

NATIONAL VOCATIONAL EDUCATION
AND TRAINING RESEARCH PROGRAM

RESEARCH REPORT

Defining vocational streams: insights from the engineering, finance, agriculture and care sectors

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Australian Government
Department of Industry



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About the research

Defining vocational streams: insights from the engineering, finance, agriculture and care sectors

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This report is part of a wider three-year program of research, *Vocations: the link between post-compulsory education and the labour market*, which is investigating the educational and occupational paths that people take, and how their study relates to their work. This report builds on previous research by the authors, which identified a vocational stream as a set of linked occupations with related skills within a broad field of practice. They argue that vocational streams can play a role in increasing the capacity of the workforce and in helping to address skill shortages.

As part of the second year of the program, the authors interviewed a variety of stakeholders, including industry, employee, education, government and occupation groups, to validate the usefulness of a vocational stream framework for the labour market. The authors identify the preconditions for vocational streams to occur and how these preconditions can play out in industry.

Key messages

- Two preconditions are identified for realising enhanced, more adaptive workforces through vocational streams. Links in terms of underpinning skills and knowledge, or ‘commonalities in capability’, is the first precondition that supports a vocational model of workforce development. The second precondition is the potential for commitment and cooperation across stakeholders, or social partners, on resolving issues such as skills shortages.
- These two preconditions operate interdependently. Ultimately, stakeholder engagement, collaboration and the market environment within a specific sector are all key influences in shaping vocational outcomes. The preconditions react together in producing three possible outcomes:
 - a lack of common capabilities, where specialisation occurs early in an occupation or field of study, thereby creating segmentation in the labour market and limiting mobility across occupations and weakening the impact of partner collaboration
 - an outcome characterised by linkages between occupations and an absence of institutional collaboration; for example, in the healthcare sector, where a lack of cooperation has hampered the development of more generalist roles
 - a scenario in which there are both occupational linkages, in terms of underpinning capabilities, and a high degree of social partner readiness, evidenced by a high degree of cross-occupational mobility. For example, in agriculture this outcome is characterised by compromise, the pursuit of cooperative solutions and a commitment of resources to address workforce challenges.

Rod Camm
Managing Director, NCVET

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Executive summary

This report has been prepared as part of the National Centre for Vocational Education Research (NCVER) Consortium Research Program: *Vocations: the link between post-compulsory education and the labour market*. The research seeks to understand the presence of vocational pathways in core sectors of the Australian labour market – agriculture, financial services, engineering, and healthcare and community services. There are three strands in the project. Strand 1 focuses on improving outcomes from entry-level vocational education and training (VET), particularly VET in Schools. Strand 2 focuses on the role of educational institutions in improving pathways within and between vocational education and training and higher education. Strand 3 focuses on understanding the nature of vocations and their potential improvement. This is a report on Strand 3's research in 2012. In the first phase of research in 2011, we defined a 'vocational stream' as a set of occupations within a broad field of practice, linked by the knowledge, skills and capabilities required to work within a broadly defined vocation that combines educational and broad occupational progression.

In this phase of research, Strand 3 researchers conducted in-depth stakeholder interviews across the four sectoral case studies, asking the questions:

- How, if at all, are occupations related by underpinning practices and concepts? Can we thus identify occupations comprising a vocational stream?
- Who are the social partners that oversee these linked (or otherwise) occupations and how do they support/inhibit the development of capability within and between these occupations?
- What could emerge from current arrangements?

We argue that vocational streams are readily identified across the four sectors. That is, in the three sectors facing skills shortages (engineering, healthcare and agriculture), linkages between occupations were identified as a means for increasing workforce capacity. Even in financial services, where there was no sense of crisis, mobility between occupations was regarded as commonplace. We argue that these linkages, defined in terms of the underpinning skills and knowledge, are the first essential precondition for supporting a vocational model of workforce development. These *commonalities in capabilities* not only support improved utilisation of the workforce, but underpin a more adaptable individual, someone able to flourish under changing conditions within a broad area of practice. Capabilities link individuals, education and work by identifying the resources – social and economic – that individuals need to develop as autonomous and innovative workers within a broad range of occupations (Wheelahan & Moodie 2011).

These commonalities took on a number of dimensions across the four sectors. In healthcare, the scope of practice could be considered to be care (linking care workers, nursing assistants, enrolled nurses, registered nurses, and across areas such as mental health, aged care and disability care), or allied health (including occupational therapy, physiotherapy, podiatry etc.). Health workers share common capabilities both horizontally across traditional occupational boundaries as well as vertically, into higher levels of responsibility. In financial services, in the absence of any real systemic or sectoral approach to workforce development, mobility in a broad area of practice took on an organisational dimension. This was characterised by strong recruitment processes, horizontal and vertical career paths, and training in strong internal labour markets. This organisational dimension is also emerging within the corporatisation of the agricultural sector. However, the most dominant theme in the agricultural industries was one of regional capabilities. This has already emerged strongly in areas

where commonalities in local skills and knowledge extend across agricultural, local government and mining operations. In engineering, highly structured education and training paths in both the trades and professions tend to emphasise specialisation relatively early, so there is a greater focus on linking paraprofessional/technical occupations to the professional engineer. Importantly, across all four sectors, intermediate occupations were seen both as destination roles within a vocational stream as well as stepping stones and vital links between lower and higher skilled roles. These roles included paraprofessionals in engineering, agricultural technicians, financial advisors and brokers, and enrolled nurses and allied health assistants.

Commonalities in capabilities is one of two enabling conditions for realising greater and more adaptive workforce capacity around a vocational stream framework. The second is that of *social partner readiness*, or the potential for institutional commitment and cooperation on workforce challenges. This involves mobilising and consolidating a community of trust associated with a common objective; for example, skills shortages, and involves not only compromise and pursuit of cooperative solutions, but also a commitment of resources. These social partners may include industry, employee, community, educational and government groups. Social partner readiness recognises two key tenets of social capital theory: first that durable forms of social capital must exist (including trustworthiness, networks and institutions), and second that the linkage between social capital and collective action is trust (Ostrom & Ahn 2003). In each of the four sectors, we observed varying levels of social capital, ranging from tacit networks in financial services, to a complex web of formal and informal institutions in healthcare. The importance of trust was also highlighted across the case studies and ranged from high levels of contestation in healthcare, to consensus among employer, union, and educational groups in engineering.

In agriculture, engineering, and healthcare, the catalyst has unequivocally been long-standing skills shortages. The challenges are well documented, and in these three sectors institutional collaboration has gained momentum to varying degrees. In agriculture, regional projects have aligned industry, local government, employer, community and educational stakeholders across industries (such as mining and agriculture) in a bid to manage the otherwise chaotic flows of seasonal labour and regional emigration. In engineering, national solutions to skills shortages have been endorsed by a wide range of social partners (Australian National Engineering Taskforce [ANET] 2012) and gained support at a parliamentary enquiry. In financial services, employers, universities, TAFE (technical and further education) institutes and industry groups have yet to be mobilised around workforce issues, as the industry continues to contract. And in healthcare, the substantial complexities associated with public health risk, role clarity, occupational standards, boundaries and regulation, and different learning models present significant barriers to leveraging the clear commonalities in the capabilities across occupations.

These two preconditions – commonalities in capabilities and social partner readiness – generate three key outcome scenarios, depending on how the preconditions are met:

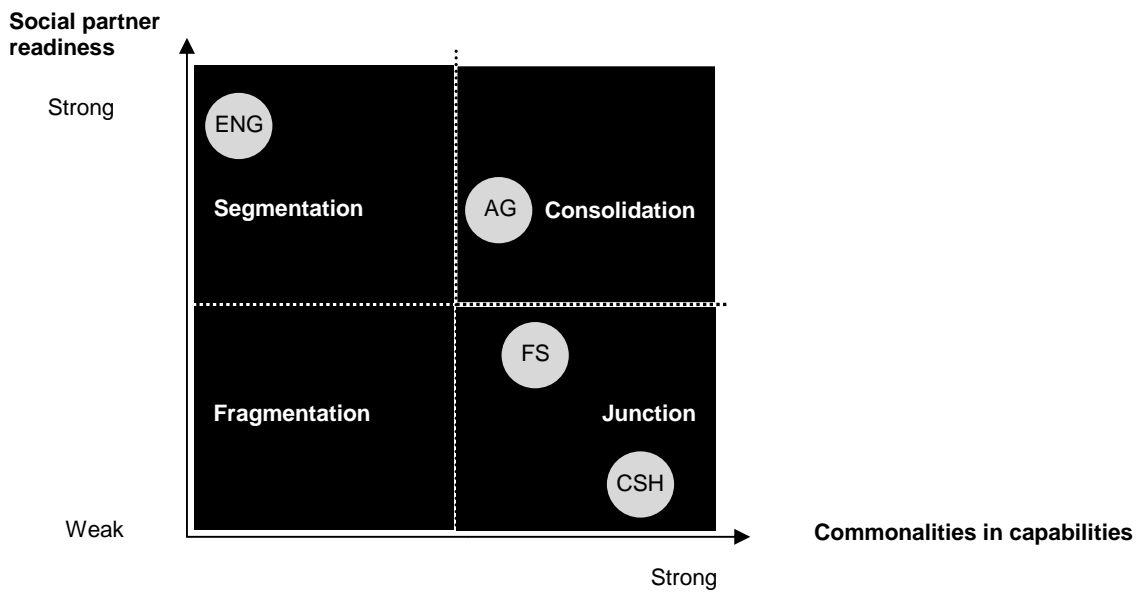
- *Segmentation* is characterised by a lack of commonalities in underpinning knowledge and skill, as in the engineering sector, where specialisation tends to occur early, and there is limited mobility across occupational boundaries. Segmentation is therefore likely to persist, despite a cooperative set of social partners.
- *Junction* is defined by a hitherto absence of institutional cooperation, despite recognised commonalities in capabilities between occupations. Two scenarios exist within this model: first, in the healthcare/community services sector, institutional arrangements are characterised by groups which defend entrenched institutional boundaries; second, in financial services, there is an

absence of explicit stakeholder engagement with skills issues, with workforce development flourishing implicitly across the sector.

- *Consolidation* is characterised by both recognised commonalities in capabilities, linking occupations in a scope of practice, as well as a higher level of social partner readiness, as witnessed by greater levels of stakeholder engagement and a commitment of resources, as in agriculture.

These three key outcomes and the preconditions which generate them are shown graphically in figure 1.

Figure 1 Vocational stream preconditions and outcomes



Note: ENG = engineering, AG = agriculture, FS = financial services, CSH = community services and health.

We argue that the identification and promotion of both commonalities in capabilities and greater institutional cooperation have the capacity to assist with current severe workforce challenges and also to support a workforce of more adaptable, capable individuals. In each sector, we identified strong examples of initiatives aiming for collaborative solutions, models or ideas which reach across educational, industry and government divides to give individuals access to educational and occupational pathways. In the third and final phase of research in 2013, we will endeavour to consolidate the architecture of these models and explore how their successes could (or could not) be deployed in different settings.

Background

In 2011, we raised the following research questions:

- How do individuals move into and through the labour market? Can this movement be characterised as vocational pathways?
- What are the commonalities in the trajectories of workers in the labour market?

Using nine waves of the Household, Income and Labour Dynamics in Australia (HILDA) longitudinal dataset, the research found strong evidence of labour market segmentation and, in particular, very limited occupational mobility (Yu, Bretherton & Schutz 2012). The movement of individuals through the labour market was characterised by three distinct profiles: high skill, mostly accessed by those with specialised training; low skill, characterised by entrenchment in low-skill work; and marginal attachment, typically affecting women and older workers with limited episodes of paid work. The job transitions observed during the course of this study suggested limited, not expansive, occupational choice for a wide range of labour market entrants of varied education and training levels.

These different pathways point to some clearly different destination points for the workers identified within these three pathways. The literature has often characterised ‘good jobs’ as typically being found in firms with strong internal labour market structures, or occupational ‘craft markets’, and having high negotiated wages, economic security and career advancement. By contrast, ‘bad jobs’ typically feature low and competitively determined wages, no career ladder and low-skill work (Leontaridi 1998). (See Yu, Bretherton & Schutz 2012 for greater detail.) We found however that our ability to draw the analysis out further along these lines was limited by its simple dichotomy. In this paper we identify the structural differences between sectors and in particular we ask: if there is broad segmentation between ‘good’ and ‘bad’ jobs in a vocational stream, then what is the role of intermediate jobs and qualifications? Within current institutional arrangements, do intermediate-skill roles represent a stepping stone and/or a bona fide career destination in their own right?

