IBSA Manufacturing

Digital Skills Cross Sector Project

Case for Change

November 2017

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IBSA
Innovation & Business Skills Australia

Prepared on behalf of the Digital Skills Project Reference Group for the Australian Industry Skills Committee (AISC)

Digital Skills Cross Sector Project

Case for Change, November 2017

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Innovation & Business Skills Australia

Contents

Administrative information

Name of Cross Sector Project

Digital Skills

Name of lead Skills Service Organisation (SSO)

Innovation and Business Skills Australia (IBSA) Manufacturing

Project webpage address

A project page for the Digital Skills cross sector project was established on the IBSA Website to provide all IRCs and interested stakeholders with information on the activities. The webpage link is provided below:

https://www.ibsa.org.au/consultation-project/coding-skills-cross-sector-project/

Members of Project Reference Group (PRG)

A Project Reference Group (PRG) was established in July 2017 to oversee this project and consists of Industry Reference Committee (IRC) members and subject matter experts as provided in Attachment A.

This Digital Skills Cross Sector Project *Case for Change* was reviewed and approved by the project Reference Group in November 2017.

Name of training package(s) and qualifications, skill sets and units of competency (if known) impacted by proposed cross sector training product components

This Digital Skills Cross Sector project, by design, looked across a number of manufacturing and related Training Packages to identify qualifications, skill sets and units of competency impacted by digital analytic/diagnostic skills, additive manufacturing (3D printing) skills, and programming/coding skills.

A list of the Training Packages included in the scope of the project and a description of the review and analysis process is detailed in the section outlining the Project Scope.

Stakeholder feedback identified a need to strengthen specific digital skills in specific existing qualifications/units. Analysis identified that many units are currently being used in a cross sector manner. Stakeholders did not identify a need for more units, skill sets or qualifications. The Training Package components to be reviewed and changed are detailed in Attachment B and include the following:

Qualifications

MSA07 Manufacturing Training Package

- MSA30208 Certificate III in Manufacturing Technology
- MSA40108 Certificate IV in Manufacturing Technology
- MSA50108 Diploma of Manufacturing Technology
- MSA60108 Advanced Diploma of Manufacturing Technology

MEM05 Metal and Engineering Training Package

- MEM30505 Certificate III in Engineering - Technical
- MEM30705 Certificate III in Marine Craft Construction
- MEM40311 Certificate IV in Advanced Jewellery Manufacture
- MEM50105 Diploma of Engineering - Advanced Trade
- MEM50311 Diploma of Jewellery and Object Design
- MEM60211 Advanced Diploma of Jewellery and Object Design

These qualifications are currently being transitioned to the *2012 Standards for Training Packages* and will be available for review in relation to *Digital Skills* in July 2018.

The Project Reference Group noted the need for a timely response to the updating of Training Package components which contain digital skills and strongly encouraged that these qualifications be prioritised for updating once the transition work is complete.

One accredited course, Diploma of Applied Technologies, was identified during the project. It is currently a higher education diploma which is being re-accredited as a VET diploma. Details are included in the 'bottom-up' analysis section.

Units of Competency

Overall 211 Units of Competency containing Digital Skills in eight Training Package areas have been identified as requiring updating/alignment to emerging Industry 4.0 skill needs, as summarised in the table following and detailed in Attachment B.

Training Package	Number of Units of Competency To be strengthened / updated for Digital Skills
MEA Aeroskills	39
LMT07 / MST Textiles, Clothing and Footwear	11
MEM05 Metal and Engineering	104
MSA07 / MSM Manufacturing	8
MSL Laboratory Operations	3
PMA Chemical, Hydrocarbons and Refining	1
PMB Plastics, Rubbers and Cablemaking	5
ICP Printing & Graphic Arts	40
TOTAL	**211**

The Case for Change does not recommend the development of new units of competency however this may occur as a result of the subsequent training package development. This case for change proposes that all decisions on how units should be updated/aligned to Industry 4.0 or newly created, as a consequence of the training package development process, should be taken by the respective Industry Reference Committee. If agreed to by respective Industry Reference Committees, the work can be undertaken in a holistic, cross sector manner.

In addition 17 accredited units were identified which appear to potentially duplicate content of Training Package units. They are listed as an addendum to Attachment B.

Stakeholder Consultations

Stakeholder consultation was guided by the *Digital Skills Cross Sector Project Reference Group.* Feedback was considered from all stakeholders and in depth face to face and phone consultation occurred with key stakeholders. A list of stakeholders consulted is provided in Attachment C.

Supporting research

The Case for Change was developed having regard for the Training Package Development and Endorsement Process Policy and provides robust evidence to support AISC's decision making process.

Supporting research is provided in Attachment D.

Executive summary

As the Australian economy, and the broader global economy, are being impacted by a range of technological, economic and social forces – work is changing in profound ways and with it the skills workers require. To ensure the Australian vocational education and training (VET) system can deliver the skills businesses need as they respond to and look to benefit from these changes; the Australian Industry and Skills Committee (AISC) has commissioned a number of cross sector projects. These projects investigate the ways in which jobs and skills are changing to meet these shifting cross sectoral skill requirements.

Project Scope

IBSA Manufacturing was tasked with leading one of these cross sector projects. Initially the project scope was focused on examining whether coding/programming skills are included in manufacturing and related Training Packages, and to determine the scope and scale of change required to ensure the ongoing relevance of existing training products for a rapidly changing workplace.

The Industry Sectors and related Training Packages included in the scope of the project were:

- Aeroskills (MEA)
- Chemical, Hydrocarbons and Refining (PMA)
- Laboratory Operations (MSL)
- Manufactured Mineral Products (PMC)
- Manufacturing and Engineering (MEM)
- Manufacturing (MSA07 / MSM)
- Metal and Engineering (MEM05)
- Plastics, Rubber and Cablemaking (PMB)
- Printing and Graphic Arts (ICP)
- Textiles, Clothing and Footwear (LMT07 / MST)
- Information and Communications Technology (ICT) (for the purposes of determining if there were units and skill sets available to be imported into other Packages)

At the first meeting of the Project Reference Group – it was unanimously agreed that there were broader digital changes occurring in the workplace (and associated changes to the skills required by workers) that went beyond coding skills. After reviewing the Industry Skills Forecasts and Proposed Schedules of Work developed by the relevant Industry Reference Committees, a broader scope for the project was agreed and then further refined during the course of the project.

