented benefits of education

Improved self-esteem, self-confidence and communication skills
Higher levels of life satisfaction and happiness
Increased engagement or reengagement (being given a 'second chance')
Improved problem-solving skills
Improved understanding of the concepts of 'lifelong learning' and a stepping stone into further education and training
Improved health, life expectancy and quality of life for the learner and their offspring
Increased consumer choice efficiency
Increased personal status
More hobbies and increased participation in leisure activities
Intergenerational benefits through greater support for children's learning

Source: Deloitte Access Economics (2011).

In terms of VET specifically, some studies have focused on the social benefits of VET. Priest (2009) described how individuals build social capital through VET by developing new networks, and gain confidence and self-esteem through the respect they receive from teachers and classmates. While many students gain social capital incidentally, the author suggests that VET instructors can tailor training in such a way that increases the opportunity to generate these benefits for individuals. Stanwick, Ong and Karmel (2006) uncovered similar findings when they interviewed VET practitioners about their perceptions of the wellbeing benefits to those currently participating in vocational education. While not quantified or measured in any objective manner, practitioners identified benefits such as increased confidence, self-esteem and feelings of control. Social benefits such as social interaction, friendship, concepts of family, solidarity, a sense of belonging and being part of a supportive environment were also identified. These social benefits add to the reasons for VET's long-term use as a labour market instrument promoting social inclusion and equity (Cedefop 2013).

Discussion

This section addresses the three main themes emerging from this review on the costs and benefits of VET. It firstly summarises the overall trends distilled from the existing literature for each of the three levels of interest in the review (the economy, business and the individual). It then attempts to summarise the complexities of undertaking such analyses and looks towards future estimations of the costs and benefits or analyses of return on investment, providing some practical suggestions of how to plan and frame further work of this type.

Overall trends

The many different factors involved, and how they influence the analyses conducted, limit our ability to generalise the findings about the costs and benefits of training. Additionally, many analyses are likely to be specific to the context in which they are being applied. With these caveats in mind, there are some broad findings that appear to hold true across multiple analyses.

Economy level

At the level of the economy, the research suggests that VET provides a substantial return on investment. This appears to be mostly attributed to VET generating an increase in employability rather than an increase in productivity. International research suggests that education, in general, also brings a number of social benefits, such as improved health, democratisation and human rights, improved environment and reduced national crime and drug use. VET, in particular, is thought to generate improved social equity. This is also reflected by Australian research, much of which has focused on disadvantaged groups.

Business level

It is particularly hard to point to any overarching trends at the business level. Analyses focused on individual businesses or industries appear to be highly context-specific, resulting in extremely variable estimates of return on investment. Studies have suggested that a large contributing factor is that the methodologies used to measure improvements in productivity are more effective in some industries than in others. Examples of high returns on investment were found, especially in businesses focused on manufacturing, where training is often highly specific. In terms of non-market benefits, international research likened organisations, or workplaces, to small societies in which the social benefits from VET can be experienced. Other commonly reported benefits of VET to businesses include reduced labour turnover and less absenteeism.

Individual level

The return on investment for individuals has attracted more research attention than the other two categories. Similarly to the business level, the return on investment for an individual is influenced by many contextual factors, including individual characteristics. While we cannot say that all vocational education will lead to an economic return for all individuals, some fairly broad conclusions can be drawn. The research suggests that higher-level VET qualifications (advanced diplomas and diplomas) provide individuals with a good return on their investment. We can also be reasonably confident that students will experience a return on their investment in a certificate III or IV. Additionally, students who study VET part-time experience higher returns than those studying full-time due to the lower

opportunity cost. Lower-level qualifications (certificates I and II) consistently resulted in low financial returns, but the research suggests that these qualifications can lead to other, non-financial, benefits, such as acting as a stepping stone to further study or for personal development reasons. Other non-financial benefits of training include increased self-esteem and self-confidence and improved wellbeing.

Analysing costs and benefits is a complex exercise

This review of recent research on the costs and benefits of training for individuals, business and the economy has demonstrated that it is complicated. There is no simple answer – no magic formula which tells us whether training is worth the investment for any particular individual, business or the economy. What these studies have shown, however, is that the exercise of estimating the return on investment, or, indeed, even attempting to measure the costs and/or benefits of vocational education, is difficult. By way of example, Burke (2016) shows there are large gaps in our understanding of the full costs involved in VET, suggesting a need to establish some improved basic measures.

Table 5 summarises the many elements that come into play when analysing the costs and benefits of VET.