We define a vocational stream as a set of linked occupations within a broad field of practice, where the focus is on the attributes, knowledge and skills a person requires to work within a broadly defined vocation that combines educational and occupational progression (Buchanan et al. 2009). A vocation could emerge, for example, from the commonalities between nursing, aged care and child care. The vocation is care work, and fosters identification with the field of practice rather than a specific employer or enterprise. Vocations are underpinned by capabilities. Capabilities link individuals, education and work by identifying the resources that individuals need to develop as autonomous and innovative workers within a broad range of occupations. Sen (1999) highlights these resources as providing the social and economic conditions that enable civic participation, including in the labour market. Capabilities are differentiated from generic skills, employability skills or graduate attributes because they are not ‘general’ or ‘generic’. Rather, capabilities embrace the knowledge, technical skill and attributes required to be autonomous in a field of practice. While some of these attributes are described as generic (for example, problem-solving skills), they are understood differently in different disciplinary contexts. For example, the application of problem-solving skills for an animal technician is vastly different from that for an enrolled nurse. In the capabilities approach, the focus is on the development of the individual and on the knowledge, skills and attributes providing both the

ends and the means with which individuals flourish in their vocational stream (Wheelahan, Moodie & Buchanan 2012).¹

Based on the work done in 2011, in this paper we explore more deeply the implications of occupational segmentation for the development of human capability. We compare the dynamics of progression and how human capability is developed within these four sectors, the extent to which they differ, and the possibility of framing the development of human capability around vocational streams.

¹ The term ‘capability’ has been used in this report in preference to ‘competency’ because in the current Australian VET policy settings competency is derived from a concern with meeting the specific task requirements as defined by particular jobs. For us, a concern with capability starts with the individual and goes to their capacity to flourish at work (and in life beyond) and the ability to adapt to changing circumstances. We are indebted to Brendan Goodger and Rod Cooke of the Community Services and Health Industry Skills Council for highlighting the importance of distinguishing a potentially broader notion of competence. Neither, however, should be taken as supporting the use of terminology or findings arising from their use in this report.

Method

In 2012, the project sought to validate the usefulness of the vocational stream framework, with the research process built around a series of in-depth stakeholder interviews. This involved extensive desktop research, in which the many initiatives and opportunities that have arisen of great relevance to our research on vocational streams were reviewed. A discussion paper detailing the questions and issues at hand was also released (see attachment A).

Ultimately, 14 stakeholder interviews were conducted, each lasting around 60 minutes. These stakeholders were chosen to reflect a broad spectrum of views from industry, employee, educational, government and occupational groups. The research participants are detailed in table 1.

Table 1 Research participants

Agriculture	Financial Services	Healthcare and Community Services	Engineering
AgriFood Skills Australia	Innovation and Business Skills Australia	Community Services and Health Industry Skills Council	Association of Professional Engineers, Scientists and Managers Australia
National Farmers Federation	Chartered Financial Analyst Institute	Health Workforce Australia	Communications, Electrical, and Plumbing Union
Australian Council of the Deans of Agriculture	Financial Services Institute of Australasia	Victorian Department of Health	Faculty of Engineering and Surveying at the University of Southern Queensland
		NSW branch of the Australian Medical Association	
		Victorian branch of the Australian Nursing Federation	

The limitations of this current phase of research relate mainly to the small number of interviews undertaken. Here, we were constrained by the scope of the project, as well as the available participants at the time of research. However, this work builds on the extensive desktop research in 2011 and 2012, and data analysis and 32 employee interviews conducted in 2011 (Yu, Bretherton & Schutz 2012). Taken as a whole, and with the depth of experience exemplified by the participating stakeholders, the research is able to provide a robust profile of how skills are formed, linked and deployed in the four industry case studies.

Community services and healthcare

The health and community services sector represents a critical case study for this research because of the immediate and growing significance of this industry to the Australian labour market and economy. The health and community services industry is the largest single employment group in Australia, with 11% of the entire workforce employed in health and community services (social assistance) jobs. Census data identify a 22% growth in employment in this industry between 2001 and 2006, which represents twice the average rate of growth of all other industries over the same period (Community Services and Health Industry Skills Council 2012). Despite such strong growth, the sector faces significant workforce crises: the workforce is ageing and workforce ‘shortages, surpluses and maldistribution’ are widely reported (Brownie, Bahnisch & Thomas 2011a). In aged care, for example, Health Workforce Australia highlights a ‘mismatch between population health needs of older people and the trend towards increasing specialisation in professions’ (Health Workforce Australia 2012, p.6). The mismatch is characterised by a broad range of health service needs of a well, or early-at-risk, large population at odds with an increasing concentration of specialist health professionals addressing relatively few chronic/complex needs. It is estimated that an extra 52 700 registered nurses and 115 600 care and welfare support workers (across aged and disability care, child care, and nursing support) will be needed by 2015–16 (Community Services and Health Industry Skills Council 2012). In addition, the research highlighted shortages of doctors both in regional and remote areas as well as shortages in specialisations (such as palliative care and geriatrics). These shortages are exacerbated by the paradox of stronger numbers of medical graduates, but a shortage in availability of clinical training placements.

Research participants in this study highlighted the need for greater nursing capacity, from nursing assistants through to enrolled and registered nurses, as well as the rebalancing of capacity amongst medical practitioners. The crisis arising from the confluence of skills imbalances, an ageing workforce, and capacity (financial and otherwise) to meet healthcare needs was highlighted in comments from research participants:

Each of the states’ costs and demands on our health systems are growing at such a rapid rate that all of the states will be bankrupt on their health expenditure alone within 15–20 years. Now to me that’s a national crisis. (Community Services and Health Industry Skills Council)

In the community services sector, where qualifications are generally lower, capacity is constrained by limited mobility between low and medium to high-skill work. Romeyn, Buchanan and Fattore (2010) conclude that significant barriers to skill formation and career development exist in community services. Foremost amongst these barriers are the prevalence of low-cost funding models, high levels of casualised, part-time or agency-based employment and poor job perception in care work. Ultimately, these barriers have manifested themselves in severe staff recruitment and retention issues, high workloads, limited access to training and development and, in the not-for-profit sector, low pay. These conditions limit the notion of occupational pathways at both ends of the skills spectrum. As the Community Services and Health Industry Skills Council commented:

They can’t afford high pay rates. They can’t afford to pay for professional development. And they can’t afford to pay for expertise and skills gained. That’s the general principle. Generally the larger the organisation the more likely it would be that they would have career paths and professional development.

Amidst these workforce dynamics, the sector is also seeing industry reform by way of the introduction of the National Disability Insurance Scheme from 2014, as well as the progression of the Fair Work Australia equal remuneration case, which is seeking pay rises of 19–41% over eight years to over 150 000 workers (Community Services and Health Industry Skills Council 2012).

Recognised linkages within broad scopes of practice

This research seeks to explore how human capability might be (or is) developed around any vocational streams that may exist within a sector or industry. In order to explore this question it is important to first establish or understand the composition and nature of stakeholder engagements in the sector. In the health and community services sectors, discussions and deliberations relating to vocational pathways and enhancements to capability and competency have traditionally occurred in a deeply segmented way. Key informants for this project highlight that the industry is defined by strong and vocal stakeholders. In this context, Health Workforce Australia has been charged with coordinating a national approach to the health workforce and has sought to emphasise the elements of multidisciplinary team-based practice and the improved utilisation of the skills of the workforce. These elements are particularly relevant to the notion of vocational streams and the capabilities approach and were drawn out during the research process. Stakeholders were receptive to the notion of identifying and improving linkages between occupations, for example:

There's [sic] mainly issues around availability of enrolled nurses and that is going to extend into a longer-term issue around the availability of nurses more generally ... we're interested in the scopes of practice of enrolled nurses and registered nurses and the skills mix of those occupations in relation to assistants in nursing so that's important for us. (Health Workforce Australia)

The nurses union identified strong occupational and educational linkages between assistants in nursing, enrolled nurses and registered nurses. The pathway through each occupation typically requires a certificate III, a diploma with well-recognised core capabilities, and a three-year degree, respectively. Assistants in nursing and enrolled nurses across the age distribution undertake this path to higher-skilled work, with the conversion rate (from enrolled to registered nurse) estimated by the nurses union to be around (an historically high) 20–30%. There is significant mobility across practice areas such as critical care and aged care.

Other health professionals however tend to undertake highly specialised forms of education and training; for example, medical graduates progress through the ranks of intern, junior doctor, registrar and specialist over a period of up to 15 years. There is very limited mobility across specialisation due to the deep investment in education and training, and there has been a declining number of general physicians and surgeons, as doctors become increasingly specialised.

The shared recognition of imminent workforce crises suggests that stakeholders might be increasingly motivated to collaborate in order to explore how workforce shortages might be eased through the use of innovative human capability strategies. The idea of expanding the scope within and between healthcare occupations in a team-based setting represents a possibility for expanding capacity. As discussed later, however, notions of skills substitution are not uncontested. The initial logic of blurring occupational boundaries was highlighted by comments from the industry skills council:

Another challenge is the boundaries between what is an aged care worker and a mental health worker and a disability worker. Statistically two-thirds of people over 65 have a mental health issue and are disabled so even though you're an aged care worker you're dealing with mental

health and disability. So the boundaries are blurring [and] movement into different sectors of the caring is quite common. (Community Services and Health Industry Skills Council)

Strong examples of potential vocational streams exist in areas such as allied health and in nursing. These examples have been borne out in piloted projects, where the key features have been improved links between occupations, typically by expanding the scope of one (lower-skilled) role to release pressure on another (higher-skilled role); or by prioritising the need for generalist workers rather than more specialised counterparts.

The allied health workforce is a good example of where commonalities in skills, knowledge and capabilities exist, and is supported by both the higher education and VET sectors. Undergraduate degrees in health sciences, for example, define the vocation in terms of knowledge and skills in population health, public health, nutrition, Indigenous health and health services management. VET qualifications, including Certificate III in Allied Health Assistance, Health Services Assistance, and Aged Care, contain commonalities relating to client movement, infection control, occupational health and safety and medical terminology. Within the VET workforce, expansion of scope arrangements are being made in qualifications such as the Certificate IV in Allied Health Assistance and Aged Care, where competencies formerly in the domain of degree-qualified workers are now more broadly shared (Training.gov.au 2011a, 2011b). There are also suggestions of more generalist health workers, including a professional 'medical generalist' and 'allied health generalist' (Health Workforce Australia 2012). These generalist skills may include intake, assessment, and case planning and management and are particularly important for rural areas. Stakeholder consultation conducted by the Community Services and Health Industry Skills Council reported that, within community services, specialist qualifications existed at the expense of the development of core skills within more generalist qualifications (Community Services and Health Industry Skills Council 2012). As the Victorian Department of Health suggested:

What we're trying to build is a medical workforce in hospitals, building on the existing general physician and general surgeon workforce that is able to deal pretty flexibly across a range of different disciplines within their areas of training ... The onus is really on the employer and government to articulate how it wants to employ these flexible generalist roles in greater numbers to deliver specific services.

This latter comment was broadly corroborated by the Australian Medical Association and the Faculty of Medicine at Sydney University, both of which suggested that the prevalence of general physicians and general surgeons in public hospitals had diminished over the last 20 years, with problems therefore raised in patient care in the gap between, for example, emergency and specialist care, where a general physician might once have coordinated assessment and clinical management.

In Victoria, numerous demonstration projects were supported by the Workforce Innovation Grant 2010–11, focusing on expansion and utilisation of the health workforce (Victorian Department of Health 2012). These projects included scoping for an allied health assistant role in social work, an occupational therapy assistant, and developing remote supervision and communication models for allied health workers in remote communities.

The department also trialled two nurse's assistant models, with the assistants responsible for daily living activities, basic mobility and manual handling, thus freeing up the nurses for more complex clinical tasks. Importantly, the nursing assistants were deployed on top of existing staffing levels. The

evaluation reported cost savings by way of reduced overtime, positive staff and patient feedback, and greater workforce capacity and sustainability (Victorian Department of Health 2012). Despite concerns relating to clarity of roles and structures of supervision, there appears to be strong support for further development (including the rollout of more nursing assistants in a case study at Austin Health) of an appropriate training model. The key risks were identified as maintaining the support of external stakeholders, the sustainability of recruitment and training, and the strength of governance and quality assurance procedures.

Fostering links between healthcare occupations confronts the difficult issues of upholding job standards and role clarity while simultaneously blurring the occupational boundaries. Concern was expressed by the Australian Medical Association and the Faculty of Medicine at Sydney University about the use of other health professionals to provide a total diagnosis and assessment, thus replacing doctors. Both informants suggested that the scope for role substitution or expansion is likely to be more workable in a public hospital setting (where team-based practice is already more commonplace and access to doctors is routine), where, for example, a patient is more likely to work with a nurse practitioner and doctor, and not a nurse practitioner rather than a doctor (as might be more likely to arise in a primary care setting).