The 'digital skills' project focused on the following skills:

1. digital analytic/diagnostic skills – arising from the digital augmentation occurring in many industries where there is a need for people with the technical skills to analyse and respond to data provided by the machines in their workplace,
2. additive manufacturing (3D printing) skills, and
3. programming/coding skills.

The content of the Training Packages listed above was analysed through a detailed search of the full content of each Training Package using the following search terms:

- Digital
- Code
- Coding
- Program
- Programming
- Additive
- CAD
- CAM
- CAE
- 3D (and 3-D).

The search identified a large number of units containing content relevant to the scope of the project. Other units referencing concepts including basic digital literacy, digital media, digital files, and various codes (in the form of standards) were excluded.

Stakeholder Feedback

Few of the more than 40 individuals involved in the project consultations identified a need for specific changes to Training Packages to meet current or future digital skills needs. Those that did have feedback on Training Package content made reference to the need to make sure that that content was up-to-date in today's rapidly changing work environment. No-one involved in the consultations identified any gaps that needed to be filled (or where they did, later analysis identified units which were available). The Training Package analysis undertaken during the project identified a wide range of Training Package components which contained specific digital skills relevant to the scope of this project. A number of units of competency in these Training Packages were already being used in a cross sector manner.

Many of those involved in the consultations raised the issue of skills needs in an Industry 4.0 environment (Industry 4.0 is also referred to as the fourth industrial revolution and relates to the profound changes occurring in manufacturing and related industries as a result of digitisation). They

questioned if and how Training Packages could meet the needs of this new industrial revolution and what would happen to Australian manufacturing if they were unable to do so.

A number of participants pointed out the very short amount of time required to get new courses accredited in the university sector (a matter of weeks) versus the time needed to get courses accredited or Training Packages changed in the VET sector. People also pointed to the need for critical thinking, problem solving and other skills that went 'beyond the technical' during the consultations when they discussed future skill needs in manufacturing and related industries.

Supporting Evidence

Research was undertaken to support the project and found a paucity of evidence on the specific digital skills needed in manufacturing and related industries. Instead, there was a wide range of research on the changes occurring as a result of Industry 4.0, including how other countries are changing their VET systems to try and accommodate these changes (see Attachment D).

Summary of proposed changes

There are three direct Training Package changes proposed as a result of this project and a recommendation to undertake further cross sector work:

1. The four Manufacturing Technology qualifications in the MSA07 Training Package should be reviewed and updated.
2. The six qualifications in the MEM05 Training Package which focus on CAD/CAM skills should also be reviewed and updated.
3. The 211 'digital skills' units from Training Packages identified in this analysis should be reviewed and updated – with a priority given to those which have not had substantial changes made to them for five or more years.
4. IBSA Manufacturing leading a new cross-sector project which examines the skill needs of Industry 4.0 and the potential impact on Training Packages – with Manufacturing as the pilot for any possible changes. The research should consider, amongst other things, how Training Packages can be updated and maintained in a timely manner given the pace of change in the world of work as a result of digitisation; the inclusion of core skills such as creative thinking, critical thinking, problem solving and other higher order core skills; and the need for specific 'working in Industry 4.0' units.

The following recommendation sits outside the scope of this Case for Change however industry stakeholders involved in the consultations did want the AISC to consider:

5. Encouraging States and Territories and the Commonwealth to consider making the Diploma of Applied Technologies available as a subsidised program/eligible for VET Student Loans (once it is accredited by the Victorian Registration and Qualifications Authority (VRQA)).

Finally the development of this Case for Change identified some apparent duplication between accredited units and those available in Training Packages which should be investigated further with the VRQA.

The Case for Change

Current and emerging developments in skill needs – top down analysis

The World Economic Forum's 2016 *Future of Jobs* survey[1]determined that 35 percent of the skills deemed important in today's workforce will have changed in four years. The fourth industrial revolution is characterised by a range of new technologies that are merging the physical, digital and biological worlds and will bring *"change at a speed, scale and force unlike anything we have ever seen before"*.[2]

According to the AIIA, major technologies impacting the manufacturing sector include Artificial Intelligence (AI), the Internet of Things (IoT), general automation, robotics and augmented reality.[3]

When manufacturing executives were asked to identify the top-five impacts of digital technologies to 2020[4], they identified that:

1. as more tasks are automated, work will become more strategic
2. we will work faster
3. work will require greater technical expertise
4. interpersonal relationships at work will be more valuable, and
5. jobs and the required skills will change significantly.

These observations were consistent across the research. In examining the impact of additive manufacturing/3D printing Brown and Satyavolu for Cognizant's *Centre for the Future of Work*[5], outline its potential to rapidly change the manufacturing sector – from "legacy industrial models" to "what you want, when you want it" manufacturing. Despite the impact 3-D printing will have, in their survey of 500 senior manufacturing executives, approximately 70 percent of respondents did not focus on a need for 3-D printing skills when asked about the impact of digital change. Instead they identified how 3-D printing is boosting the need for innovation skills. Specifically they identify that this will mean, less emphasis on discrete manufacturing equipment installation (and skills), and more focus on whether the new equipment will improve new digital business approaches.

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[1] World Economic Forum (2016) *Future of Jobs,* https://www.weforum.org/

[2] World Economic Forum https://www.weforum.org/about/the-fourth-industrial-revolution-by-klaus-schwab

[3] AIIA (2017) *Skills for Today. Jobs for Tomorrow* https://www.aiia.com.au/__data/assets/pdf_file/0020/81074/JOBS-FOR-TOMORROW-FINAL.pdf

[4] Brown, R. H. & Satyavolu, P (2017) *The Work Ahead: Designing Manufacturing's Digital Future report* (p.4) The Centre for Work, Cognizant. https://www.cognizant.com/whitepapers/the-work-ahead-designing-manufacturing-s-digital-future-codex2391.pdf

[5] Brown, R. H. & Satyavolu, P. (2017) *The Work Ahead: Designing Manufacturing's Digital Future report* (p.4) The Centre for Work, Cognizant. https://www.cognizant.com/whitepapers/the-work-ahead-designing-manufacturing-s-digital-future-codex2391.pdf

In their examination of skill needs in the aerospace sector, rather than focussing on explicit technical and digital skills, Lappas and Kourousis [6] note that employees need a plethora of skills, like "the ability to respond creatively to complex problems, effective communication, team working and the use of technology to create new knowledge". They also raise concerns about whether an 'industrial-age curriculum' can fully equip students for work in an 'information-age society'.