Table 5 Factors that influence estimations of return on investment and measures of the costs and benefits of training

Factor	Explanation
Purpose	The purpose of the analysis can vary. For example, is it a forecast or an evaluation? Is it an economic-justification purpose, or is there a broader social interest?
Perspective	There are many different players (at the individual, business and economy level). The various perspectives influence how and what costs and benefits are measured.
Context	Even at the various levels (individual, business and economy), the context can vary. This is particularly true when considering different industries and different countries.
Methodologies	Different methodologies can be used for estimating return on investment, for measuring and/or quantifying costs and benefits. All have assumptions and limitations.
Timeframe	The timeframe of interest can vary from short term (maybe immediate) to long term.
Variables	There are many different variables that can be considered and they vary on how measurable they are.

Each of these factors are relevant to each level of analysis (for example, the economy, business or the individual level), but the specific options for each element are likely to differ. How each of these could be considered in the planning or interpretation of an analysis is described below.

Where to from here?

Given the complexity involved when undertaking an examination of the costs and/or benefits of training, as summarised above, it is useful to consider some practical steps that can be taken to refine the approach. The findings of this review have been used to formulate some suggestions about the issues that should be considered when planning to undertake such an exercise.

Where findings from existing studies are being used to inform another purpose or situation, the considerations that follow can help to identify the most relevant estimations. Identifying the perspective, the context and the variables that resonate with the situation of interest will improve the transferability of the findings.

Defining the objective

The first step is to clearly establish the purpose of the analysis. How will the findings be used? Who is the intended audience? Is it a forward-looking exercise (a forecast of how different levels of investment in the future may influence the return on investment, for example), or is it an evaluative exercise (an evaluation of training that has already occurred, for example)?

Part of defining the purpose is to determine the perspective the analysis will be adopting. For example, is the analysis looking at individuals, groups of individuals, a business, an industry, the economy, or several countries?

For some, the analysis might be an academic exercise, whereby the research has been developed with a comparatively general purpose. For others, the purpose might be more specific, perhaps with practical outcomes in mind. For example, it may aim to help to guide decision-making regarding training in a specific industry. Being clear about the purpose enables the next stage and helps to determine the most appropriate type of analysis.

Deciding what is relevant to meet the purpose

Once the purpose has been clarified, a series of decisions helps to shape the analysis. This decision-making process is important and careful effort here will maximise the usefulness of the outcomes. Considerations should include, but not be limited to, the following:

- What elements or variables should be included? And why? This involves thinking about the inputs and outputs of the analysis and is linked directly to the purpose. Being clear on how the findings will be used will help to shape what is to be included. For example, if a business plans to use the outcomes of a costs and benefits analysis to optimise its training practices, it would make sense to include variables that can be modified by the business.
- Are the data available? If not, are the elements to be included measurable? Do they need to be quantified? Can they be separated from other variables? Some studies will rely on extant data and will be limited by the characteristics of that dataset (the size of the sample, the variables present etc.). Other studies will require the collection of data, which may be quantitative or qualitative in nature.

Determining the approach

Closely related to the above is determining the approach the analysis will take. The decisions here will reflect the purpose and perspective of the analysis, as well as the data requirements and availability. The obvious differentiation in this aspect is between an economic return on investment estimation versus an examination of less tangible costs and/or benefits, the latter requiring a qualitative approach.

Whatever the approach, some limitations are likely and assumptions will need to be made. These should be identified and deemed acceptable and sensible before proceeding with the analysis, as they will have a bearing on how the findings are interpreted and used.

Interpretation of the findings

All of the decisions made in relation to the concepts described above should be taken into account when interpreting the findings of the analysis and/or assessing its broader applicability. Particular attention should be given to:

- the limitations of the data and/or methodologies and the assumptions made
- the context of the analysis. This is especially important when assessing the broader applicability of an analysis when attempting to apply its findings to another situation.

Concluding remark

As a final word, irrespective of the focus of future work in this area, it is the consolidation of numerous related studies that will most effectively illuminate the whole picture. As Cedefop (2013) argues, understanding the interaction between financial (market) and non-financial (non-market) benefits is important in assessing VET's true benefits and the full return on investment. The challenge will continue to be finding appropriate ways to measure and compare these elements.