The projects discussed above highlight the opportunity to enrich the skill levels of all members in a team-based practice. However, strong concerns are expressed about diluting the skills mix, for example, by replacing registered nurses with nursing assistants, instead of recognising the roles of both within a broader team. There are key issues here – of affordability versus deskilling and of expanding capacity versus degrading the role of one or more occupations. The management of such concerns require careful (and early) consultation within the professional, industrial and regulatory domains and represents the core challenge. The complexities are highlighted by the comments below:

The suggestion that a person with lesser qualifications is somehow better positioned to do the work in a more complex environment defies basic logic. [Also] there is an assumption built in to that that nurses can split their tasks up, and say that helping a patient in the shower is something you don't need to have a degree to do. [However] in a busy ward these days, the chances for you to communicate with a patient are limited ... it tends to happen when you're having that face to face care provision, for example, in the shower. And so as you get to talk to them you get to assess their skin, you get to assess their mental state. These things happen at the same time ... [But] employers have said no, that's a waste of a degree qualified person. You can go around and look at charts and speak to doctors, but everyday things like taking someone to the shower, helping them have a meal, looking at a basic dressing ... [that's] now looked at as not a nursing job. And for nurses, that is a spectacular part of what makes nursing attractive.

(Australian Nursing Federation, Victoria)

Institutional challenges to greater capacity

While stakeholders in this industry remain highly motivated to explore issues of human capability through skill definition and recognition frameworks, this represents only part of the workforce capacity discussion. In the context of workforce shortages and the future affordability of healthcare, the debate around occupational linkages, via role substitution and the expansion of practice scope, is ongoing, but is set against some serious challenges. These include the supply of clinical training placements and demands on existing practitioners (Brownie, Bahnisch & Thomas 2011a) and fragmented approaches to workforce development and funding. In particular, the Australian Medical Association, the nurses union and the Faculty of Medicine at Sydney University flagged an imminent

crisis in internship placements following a doubling of medical graduates without commensurate planning for their postgraduate training. The Faculty of Medicine also drew attention to excessively long training times for doctors (five to 15 years to specialise) and suggested that a key cause was the fragmentation of training delivery (between universities, the Health Education and Training Institute, and the medical colleges). The Faculty of Medicine highlighted that ‘perverse incentives’ existed for medical students, noting that procedural specialties (such as cardiology and gastroenterology) are remunerated more favourably than areas where shortages now exist, such as palliative care and geriatrics. These challenges (funding, clinical training placements, training delivery and incentive structures) in the training of doctors and nurses could be regarded as first-order priorities in the expansion of workforce capacity. Issues of role substitution and expansion then are important, but secondary. Across all these debates, however, the institutional structure is likely to have a profound impact.

The dominance of occupational groups, and the allied issue of upholding or breaking down occupational boundaries, was a recurrent theme throughout the research. For example, medical colleges may resist reforms in the training requirements of medical graduates and interns, as well as changes in incentive structures; nurses may resist the integration of nursing assistants and, similarly, doctors may show reluctance to accept nurse practitioners within what is traditionally doctors’ scope of practice (for example, prescribing medication). Given widely acknowledged work intensification, long hours and heavy case loads, the resistance is not to greater workforce capacity, but to a lack of clarity around roles, and the threat of existing roles being degraded or substituted.

There is resistance from a lot of doctors [to physician’s assistants and nurse practitioners]. They see it as denigrating their professional role. [One] problem is the fee structure and how they actually fit into the system. In America it took twenty or thirty years to get where they are now. It took them a hell of a long time to work it out. (Faculty of Medicine, Sydney University)

The vocal and sometimes adversarial nature of institutional relationships was highlighted in the following comments:

In terms of our relationship with the groups that we deal with, if you look at the public hospitals and the State Health Department and the Minister, we often operate in a sort of a ‘trade union’ way so in that sense it’s an adversarial relationship. (Australian Medical Association, NSW)

We’re not pushing to invade you know, what is doctors’ territory traditionally, and that’s not just because we don’t want our territory invaded ... Doctors don’t have to explain what their role boundaries are, they’re whatever they say they are. But we are always expected to be defending our patch constantly. (Australian Nurses Federation, Victoria)

The tension between occupational boundaries is perhaps best demonstrated in aged care, where the health workforce is particularly diverse and arguably fragmented. Health Workforce Australia undertook a case study of aged care (‘Caring for old people’), aiming to challenge entrenched norms. Using 20 demonstration projects, it sought to respond to a number of identified issues: traditionally defined roles that are inflexible to changing service needs and a workforce fragmented across sectoral and professional boundaries (Health Workforce Australia 2012). They found that there were strong commonalities in the skills and knowledge across disciplines and promoted a shift away from traditional professional demarcations. However, substantial barriers to implementing systematic reform driven by these results from Health Workforce Australia exist, including significant industrial issues associated with expanding the scope of existing roles and the emergence of new roles, as well as management of costs; the ability of the VET and higher education system to support interdisciplinary practice and pathways and meet workforce needs; and the importance of upholding

technical excellence and job standards while blurring the occupational boundaries. As elucidated in the Productivity Commission's Inquiry into Aged Care:

[Tensions arise] between issues of safety and cost control and a desire of existing professional groups to defend their turf and bring care assistants under the auspices of regulated professions ... many decisions still reflect the power of entrenched interests and a narrow understanding of the workforce as radiating outwards from a core of the professions and specialties.

(Brownie, Bahnisch & Thomas 2011a, p.26)

The tension is borne out in the education and training system, which is divided between self-accrediting universities and autonomous health profession registration boards, and the consultative practice of the industry skills council and its qualifications:

In Australia if we want to set up a qualification in the VET space we have to demonstrate under the national system that we've exhaustively [*sic*] consulted, widely consulted a number of occasions and we'll have workers, we'll have subject experts, we'll have consumers, we'll have leaders, we'll have health professionals, we'll have government, not-for-profit, we'll have everybody in there to get a consensus view, but who determines what the skills of a doctor are? Other doctors.

(Community Services and Health Industry Skills Council)

These comments highlight the benefits of qualifications developed in a nationally consistent, consultative manner. However, the value of a qualification, to the extent that it confers on its owner value in the labour market as well as the intrinsic value attached to meeting the required educational standards, depends on much more than this process. There need to be high trust levels in the learning and assessment processes, the institutions themselves, governance, and the outcomes attached to the qualification. There exist significant questions around the quality of skills associated with lower and mid-level VET qualifications (Australian Workforce and Productivity Agency 2013), without a commensurate mistrust of higher education qualifications.

With respect to the regulatory domain, a national registration scheme has governed ten health professions since July 2010, with a further four added in July 2012.² There are no nationally uniform requirements or checks for occupations, apart from these, before an unregistered health practitioner can commence practice, and nor are there mechanisms (except New South Wales, and under consideration in South Australia) for limiting incompetent and unprofessional practice. In aged care, for example, there is no minimum requirement of a Certificate III in Aged Care for care workers, raising serious questions about health and safety issues. Yet in child care, a four-year degree-qualified teacher is now required in each child care facility, despite university qualifications traditionally lacking a focus in early childhood education. As the industry skills council remarked:

I'm amazed that the aged care workforce is not regulated with a mandatory qualification because we set up our 14 national boards [where] there is a concern about the quality of care, but the aged care workforce deals with the most complex, the part of the workforce that needs the highest level of care and we don't regulate it ... The reality is that if we regulate I think government are a bit concerned that will create such a wage push.

(Community Services and Health Industry Skills Council)

² The initial ten included chiropractors, medical practitioners, nurses and midwives, dental care providers, optometrists, osteopaths, pharmacists, physiotherapists, podiatrists and psychologists. The additional four were Aboriginal and Torres Strait Islander health workers, Chinese medicine practitioners, medical radiation practitioners, and occupational therapists.

In this context, in February 2010, the Australian Health Workforce Ministerial Council (AHWMC) agreed to undertake a national consultation of whether, and what kind of, further public protection measures are necessary for unregistered health practitioners (Australian Health Ministers Advisory Council 2011). The options currently being explored include no change, strengthened self-regulation,³ and a statutory code of conduct.⁴

Despite the focus on entrenched institutional divides, we have documented numerous pilot and demonstration projects that tackle the issues mentioned above. In New South Wales, an example of a successful collaborative clinical health network arose in 2001 when the then Health Minister established the Greater Metropolitan Transition Taskforce to promote equitable treatment and outcomes for all residents of Greater Sydney (New South Wales Department of Health 2004). Across 15 clinical programs, working groups were convened, consisting of doctors, nurses and allied health professionals, service managers as well as consumer representatives, with an emphasis on communication and inclusiveness. While the health outcomes, in terms of quality of care and equity of outcomes, are undoubtedly the key strength of the network, the taskforce itself 'regards the initiation of a culture change towards greater clinical governance as its most significant achievement ... clinicians, managers and consumers have demonstrated a remarkable enthusiasm to join forces across historical divides, analysed the current provision of services for the particular patient group, identified gaps and current and future pressure points' (New South Wales Department of Health 2004, p.8). According to the Sydney University interviewee, it is a testament also to the potentially obstructive or facilitative role of the government, that the network was established outside the bureaucracy of New South Wales Department of Health. The following comments attest to the complexity of the challenge:

It requires leadership from the clinicians, from the community, from managers, and from bureaucrats and government, and it also requires political will ... [and] clinician engagement. It's involving, in a meaningful way, clinicians, and by clinicians I mean doctors, nurses, allied health. In all our networks we had all those people with equal standing.

(Faculty of Medicine, Sydney University)

In summary, the notion of vocational streams has been explored through initiatives on role substitution, expansion of scope, and the positions of generalist workers (from allied health assistants to general surgeons). In particular, care work and nursing, and the allied health professions were highlighted as readily providing linkages between occupations. The importance of intermediate occupations such as enrolled nurses and allied health assistants was made paramount, both from system sustainability and capacity perspectives, as well as for their role in providing pathways between occupations and sectors of tertiary education. However, the institutional barriers to realising the potential of these vocational streams are numerous and challenging. Fragmented approaches to learning models, accreditation and regulation are mediated by strong occupational groups as well as TAFE institutes and universities, which are bound by different accreditation structures. These groups may be adversarial, but voice the critical issues of maintaining educational as well as job standards and, as yet, there are few examples of forums that engage the various groups in a meaningful and open manner. While Health Workforce Australia is tasked with a nationally coordinated workforce plan, there remain substantial impediments to dealing coherently with the level of overlap embedded in entrenched occupational boundaries.

³ Under this option, professional associations and industry bodies with the support of government would set out professional standards in a voluntary code of practice.

⁴ Similar to the current Code of Conduct in New South Wales, this would act as a 'negative licensing' mechanism, which provides for a set of standards applicable to all unregistered health practitioners as well as effective remedies against those who fail to comply with the standards. This option is less costly and more targeted than statutory regulation.

Engineering

In order to understand how human capability issues are explored and understood in engineering vocational streams, it is important to recognise the key issues of concern for the sector. Key informants for this project argue that the engineering sector is deeply influenced by the recognition that a skills crisis (a widespread skills shortage) has existed for more than ten years in some disciplines, such as civil engineering, and, without significant intervention, is predicted to be prolonged. Engineering skills across the trades and technical and professional occupations currently dominate the national skills shortage list compiled by the Department of Education, Employment and Workplace Relations (2012b). This has particularly affected civil and electrical engineers and the electrotechnology, telecommunications and automotive trades. Demand for these engineering skills has been driven by growth in the resources sector and in defence and infrastructure projects, including the National Broadband Network, and clean energy/sustainability initiatives (Australian Government 2012). Demand from the resources sector in Queensland and Western Australia has also exacerbated shortages in the manufacturing, power and traffic sectors (in both the trades and professions).

Trades workers in automotive, electrotechnology and telecommunications trades remain some of the hardest vacancies to fill (Department of Education, Employment and Workplace Relations 2012a). Feedback from the Communications, Electrical and Plumbing Union highlighted low apprentice wages, limited exposure to engineering maths at the secondary school level, and inadequate resources allocated to training across public and private sectors as key reasons for the low rates of apprentices entering and completing their trades training. They explain:

We've got around about twenty-five, twenty-six thousand people in training across all levels of our apprenticeship program. That really should be up around the twenty-seven, twenty-eight thousand. It's been at that level, hovering around that [level] for the last 15 years ... We've got rates of pay that are structured for apprentices reflective of when I started my apprenticeship [30 years ago] where you get around about 40% of the tradesman's rate ... So you get a very poor pay rate. It's akin to the unemployment benefit. (Communications, Electrical and Plumbing Union)

The engineering profession faces a severe skills shortage, particularly amongst experienced engineers. Skilled migrants comprise over half the supply of newly qualified engineers (Watson & McIntyre 2011), with over 52% of the engineering labour force born overseas, compared with 27% of the overall labour force (Kaspura 2011). Even so, a reported 47% of vacancies remain unfilled (Department of Education, Employment and Workplace Relations 2012a), the highest of all professions. Consult Australia (2010) also finds that employees are being poached in 75% of large firms. The growth in engineering graduates has been driven by overseas students, while attrition rates remain high, both amongst students and qualified engineers (Watson & McIntyre 2011).