Skills needs shared by multiple sectors and industries - 'bottom up' analysis

The digital skills contained in the Training Packages which were the focus of this Digital Skills Cross Sector project were analysed, along with units in related accredited courses. The analysis identified 10 qualifications, one skill set, one accredited course, 17 accredited units, and 211 Training Package units of competency which contain relevant digital skills.

Qualifications

There are four manufacturing technology qualifications available in the MSA07 Training Package (which range from Certificate III to Advanced Diploma) and a more recently updated Certificate II qualification from the MSM Manufacturing Training Package. The Certificate II qualification has been specifically designed for a VET in Schools environment and was first implemented in 2016 therefore is not recommended for review as part of this project. The four qualifications from the MSA Training Package which are recommended to be aligned to Industry 4.0 requirements are:

- MSA30208 Certificate III in Manufacturing Technology
- MSA40108 Certificate IV in Manufacturing Technology
- MSA50108 Diploma of Manufacturing Technology
- MSA60108 Advanced Diploma of Manufacturing Technology

The Certificate III and IV qualifications were designed to be delivered through a one and two-year technology cadetship respectively (under a contract of training arrangement). They were first introduced in 2011 and offer cadets a number of streams to choose from. Some State governments provide funding for these qualifications as traineeships. They are recognised in Queensland as cadetships. The Diploma and Advanced Diploma were also introduced in 2011 and offer learners specialist streams. They are not offered as cadetships.

While all four qualifications have been updated since their introduction the changes made have been either to correct unit codes, replace imported units with newer equivalent units, or to amend unit

[6] Lappas, I, & Kourousis, K, I. (2016). Anticipating the Need for New Skills for the Future Aerospace and Aviation Professionals. *Journal of Aerospace Technology and Management*, *8*(2), 232-241. https://dx.doi.org/10.5028/jatm.v8i2.616

codes. These changes are important but signify that no substantive change to the content of these qualifications has been made since their introduction.

These qualifications are currently being transitioned to the *2012 Standards for Training Packages* and will be available for review in relation to *Digital Skills* in 2018. Given the pace of technological change, the need for existing workers to upgrade their technology skills as a result of Industry 4.0, and the need for new entrants to the labour market to have current technology skills it is recommended that these qualifications should be updated

CAD/CAM/CAE/3D printing/additive manufacturing

In addition to the specific manufacturing technology qualifications, there are six qualifications in the MEM05 Metal and Engineering Training Package which include skills related to additive manufacturing (CAD, CAM, CAE and 3-D printing). One has not been updated since 2005, others were last updated in 2012 and 2013. Given the significant advances being made in 3-D printing/additive manufacturing and the way it is already starting to transform the manufacturing sector – it is recommended that these qualifications should also be updated:

- MEM30505 Certificate III in Engineering - Technical
- MEM30705 Certificate III in Marine Craft Construction
- MEM40311 Certificate IV in Advanced Jewellery Manufacture
- MEM50105 Diploma of Engineering - Advanced Trade
- MEM50311 Diploma of Jewellery and Object Design
- MEM60211 Advanced Diploma of Jewellery and Object Design

These qualifications are currently being transitioned to the *2012 Standards for Training Packages* and will be available for review in relation to *Digital Skills* in 2018.

Skill sets

The *ICPSS00002 3D Print Fundamentals Skill Set* was first released in January 2016 and includes three units to assist learners to understand the basics of 3D printing. The Printing and Graphic Arts IRC have had a Case for Change to this skill set approved to enable them to improve the currency of the existing units in the skill set and add a new unit. The project will also consider the structure and purpose of the skill set. No further changes to this skill set are recommended as a consequence of this Cross Sector Project.

Accredited course

As part of the Commonwealth government's 'Apprenticeships Training – Alternative Delivery Pilots' AiGroup, Siemens and Swinburne University have developed two higher level apprenticeship courses in

Applied Technologies. They are designed to help new entrants to the labour market work in an Industry 4.0 environment. The apprenticeships are respectively at Diploma and Associate Degree level.

The diploma course is currently being considered by the VRQA for accreditation as a VET accredited course – enabling it to be taught more widely across the VET sector. The Victorian government has indicated it will add the course to its subsidised course list once it is accredited – making it more widely available to learners in Victoria. Once it is accredited as a VET diploma it is understood that it will be discussed with other State Training Authorities and the Commonwealth with a view to including it on other State government subsidised funding lists and thus also as a course eligible for VET Student Loans approval.

The course contains units specifically designed for new entrants to an Industry 4.0 work environment and has been well received by employers involved in the pilot. It is recommended that the AISC supports the intention that State Training Authorities and the Commonwealth recognise the course for funding/VET Student Loan eligibility purposes.

Training Package units of competency

This analysis also identified 211 units which are currently in use within the Training Packages which are the primary focus of the project, and which contain the set of digital skills which are within the scope of the project. A further seven units from the ICT Training Package contain skills relevant to the scope of the project.

A number of units, those with a more generic focus, are already being used in a cross-sector manner across multiple Training Packages. In addition, a total of 38 units contain more than one type of the digital skills relevant to the scope of this project and are used in multiple Training Packages. Other units are necessarily specific to the instruments they relate to (eg the various digital skills units in the MEA Aeroskills Training Package).

It is noteworthy that of the 211 units identified in this research, 35 have not been updated since they were first introduced in 2005, an additional 24 have not been updated since 2011 and 60 have not been updated since 2012. In addition, some of the updates to units with more recent release dates, have involved changes to update the unit content to meet nationally agreed standards, rather than to make substantive changes to the content of the units. This means that more than half of the digital units identified in this analysis were developed more than five years ago and many of those released more recently have not had substantive changes made to their content for some years. Given the nature and pace of technological change it seems appropriate that the content of the units identified here should be reviewed and potentially updated, with an immediate emphasis on those which have not been updated within the past five years.

