



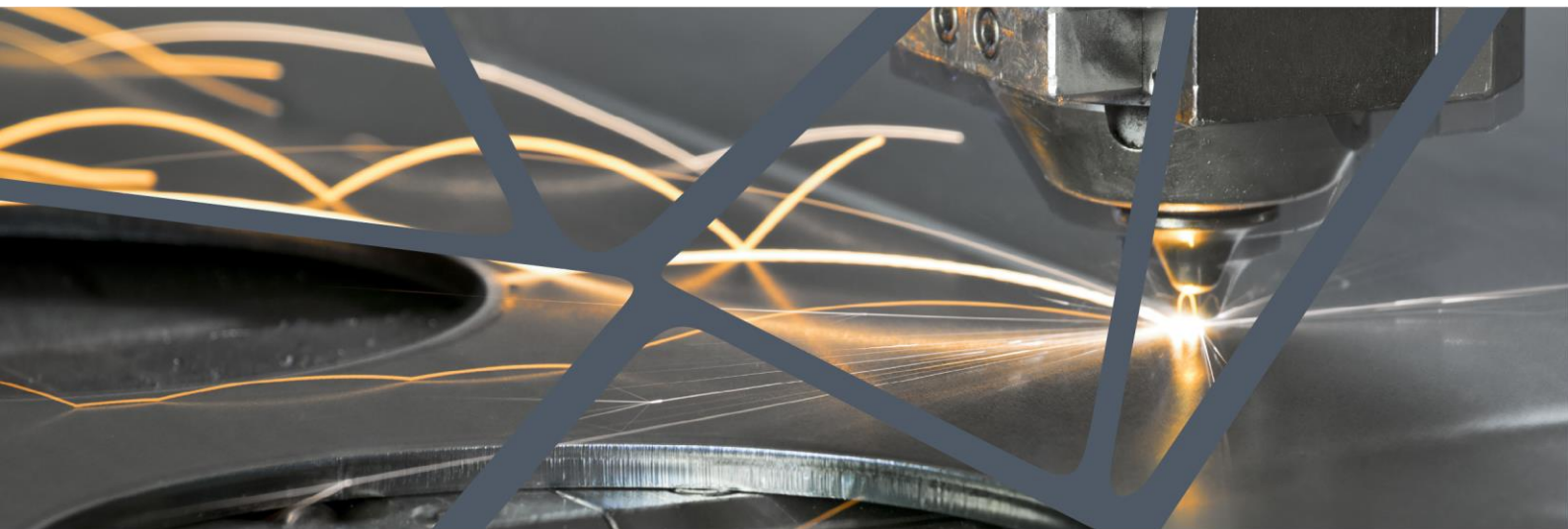
Australian Government



Australian Workforce
and Productivity Agency

Submission

Manufacturing workforce issues paper



Submit this stakeholder submission form and any attachments to mfgstudy@awpa.gov.au by COB Friday 22 November 2013.

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Manufacturing—what lies ahead?

1. What are the priority skills required in the manufacturing workforce to work in global supply chains?

Manufacturers are finding they must increase operational efficiency, improve the quality of their service, develop new markets and products and find new ways to differentiate their offering. The national broadband network (NBN), digital manufacturing (DM) and online services offer critical opportunities in this regard. The 2012 *Optus Future of Business Report*¹ by Deloitte Access Economics rated the manufacturing sectors as the least digital ready of seven major sectors rated in the industry readiness index.

The *Now and into the future*² study of manufacturing businesses in Melbourne's northern region, for example, found that manufacturers were not taking advantage of supply chain opportunities such as integrating their businesses IT systems with customer or supplier systems.

Digital manufacturing (DM) is the application of computer and internet based technologies to manufacturing. DM includes technologies for managing, storing and communicating information; modelling, simulation and visualisation; and building, testing and validating. Digital manufacturing complements other technologies being introduced in manufacturing such automation and remotely operated machinery.