The shortages in engineering skills have arisen in part as a consequence of publicly owned utilities being restructured and sold and, from the 1980s and 1990s, engineering work being outsourced. During this time, public sector utilities workers dropped from 95.9% to 54.7% of industry employment (Australian Government 2012). Until that time, training efforts were concentrated in public sector graduate and cadetship programs (in both the trades and professions), with many experienced engineers and trades workers moving into the private sector later in their careers. The responsibility for the training of engineers and technicians has fallen to the private sector, which, constrained by serious skills shortages and the pressures of competitive tendering, struggles or neglects to invest in training and workforce development. The strong preference now for hiring experienced engineers

(five to ten years experience) creates the dynamic where ‘there can be simultaneously high levels of graduate unemployment and shortages of engineers’ (Australian Government 2012, p.65). Meanwhile, salaries for experienced engineers in the private sector are higher and have seen faster growth than salaries in the public sector (Kaspura 2011). This has exacerbated shortages in the public sector, amidst the long-term decline in public sector engineering capability.

Mobility across industries, and upwards within specialisation

Pathways in both the trades and professional engineering are highly structured. Professional engineering requires the completion of a four-year degree (for professional engineers), a three-year degree (engineering technologists) or two-year associate degree/advanced diploma (engineering associates). In order to gain recognition in these occupations, educational programs must be accredited by Engineers Australia, the national body responsible for accreditation of education programs and the setting of occupational standards. In the electrical trades, cited as the strongest platform for articulating into engineering (Karmel, Lim & Misko 2011), licensing (to operate as an electrician, for example) typically takes place at the end of a four-year apprenticeship. These highly structured programs tend to specialise quite early and there exists relatively low mobility for those wishing to formally ‘switch’ specialisations, for example:

If I was a mechanical fitter and I wanted to become an electrician, I would probably get about six to eight months credit against [the] electrical trade ... there isn't a cross-fertilisation in any dramatic sense. If a mechanical fitter, or a boiler maker, or a fabrication trades person wanted to do the electrical trade, it's really pretty much start again.

(Communications, Electrical and Plumbing Union)

Research participants indicated that, in both the engineering trades and professions, there is limited horizontal mobility between occupations. Rather, individuals are more likely to specialise vertically within their discipline or traditionally defined area of practice (such as mechanical trades, or civil engineering) and/or move into managerial positions. While there are some commonalities in the knowledge and skills acquired (for example, basic fabrication and welding in the trades; computing and design in engineering), specialisation tends to occur quite early in the training and education programs. Some have argued for later specialisation in engineering, with core studies focusing on the technologies used in practice, including design, modelling and simulation tools (King 2008, p.95).

Where occupational mobility is limited, however, deployment of engineering skills across industries is common. For example, while trades workers, technicians and professional engineers work across the mining, construction, manufacturing, transport and utilities industries, they are generally working within their area of specialisation. Strong occupational labour markets, characterised by the well-recognised value of qualifications, overseen by occupational associations such as E-Oz and Engineers Australia, support strong cross-industry mobility. This feature is unique amongst the four sectors in our study. As highlighted by comments from the Communications, Electrical and Plumbing Union:

You might just like to go into maintenance work where you're working on computer control, manufacturing equipment, or [into] the lift industry, or working in mines, or in transport stevedoring on their cranes ... [or] they might go and specialise in air conditioning and refrigeration, or they may go off and do energy management in relation to the electricity industry, or into sustainability where they'll be working on photo[voltaic systems].

Intermediate, or paraprofessional, occupations – typically engineering associates or technical officers with diploma, advanced diploma or associate degree qualifications – have been highlighted as a key

strategy for alleviating skills shortages at the professional engineer level and for supporting mobility (Dowling 2010). However, Consult Australia (2010) suggests many engineering firms are struggling to find civil, structural, electrical and mechanical drafters. While enrolments in associate degrees in engineering have expanded significantly from a low base between 2002 and 2011, those in advanced diplomas have dropped by 11% (Moodie & Fredman 2013), and the proportion of all engineering graduates with these two-year qualifications is only 5% (Engineers Australia 2010). The main differences lie in the depth of these roles, the scope of understanding of the relevant sciences, mathematics and engineering, and their engineering application ability. (For example, professional engineers are responsible for integrating technical and non-technical considerations and managing risk and sustainability issues.)

Only 1% of VET completions in engineering technologies are at the paraprofessional level (Watson & McIntyre 2011). Moreover, some research shows that up to 50% of those studying at the paraprofessional level would like to use their qualification as a bridge into professional engineering (Dowling 2010). Yet the completion rates of the small number who transition into a degree are around 20%, compared with 65% for all engineering students (Watson & McIntyre 2011). Watson and McIntyre (2011) and Godfrey and King (2011) identify a number of reasons for barriers to a flourishing paraprofessional engineering workforce, as well as barriers to smooth transitions between vocational education and training and higher education, including:

- There is a lack of foundational knowledge in maths and physics in the VET training package framework to support either working in technical occupations or higher levels of study. Very few VET engineering programs have been accredited (or even applied for accreditation) by Engineers Australia as containing the level of technical knowledge required by their Stage 1 competency standards (see Watson & McIntyre 2011, p.56, for a list of accredited programs).
- A large number of private registered training organisations (RTOs) and a weak regulatory framework with respect to the quality of providers led to inconsistency in the standards of equivalent VET courses.
- Employers, as well as higher education institutions granting admission/credit, have difficulty understanding the skills and knowledge contained in a particular VET engineering qualification.
- Flexibility in the training package framework of vocational education and training also leads to strong variability in the units studied in any particular VET qualification and necessitates case-by-case consideration of credit granted to students seeking articulation from vocational education and training to higher education. David Dowling describes the credit transfer practice at the University of Southern Queensland:

Two approaches [to granting credit] are used: credit is granted in accordance with a negotiated articulation arrangement between the university and the relevant VET institution. [Otherwise] the qualifications of each applicant are carefully assessed to identify prior learning. Credit is then granted for that learning. This approach ensures students are not granted credit for topics they have not studied, or not studied in sufficient depth. To do otherwise would set them up to fail.
- There is difficulty in achieving the dual purpose of work-readiness and a bridge to further study due to differences in vocational education and training and higher education (see Dowling 2010). Innovation and Business Skills Australia (IBSA; 2010) gives the example that VET engineering qualifications do not include the calculus required for a first-year engineering degree as it is not required for the 'destination occupation', for example, as an engineering associate or technician.

The pathway between the trades and paraprofessional/professional engineering sees many of the same barriers, more so in civil than in electrical or mechanical engineering. Further, skill shortages in many trades, strong earnings profiles and the presence of work and family commitments at older ages diminish the incentive for trades workers to pursue the professional engineering pathway. One successful program facilitating this pathway, however, is the diploma program at Chisholm Institute of TAFE, which combines electronics, mechanical and computing expertise (Watson & McIntyre 2011, p.76). The program seeks to fill the gap between trades and professional engineers and targets early career trades workers, with about 20% of trades completions at Chisholm continuing on at the paraprofessional level.

High level of stakeholder cooperation

There are, however, a number of case studies in which the sectoral divide between vocational education and training and higher education is being managed successfully, where admission of students on the basis of VET awards is higher, and where retention and completion rates for these students are higher (Watson & McIntyre 2011). These case studies include Charles Sturt University, University of Western Sydney, RMIT University, Swinburne University, and the Australian Maritime College. Their success has been attributed to negotiated curriculum models, whereby both VET and higher education parties as necessary identify and eliminate knowledge and skills gaps for transitional students and provide additional support in areas such as career mentoring and academic literacy. Such partnerships require high levels of institutional trust and commitment, including resource allocation.

Many of these initiatives are examples of institutional collaboration in response to persistent skills shortages. Professional engineering in particular has mobilised stakeholders from educational, industry, employee and government groups in the form of the Australian National Engineering Taskforce, and has sensitised parliamentarians to their cause via the latest Senate enquiry (Australian Government 2012a). The recommendations arising from recent reports (Australian National Engineering Taskforce 2012; Australian Government 2012a) suggest genuine cooperation by considering best practice examples offered by employers, universities and TAFE institutes, as well as broad endorsement of solutions which challenge traditional approaches to knowledge and skill formation. A key example is the latest report released by the taskforce (2012). It provides broad-based consensus recommendations for addressing the engineering skills shortage, which have been broadly accepted by the Senate Enquiry into Engineering Skills Shortages. The recommendations include:

- targeting a greater supply of domestic engineering graduates at all Australian Qualifications Framework (AQF) levels and promoting engineering careers at the school level
- improving government engineering capacity and reviewing procurement models. The taskforce argues that the competitive tendering for engineering services has driven higher costs and waste and transferred the full responsibility of workforce development onto engineering firms
- establishing an Australian National Engineering Workforce Development Council, akin to the function of an industry skills council, comprising the members of Australian National Engineering Taskforce as well as representatives from vocational education and training and industry
- promoting greater levels of work-integrated learning, including cadetships, as a means of improving engineering education programs. While a more ‘industry-collaborative’ model of program delivery with a greater focus on business principles would require an examination of traditional approaches to curriculum and assessment, institutional relationships and the formation

of engineering knowledge and practice, it is seen as necessary to improve participation and completion rates in engineering programs (Trevelyan 2010; Watson & McIntyre 2011).

In summary, there appears to be limited scope to frame the development of engineering capability around a vocational stream: supported by specialised education and training, strong occupational markets dominate in traditional silos in both the trades and professional engineering. It may be the case that the vocational stream needs to be defined more narrowly, for example, as civil engineering, electrical engineering and mechanical engineering streams. Members of the engineering team would be expected to move between the specialisations in each of those disciplines. For example, a civil engineer should be able to work in, and move across, a specialisation such as water engineering, transport engineering, construction etc. These demarcations suggest that greater utilisation of the existing workforce will coalesce around strategies within rather than across specialisation. The Australian National Engineering Taskforce suggests that these strategies will include better tertiary pathways and work-integrated learning and improving the retention of qualified engineers. There is, however, a strong sense of institutional cooperation and willingness to endorse new solutions to a long-standing problem, including strong support for pathways and careers for intermediate/paraprofessional occupations. Initiatives within and across the VET–higher education divide, as well those by employer organisations, are endeavouring to build the engineering skills so desperately needed.

Financial services

The financial services sector represents an important contrasting case study. While the engineering, agriculture, and health and community services vocational streams might be characterised by a widespread recognition that a skills shortage is imminent and hence innovation relating to vocational pathways may represent a way forward, the finance services industry is characterised by contraction, along with low stakeholder engagement and collaboration in the area of human capability frameworks. It was also a stark contrast to the other sectors in our study insofar as there are no documented skills shortages, with financial services employment between 2010 and 2011 falling 4.9% compared with growth of 3.8% across all industries (Innovation and Business Skills Australia 2012). The sector continues to restructure in response to pressures from global uncertainty on its business models, and there is relatively low recruitment activity (Australian Government 2012c). The government projects banking employment to decline over the next five years, while overall industry growth will be virtually flat at 0.8% per annum (Australian Government 2012c). Instead of demographic headwinds, or inadequate pipelines of graduates or apprentices, the key workforce challenges highlighted by respondents were related to increasing regulatory and compliance requirements, technological change, and the blurring of job roles and skill requirements (Innovation and Business Skills Australia 2012).

The maturation of Australia's superannuation system ranks Australia's funds management system as the fourth largest in the world, and an increasing array of financial products, together with further growth in funds under management, positions the financial services industry strongly in the long term (Innovation and Business Skills Australia 2012). The industry is regulated by the Australian Securities and Investments Commission (ASIC) and the Australian Prudential Regulatory Authority (APRA), which are currently overseeing a suite of regulatory changes. These changes include changes in the International Financial Reporting Standards (IFRS) and the release of Basel III (a global banking regulatory framework), as well as increased consumer protection requirements and minimum training requirements for financial planners and advisers. This has significant workforce implications, particularly for growth in intermediate occupations such as compliance officers, mortgage brokers and financial advisers, who are typically qualified at a certificate III/IV or diploma level.

The workforce overall is highly qualified, with over 40% of workers holding at least a bachelor's degree, reflecting an occupational distribution where almost one in two workers is a manager or professional (ABS 2012). However, around a third of workers have no post-school qualifications and represent a large cohort of clerical workers in the industry (44% of the workforce).

Comments from Innovation and Business Skills Australia indicated that some intermediate occupations are used as stepping stones into further study and more highly skilled work. This is particularly the case for accounting clerks or paraprofessionals who articulate from VET accounting qualifications to university degrees. However, for a large range of occupations, VET qualifications are either only loosely linked to career progression (as in the case for the Certificate III in Financial Services for many bank workers), or an end in themselves (as in the case for occupations stipulated by the Australian Securities and Investments Commission Regulatory Guide 146 as having minimum training requirements. These requirements are set at certificate III or diploma level across a range of advisory activities). Respondents corroborated findings by Yu, Bretherton and Schutz (2012), who found a strong barrier in the workforce separating highly skilled workers with a minimum bachelor's degree from those in intermediate occupations. However, the regulatory changes discussed above and

consultations by Innovation and Business Skills Australia (2012) highlight the growing importance of this intermediate workforce to meet demand for compliance and advisory needs.