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Appendix A

	Aim of estimate	Notable considerations regarding the analysis	Return on investment	Notes
Economy-wide focus				
Independent Economics 2013	<p>Modelling conducted to estimate return on investment based on:</p> <ol style="list-style-type: none"> 1) The committed increase in investment in VET under the National Agreement on Skills and Workforce Development; and 2) The question as to whether investment in VET should be further increased. 	<ul style="list-style-type: none"> • Inclusion of module completers • Models also include students who study at the same or lower level (reskillers) • Effect of supply and demand of occupations included 	<p>The analysis, based on the committed 5.6% increase, shows an 18% internal rate of return for the Australian economy.</p> <p>Total costs of VET were estimated to be \$7.0 billion. This included tuition of \$2.3 billion (including contributions from government, students and businesses) and foregone earnings by students of \$4.7 billion.</p> <p>Total benefits were estimated to be \$20.4 billion. This consisted of employability benefits of \$18.4 billion and productivity benefits of \$2.0 billion.</p>	<p>Authors argue that the estimated benefits in this report are significantly larger than those reported by the Productivity Commission (2012) because if more fully includes the benefits of module completions as well as full qualification completion, and also includes benefits from reskillers as well as upskillers.</p>
Universities Australia & KPMG Econtech 2010	<p>This is an update to a 2009 report that measured the net economic benefits of government policy aimed at increasing university funding. It predicts the outcomes of various funding changes based on recommendations in the Bradley Review (Bradley et al. 2008). This report updates the previous one with the latest data and research, but is also extended it to capture the effect of increased funding of public VET.</p>	<p>Uses a system of models to capture both economic costs and benefits. The system comprises five models:</p> <ul style="list-style-type: none"> • a university funding model • an educational attainment, labour force size and productivity model • a research and productivity model • a VET funding model • an economy-wide model. 	<p>The predicted impacts of increasing funding for tertiary education for each of the five models are presented in the report. In summary:</p> <ul style="list-style-type: none"> • Overall, increasing university and VET funding will lead to a lift in the education level of the workforce and a lift in research outcomes. This leads to labour productivity benefits, and labour force gains arising from both gains in labour force participation rates and population gains from those international students that remain in Australia after their studies. • The internal rate of return for universities and the tertiary sector as a whole is 14% and 15% respectively. 	

	Aim of estimate	Notable considerations regarding the analysis	Return on investment	Notes
Individual focus				
Chesters, Ryan and Sinning 2013	To determine the effect of literacy skills on income.	Education levels were grouped broadly: Year 12 or below (reference group), certificate or advanced diploma/diploma, bachelor degree or higher. Three skill measures were used in the analysis: document literacy; prose literacy; and quantitative literacy. Interval regression model used for the analysis.	<ul style="list-style-type: none"> • Those with higher levels of education (vocational or higher education) had higher income. • The inclusion of literacy skills in the model lowered the income effect of qualifications, demonstrating that both education levels and skill levels are important in determining income. • Within broad education levels, income increased with literacy skill level. • Highly educated workers experienced higher returns from literacy skills than workers with low levels of education. 	Uses data from the Survey of Aspects of Literacy (1996) and the Adult Literacy and Life Skills Survey (2006)
Karmel and Fieger 2012	To identify groups of people who experience benefits from completing a qualification.	Outcome variables considered: being employed after training; improved employment circumstances; further study; salary; occupational status.	<ul style="list-style-type: none"> • Over 95% of students see an employment or further study pay-off from completion. • The employment pay-off from completion is highest for those not employed before training. • The further-study pay-off is highest for those not employed before training and for those undertaking a certificate I/II (that is, very few of those who drop out from a cert. I/II continue in other accredited training). • There is a significant pay-off in terms of wages for those taking diplomas and above, and those who are not employed before training and who are undertaking a certificate III/IV. 	Uses data from 2009 SOS.
Lee and Coelli 2010	Examines the effect of field of education on returns from VET for individuals, as well as returns from VET for mature-age students.	Does not determine individual rate of return from investing in a VET course. Rather, it measures effects of educational qualification on employment and earnings outcomes, and how these have changed over time. It measures these relative to	<ul style="list-style-type: none"> • Relative to Year 12 completers, there are no benefits from obtaining certificate I–IV qualifications. However, there are positive employment and earnings outcomes associated with advanced diploma/diploma qualifications. 	Uses ABS Surveys of Education and Training (1993–2005).