DM assists manufacturers to address some of the essential business challenges facing the manufacturing sector, such as improving product and service quality, better real-time supply chain integration, improving business efficiencies, better customer engagement with customers, identifying new markets and partners, and improving collaboration particularly in the design phase. Australian SME manufacturers have been comparatively slow to adopt DM. SMEs face particular barriers to the adoption of digital manufacturing techniques, and digital services opportunities more generally, such as lack of time, knowledge and capital to invest. SMEs, and in particular Australian owned and family run businesses, often have the least access to skills and information. This is partly because they have fewer global connections and partners and much DM knowledge and innovation comes from overseas.

Servitization would appear to be a key strategy in an organisation's capabilities and processes to shift from selling products to selling integrated products and services that deliver value in use. Servitization is a concept of significant potential value, providing routes for companies to move up the value chain and exploit higher value business activities.

¹ *Optus Future of Business Report*, Deloitte Access Economics, 2012.

² *Manufacturing in Melbourne's North: Now and into the future*, Northern Melbourne Regional Development Australia, 2012.



2. If manufacturers are to exploit opportunities from the Asian century, what are the capabilities leaders, workers and managers need?

The opportunities available and the need for the development of an Asia capable workforce have been highlighted in key reports.³ Managers and leaders of Australian businesses need to become more familiar with Asian cultures and ways of doing business to capitalise on potential benefits. The Australian workforce will need to be equipped with the knowledge, cultural skills and networks to compete effectively in Asia. The Ai Group/Asialink report identified the following 'necessary skill factors':

- Appreciation of different political and legal processes
- Managerial skills
- Local cultural knowledge
- Local language skills
- Local knowledge is important to business dealings in Asia
- Local staff being important to business dealings in Asia

The Australian Centre for Asia Capability will play an important role through the provision of short courses for company executives and directors. It will also conduct practical research into best-practice business with Asia and play a major role in the promotion of the importance of Asia capabilities.⁴ Understanding cultural differences will need to be a key focus and this is assisted by speaking an Asian language or by living and working in Asia for a period of time. It is important for manufacturing enterprises to make themselves aware of the opportunities presented in Asia and to participate in programs provided by the Centre.

³ Australian Government, 2012, *Australia in the Asian century*, White Paper and Asialink Taskforce, 2012, *Developing an Asia capable workforce – a national strategy*.

⁴ *Business must rise up to meet the Asian Century*, Jenny McGregor, CEO Asialink, The Age, 25.07.2013.



3. How are recent and emerging advances in technology impacting on skill requirements?

Technology investment is one aspect of improving the Australian manufacturing sector's competitiveness and productivity. This investment can range from automating plant equipment, investing in better reporting or data analysis software, support for design activities, and investments in technologies that improve business practices, such as cloud-based business applications.

Workforce skills affect a company's ability to leverage investments in new technologies, both through effective utilisation of the technology and complementary innovations in other parts of the business. Research from the UK suggests that technology investment can also be a driver for increasing workforce skills, with high performance organisations that invested in ICT finding that they also needed to invest in a more highly skilled and flexible workforce to realise productivity or competitive benefits from the investment.⁵

Technology is significantly impacting on skills requirements. For many skilled operator and trade occupations this is reducing the need for manual skills and increasing the need for them to operate and troubleshoot computer-controlled equipment. Training package competencies are often 'future-proofed' against emerging technologies, but RTOs need to ensure that they do not fall behind by insisting on teaching redundant skills. A prime example is in the area of computer aided drafting (CAD). Some RTOs continue to teach apprentices to use pencils and drawing boards when industry computerised these practices many years ago.

Technology penetration has implications for skills needs in the manufacturing sector. Basic IT skills are also an important foundation skill for many workers. However, in a 2009 survey undertaken by Ai Group, over a third of companies (34.7%) identified shortages in basic IT skills. Manufacturing firms were most likely to report IT skills shortages (35.4%), followed by the services sector (30.4%) and the construction sector (27%). Other foundation skills, such as numeracy and literacy, can also impact on a worker's ability to safely or correctly use machinery and technology.

Increasing use of technology is also increasing demand for employees with STEM skills, and the ability to integrate systems and / or operate multiple types of equipment. Some businesses are concerned that the Australian training system produces graduates that are overly specialised and lack these broader skills.