Dynamic occupational links with an organisational focus

For both VET and higher education qualified roles, respondents identified strong commonalities in the composition of skills and knowledge across occupations. Interestingly and in particular contrast to the issues facing the health and engineering sectors, the issues of human capability frameworks in the finance sector appear to congregate around the recognition of strong cognitive skills and how this might be facilitated to ensure the delivery of high-quality candidates to employers. Moreover, consultations by Innovation and Business Skills Australia indicated that employers see a convergence in information and communications technology (ICT) and business skills, shifting demand away from specialist, and towards generalist, skills (Innovation and Business Skills Australia 2012, p.16). Innovation and Business Skills Australia, for example, identified the following common areas across their qualifications:

We had an audit done of our training packages and there's a whole series of units that overlap. You look at – across industry is what we really call them, rather than generic, so cross-industry skills ... [They're] around customer service ... in the IT area ... management skills. Yes, there'd be things like budgets, projects, HR ... Compliance is another one ... Risk and governance.

Similarly, comments from the Chartered Financial Analyst Institute (in relation to the chartered financial analyst program, a global industry qualification broadly equivalent to a master's of finance) highlighted the advantages of studies supporting a range of occupations:

[Employers] are trying to identify some fundamental skills and knowledge that one would need to have in order to be proficient, or to quickly move into say a junior analyst role ... so we think about statistics, economics, financial statement analysis, those fundamental skills at a beginning level, at a base level, are very important to them ... What they [employers] like is the breadth of the skill sets that the CFA provides. So we are kind of a knowledge-based framework over which we have ten domain topics,⁵ and they really appreciate the rigour and the mastery level of the fields and [depth of] understanding ... The CFA program is more of a generalist [program]. We take a generalist approach to financial analysis and portfolio management ... which is appealing in that people can go on a variety of directions. (Chartered Financial Analyst Institute)

Importantly, these generalist⁶ skills support dynamic workforce capability, capability which starts at recruitment at the organisation level. There is a strong focus at initial hiring on cross-disciplinary, advanced cognitive skills (for example, analytical skills, problem-solving and communication), as highlighted in the comments below:

Most [graduates' background] would be more of accounting, economics, science ... maths degrees would be highly valued. And certainly individuals with arts [degrees] can enter. Engineers would be a high profile, a highly valued skill set as well ... The employers take a fairly broad approach to hiring individuals. So I can take someone with a maths degree, but then if I bring them into my

⁵ These include corporate finance, economics, financial reporting/analysis, quantitative methods, equity investments, fixed income assets, derivatives, alternative assets, portfolio management, and ethical/professional standards.

⁶ The reference to generalist skills here is distinct from 'generic' cognitive skills. Generalist here is vocational in nature, referring to a set of capabilities supporting a field of practice, and sits between generic cognitive/behavioural skills and specific occupational competencies.

organisation I am going to have to either put them through training myself, [something like] a CFA program. (Chartered Financial Analyst Institute)

Career progression is characterised as fluid, both between and within firms. As the comments above indicate, there appears to be recognition of a broad, vocational capability supporting transferability not only between firms, but also between sub-industries and occupations. At the firm level, this is often supported by strong internal labour market pathways, including investment in formal and informal on-the-job training. The dynamism of the workforce is such that employees are deployed into new occupations and withdrawn from redundant ones with relative ease. The vocational stream could be defined across a range of occupations (both within and between firms), including compliance clerk, business analyst, risk analyst and financial dealer, within a broad industry practice such as funds management, general insurance, or banking. Or it could be movement between equities analyst, derivatives analyst, financial broker and financial dealer roles. Respondents regarded such transitions, which were typically supported by some core disciplinary studies and/or strong on-the-job learning, as common. The importance of this dynamism is reflected in comments below:

One of the things we really struggle with is what the notional [value] of transferable skills are [sic] and how we capture that in qualifications, because it's not always clear ... [quite often] the manager will tend to say, 'Well, I need an X'. So trying to get industry to look and say, 'Anticipate that tomorrow you might need a Y. What is it that X has got that will help you make him a Y, or her?' It becomes a lot more difficult and a lot more complex. (Innovation and Business Skills Australia)

You could actually move from equity into fixed income, or fixed income into equity, because you have that base [knowledge]. And then also alternative investments ... And as new products come along, I mean people are able to deal with new products ... there's a lot of overlap in these fields and so ... Eventually they may try to move into portfolio [management] and become a portfolio manager, and then CIO, etc. ... [That] is the more common progression.

(Chartered Financial Analyst Institute)

Of the four sectors in our study, the financial services sector appeared to organically support the notion of vocational streams, especially at an organisational level. That is, the linkages between occupations are facilitated by strong internal labour markets, including on-the-job training, and a workforce development model which builds disciplinary (and organisational) capabilities on top of cognitive skills recruited at entry. Flexible business models, where innovation and contraction routinely change skills demands, as well as fluid occupational labour markets, underpin such linkages between occupations. As a result, respondents supported generalist education and training programs, where the core capabilities developed are not only employability skills, but vocational units such as knowledge of financial assets, risk and governance, and accounting, which support a range of career directions. This is reflected below:

I think that we should have much more open qualifications ... [Like] a very broad qualification footprint that then allows people if they want to specialise ... Something that's more encompassing, that allows people to either generalise or be specific, is probably more desirable ... with options that allow people to highly specialise at an appropriate level.

(Innovation and Business Skills Australia)

Implicit institutional collaboration?

Despite the obvious potential for framing capabilities within a vocational stream, this appears to occur most clearly at the organisational level. Unlike agriculture, engineering or healthcare, there is

little indication of a coordinated strategy (or at least strategic intentions) on workforce development at a systemic level. There are no taskforces, working groups or parliamentary enquiries which seek the consensus of employer, educational, government, union and community groups. While the industry skills council conducts wide-ranging consultations, it has limited influence over the pathways or outcomes of almost half the workforce, who are (and will be) degree-qualified. Other stakeholders, including employers, universities and associations promoting industry qualifications (including the Chartered Financial Analyst Institute, the Institute of Chartered Accountants etc.) do not exhibit the level of dialogue and cooperation seen in agriculture and engineering. Unlike the three other sectors, there are no imminent skills shortages or demographic headwinds and, as noted, it is regulatory changes which present the most pressing workforce challenges. In short, there has been no catalyst for explicit institutional collaboration relating to workforce issues.

However, where there is no explicit collaboration, a coherent and tacit respect for vocational capability appears to exist. That is, key informants readily acknowledged that a broad set of skills, knowledge and experience supports careers across occupational, employer and sub-industry boundaries, and that these capabilities receive tacit respect from institutional actors, including employers, regulators and educational stakeholders. These highly transferable capabilities are initially developed through both formal educational programs (including industry qualifications) and on-the-job learning, and are then often deepened at the organisational level. How sustainable this model of capability development is poses an interesting question, since, anecdotally, poaching practices have been common (a consequence of the high transferability of skills) and the capacity to pay for personnel is virtually unlimited, compared with the other sectors. In claiming that there has been no formal mobilisation of institutions to deal with workforce capability is not to say the industry isn't highly organised, or mobilised: it is, but around the promotion of industry interests (for example, the Association of Superannuation Funds, the Australian Bankers Association), or occupational interests (for example, the Association of Financial Advisors, the National Institute of Accountants). We regard the potential level of (explicit) institutional collaboration relating to workforce development as quite high, given the common and open understandings of vocational capabilities, but this will not necessarily reflect the forms of collaboration seen in agriculture, engineering and healthcare.

In summary, in financial services we suggest that broad yet tacit acceptance already exists for the notion of vocational streams and that a key dimension along which vocational streams could flourish is organisational. While existing institutional relationships, comprising industry and occupational associations, universities, employers, the industry skills council, regulators and the government, are highly organised around some issues, they are yet to be explicitly concerned with issues of workforce development. This is primarily because there exists a loosely defined, yet coherent, understanding of the skills and knowledge required across the sector – and there are no substantial workforce crises. Devolved to the employer level, there are also significant resources invested in recruiting, developing and utilising the capabilities of workers within an organisation's scope of practice. It is this combination of a fairly open yet coherent understanding of 'cross industry' capability, matched by a commitment by employers to deepen this in ways relevant to immediate organisational need, that defines the dynamism of this sector's system of workforce development.

Primary industries

The primary industries sector is an important case study for this research because of the profound and broad-sweeping changes facing the sector. As key informants for this project highlight, primary industries is in a period of 'skill transition', which means the development of human capability frameworks are changing too. In a sector historically characterised by informal and poorly recognised skill acquisition, employers and employees have been required to adapt existing skills to meet the demands of changing global product markets. As key informants for this project note, the primary industries sit at the nexus of substantial global and domestic change. From climate change to food security, and from policy reforms, including the Murray Darling Basin Plan and Clean Energy initiatives, the context for agricultural production faces significant uncertainty (Agrifood Skills Australia 2012).

Many of these pressures coalesce around the management of resources, which Australian producers have pioneered in areas such as water and land management, and sustainable farming practices. Agricultural production has benefited from major technological advances in areas as diverse as genetics, robotics, sensors and the use of chemicals. Where manual labour once operated, now GPS-guided tractors, computerised irrigation systems, laser levellers and harvesting technology prevail.

These technological advances have changed the skill needs of the modern agricultural workforce. Research participants noted that the traditional modes of accumulating skill purely through learning on the job increasingly needed augmentation with formal education to enable the acquisition of the technical skills associated with operating computerised and highly mechanised systems. Never before has the industry required such a technologically capable and business-astute workforce. Furthermore, the need for higher-order skills in the area of professional services (for example, agricultural and environmental scientists, veterinarians, chemists and business/finance advisors) is accelerating, and presents new and chronic problems (National Farmers Federation 2008). Indeed, the National Farmers Federation (NFF) cites six of the top seven in-demand occupations as being at trade-level or higher (2008). The following examples from Agrifood Skills Australia highlight this need for higher skilled workers:

They've got all this on-board equipment now, the technology there for fertiliser application or for chemical application, or they can tell you how much crop they're pulling off a certain part of the land, because it's all GPS-controlled. But they really can't get the data, they can't manipulate the data, or interrogate the data, if you like, to make meaningful decisions out of it. They still need that high level of skill.

(Agrifood Skills Australia)

These changes in skills demand are only one important dimension of the pressures on the agricultural workforce. Competition from other industries, of employment, the remote location of many job opportunities, the emigration of younger workers and the ageing of the workforce, combine to limit labour supply. Agrifood Skills Australia predicts that, by 2018, over a third of the workforce will be over the age of 65 (2012). At the same time, low levels of VET and higher education enrolments and graduates help to maintain skill shortages in many intermediate and high-skill areas (National Farmers Federation 2008). University graduates in agriculture have declined by 40% in the last ten years (Pratley 2012). Using job advertisement data, the Australian Council of Deans of Agriculture (ACDA) estimates that 4500 agribusiness and 1200 production management positions need filling annually at the university graduate level. This compares with about 700 graduates being produced each year (Pratley 2012). However, enrolments in full-time VET studies have seen steady growth between 2006

and 2010 (NCVER 2011). All these factors contribute to, and define, the serious problems of attracting and retaining skilled, semi-skilled and unskilled workers.

The workforce also features a large segment of contingent workers, those who work on a seasonal, casual, contract or labour-hire basis, or as skilled migrants. While seasonal (and increasingly, sub-contractor) work is fundamental to agriculture, the industry ‘acknowledge[s] that expecting labour to be mobile, on call and skilled is not sustainable if the nature of income is spasmodic, and the pathway to gaining skills unstructured’ (Agrifood Skills Australia 2012, p.16). Furthermore, work intensification and poaching of workers from competitors becomes the common response to shortages, exacerbating the fragmentation of work organisation and limiting access to learning opportunities (Pratley 2012). Interviewees further highlighted that barriers to mobility between low- and medium-skilled roles included poor literacy and communication skills and disaffection from classroom learning. Mobility for more highly skilled workers however was regarded as almost open-ended:

You’d exit [university] as an ag scientist, and you might find yourself working on a farm, or more likely you’re working in an ag business sector, either as an advisor – you’re working for a bank, consultants – those sort of careers are growing greatly. (National Farmers Federation)

While small operations are more time- and resource-constrained and are less likely to provide internal career paths, increasing corporatisation of the sector is bringing changes to job roles and work practices as well as to management culture and organisational structures (including changes to capital and risk management structures). The efficiencies and professionalism that accompany this form of aggregation has also opened up ‘career pathways which may mitigate the fragmentation of traditional work organisation’ (Agrifood Skills Australia 2012, p.16).