		<p>completing Year 12.</p>	<ul style="list-style-type: none"> • Compared to persons who did not complete Year 12, there are positive employment and earnings outcomes from all levels of VET qualification. • For mature-age students, undertaking a VET qualification is only worthwhile if they have fewer than 12 years of schooling and intend to enrol at certificate III or higher. Furthermore, there can be a delay of one or two years before positive effects materialise. • Relative to persons who did not complete Year 12, the fields of education that provide the largest effects on earnings and employment outcomes are business, engineering, architecture, building, and automotive. • Found relatively stable returns over time. 	
<p>Long and Shah 2008</p>	<p>Aimed to estimate rates of return from education for males and females of different ages and with different levels of schooling, enrolled full- or part-time in different level courses.</p>	<ul style="list-style-type: none"> • A number of estimates of the rate of return from VET qualifications is presented, accounting for several different levels of qualification, type of study (full- or part-time), gender, age while studying, level of schooling and varying costs. • Cost of education includes foregone income (so rate of return is lower for full-time students than for part-time; leisure has no value). • Income used instead of earnings. This means the calculations include the effects of qualifications in securing employment (factors such as occupation, hours of work and years of labour force experience). • Does not include university qualifications (so value of VET and university cannot be compared). 	<ul style="list-style-type: none"> • The returns from certificates I and II were variable. The small costs make the estimates sensitive to small changes in either benefits or costs. • The returns for advanced diplomas, diplomas, certificates III and IVs are similar, with some variations based on characteristics such as gender, full-time vs part-time and highest level of schooling. • Rates of return were not consistently higher for males or females. • Rates of return are higher for part-time study than full-time. • Age made only a small difference to the rates of return. • The rates of return were mostly slightly higher for those whose highest level of schooling was Year 10 than for Year 12, especially for females. • The rates of return for advanced diplomas and diplomas were higher 	<p>Used ABS 2005 Survey of Education and Training</p>

			than reported in earlier studies. The rates of return for certificates III and IV were sometimes higher than previous studies. These differences are due to the different methodological approaches of the studies.	
Leigh 2008	Estimated returns from a variety of specific educational attainments – years of schooling, trade qualifications, and university qualifications.	<ul style="list-style-type: none"> • Draws on previously conducted research on ability bias and the social rate of return – a drawback being that they typically don't estimate returns across a variety of educational qualifications. • VET qualifications were compared with those with Year 11 or less, VET and higher education qualifications were compared to those with Year 12 completion. • Calculated both the productivity and participation effects. • The calculations do not take into account the costs of education (tuition fees, foregone earnings etc). 	<ul style="list-style-type: none"> • Compared with individuals with schooling of year 11 or less, certificate I and II showed no significant increases in hourly or annual earnings. Certificates III–IV showed 7% increase, diplomas showed 12–13% (productivity increases). Annual earnings (productivity and participation effects) for cert. III–IV and diplomas showed 19–21% increase. All three levels were associated with higher participation rates: 16% for cert. I/II, 5% for cert. III/IV and 7% higher for diplomas. <p>This suggests that higher-level VET has an economic pay-off, mostly through participation rather than increased productivity.</p> <ul style="list-style-type: none"> • Compared with those with Year 12, cert. III/IV had no effect on productivity or participation. Diplomas increased hourly wages (productivity) by 13–14% and annual earnings (productivity plus participation) by 17–19%. Bachelor degrees increased hourly wages by 32–35%, annual earnings by 45–50%. Graduate diplomas and graduate certificates increased hourly earnings by 35–39% and annual earnings by 42–46%. Master's degrees and doctorates increased hourly wages by 41–45% and annual earnings by 66–74%. All three forms of university qualifications were associated with a 10–11% increase in participation. 	Used 2001–05 Household, Income and Labour Dynamics in Australia (HILDA) Survey
Australian Council for Educational Research	Examined the occupational status of jobs and weekly earnings by type of	Types of post-school training analysed: apprenticeships, traineeships, TAFE	<ul style="list-style-type: none"> • University courses led to the largest increases in occupational status (with 	Used the Longitudinal Surveys of