The adoption of new or complex technologies within a manufacturing business can lead to the need to employ specialist workers from overseas, including on a temporary skilled migration visas (457s). This can occur because the technology is new or rare in Australia, there is a lack of suitably qualified employees in the area, or a project requires a new skill which the Australian training system does not cater for. In addition to filling skills shortages, these workers can be a valuable source of training and mentoring for other employees.

⁵ Australian Industry Group, *High Performance Organisations: Maximising Workforce Potential*, 2012.



Manufacturing workforce now and in the future

4. What strategies do businesses use to engage and retain older workers?

The ageing workforce in manufacturing presents a range of issues and subsequent strategies to address these. The first issue is to achieve the realisation that it is increasingly necessary to retain mature age workers in the workplace and that this may involve retraining. One of the overall approaches used by manufacturing companies is participation in the Commonwealth Government's Corporate Champions program which is designed to recruit and retain mature age workers (45+).

Strategies have included the introduction of flexible working conditions often as part of a transition to retirement plan. This enables workers to move to part-time arrangements, have increased leave flexibility and to act as mentors to younger workers. Occupational health and safety measures have also been introduced to reduce the physical demands of the job on mature age workers. This can include the purchase of equipment to ease manual handling tasks, job rotation practices for the same reason and physical adjustments to working stations and the environment. The introduction of measures such as these, encourage mature age workers to continue in employment.

5. What strategies are being used to attract and retain women in manufacturing?

As the Issues Paper highlights one key strategy is to introduce more part-time work into the manufacturing industry. Where this can be done it is likely to be an encouragement to women to consider a combination of employment in a manufacturing setting combined with other responsibilities such as caring.

6. Are education and training providers currently producing graduates with the skills and competencies required by the manufacturing industry today and into the future? If not, what are the skills gaps?

There is a somewhat unusual qualifications pattern in the manufacturing industry which is implied in the Issues Paper. The first issue is the very high level of the workforce without any post-school qualifications (45.2%) which is higher than the all industries average (38.7%). So there is a general need to lift the level of training in the industry.

The second element of the pattern is the high level of the workforce with certificate III or IV qualifications (29.8%) compared to the all industries average (20.3%). This is understood in the context of certificate III entry to the manufacturing workforce through apprenticeships.

The third element is that there is relatively little by way of higher level qualifications in manufacturing. Advanced diplomas and diplomas are held by only 7.9% of the workforce compared to 10.5% across all industries and for degrees or higher the corresponding figures are 14.5% and 27.2%. Accordingly, there is a skills gap, measured by the achievement of higher level qualifications, in terms of management and leadership.

Completion rates are also a concern at 57.3% for trade apprenticeships and 54.4% for non-trade occupations.⁶ There is clearly a need for these to increase as Ai Group as outlined elsewhere.⁷ In general terms employers using the VET system have decreased by 4.2% and in manufacturing 61% of employers

⁶ Issues Paper, page 28.

⁷ *Apprenticeships: achieving excellence*, Ai Group, 2013.



are using the system for accredited training and unaccredited training has fallen to 38.5%.⁸ Employer satisfaction with VET training has slipped for all categories. For manufacturing employers with apprentices, for example, satisfaction levels have fallen from 74.3% in 2011 to 68.5% in 2013.⁹

One issue which Ai Group is aware has caused some dissatisfaction from manufacturing employers is in the implementation of competency based progression and completion for apprenticeships. Many RTOs have interpreted this to mean that apprentices progress and complete in line with the long standing TAFE practice of completing the Certificate III qualification within three years. For employers this has the effect of eliminating the fourth year of the apprenticeship where previously apprentices consolidated their skills in the workplace before gaining their 'trade papers'. State government funding arrangements and TAFE budgeting systems combine to make this practice difficult to change.

The Ai Group is currently conducting a project funded by the Australian Government under the Accelerated Australian Apprenticeships program titled *Engineering Excellence*. This project is developing systems in 10 RTOs across the country that will more closely link apprentices' training and assessment to what they do in the workplace, and align more closely to the progression system contained in the Award. Employers will have a much greater say in when their apprentices are deemed ready to progress through their apprenticeship. As competency based progression and completion becomes more widely implemented across all trades, getting these systems right will be important if we are to ensure employers retain confidence in the apprenticeship system.