Stakeholders consistently remarked on the poor perception of working in agriculture, with the industry ‘perceived as synonymous with remoteness and basic jobs (as distinct from lifestyle and technology focussed careers)’ (Agrifood Skills Australia 2012, p.21). School students are little exposed to an understanding of food sources and the importance of agriculture to the economy, much less agricultural careers. Moreover, there is a lack of awareness of career opportunities across the supply chain in service/support industries, including chemical/fertiliser production and distribution, agricultural financing and marketing, transport and advisory services. Finally, a perception of ugly, environmentally damaging production systems is actually at odds with the pioneering practices in sustainable resource and environmental management. To address this problem of perception, the industry seeks to better promote sophisticated, socially and financially rewarding careers, particularly to potential and actual tertiary students. Many education and training initiatives and programs (in both vocational education and training and higher education) now offer internships, which give students a clearer perspective of what working in agriculture entails (Agrifood Skills Australia 2013).

Transferable skills for an agricultural vocational stream

There is a recognised lack of career paths in agriculture, in terms of their formalisation, recognition and promotion (Agrifood Skills Australia 2012). Yet the National Farmers Federation recognises that ‘the breadth of the spectrum of roles on farms in fact offers easy entry to the sector, with on-the-job training establishing many clear paths, which, coupled with formal practical, technical or academic training, opens the door to a vast range of long-term occupations’ (2008, p.19). This fluidity, traditionally supported by strong on-the-job training, was recognised in the 2011 phase of our study, but is embedded in fragmented work organisation and precarious employment. Thus, Agrifood Skills Australia suggests that the reality of articulating these career paths requires ‘focussing on

transferable skills between, not just a hierarchy of job roles, but jobs in other agrifood sectors and a realisation that ultimately, pathways between sectors may just be the genesis of a robust, adaptable and highly skilled agrifood workforce' (Agrifood Skills Australia 2012, p.25).

Vocational streams could be part of the solution to a sustainable agricultural workforce. Research participants readily identified a vocational body of knowledge and skills supporting many related occupations. This included animal science and husbandry, plant and crop science, production systems (for example, irrigation and fertilisers), operation of machinery and technology, sustainable practices (for example, water, land and carbon management), and agribusiness (for example, financing, marketing and economics). These responses applied to learning within both VET and higher education study, and many of these elements are included in a full course of study. Agribusiness in particular was cited as a strong candidate for facilitating links between vocational education and training and higher education; however, the underpinning science knowledge is lacking in VET graduates:

Quite a few of the universities recognise, say Certificate IV as an entry requirement into a degree, and a diploma from TAFE as having potential credit into a degree. The problem is though that it depends on which degree, and if it's an agriculture or agriculture science degree then one of the problems with giving credit is that the TAFE qualification doesn't have the enabling science underpinning it and so it's very hard to give credit when they've actually got to go back and do that science.

(Australian Council of the Deans of Agriculture)

Research participants thus all suggested that high levels of transferability of skills exist: horizontally, for example, from on-farm production to professional services (especially for university graduates), across sub-industries as a technician, and vertically into management roles, as well as across industries within a region. The underlying capability was often identified in terms of the knowledge and skills mentioned above.

Intermediate jobs – paraprofessionals and technicians – are rapidly expanding in the areas of sustainable practice, advanced machinery operation, and animal performance, nutrition and breeding. Employment-based training pathways do not exist for most of these roles, and Agrifood Skills Australia is trialling cadetship programs – taking students from high school to undergraduate study. (The Agrifood Skills Australia Career Access Pathway program is working with five schools as well as government, university and producers). Given the demand for skills at all levels, intermediate roles were seen as being both rewarding careers in themselves and stepping stones to higher skilled work:

[Intermediate occupations such as a food technologist] would be a natural progression for a person who's been in the industry for some time, has come from the shop floor if you like, but they're also a destination for recent [university] graduates as a stepping stone to working at a much higher level ... [University graduates] would come into a larger organisation.

(Agrifood Skills Australia Skills Australia)

The role of qualifications in supporting the primary industries vocational stream is less clear than for the other sectors in this study. In the context of the historically low levels of post-school qualifications, the government currently supports the upskilling of the agricultural workforce, for example, via the National Workforce Development Fund, to at least a certificate III level. The labour market value of these qualifications, however, not only depends on the consistency and transparency of the qualification (and how well this is respected by industry), but also on its ability to achieve acceptance within and between the educational, industrial and organisational domains (Maurice, Sellier & Silvestre 1986). Industry pressures are pushing the debate towards skill sets and away from full qualifications, although the New South Wales Board of Vocational Education and Training is

currently facilitating debate on a capabilities-based approach. Part of the push towards skills sets⁷ is related to cultures entrenched in on-farm learning with little engagement with the training system and with limited resources to release employees for formal study. The perception of having to pay more for skills recognised also plays a part in this. However, positive examples were also given:

The employers – they have to be cajoled or convinced that this [formal training] is going to be a positive outcome for their business ... [but] their perception of the training system has been changed by positive outcomes, and once they've experienced ... are reinforced through positive outcomes, they engage with the system. I'll give you an example: a large bakery was telling me that when they engaged with the VET system well they motivated their employees, their retention was increased, their productivity was increased. (National Farmers Federation)

Despite the challenges of formally facilitating pathways in agriculture, research participants easily recognised commonalities in the skills and knowledge underpinning a vocational stream in this field. Perhaps more importantly, a significant level of stakeholder and regional cooperation has occurred and continues to gather momentum.

Social partner collaboration, with a regional focus

Competition for workers in areas servicing both agriculture and mining has seen a struggle arise in agriculture, both in terms of supporting worker mobility in areas with rising living costs and attracting mechanical engineers, trades workers (electricians and plumbers especially) and large machinery/plant operators. As explained by Agrifood Skills Australia:

In the agrifood context, skills ecosystems are typically regional and recognise the deep interdependence of co-located industries and that only through collaboration and shared risk at the local level will regional Australia build sustainable and robust skilled labour pools capable of withstanding seasonality and varying business cycles. They harness the expertise found within local governments, regional businesses and the respective communities. They understand the pivotal role of local expert intermediaries and that in the regions, skills and workforce development are inextricably linked, and so too must be the solutions. When independently evaluated, AgriFood Skills Australia's cross-industry skills ecosystem pilot [Make it Work] in regional New South Wales was found to lift productivity of the local labour force by a potential 3.2% per year and reduce the net migration of workers by 33%.

(Agrifood Skills Australia 2012, p. 31)

Recognising the regional interdependency of both the agricultural and mining industries, in 2011 the Regional Agricultural and Mining Integrated Training (RAMIT) project, a joint initiative between the Minerals Council of Australia, the National Farmers Federation, and mining and agriculture industry skills councils, piloted a cross-sector, entry-level training and workforce development model in two rural locations (Morawa, Western Australia, and Emerald, Queensland). The model is being promoted nationally across other regional communities, with key features of its success including the engagement of industry and community representatives and local champions of the model, who have local knowledge and credibility (Skills DMC 2012). This follows the success of the 'Make it Work' project, a partnership between Agrifood Skills Australia and Narrabri Shire Council in northwestern New South Wales. The project created a sustainable local labour force by coordinating seasonal labour

⁷ Skill sets are defined as groups of units of competency designed to meet an individual's needs; a passport-style qualification would allow individuals to bundle together elements of prior learning and skill sets from different registered training organisations to meet desired certificate III targets.

needs across industries, including agriculture, mining, manufacturing, infrastructure management and retail, and providing cross-industry training, resulting in a Certificate III in Rural Operations.⁸ The model is being rolled out nationally in four locations between 2012 and 2014, supported by over \$4 million in funding. Part of its success is attributable to the tracking of seasonal skill demands across industry, as explained below:

The thing we need for each region is really a skills demand timeline so you can see what commodity is there, what's the peak activity, when the harvest is on, when the irrigation's on, whatever activities – it's taken up. If you map that across in a region, you'll find there's actually an opportunity for full-time employment, but not with one employer ... These [students] are actually trained across three industries, using that rural operations qualification. They're trained across, at Certificate 3 level, agriculture, local government and mining. (Agrifood Skills Australia)

In March 2012, the National Farmers Federation brought together 50 industry, government and education representatives to work towards a solution for labour and skill shortages in agriculture. The resulting Education, Skills, Training and Labour Working Group will play a leadership role in coordinating the workforce development efforts of industry, government and education sectors. In September 2012, the National Agribusiness Education, Skills and Labour Taskforce was also formed, with the purpose of promoting agricultural careers as an attractive option in the context of an ageing workforce and severe labour and skill shortages. The comments below explain the importance of such positive momentum across the sector:

We're a very fragmented industry and to have a whole range of people trying to gain the upper hand as it were is actually not doing anyone any good and I think they've realised that a collaborative approach is where it's going and working together, so I think that's happened ... politicians have become sensitised too, and so we now have bipartisan interest and sensitivity to this issue. (Agrifood Skills Australia)

This level of within-and-between-industry collaboration, featuring broad-based buy-in from industry, government and educational and community stakeholders, as well as local community coordinators and champions, is distinctive in our study. It should be highlighted, however, that these various networks and collaborations often lack the voice of an employee or profession-based member organisation, as seen in both engineering and healthcare. While this is an artefact of the fragmented agricultural workforce (fragmented along geographic as well as sub-industry lines), the limited employee representation has the potential to produce workforce development strategies and outcomes that do not represent the interests of this major stakeholder. For this reason, efforts to include community and local representatives are of heightened importance and need to be balanced with the industry, government and educational groups which dominate the collaborations mentioned above.

In summary, vocational streams in agriculture are underpinned by a high degree of transferability of skills and knowledge across the sector. The main dimension along which an individual can deepen their capabilities within the agricultural vocational stream is most likely regional. There are well-recognised commonalities in cross-occupational and even cross-industry knowledge and skills, with linkages facilitated by fluid labour market pathways. Strong levels of stakeholder trust and collaboration exist in recognition of the severity of the crisis and the fragmented nature of the industry, although a strong employee voice is missing.

⁸ The cross-industry skills include chemical application, transport and storage; operation, transport and maintenance of tractors, equipment and specialised machinery including backhoe, loader, ride-on vehicles and forklifts; operation and recovery of four-wheel drive vehicles; cleaning machinery of plant, animal and soil material; welding using manual and gas metal arc welding processes; traffic control (see Narrabri Shire 2013).

Vocational streams: potential and outcome

The research process in this phase of the project helped us to develop a more nuanced analysis of our initial findings of 2011. Based on the occupational segmentation found in phase one, we developed a hypothesis that the development of human capability was segmented by domains. These domains were characterised as ‘fluid’ – as in agriculture or financial services – where labour market progression and qualifications were loosely related, or ‘tracked’ – as in healthcare and engineering – where strong occupational labour markets are tied more closely to an explicit educational pathway (for example, apprenticeship or degree, along with licensing or registration schemes). Within each domain, three trajectories could exist: high skill, low skill, and marginal attachment.

The findings of this research show that these three trajectories can be differentiated further in order to better explain the variability in skill formation, both within and between different areas or disciplines of practice. For the purposes of this paper, a distinction is drawn between vocational stream *potential* and vocational stream *outcome*, as a way to qualitatively describe how a range of factors can influence the development of the vocational streams which ultimately emerge. We first consider the preconditions most likely to underpin a successful vocational stream model of workforce development – vocational stream potential – before considering how (current) realisations of these conditions can characterise outcome scenarios – vocational stream outcome.

Preconditions for vocational stream potential

A vocational stream is defined as a set of occupations linked by common disciplinary knowledge, skills and capabilities within a broader field of practice. The importance of establishing links between occupational groups was recognised, to varying degrees, in all of the case study sectors. The need for links between occupations was highlighted in financial services and agriculture, and especially in healthcare and community services, as a means for expanding workforce capacity. This flexibility is particularly critical for agriculture and healthcare and community services, given long-standing reports of skills shortages. Further, developing capability to support a broader notion of practice could create individuals better able to respond to change, which respondents in all sectors gave as an important outcome for developing students and workers. Finally, improved links between occupations, particularly from lower- through to higher-skilled roles, can support existing educational pathways policy, which promotes articulation from lower- to higher-level qualifications.

Consequently, we define the first precondition for a vocational stream model of workforce development as commonalities in capabilities: the successful identification of linkages and overlaps between occupations within a broad field of practice, strictly in terms of their knowledge, skills and capabilities. These linkages were evidenced strongly (both horizontally and vertically) in healthcare and community services, agriculture, and financial services. In agriculture, for example, respondents highlighted the transferability of skills and knowledge in animal and crop science, production systems and sustainability, machinery and technology, and agribusiness. In healthcare, a Health Workforce Australia study showed extensive commonalities across occupations in aged care. And in financial services, knowledge of financial asset classes and risk management allowed advisors and analysts to move across different classes of asset management and advice. In engineering, there was less blurring

of occupational boundaries, and mobility was more commonly characterised by vertical movement within specialisations (or horizontally across industries).