(Marks) 2008	post-school education and training in young people (by age 24).	certificates, TAFE diplomas, university diplomas, university degrees, postgraduate degrees and other qualifications (mainly courses run by private providers). Considered participation and completion separately.	<p>completion of a bachelor degree bringing a substantially larger increase than participation alone).</p> <ul style="list-style-type: none"> • Apprenticeships, traineeships and other TAFE courses were associated with little change in occupational status, likely due to these young people often already working in similar occupations before completing their studies. • A bachelor degree increased earnings by about 30%. Apprenticeships increased earnings by about 20%. A TAFE diploma increased earnings by about 14%, a university diploma by almost 20%. A traineeship led to an increase of earnings of around 8%, a TAFE certificate by about 5%. • Completion was more important for occupational status and earnings for most types of post-secondary education and training, especially university degrees and diplomas. The exception was apprenticeships and traineeships, where there was little difference between participation and completion. 	Australian Youth (1995–2005)
Chapman, Rodrigues and Ryan 2007	Aimed to determine if there are significant private returns from VET qualifications in order to argue for an income-contingent loan.	Standard wage equation used to determine impact of educational qualifications on earnings. Characteristics included: education, estimated experience (time in paid work) and hours worked. Assumed all study was conducted full-time (overestimating foregone income) but included income support (which offsets the foregone income overestimation).	<ul style="list-style-type: none"> • Internal rate of return for one-year cert. III/IV were estimated to be high (~35–37% for males, ~29–32% for females). Foregone income was lower in this group (short one-year course) and reference group (those who did not complete school) have a lower earnings profile compared with those who have completed school). • Internal rate of return for 1.5 year assoc. diploma was ~10% for males, ~14% for females (compared with those who finished school). • Internal rate of return for 2-year diploma was ~7.5% for males, ~10.5% for females. • The rates of return differed 	Used first three waves (2001, 2002 & 2003) of the HILDA Survey

			significantly across the entire wage distribution but remained robust.	
Karmel and Nguyen 2006	<p>The analysis had two parts:</p> <ul style="list-style-type: none"> the effect of highest qualification level on employment and wages a comparison of employment and wages for those who completed a VET qualification with those who have not completed a qualification (module completers). 	<ul style="list-style-type: none"> Used logistic regression models to examine impact of highest qualification level. The analysis is conducted using data for those who have recently studied VET and do not represent the whole population. The analysis comparing graduates with module completers used the perceived increase in wage as reported by students in the Student Outcomes Survey. 	<ul style="list-style-type: none"> The findings regarding the effect on wages were mixed. Previous education level, the qualification being studied, and whether the person had been in full-time employment or not all influenced whether there was a benefit (in wages) from VET or not. Qualifications play a role in obtaining full-time employment. Qualifications at certificate III or higher are beneficial. Wages are related to highest educational qualifications, although this might not be apparent in the initial transition to full-time employment. Looking at those already in full-time employment at the time of study, the highest returns are to degrees, followed by diplomas and certificate IVs. The returns are less clear for other qualifications. Individuals who had completed a VET qualification tended to perceive a positive return from VET, especially those who had completed higher-level qualifications. Module completers were less likely to perceive a wage increase as a result from their study. 	Uses data from 2003 Student Outcomes Survey and the 2002 National VET Provider Collection.

Appendix B

Definitions of technical terms as used in this publication

Internal Rate of Return³ (IRR) a method of calculating the rate of return on investment. This involves obtaining estimates of the stream of costs and benefits of investing in education over an individual's lifetime. The internal rate of return is then constructed by determining the interest or discount rate that equates to the present discounted value of the costs and benefits.

Mincer equation (for labour market earnings) an alternative method to estimate the return on investment in training. This involves estimating some variation of a log earnings regression on years of education and years of post-education work experience, and interpreting the coefficient on education and the returns from education. This focuses on identifying the average relationship between earnings and education and not on constructing an internal rate of return.

Return on investment the percentage return on the costs incurred to undertake education and training; usually referring to the internal rate of return.

³ As described in Lee and Coelli (2010).

NVETR Program funding

The National Vocational Education and Training Research (NVETR) Program is coordinated and managed by NCVER on behalf of the Australian Government and state and territory governments. Funding is provided through the Department of Education and Training.

The NVETR Program is based on national research priorities and aims to improve policy and practice in the VET sector. The research effort itself is collaborative and requires strong relationships with the research community in Australia's universities and beyond. NCVER may also involve various stakeholders, including state and territory governments, industry and practitioners, to inform the commissioned research, and use a variety of mechanisms such as project roundtables and forums.

Research grants are awarded to organisations through a competitive process, in which NCVER does not participate. To ensure the quality and relevance of the research, projects are selected using an independent and transparent process and research reports are peer-reviewed.

From 2012 some of the NVETR Program funding was made available for research and policy advice to National Senior Officials of the then Standing Council for Tertiary Education, Skills and Employment (SCOTESE) Principal Committees. They were responsible for determining suitable and relevant research projects aligned to the immediate priority needs in support of the national VET reform agenda.

For further information about the program go to the NCVER Portal
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