7. What is currently working or is a best practice example of work-integrated learning in higher education?

As noted above and in the Issues Paper, the manufacturing workforce has relatively low levels of higher education qualifications. This is an area requiring attention as the industry moves to higher level qualifications. Ai Group has been concerned by the general lack of work readiness of university graduates. For example, in the area of employing STEM skills graduates employers indicate that the main reason for difficulties is the lack of workplace experience - 24.4% overall and 22.1% in manufacturing.¹⁰

One of the key ways of addressing this is through the adoption of Work-Integrated Learning (WIL) approaches. Work-integrated learning is an important way of ensuring that students can apply their knowledge and skills, develop job ready skills and build professional networks in industry. They are an increasingly popular curriculum innovation, based on the notion that graduates will develop graduate attributes and employability skills and therefore will be better prepared for work or professional practice if they have opportunities to integrate theoretical knowledge with practice.

For employers they are useful to:

- source employees for positions that become available once students graduate
- gain cost-effective, temporary employees
- preview potential job candidates which lowers employers recruitment costs
- gain fresh ideas, knowledge, skills and new approaches from students.

Ai Group is supportive of the initiatives of the Australian Mathematical Science Institute (AMSI) internship program. This program enables post-graduate students to undertake practical research in

⁸ *Employers' use and views of the VET system 2013*, Australian vocational education and training statistics, NCVER, 2013.

⁹ *Ibid*, page 13.

¹⁰ *Lifting our Science, Technology, Engineering and Maths (STEM) Skills*, Ai Group, March 2013.



workplaces, including manufacturing workplaces, for the mutual benefit of both parties. This approach needs to be encouraged. Similar measures are needed at the graduate level, particularly for graduates of STEM courses and for employers of SMEs.

Further consideration also needs to be given to expanding work-integrated learning programs that facilitate greater cooperative research between business and higher education institutions. A number of higher education institutions provide some form of work-integrated learning but it is not currently on a systematic basis and some commenters have questioned the viability of such approaches.¹¹

Work must be done to support and build employer's involvement, which means the development of different types of student/employer models and funding options. Any expansion of WIL activity is related to the capacity of industry to take students, especially small to medium enterprises. Ai Group therefore supports a range of flexible models that enable students to spend appropriate lengths of time in industry.

8. How important is the use of short course targeted training and non-accredited training in your sector?

NCVER reports that unaccredited training remains important to employers. 38.8% of manufacturing employers are participating in unaccredited training in 2013, a slight fall from 2011.¹² Informal training is even more important at 74%. There is a range of reasons why this type of training continues to be important and 92.9% of manufacturing employers indicate that they satisfied that this type of training meets their needs. This is the highest level of satisfaction by manufacturing employers for any type of training.¹³ This data suggests continuing levels of dissatisfaction with the training sector for various kinds of accredited training. Employers often report to the Ai Group a lack of responsiveness by training providers.

¹¹ *Will WIL'ing Work?*, Mark Brimble & Brett Freudenberg, Griffith University Business School, B-Hert News, Issue 28, April 2010.

¹² *Employers' use and views of the VET system 2013*, Australian vocational education and training statistics, NCVER, 2013, page 10.

¹³ *Employers' use and views of the VET system 2013*, Australian vocational education and training statistics, NCVER, 2013, page 13.



9. What kinds of strategies or initiatives are effective in addressing the LLN skills development needs of the manufacturing workforce?

Increased access to the Workplace English Language and Literacy (WELL) program needs to be a high priority. While manufacturing received 18% of WELL funding for 2007 – 2011¹⁴ this does not reflect its very low positioning in both the ALLS and PIAAC research.¹⁵ The levels of literacy and numeracy skills of the manufacturing workforce are among the lowest for all industries as reported in these international surveys. It would be more effective to allocate WELL funding on a basis of targeted industry need rather than a competitive grants basis. The latter has the risk that funding flows to the specialisations of pro-active RTOs and accomplished submission writers rather than to the industry areas of greatest need such as manufacturing.