The identification of commonalities in the capabilities underpinning a scope of practice is essential to, but on its own insufficient for, the emergence of a sustained vocational stream model for workforce development. The second precondition concerns the readiness of the social partners, with the potential (realised or not) for institutional commitment and collaboration relating to workforce issues also an important underpinning factor. It involves catalysing and consolidating a community of trust⁹ around a common objective and includes not only compromise, management of conflict and pursuit of cooperative solutions, but also a commitment of resources. In particular, as was identified by Yu, Bretherton and Schutz (2012), it often requires the social partners (particularly employers) to carve out the space for individuals to develop the capabilities to thrive within their field of practice (for example, study leave or structured on-the-job training). This precondition recognises the importance of social capital, defined as the attributes of agents and of their relationships that enhance their ability to solve collective action problems (Ostrom & Ahn 2003). Ostrom and Ahn (2003) identify three forms of social capital: trustworthiness, networks and formal/informal institutions.¹⁰ Central to social capital theory is the notion of a common interest in potential conflict with individual interests, and it identifies trust as the key link between social capital and collective action. In each of the four sectors, we observed varying levels of social capital, ranging from tacit networks in financial services, to a complex web of formal and informal institutions in healthcare. The route to collective action, however, highlights how trust must be built over time, in our cases ranging from high levels of contestation in healthcare, to consensus among employer, union, and educational groups in engineering.

Vocational stream outcomes

The insights provided by key informants for this research highlight that a range of factors work to define these two preconditions of commonalities in capabilities and social partner readiness. These preconditions generate different ‘vocational stream outcomes’. Ultimately, the impact of stakeholder engagement, the degree of collaboration between stakeholders at the industry level, and the market context and operating environment within a sector all work to shape the vocational outcome that ultimately emerges within a sector. In the context of the case study sectors examined by this research, vocational stream outcomes can be categorised as belonging to four types: vocational segmentation (in the case of the engineering sector); vocational junction (financial services and health/community services); vocational consolidation (agriculture); and vocational fragmentation (not captured in our project).

It is important to note that these four ‘outcomes’ are not static and may be mobilised to move from one scenario to another. As discussed, in engineering, health and community services and agriculture, widespread skills shortages have triggered widespread consultation and differing degrees of institutional cooperation. In healthcare, these imminent workforce crises may shift the readiness of social partners from one of divisiveness across occupational silos, towards one of consolidation. In financial services, existing tacit forms of collaboration could well be formally mobilised around issues of skills should the need arise. In engineering, there are some who call for less specialisation in the

⁹ See Wheelahan (2009).

¹⁰ Institutions are defined broadly as prescriptions (formal, and enforceable by a public authority, or informal) that specify actions/outcomes which are required/prohibited/permitted, and sanctions. Institutions are effectively, ‘the rules of the game’, and when dealing with collective action problems, individuals need to invest in devising, revising, monitoring and sanctioning their working rules.

formal education and training pathways, which could open up greater commonalities in underpinning capabilities across the workforce.

It is also worth noting that the key regional and organisational manifestations observed in agriculture and financial services, respectively, could emerge across any of the three outcomes, and are neither a precondition nor outcome in and of themselves. Rather, we argue that these regional and organisational aspects emerge from the broader skills ecosystem context, discussed above.

Vocational stream outcome 1: Segmentation (engineering)

The defining characteristic of this outcome scenario is a real or perceived lack of commonality in underpinning knowledge, skills and capabilities across occupational boundaries. Without this first precondition, the second precondition (social partner readiness) is rendered weaker. (This is not to undervalue the importance of institutional cooperation more broadly, but to recognise its limitations in building a vocational stream.) Interviews with key informants in the engineering sector suggested that strong social partnerships are more likely to support pathways through trades and paraprofessional occupations within rather than between specialisations.

In engineering, the scope for developing capability by improved linkages between occupations appears limited to vertical linkages within specialisation (for example, from civil engineering draftsman to civil engineer), rather than across such boundaries. This arises because education and training programs and subsequent career paths tend to be quite specialised from an early stage, with limited scope to move across occupational boundaries. Groups such as the Communications, Electrical and Plumbing Union, E-Oz, and Engineers Australia who define the requisite training, completion and registration/licensing standards mediate each set of traditional occupational boundaries. Insights from the key stakeholders highlighted the difficulty (and rarity) of transferring from one discipline to another, both within the education and training system and the labour market. Rather than improve links across these boundaries, strategies to enhance workforce utilisation include ensuring better tertiary pathways within a discipline (with a focus on the paraprofessional/technician workforce), targeting greater retention of qualified engineers, and improving work-integrated learning for students. Integral to this is improving the structures of on-the-job learning, including internships, cadetships – even potentially quasi apprenticeships. Given the public good aspect of on-the-job training of this nature, a case could be made for directing public funding into supporting such structured arrangements.

In engineering, it is not for lack of institutional cooperation that a workforce crisis persists. In particular, the Australian National Engineering Taskforce brings together the largest employer, union, university and industry groups to propose solutions endorsed by its partners. These partners have worked together to promote greater engagement across industry and universities and have proposed an industry skills council-type body to oversee workforce development across the vocational education and training and higher education sectors. Significant work is being undertaken to promote a stronger paraprofessional/technical workforce, with strong examples of best practice models to build from. The highly specialised nature of engineering work, however, means that expansions in workforce capacity are unlikely to arise by fostering links between the different occupational silos.

Vocational stream outcome 2: Junction (healthcare and financial services)

The junction scenario is characterised firstly by recognised linkages between occupations within a broad scope of practice and secondly and, more importantly, it is identified by a hitherto absence of

institutional collaboration. The health and community services sector and the financial services sector case studies provide divergent examples of how this scenario might look.

In healthcare and community services, commonalities in capabilities were very clear. This was seen at both lower and higher skill levels, with respondents citing commonalities in knowledge and skills as underpinning the potential for generalist roles (from allied health assistants to surgeons), as well as role expansion and substitution in areas such as nursing and allied health. The links between otherwise more specialised occupations are the subject of policy development by Health Workforce Australia, including pilot projects and other studies. These links within a care, allied health, or surgery vocational stream create strong opportunities to expand utilisation of the existing workforce and increase much needed health workforce capacity.

However, the complexities of public health risk and models of care, registration and regulation, role clarity and occupational standards, and the interplay of educational, occupational, and government stakeholders make it very difficult to take advantage of the natural linkages between siloed occupations. Strong traditional occupational boundaries are mediated by equally strong occupational groups, including the Australian Nurses Federation and the Australian Medical Association, although in community services, occupational groups are more fragmented. Despite the many examples given of opportunities to expand workforce capacity by leveraging the commonalities between occupations (and releasing highly skilled staff for more complex problems), institutional complexities present significant barriers to a swift solution. A key threshold issue for engaging with a vocational framework in healthcare and community services will be how, within team-based practice, skills expansion can be made available to all team members. Respondents highlighted significant barriers arising from institutions and lobby groups that have traditionally held autonomous positions in upholding their occupational boundaries and historically low levels of communication and trust. The legacy of these institutional divisions, and the importance of upholding occupational standards, must now contend with an increasing desire to take a whole-of-workforce approach to increasing workforce capacity.

Whereas in health and community services the ‘junction’ is characterised by long-standing institutional divisions, these same junctions in financial services are characterised by an absence of formal stakeholder engagement and a devolvement of workforce issues to the organisational level.

The financial services sector was unique in our study due to the relative absence of institutions explicitly mediating the workforce development space. The links between qualifications and labour market progression are tenuous and workforce planning mostly takes place at an organisational level, with a focus on initial recruitment, followed by strong internal labour market pathways. Unlike the other three sectors, respondents cited the regulator as the significant institutional player affecting workforce development requirements, with little reference to industry, employee or educational stakeholders. This is not to say that the industry is not organised around areas of practice, rather that collaboration on workforce issues is implicit rather than explicit, with the absence of any workforce crises meaning that no formal mobilisation has yet been required.

Nevertheless there is a system-level tacit respect for how these broad capabilities are developed, evidenced by high levels of mobility across sub-industries and firms. However, the high degree of transferability of skills and strong investment in workforce capability at the firm level raise issues about the poaching of staff and remuneration/incentive structures. The links between occupations are dynamic and commonplace. Recruitment typically focuses on high-level cognitive skills, such as communication, problem-solving and analytical skills, and may be across disciplinary areas, including engineering, maths, computing science and business. Further formal study typically supports core

disciplinary knowledge and skills in broad practice areas such as asset management, general insurance, life insurance, or wholesale and retail banking. Such a flexible workforce can be deployed to newly created occupational titles or withdrawn from redundant ones, with on-the-job learning being the key driver. More so than the other sectors, financial services exemplified how a vocational stream flourishes at an organisational level, with internal labour markets characterised by strong recruitment and investment in internal training and career progression.

Vocational stream outcome 3: Consolidation (agriculture)

We characterise a third outcome as having both recognised linkages between occupations in terms of underpinning capabilities and a high degree of social partner readiness. Insights from key stakeholders in agriculture suggested a high level of cross-occupational mobility, as well as broad-based input – and a commitment of resources – into collaborative solutions for long-standing workforce challenges, particularly at the regional level. This is not to suggest that the challenges are receding or that institutional cooperation entails uniform agreement, only that there is genuine scope and desire to expand workforce capacity in line with a regional scope of practice.

In agriculture, the links between occupations were evident, with graduates (especially university graduates) able to work across areas of animal health, crop management, agribusiness and advisory activities in a fluid labour market. At the high-skill level in particular, the notion of the vocational stream is supported by broadly specified knowledge and skills contained in degrees and higher-level VET qualifications, movement towards integrating industry experience via cadetships, and institutional cooperation to promote the diversity of agricultural studies and careers.

Apart from high-skill work, however, the dominance of seasonal work and labour-hire contractors, along with the old traditions of informal learning and limited investment in formal learning, create difficulties in leveraging these advantages, resulting in an approach different from the other sectors. The industry has moved towards qualifications which support regional capability. This raises the possibility of a regional scope of practice, where commonalities in knowledge and skill are characterised as those common to an area; for example, combining viticulture, wine making and hospitality. This notion of a regional scope of practice characterises the success of the Narrabri Make it Work project and is being explored in further rollouts.

High levels of institutional cooperation within these regional scopes of practice led to the success of models such as the Make It Work project. This project involved managing seasonal pools of labour across the mining, agriculture, infrastructure and manufacturing industries and required leadership from community, educational, government and employer bodies. These stakeholders continue to establish new workforce development models, which leverage capabilities relevant to a regional area. Unlike the other sectors, collaboration has taken place across industry,¹¹ across institutions (for example, employers and community groups) and at different levels of government. The notion of regional capabilities has gained considerable traction, although in terms of education and training, it has manifested via broad support for quite narrowly specified skills sets rather than full courses of study. This remains a point of tension, particularly with universities offering agricultural degrees, where the aim is to prepare graduates for diverse changeable careers by embedding holistic knowledge of science, production systems and technologies in their learning. There is also, relative to the other case studies, an absence of an employee organisation working in these networks.

¹¹ For example, between the mining and agriculture industry skills councils, and between industry groups such as the Mining Council of Australia and National Farmers Federation.

Nonetheless, in general, the social partners in primary industries show high levels of commitment and readiness to work towards collaborative solutions.

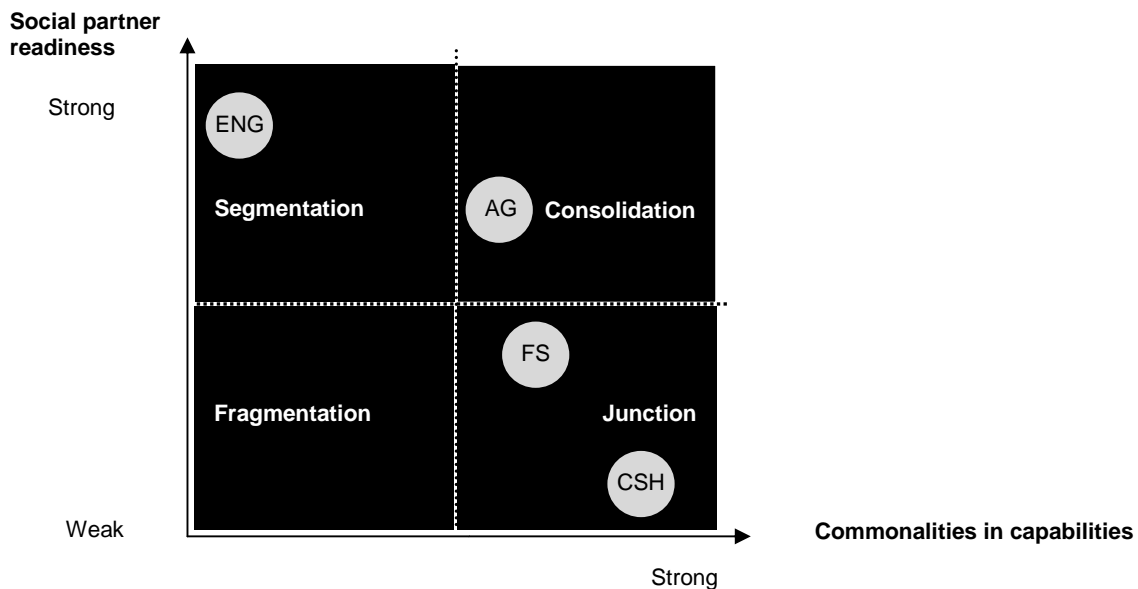
Vocational stream outcome 4: Fragmentation

A fourth vocational outcome exists, characterised by both weak linkages between occupational capabilities and weak (or absent) social partners. While none of our case studies exemplified this category, it is conceivable that narrowly defined occupations with limited transferable skills exist in a workforce that is fragmented, with limited organised representation for employees, employers or other stakeholders. This outcome has been specified for the sake of completeness and for exploration in future research.