Further analysis of other IRC Industry Skills Forecasts and Proposed Schedules of Work (and supported in some instances through observations made in the consultations) identifies the digital skills which

were the focus of this project are also applicable in the future skill needs of other industries which focus on 'making things'. They are:

- Agriculture
- Civil Infrastructure
- Construction
- Dental and other areas of the Health sector (eg Technicians Support Services)
- Food, Beverage and Pharmaceutical Manufacturing
- Furnishing
- Horticulture
- Meat Processing
- Pulp and Paper Manufacturing
- Timber Manufacturing

Opportunities for qualification design to promote occupation mobility, and for modernising sector / industry specific units, qualifications or skill sets

The four Manufacturing Technology qualifications (particularly those at Certificate III and IV level and able to be offered as cadetships) are an important pathway to support greater occupational mobility within the manufacturing sector (and related industries) and for workers from outside the manufacturing sector wanting to move into new technologically focused jobs within the industry. Updating these qualifications should be a matter of priority to support improved mobility.

In relation to the units available across the 10 Training Packages considered here – despite the number available the analysis showed little overlap. The largest number of units were those focused on digital analytic/digital diagnostic skills ie the skills to input, analyse and interpret data from machines and to use that information in a job role. While the project was clearly understood to be one focused on cross sector opportunities to align units and reduce any duplication, given the different machines learners are required to work with (eg in the aviation industry) it was not considered that the units as written were duplicative. No feedback was received during the consultations which indicated that units were duplicative or could be more broadly applied.

Of the units which incorporate **coding/programming skills** 15 are used in two Training Packages, five are used in three different Packages and one is used in four different Packages.

Of the units providing **additive manufacturing, CAD, CAM, CAE, or 3-D printing skills**, nine were used in two different Training Packages, one was use in three different Packages, two were used in four different Packages and one was used in five different Packages.

Of the units which included the specific **digital skills** which are the focus of this project, 16 were used in two different Training Packages, one was used in three different Packages, one was used in four different Packages, and one was used in seven different Packages.

The MEM Metal and Engineering Training Package contained the largest number of digital units. Many of the units in this Package have not been updated since 2005 and while they are the subject of a current Activity Order (to ensure they meet the 2012 Standards for Training Packages) – it is recommended that their content be updated and changes made to ensure the digital skills included in the units are current.

Industry drivers and how the proposed changes address identified cross sectoral skills needs

There are three drivers for the changes proposed in this Case for Change. They focus firstly on ensuring a cross sector approach to the recommendations, secondly ensuring that the current suite of digital skills being provided in Training Packages are contemporary and thirdly, that the sector has considered how it will meet the need for skills in a digitally integrated and rapidly changing Industry 4.0 environment.

While this project focused on the manufacturing, printing and related sectors, an analysis of all available IRC Industry Skills Forecasts and Proposed Schedules of Work identifies that there are other industries impacted by these changes and with similar skill needs. They are all involved in manufacture, production or construction processes.

Despite adopting a cross-sectoral approach to the project – the fact that (a) there are a number of units which are already being used in a cross sectoral manner, and (b) the specific machines used in different manufacturing and related industries – meant that the report makes no recommendations for new cross sectoral units to be created. However, undertaking training package development work in a holistic and cross sector manner could potentially identify similarities in units across training packages and lead to the development of units which could be used across sectors.

The steps outlined below aim to address the needs identified in the project, that is:

1. ensuring that existing units, skill sets and qualifications are current by updating the identified Training Package components (Attachment B)
2. providing other IRCs with similar digital skills in their Training Packages with advice on this project,
3. meeting with other IRCs and their SSOs to examine if the cross sectoral units already in use in the Training Packages which were the focus of this project can be used in their Training

Packages where a need for the same skills is identified[7], and

4. ensuring the skill needs of the Australian manufacturing sector (and related industries) continue to be met in an Industry 4.0 environment by:
    a. providing approval and funding for IBSA Manufacturing to undertake a cross-sector project focussed on determining how Training Packages can continue to meet the needs of the workforce in a rapidly changing Industry 4.0 environment, and
    b. promoting the take-up of the soon-to-be accredited Diploma of Applied Technologies (higher level apprenticeship) as a means of meeting the skill needs of new entrants to the workforce going into Industry 4.0 workplaces.

NB: IBSA Manufacturing is currently working with the Furnishing IRC to identify similar digital skills in the MSF Furnishing Training Package. A separate 'Case for Change' will be submitted for this work.

Industry support for change

Consultations took place over a seven week period and involved face-to-face meetings and telephone interviews with representatives from small and medium businesses, national and global businesses, unions, training providers, industry peak bodies and other VET sector stakeholders. IBSA Manufacturing is grateful for the time taken by industry representatives to participate in the project and for the input they provided.

Participants were based in the inner city and outer suburbs of Sydney, Melbourne, Brisbane, Canberra, Adelaide, Perth; three were in regional areas of New South Wales and Victoria. Due to the time required to reach agreement on an expanded scope for the project it was not possible to also implement a wider survey to garner feedback. However input was received from multiple participants from all industry areas included in the project scope, and from those currently represented on the affected IRCs.

Specific details on the consultation participants are included at Attachment C.

Evidence of cross sectoral support, including impacted IRCs and other key stakeholders

All IRCs which are impacted by the recommendations included in this Case for Change were provided with advice on the project as it progressed and with an early copy of the anticipated recommendations

It should be reiterated that all decisions on how units should be updated/aligned to Industry 4.0 or newly created, as a consequence of the training package development process, will be taken by the

[7] A number of the PRG representatives involved in this Case for Change project also sat on other Case for Change PRGs. In addition, staff from IBSA Manufacturing participated as observers on all other Case for Change projects and have provided formal and informal advice to other SSOs. As a consequence, there is a level of understanding of this digital skills project beyond just the industries included in the project scope. IBSA intends to build on this in continuing a cross sectoral approach to sharing the lessons of the project and offering support for the use of the already identified cross sectoral units from within the Training Packages which were part of this project scope – to other industry areas and Training Packages.

respective Industry Reference Committee. This Case for Change *does not propose* mandating any digital skills to be imposed on industries.

IRC feedback will be provided as a separate document.