In addition it is clear that the overall WELL program needs an increased funding allocation. The evaluation notes that over the last five years 72,000 employees have undertaken the program when there are over four million employees with LLN skills below the minimum required level.¹⁶

Related to this is the need for the LLN workforce to expand to meet the LLN requirements of the workforce. More trained LLN specialists are required and the general VET workforce needs to include relevant LLN competencies within their training. It is also important for an increasing number of RTOs to include the Foundation Skills training package on their scope. As well as increasing overall capacity this would also spread the WELL delivery load more effectively across RTOs than at present.

Previous Ai Group research has highlighted the importance of supervisors in addressing workplace LLN requirements.¹⁷ A skill set developed by IBSA will assist supervisors to identify and support employees with LLN issues. A strategy needs to be developed to assist in the implementation of this initiative in manufacturing workplaces.

The National Foundation Skills Strategy for Adults has identified the need to introduce workplace champions to act as ambassadors and promoters of foundation skills training. Ai Group believes that the establishment of such a co-ordinated network could provide valuable assistance to manufacturing workplaces seeking help.

Workforce Development Advisors and WELL brokers can also play an important role advising manufacturing workplaces to include consideration of the WELL program as part of a broader workforce development funding application to the National Workforce Development Fund.

10. What employment and training strategies are effective to help displaced workers or at-risk workers to transition to new employment?

¹⁴ *Strengthening Foundation Skills in the Workplace*, an evaluation of the WELL program, Third Horizon, February 2012.

¹⁵ ABS, 2006, *Adult Literacy and Life Skills Survey*, Summary Results, ABS, Canberra and ABS, 2013, *Programme for the International Assessment of Adult Competencies*, Australia 2011 – 12, 4228.0, ABS, Canberra.

¹⁶ *Getting it Right: Foundation Skills for the Workforce*, Australian Industry Group, October 2013.

¹⁷ *National Workforce Literacy Project*, Final Project Report, Australian Industry Group, January 2012.



11. What types of continuous learning programs have been effective in teaching manufacturing workers skills that can be broadly applied across the industry and to other industries?

12. What strategies can be used to encourage innovation (technical and non-technical) in the workplace?

A key strategy to encourage innovation is to increase the level of Science, Technology, Engineering and Mathematics (STEM) skills in the workforce. As the Issues Paper highlights there is an increasing international demand for STEM graduates at the same time as Australia is falling behind in the number of STEM graduates from tertiary institutions.¹⁸ Additionally, employers report difficulty recruiting employees with STEM skills. The highest response in the Ai Group survey was difficulty recruiting technicians and trades workers in the manufacturing industry (44%).¹⁹ The situation is not helped by similar trends in the secondary education sector where participation in STEM-related areas of knowledge and skill is also decreasing.²⁰

The Office of the Chief Scientist has initiated a number of reforms that will assist in this area. These include the development of a national strategic approach to STEM, a comprehensive national survey to establish the data for Australia, a school – industry numeracy project in conjunction with the Australian Association of Mathematics Teachers and the Ai Group and the establishment of an Industry Working Party which will consider a range of related issues including work-integrated learning.

The digital literacy of the workforce is another key factor affecting innovation in the workplace. In a recent report the Ai Group has recommended the development of a comprehensive workforce skills strategy for the digital economy.²¹ There is a need for manufacturing enterprises to continue to invest in technologies including digital technologies. This is always a challenge for a sector dominated by SMEs and facing an uncertain economic outlook. Increased level of collaboration between government and business is a pre-condition for success in this area.

The introduction of the Manufacturing Innovation Precinct in mid-2013 has the potential to encourage innovation in the manufacturing industry. One of the aims of this initiative is to connect industry with researchers.²²

¹⁸ OECD, 2011, *Over-qualified or under-skilled: a review of existing literature*, OECD Social, Employment and Migration Working paper, No 121 cited in the Issues Paper, page 36.

¹⁹ *Lifting our Science, Technology, Engineering and Mathematics (STEM) skills*, Australian Industry Group, March 2013.

²⁰ *Making Sense: a business perspective on school reform*, Australian Industry Group, June 2013.

²¹ *Ready or Not? Technology Investment and Productivity in Australian businesses*, Australian Industry Group, June 2013.

²² *Building critical mass – the new Manufacturing Innovation Precinct*, Manufacturers' Monthly, 15 July 2013.