A visual representation

We can visually present the four sectors against their current preconditions for commonalities in capabilities and social partner readiness and show the scope for possible future movements (figure 2). The four quadrants represent the outcome scenarios of fragmentation, segmentation, junction and consolidation.

Figure 2 Vocational stream preconditions and outcomes



Note: ENG = engineering, AG = agriculture, FS = financial services, CSH = community services and health.

The relative positions of each sector along the horizontal axis indicate the potential for characterising the development of capability as a vocational stream. As indicated, none of the case studies fell under the ‘fragmentation’ scenario. Healthcare and community services has most strongly documented the commonalities between occupations and sought to highlight the benefits of breaking down occupational silos. It has the greatest potential for leveraging these commonalities into improved workforce capacity. But low levels of social partner readiness characterise both healthcare and financial services as sectors at ‘vocational junction’.

The relative positions along the vertical axis illustrate social partner readiness. Engineering, with a national taskforce comprising educational, union, employer and other industry peak bodies (as well as sector-level associations), has alerted stakeholders as well as the government to the urgency of its

workforce challenges and proposed recommendations endorsed by this broad set of institutions. Yet limited occupational linkages characterise engineering as a model of ‘vocational segmentation’, with a focus on mobility within occupational boundaries.

As argued however, it is in agriculture that the ability to take advantage of a vocational stream framework has seen an outcome of ‘vocational consolidation’. Models of regional capability are being rolled out across the country, with support from a wide range of social partners, including all levels of government. For this reason, the agricultural sector most closely reaches the diagram’s northeast corner, where increases in workforce capacity are most likely. Movements towards the boundary locus measure some expansion in the common capabilities underpinning a range of related occupations (x-axis) and/or greater institutional commitment and cooperation (y-axis).

By fostering both dimensions of vocational potential, all sectors stand to gain in terms of both workforce utilisation and capacity, while pathways for students and workers will also be improved. We argue that the identification and promotion of both commonalities in capabilities and greater institutional cooperation have the capacity to assist with the current severe workforce challenges and also to support a workforce of more adaptable, capable individuals. In each sector, we identified strong examples of initiatives that have been undertaken towards collaborative solutions, models or ideas. These reach across educational, industry and government divides to give individuals access to educational and occupational pathways. In the third and final phase of research in 2013, we will endeavour to consolidate the architecture of these models and explore how their successes could (or could not) be deployed in different settings.

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Glossary (participating organisations by sector)

- Agrifood** Agrifood Skills Australia is the industry skills council for the rural, food processing, meat and seafood industries.
- NFF** National Farmers Federation is the peak national body representing farmers in Australia.
- ACDA** Australian Council of the Deans of Agriculture represents thirteen universities which offer agricultural and related degrees, and works to promote agricultural studies and careers.
- APESMA** The Association of Professional Engineers, Scientists and Managers Australia is the largest union representing professional engineers across essential industries and services including IT, mining, construction, water, power, road and rail.
- CEPU** The Communications, Electrical, and Plumbing Union represents workers in the essential industries of communications, electrical and plumbing.
- USQ** The Faculty of Engineering and Surveying at the University of Southern Queensland offers associate, bachelor and postgraduate degrees in engineering.
- HWA** Health Workforce Australia was set up to coordinate a national approach to health workforce planning.
- VicHealth** The Victorian Department of Health manages public health services across 86 local hospital networks in Victoria, across three portfolios of health, mental health and aged care.
- FacMed** The Faculty of Medicine at Sydney University is responsible for training medical graduates.
- AMA** The NSW branch of the Australian Medical Association is a members-based lobby group representing over 27 000 medical practitioners and students.
- CSHISC** The Community Services and Health Industry Skills Council provides information and advice on national workforce development and skills needs in community services and health.
- ANF** The Victorian branch of the Australian Nursing Federation is a lobby group representing registered nurses, enrolled nurses, midwives, nursing students and personal care workers.
- CFA** The Chartered Financial Analyst Institute is a global association of investment professionals representing over 100 000 CFA Charterholders who have completed their postgraduate level program. A further 220 000 candidates are currently enrolled in the program.
- FINSIA** The Financial Services Institute of Australasia (FINSIA) represents over 16 000 members working in corporate finance and wholesale banking, financial markets, managed funds and superannuation and private wealth management and retail banking.

Attachment A: 2012 discussion paper

This discussion paper has been prepared as part of the National Centre for Vocational Education Research Consortium Research Program: *Vocations: the link between post-compulsory education and the labour market*. The project's central concern is to gain a more accurate understanding of the connections between and within work and education. The research is taking place over three years, with phase one completed in 2011.

We are focusing on four broad industries to help us to understand the links between education and work. These four areas are healthcare and social assistance, engineering and trades, agriculture, and financial services.

Recent educational policy reforms are underpinned by the assumption that higher levels of education and training will both strengthen the Australian economy and deliver benefits to the individual worker. Improved pathways within the education system are said to support pathways into and upwards within the labour market. Our results from 2011 cast doubt on the notion that everyone who wants and is qualified for a 'good job' can get one and provided evidence of quite limited occupational mobility.

In this phase, we are consulting stakeholders in the above four industry areas. We are seeking your views on:

- how occupations are linked now
- how they could be better linked in the future
- the role of institutions in managing these relationships. These include educational institutions, employers, skills councils, occupational bodies, unions, and government agencies.

Our aim is to compare how occupations have evolved and provide scenarios where links between occupations within the four industries are supported/inhibited by the various social partners. This will help to inform the next stage of the project, which will focus on what we need to change to improve occupational mobility.

What is the project about?

We are exploring whether a broader notion of what an occupation is may be helpful. The key concept guiding our work is 'vocational stream'. We define a vocational stream as a set of linked occupations within a broad field of practice. The focus is on the attributes, knowledge and skills a person requires to work within a broadly defined vocation that combines educational and occupational progression (Buchanan, Yu, Marginson & Wheelahan 2009). A vocation could emerge, for example, from the commonalities between nursing, aged care and child care. Vocations defined this way foster identification with the field of practice or broad occupation rather than a specific employer or enterprise. In recent times, much debate on skill has been in terms of 'competencies'. The assumption is that any job can be broken down into a collection of discrete units of work roles or tasks. Our starting point is different – we start with the individual and the knowledge, skills and attributes they need for a broad occupation. We are concerned with their capacity to react to

changing circumstances, and the importance of broader occupational capability. We are using the capabilities approach to help our thinking about this.

The capabilities approach was developed by the economist and Nobel Laureate Amartya Sen (1999) and the philosopher Martha Nussbaum (2000). It is increasingly used by governments and international agencies to identify the individual, social and economic resources that are needed to support individual wellbeing, social inclusion and individuals' capacities to make choices about their lives, how they wish to live, and the work they engage in (Henry 2009). In the capabilities approach to vocations, the focus is on the development of the individual and on access to the resources individuals need to become effective, innovative and autonomous workers within a broad range of occupations.

We will be talking to stakeholders in the four industry areas so that we obtain a range of perspectives, including those of educational institutions, occupational associations, unions, skills councils, employers and government bodies.

What did we find in 2011?

In 2011, we researched the following research questions:

- How do individuals move into and through the labour market? Can this movement be characterised as vocational pathways?
- What are the commonalities in the trajectories of workers in the labour market?

Using nine waves of the Household, Income and Labour Dynamics in Australia (HILDA) longitudinal dataset, the research found strong evidence of labour market segmentation and in particular very limited occupational mobility (Yu, Bretherton & Schutz 2012). We found there were three distinct pathways that accounted for most movement by individuals through the labour market: high skill, mostly accessed by those with specialised training; low skill, characterised by entrenchment in low skill work; and marginal attachment, typically affecting women and older workers with limited episodes of paid work. The job transitions we observed suggest limited, not expansive, occupational choice for a wide range of labour market entrants, of varied education and training levels.

These different pathways point to some clearly different destinations for workers within these three clusters. Greater upward mobility was apparent where there are more structured occupational pathways. These occupations, such as medical professions and the trades, are often characterised by strong relationships between occupational/professional bodies and education and training institutions. By contrast, there was evidence that the lower reaches of the labour market seem more fluid, less sustained by any career direction and likely to be characterised by fragmentation within the occupation itself and between the occupation and education and training institutions.

How do links between and within education and work vary?

In 2011, we found prima facie evidence of fluid and structured vocational streams. Fluid vocational streams have dynamic, often informal, links between occupational and educational progression. For example, banking clerks were able to access on-the-job training and opportunities to move internally into mortgage consulting, financial advising or branch management. Structured vocational streams, on the other hand, are characterised by stronger links between formal education and occupational outcomes and less emphasis on on-the-job training. Electricians, for example, undertake a formal apprenticeship with clear requirements and are supported by a strong occupational association. We

will compare the dynamics of progression within these structured and fluid labour markets, the extent to which they differ, and the implications for nurturing human capability within different domains.

Within this framework of fluid and structured vocational streams, we seek to identify and test the importance of relationships between educational institutions, employers, skills councils, occupational bodies, unions, and government agencies with respect to fostering/fragmenting vocational streams.

These include:

- The nature of dominant business models and conditions within each sector. In particular, we consider the competitive structure of the sector, its modes for engaging labour, and the structure of jobs.
- The role of occupations with highly structured pathways (such as nursing and the trades) versus those typically promoted within a firm's career ladder in determining mobility. We will explore the extent to which these streams are actively managed by different types of stakeholders. This includes consideration of the strength of occupational associations/regulators and the relationships between them, as well as the relationships between educational institutions and occupational associations. A central question here is: if skills development is demand-driven, what influence do the various stakeholders (including employers and unions) have in shaping these demands? And how do these interventions shape the longer-term outcomes for students and workers in the four vocational areas featured in this study?

The last point relates to the level of institutional trust. In our research so far we have found that the level of trust that stakeholders have in qualifications is important in determining how they are used and valued. Trust only develops through relationship-building, and importantly is based on confidence in the teaching, learning and assessment processes (Wheelahan 2009). The research will emphasise the state of relationships within the four broad industries, including educational institutions, professional bodies, industry skills councils, employers and unions.

What about intermediate occupations?

In our consultations with stakeholders, we will also explore whether occupations requiring intermediate skills (such as in paraprofessional and technical occupations) could be developed to support better occupational mobility. In thinking about links between related occupations, research has long used the idea of 'good jobs' and 'bad jobs' to analyse labour market segmentation. In particular, the literature describes 'good' jobs as typically having high negotiated wages, economic security and career advancement. 'Bad' jobs by contrast typically feature low and competitively determined wages, no career ladder, and low-skill work (Leontaridi 1998). We found however this reasoning was too simplistic. It was clear that our high- and low-skill trajectories were not characterised by singular employment and wage-setting mechanisms. For instance, highly unionised nursing professionals with highly discipline specific skills are employed on a different basis from financial services professionals, where recruitment focuses on strong generic skills across a number of disciplines. In 2012 we will focus on the structural differences between sectors and their impact on fostering links within each vocational stream. We are concerned with the decline of intermediate jobs, with more jobs requiring degrees for entry, as well as growth in low-skill roles. In particular, if there is broad segmentation between 'good' and 'bad' jobs within a vocational stream, then:

- What is the role of intermediate jobs and qualifications?

- Within current institutional arrangements, are intermediate-skill roles a stepping stone to higher skilled jobs or a destination in their own right (or both)?
- How does this vary between fluid and structured streams, and how (if at all) could intermediate jobs improve links within a vocational stream?

Questions for discussion

In 2012, we turn our attention to identifying the links that exist between occupations, while looking ahead to what links *could* exist. We are especially interested in the relationships and institutional arrangements which foster these links. In particular, we are seeking your input to the following questions:

- What are the broad economic and policy factors that influence the way these industries develop?
- How, if at all, are occupations connected by common underpinning practices and concepts? Can we identify linked occupations comprising a vocational stream?
- Which bodies and institutions oversee these occupations? How do they support/inhibit the development of a broader occupational capability?
- What could emerge from current arrangements?

Healthcare and community services has most strongly documented the commonalities between occupations and sought to highlight the benefits of breaking down occupational silos. It has the greatest potential for leveraging these commonalities into improved workforce capacity. But low levels of social partner readiness characterise both healthcare and financial services as sectors at 'vocational junction'.

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The NVETR Program 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. NCVET 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.

For further information about the program go to the NCVET website <www.ncvet.edu.au>.



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