Issues identified by stakeholders and how they will be addressed. In particular, highlight any issues that remain outstanding.

As noted earlier in this Case for Change – many of those involved in the consultations were more concerned with the impact of Industry 4.0 than specific changes to Training Packages. There were no issues identified by stakeholders in relation to the proposal to update the existing digital skills units and qualifications in the relevant Training Packages to ensure their currency.

Those participants who were familiar with the Diploma of Applied Technologies were positive about its potential to assist new entrants to the workforce in adapting to an Industry 4.0 environment. They were less clear about what options were available to them to upskill their existing workers for Industry 4.0.

There were no dissenting views from stakeholders to the approach outlined in this Case for Change.

Impact of change

Provide an analysis of the impact of the recommended changes on the vocational education and training system and relevant stakeholders (including employers, employees, students, registered training organisations, and government).

The implementation of the first three recommendations in this Case for Change represent 'business as usual' for the VET sector. That is, Training Package components will be updated to ensure their currency under the direction of the relevant Industry Reference Committee. In addition, an accredited course is being introduced which meets a need not yet included in a Training Package, and accredited units which duplicate units in Training Packages should not be re-accredited. As a consequence, the impact of the first three recommendations is considered to be positive but incremental –

> *learners will be taught more current skills and employers will receive the benefits of these skills, assisting them in improving their current operations.*

The only potential negative impact on the system results from the fact that the first three recommendations in this Case for Change include many units and qualifications that are already undergoing an update to ensure they meet the 2012 Standards for Training Packages. This will create some duplication of activity for providers, regulators and students whereby some units and qualifications will be updated twice in a relatively short period of time.

The fourth recommendation in this Case for Change relates to the commissioning of a new project to explore how Training Packages can meet the needs of the Industry 4.0 work environment. The research should consider, amongst other things, how Training Packages can be updated and maintained in a

timely manner given the pace of change in the world of work as a result of digitisation; the inclusion of core skills such as creative thinking, critical thinking, problem solving and other higher order core skills; and the need for specific 'working in Industry 4.0' units. If the project is funded it is likely that it may result in recommendations which have a more substantial impact on the system. If it is not funded it is likely that the growth in accredited courses identified in Attachment D (at both the VET and higher education level) will continue as a means of meeting employer needs in a rapidly changing environment.

The research report at Attachment D canvases the major changes being made by the German, UK and Singaporean governments (amongst others) to their training systems, as a means of preparing their current and future workforces for Industry 4.0. The changes being made are not uniform (and it is not suggested that any of them specifically should be introduced here), however they are being introduced by other countries as a means of future proofing their manufacturing and related sectors by addressing the need (a) for different skills – beyond just the technical and (b) for the more timely delivery of new skills. It is suggested that Australia needs to ensure it also looks to future proof its manufacturing and related industries, and that there may be some lessons which can be learned from other advanced manufacturing countries.

The fifth recommendation suggests that the AISC should lend its support to efforts to encourage State Training Authorities and the Commonwealth to follow the lead of the Victorian government and provide funding to students wishing to enrol in the soon to be accredited Diploma of Applied Technologies. This course is having a positive impact – it has been well received by those employers currently using it and it includes a specific focus on Industry 4.0 skills for new entrants to the workplace.

Identify the risks of not implementing the changes.

The risks of not updating the proposed units and qualifications are that Australian businesses will become less competitive and learners will find it harder to gain employment.

The risk of not funding the proposed cross sector project on Industry 4.0 is that Australian manufacturing and related industries will rapidly lose their ability to compete. A growth in accredited courses at both the VET and higher education level will result in an inconsistent national approach to training in this important area.

The risk of not encouraging States and the Commonwealth to provide funding support for the Diploma of Applied Technologies is that employers in States outside Victoria will be unable to access the Industry 4.0 skills on offer.

Provide advice about how the proposed changes advance the project's priorities.

This Cross Sector project was an opportunity to identify if generic cross sector units or skill sets were needed to address gaps or reduce duplication in the digital skills included in Training Packages. The evidence is that units and qualifications need updating and some units are already being used in a cross

sector manner across different Training Packages. As such there was no need identified for additional units to meet specific needs.

Provide estimated timeframes for implementing the proposed changes to training package(s).

The proposed changes will initially primarily impact the manufacturing industry sectors and involve the updating of qualifications and units across 10 training packages. Discussions will also be undertaken with other SSOs and the IRCs they support about how existing cross sector units in the Training Packages examined here may assist in their demand for digital skills.

Training package development work to accommodate this updating activity - it is proposed that an initial 3-month scoping phase is conducted, followed by a 12-month development phase. The development phase will include extensive cross industry consultation and validation to ensure the updated training components meet industry needs.

It is estimated that the Industry 4.0 research project proposed here would take six months to complete and would involve national and international[8] consultations, as well as more detailed desktop research.

It is also proposed that the research findings form the basis of a national conference for those in the affected industries. High profile international speakers could describe the impacts on their businesses.

Provide advice on any linkages with other cross-sector projects.

During the course of the project IBSA Manufacturing engaged extensively with all of the other cross-sector projects as they touch on skills needs across all industries including the manufacturing sectors.

This digital skills cross sector project is more closely linked to the following projects impacted by technological disruption:

- Automation
- Big data
- Cyber security
- Consumer engagement through social media

Further work needs to be undertaken to analyse the cross over between the recommended changes across the projects. And, as noted above, IBSA Manufacturing intends to engage with other SSOs and IRCs which have already identified a need for similar digital skills to determine if existing cross sector units can meet the needs they have identified.

[8] The international consultations are envisaged as using digital technology rather than face-to-face meetings given the time and costs that would otherwise be involved.

Implementing the COAG Industry and Skills Council (CISC) reforms for training packages

This Case for Change has the potential to address the following CISC reforms which the Council agreed to ensure training products best fit the needs of industry.

Ensure obsolete and superfluous qualifications are removed from the system

The proposed update of 211 units across a number of training packages is likely to identify superfluous or obsolete units of competency.

Ensure that more information about industry's expectations of training delivery is available to training providers to improve their delivery and to consumers to enable more informed course choices

Expectations for industry contextualisation in delivery and assessment of digital skills will be clearly articulated in respective Companion Volumes. This information will also be collated and available for Training Providers wanting to implement digital skills across a number of areas.