Leadership and management

13. What short- and medium-term enhancements can be made to improve the leadership, innovation and management skills in Australian manufacturing, particularly in SMEs?

The need for leadership and management skills in the manufacturing industry has been recognised by many including Manufacturing Skills Australia.²³ Evidence has been produced that Australian manufacturing management performance trails the US, Sweden, Japan, Germany and Canada²⁴ and that we have one of the lowest proportions of tertiary qualifications compared to other countries. This report suggests the most effective way to lift management capability and performance is to focus on the poorly managed manufacturing companies.

The issue of management education in the context of workplace innovation has increased markedly. Management and leadership practices are critical to the relationship between innovation and labour productivity. Leadership influences the way work is organised and subsequent productivity growth.

This requires leadership and management courses to develop a collective holistic organisation-wide capability and business strategy, which focuses on systemic innovation within the workplace culture. This means short one-off programs will not achieve the changes required. Some of the key trends in leadership development that are required are:

- The move away from short one-off training programs to collaborating on customised leadership interventions that are more closely linked to organisational strategy and are based on a partnership approach between the business, the employee and the leadership education provider.
- Responsibility for one's own learning. Leaders will be required to expand their capacity to think and reflect in broader and new ways to address current organisational challenges. This requires a transfer of developmental ownership to the individual and a willingness to take ownership.
- Leadership and learning become linked. Development takes place within teams and using "real life" work problems.
- A greater emphasis on team, organisational, network and system capacity development. This requires taking the learning back to the teams and into the workplaces. Innovative methods such as action learning can provide the much needed emphasis on building capacity at the team, organisation and system level.
- Higher-level development opportunities for leadership educators to be able to meet the complexities associated with developing leaders.

The Australian Management Practices research found that the higher skills and education levels, both at the managerial levels as well as the general workforce in manufacturing firms, are positively and significantly associated with better management. It follows that engaging better educated personnel both as managers and shopfloor workers, and constantly upgrading their skills through focused development initiatives, will almost certainly contribute to enhanced management performance within firms.

The use of business schools is problematic given their focus on large multinational companies rather than SMEs. Greater customisation for Australian conditions is required. The *Leadership 21* program at Mt

²³ *Environmental Scan: a new era for manufacturing*, Manufacturing Skills Australia, 2013.

²⁴ Green, R., *Manufacturing matters in Australia: just how productive are we?*, 2009.



Eliza Executive Education would seem to be an example of this. The Manufacturing Innovation Precinct brings SMEs into closer collaboration with larger companies and this strategy may have some benefits for increasing leadership and management performance through online Continuous Collaboration Hubs.²⁵

The establishment of the Centre for Workplace Leadership is a further illustration of the recognition of the need in this area. It is anticipated that the Centre will focus programs on SMEs to improve performance. Manufacturing companies need to ensure that they participate in this new initiative.

Improving leadership and management capability will also be an essential part of Australia's performance in the Asian Century requiring not only the development of broader leadership and management capability so that the organisation's strategy and culture are fit for purpose but also specific skills required for engagement with emerging economies.

The Report of the Non-Government Members of the Prime Minister's Manufacturing Taskforce highlights a need for new skill sets to 'absorb' knowledge but also new mindsets that support constructive relationships within workplaces, research organisations and government agencies²⁶

²⁵ *Manufacturing Innovation Precinct looks to post-election future*, Manufacturers' Monthly, 11 September, 2013.

²⁶ Prime Minister's Manufacturing Taskforce *Report of the Non-Government Members*



Support programs, policies and initiatives

14. What are the gaps in service provision and areas of duplication in the workforce development programs, policies and initiatives supporting manufacturing?

15. What strategies could be introduced to better support manufacturing businesses of all sizes to actively think about workforce development and job design, and invest in skills and training?

Manufacturing businesses continually require direct assistance when confronting issues of workforce development. In this context it remains highly important to continue the services provided by Education and Training Advisers generally, and also the Manufacturing Workforce Development Service combined with the support of the Skills Connect Fund.

16. Have we got the issues right? Where are the gaps in our analysis?

17. Any other comments on this issues paper?

- I do consent to have my input made available on the AWPA website.