Ensure that the training system better supports individuals to move easily from one related occupation to another

Addressing the issue of transferable skills is also a concern for industry. This Case for Change proposes the update of a number of qualifications which will explore the potential for broader credentials and provide an opportunity to address this issue.

The commissioning of a new project to explore how national Training Packages can meet the needs of the Industry 4.0 work environment will further identify transferrable skills for individuals.

Improve the efficiency of the training system by creating units that can be owned and used by multiple industry sectors

The update of units across a number of training package areas in a coordinated way has the potential to identify and create additional generic units that can be owned and used by multiple industry sectors, and support individuals to move easily from one related occupation to another.

Foster greater recognition of skill sets

While this Case for Change does not propose the development of skill sets the need for specific, targeted skill clusters may emerge during the training package development and review process.

Ensure that new training courses can be developed as quickly as industry needs them and be available to support niche skill needs

The commissioning of research into Industry 4.0, and further training package development work, will ensure the national training system can respond to employer needs in a rapidly changing environment.

Project Reference Group Signoff

This Case for Change was agreed to by the Digital Skills Cross Sector Project Reference Group

Name of Chair	Michael Grogan
Signature of Chair	Via email 1 December 2017
Date	1 December 2017

Attachment A: Members of the Project Reference Group

Industry Reference Committee (IRC) (or Subject matter expert)	Name	Organisation
Aerospace IRC	David Peterson (IRC Nominee)	Civil Aviation Safety Authority
Information and Communications Technology (ICT) IRC	David Sweeney	Telstra
Manufacturing & Engineering IRC	Michael Grogan (Chair)	Advanced Manufacturing Growth Centre
Printing & Graphic Arts IRC	Julie Hobbs	Design Institute of Australia (DIA)
Process Manufacturing, Recreational Vehicles and Laboratory IRC	Nigel Haywood	(formerly) National Energy Resources Australia
Textiles, Clothing & Footwear IRC	Leon Drury (Deputy Chair)	NSW Industry Training Advisory Board (NSW ITAB), Manufacturing Skills Australia
Australian Information Industry Association (AIIA) (Subject Matter Expert)	Mark Walker	ICM Consulting
Innovative Manufacturing CRC (Subject Matter Expert)	Nico Adams DPhil(Oxon)	Innovative Manufacturing CRC
Swinburne Institute of Technology (Subject Matter Expert)	Shanti Krishnan	Swinburne University of Technology

Attachment B: Training Package components to change

Lead SSO: IBSA Manufacturing

Date submitted: 1 December 2017

IRC name	SSO with responsibility for the IRC	Training package code	Training package name	Training product code (Qualification, skill set, unit of competency)	Training product name (Qualification, skill set, unit of competency)	Review status (New or updated)	Change required
Qualifications							
Manufacturing and Engineering	IBSA Manufacturing	MSA07	Manufacturing	MSA30208	Certificate III in Manufacturing Technology	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MSA07	Manufacturing	MSA40108	Certificate IV in Manufacturing Technology	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MSA07	Manufacturing	MSA50108	Diploma of Manufacturing Technology	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MSA07	Manufacturing	MSA60108	Advanced Diploma of Manufacturing Technology	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM05	Metal and Engineering Training Package	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM30505	Certificate III in Engineering - Technical	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM30705	Certificate III in Marine Craft Construction	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM40311	Certificate IV in Advanced Jewellery Manufacture	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM50105	Diploma of Engineering - Advanced Trade	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM50311	Diploma of Jewellery and Object Design	Updated	Review and update

IRC name	SSO with responsibility for the IRC	Training package code	Training package name	Training product code (Qualification, skill set, unit of competency)	Training product name (Qualification, skill set, unit of competency)	Review status (New or updated)	Change required
Units of Competency							
Aerospace	IBSA Manufacturing	MEA	Aeroskills	MEA214	Inspect, test and troubleshoot aircraft basic communication and radio navigation systems and components	Updated	Review and update
Aerospace	IBSA Manufacturing	MEA	Aeroskills	MEA215	Inspect, test and troubleshoot advanced aircraft communications systems and components	Updated	Review and update
Aerospace	IBSA Manufacturing	MEA	Aeroskills	MEA216	Inspect, test and troubleshoot instrument landing systems and components	Updated	Review and update
Aerospace	IBSA Manufacturing	MEA	Aeroskills	MEA217	Inspect, test and troubleshoot fixed wing autopilot systems and components	Updated	Review and update
Aerospace	IBSA Manufacturing	MEA	Aeroskills	MEA218	Inspect, test and troubleshoot rotary wing autopilot systems and components	Updated	Review and update
Aerospace	IBSA Manufacturing	MEA	Aeroskills	MEA219	Inspect, test and troubleshoot aircraft pressurisation control systems and components	Updated	Review and update
Aerospace	IBSA Manufacturing	MEA	Aeroskills	MEA220	Inspect, test and troubleshoot aircraft primary radar systems and components	Updated	Review and update
Aerospace	IBSA Manufacturing	MEA	Aeroskills	MEA221	Inspect, test and troubleshoot aircraft secondary radar systems and components	Updated	Review and update
Aerospace	IBSA Manufacturing	MEA	Aeroskills	MEA227	Test and troubleshoot aircraft electrical systems and components	Updated	Review and update
Aerospace	IBSA Manufacturing	MEA	Aeroskills	MEA229	Test and troubleshoot aircraft radio frequency navigation and communications	Updated	Review and update
Aerospace	IBSA Manufacturing	MEA	Aeroskills	MEA230	Test and troubleshoot fixed wing aircraft automatic flight control systems and components	Updated	Review and update
Aerospace	IBSA Manufacturing	MEA	Aeroskills	MEA231	Inspect, test and troubleshoot rotary wing aircraft automatic flight control systems and components	Updated	Review and update
Aerospace	IBSA Manufacturing	MEA	Aeroskills	MEA232	Test and troubleshoot aircraft pulse systems and components	Updated	Review and update
Aerospace	IBSA Manufacturing	MEA	Aeroskills	MEA234	Inspect, test and troubleshoot aircraft global navigation systems and components	Updated	Review and update
Aerospace	IBSA Manufacturing	MEA	Aeroskills	MEA271	Lay out avionic flight management systems	Updated	Review and update
Aerospace	IBSA Manufacturing	MEA	Aeroskills	MEA279	Inspect, test and troubleshoot full authority digital engine control systems	Updated	Review and update

IRC name	SSO with responsibility for the IRC	Training package code	Training package name	Training product code (Qualification, skill set, unit of competency)	Training product name (Qualification, skill set, unit of competency)	Review status (New or updated)	Change required
Aerospace	IBSA Manufacturing	MEA	Aeroskills	MEA282	Repair or overhaul aircraft pulse system components	Updated	Review and update
Aerospace	IBSA Manufacturing	MEA	Aeroskills	MEA283	Repair or overhaul aircraft display, control and distribution system components	Updated	Review and update
Aerospace	IBSA Manufacturing	MEA	Aeroskills	MEA285	Repair or overhaul aircraft radio frequency communication and navigation system components	Updated	Review and update
Aerospace	IBSA Manufacturing	MEA	Aeroskills	MEA288	Repair or overhaul aircraft audio and visual systems and reproducers	Updated	Review and update
Aerospace	IBSA Manufacturing	MEA	Aeroskills	MEA289	Maintain basic light aircraft avionic systems and components	Updated	Review and update
Aerospace	IBSA Manufacturing	MEA	Aeroskills	MEA291	Inspect, test and troubleshoot fixed wing single axis autopilot systems and components	Updated	Review and update
Aerospace	IBSA Manufacturing	MEA	Aeroskills	MEA313	Inspect, test and troubleshoot piston engine systems and components	Updated	Review and update
Aerospace	IBSA Manufacturing	MEA	Aeroskills	MEA343	Remove and install avionic system components	Updated	Review and update
Aerospace	IBSA Manufacturing	MEA	Aeroskills	MEA360	Maintain aircraft diesel engines	Updated	Review and update
Aerospace	IBSA Manufacturing	MEA	Aeroskills	MEA389	Repair and/or overhaul propellers	Updated	Review and update
Aerospace	IBSA Manufacturing	MEA	Aeroskills	MEA703	Apply aeronautical modelling for computer aided engineering	Updated	Review and update
Aerospace	IBSA Manufacturing	MEA	Aeroskills	MEA704	Apply avionic modelling for computer aided engineering	Updated	Review and update
Aerospace	IBSA Manufacturing	MEA	Aeroskills	MEA705	- Apply basic scientific principles and techniques in aeronautical engineering situations	Updated	Review and update
Aerospace	IBSA Manufacturing	MEA	Aeroskills	MEA706	- Apply basic scientific principles and techniques in avionic engineering situations	Updated	Review and update
Aerospace	IBSA Manufacturing	MEA	Aeroskills	MEA711	Apply avionic analogue design techniques	Updated	Review and update
Aerospace	IBSA Manufacturing	MEA	Aeroskills	MEA712	Apply avionic digital design techniques	Updated	Review and update
Aerospace	IBSA Manufacturing	MEA	Aeroskills	MEA713	- Integrate aeronautical fundamentals into an engineering task	Updated	Review and update

IRC name	SSO with responsibility for the IRC	Training package code	Training package name	Training product code (Qualification, skill set, unit of competency)	Training product name (Qualification, skill set, unit of competency)	Review status (New or updated)	Change required
Aerospace	IBSA Manufacturing	MEA	Aeroskills	MEA714	Integrate avionic fundamentals into an engineering task	Updated	Review and update
Aerospace	IBSA Manufacturing	MEA	Aeroskills	MEA716	Evaluate avionic analogue systems	Updated	Review and update
Aerospace	IBSA Manufacturing	MEA	Aeroskills	MEA717	Evaluate avionic digital systems	Updated	Review and update
Aerospace	IBSA Manufacturing	MEA	Aeroskills	MEA725	Apply advanced scientific principles and techniques in avionic engineering situations	Updated	Review and update
Aerospace	IBSA Manufacturing	MEA	Aeroskills	MEA726	Apply aircraft electrical system design techniques	Updated	Review and update
Aerospace	IBSA Manufacturing	MEA	Aeroskills	MEASS00326	LME056 Electrical/Instrument/Radio – B2 Licence Exclusion E34 Removal	Updated	Review and update
Process Manufacturing, Recreational Vehicles and Laboratory	IBSA Manufacturing	PMA	Chemical, Hydrocarbons and Refining	PMAOPS101	Read dials and indicators	Updated	Review and update
Process Manufacturing, Recreational Vehicles and Laboratory	IBSA Manufacturing	MSL	Laboratory Operations	MSL904001	Perform standard calibrations	Updated	Review and update
Process Manufacturing, Recreational Vehicles and Laboratory	IBSA Manufacturing	MSL	Laboratory Operations	MSL905002	Create or modify calibration procedures	Updated	Review and update
Process Manufacturing, Recreational Vehicles and Laboratory	IBSA Manufacturing	MSL	Laboratory Operations	MSL905003	Create or modify automated calibration procedures	Updated	Review and update
Process Manufacturing, Recreational Vehicles and Laboratory	IBSA Manufacturing	MSM	Manufacturing	MSMSUP406	Identify faults in electronic control	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MSA07	Manufacturing	MSATCS301A	Interpret architectural and engineering design specifications for structural steel detailing	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MSA07	Manufacturing	MSATCS302A	Detail bolts and welds for structural steelwork connections	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MSA07	Manufacturing	MSATCS501A	Detail standardised structural connections	Updated	Review and update

IRC name	SSO with responsibility for the IRC	Training package code	Training package name	Training product code (Qualification, skill set, unit of competency)	Training product name (Qualification, skill set, unit of competency)	Review status (New or updated)	Change required
Manufacturing and Engineering	IBSA Manufacturing	MSA07	Manufacturing	MSATCS502A	Detail structural steel members	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MSA07	Manufacturing	MSATCS503A	Incorporate structural steel detailing into fabrication and construction project management	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MSA07	Manufacturing	MSATCS504A	Detail ancillary steelwork	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MSA07	Manufacturing	MSATCM513A	Plan and complete metallurgical projects	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM04006B	Operate sand moulding and core making machines	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM04016C	Develop and manufacture precision models	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM05054A	Write basic NC/CNC programs for thermal cutting machines	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM07006C	Perform lathe operations	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM07007C	Perform milling operations	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM07009B	Perform precision jig boring operations	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM07018C	Write basic NC/CNC programs	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM07019C	Program NC/CNC machining centre	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM07020C	Program multiple spindle and/or multiple axis NC/CNC machining centre	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM07022C	Program CNC wire cut machines	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM07023C	Program and set up CNC manufacturing cell	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM07039A	Write programs for industrial robots	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM07041A	Perform production machining	Updated	Review and update

IRC name	SSO with responsibility for the IRC	Training package code	Training package name	Training product code (Qualification, skill set, unit of competency)	Training product name (Qualification, skill set, unit of competency)	Review status (New or updated)	Change required
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM09005B	Perform basic engineering detail drafting	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM09009C	Create 2D drawings using computer aided design system	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM09010C	Create 3D models using computer aided design system	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM09021B	Interpret and produce curved 3 dimensional shapes	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM09022A	Create 2D code files using computer aided manufacturing system	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM09023A	Create 3D code files using computer aided manufacturing system	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM09155A	Prepare mechanical models for computer aided engineering (CAE)	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM09156A	Prepare mechatronic models for computer aided engineering (CAE)	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM09157A	Perform mechanical engineering design drafting	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM09158A	Perform mechatronics engineering design drafting	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM09201A	Work effectively in an engineering drafting workplace	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM09204A	Produce basic engineering detail drawings	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM09210A	Create 3 D solid models using computer aided design (CAD) system	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM09211A	Produce drawings or models for industrial piping	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM09215A	Supervise detail drafting projects	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM09216A	Interpret and produce curved 3 D shapes and patterns	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM09220A	Apply surface modelling techniques to 3 D drawings	Updated	Review and update

IRC name	SSO with responsibility for the IRC	Training package code	Training package name	Training product code (Qualification, skill set, unit of competency)	Training product name (Qualification, skill set, unit of competency)	Review status (New or updated)	Change required
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM09221A	Create 3 D model assemblies using computer aided design (CAD) system	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM10013A	Install split air conditioning systems and associated pipework	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM10024	Install and troubleshoot luminaires and ancillary equipment	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM12001B	Use comparison and basic measuring devices	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM12002B	Perform electrical/electronic measurement	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM12003B	Perform precision mechanical measurement	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM12004B	Perform precision electrical /electronic measurement	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM12021B	Program coordinate measuring machines	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM12022B	Program coordinate measuring machines (advanced)	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM12023A	Perform engineering measurements	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM14086A	Apply mechatronic engineering analysis techniques	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM14087A	Apply manufactured product design techniques	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM14088A	Apply maintenance engineering techniques to equipment and component repairs and modifications	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM14090A	Integrate mechatronic fundamentals into an engineering task	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM14092A	Integrate maintenance fundamentals into an engineering task	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM16008A	Interact with computing technology	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM18059B	Modify electronic systems	Updated	Review and update

IRC name	SSO with responsibility for the IRC	Training package code	Training package name	Training product code (Qualification, skill set, unit of competency)	Training product name (Qualification, skill set, unit of competency)	Review status (New or updated)	Change required
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM18047B	Diagnose and maintain electronic controlling systems on mobile plant	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM18054B	Fault find, test and calibrate instrumentation systems and equipment	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM18057B	Maintain/service analog/digital electronic equipment	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM18058C	Modify electronic equipment	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM18059B	Modify electronic systems	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM18060B	Maintain, repair control instrumentation single and multiple loop control systems	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM18061B	Maintain/calibrate complex control systems	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM18062B	Install, maintain and calibrate instrumentation sensors, transmitters and final control elements	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM18065B	Diagnose and repair digital equipment and components	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM18066B	Diagnose and repair microprocessor based equipment	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM18067B	Tune control loops multi controller or multi element systems	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM18069B	Maintain, repair instrumentation process control analysers	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM18085A	Install, service and repair domestic air conditioning and refrigeration appliances	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM18108	Troubleshoot analog and digital electronic equipment	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM18109	Troubleshoot instrumentation systems and equipment	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM19024A	Use CAD to create and display 3D jewellery and object models	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM19025A	Create and present designs for jewellery and other 3D objects	Updated	Review and update

IRC name	SSO with responsibility for the IRC	Training package code	Training package name	Training product code (Qualification, skill set, unit of competency)	Training product name (Qualification, skill set, unit of competency)	Review status (New or updated)	Change required
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM20001A	Produce keys	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM20013A	Service automotive transponder systems	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM23003A	Operate and program computers and/or controllers in engineering situations	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM23004A	Apply technical mathematics	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM23064A	Select and test mechatronic engineering materials	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM23086A	Apply scientific principles and techniques in avionic engineering situations	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM23112A	Investigate electrical and electronic controllers in engineering applications	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM23115A	Evaluate fluid power systems	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM23116A	Evaluate programmable logic controller and related control system component applications	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM23117A	Evaluate microcontroller applications	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM23122A	Evaluate computer integrated manufacturing systems	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM23126A	Evaluate industrial robotic applications	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM23130A	Coordinate servicing and fault finding of HVACR control systems	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM23131A	Evaluate rapid prototyping applications	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM23132A	Evaluate rapid manufacturing processes	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM23133A	Evaluate rapid tooling applications	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM23134A	Evaluate jigs and fixtures	Updated	Review and update

IRC name	SSO with responsibility for the IRC	Training package code	Training package name	Training product code (Qualification, skill set, unit of competency)	Training product name (Qualification, skill set, unit of competency)	Review status (New or updated)	Change required
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM23135A	Evaluate moulding tools and processes	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM23136A	Evaluate stamping and forging tools	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM23137A	Evaluate rolling tools and processes	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM23138A	Evaluate suitability of materials for engineering related applications	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM23139A	Design a basic single zone duct distribution system	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM23140A	Determine operational parameters for building HVAC hydronic systems	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM234003A	Design machines and ancillary equipment	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM234009A	Design computer integrated manufacturing systems	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM234010A	Design microcontroller applications	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM234011A	Design programmable logic controller applications	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM234014A	Design a robotic system	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM234017A	Design exhaust, ventilation and dust collection systems	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM234018A	Design heating, ventilation, air conditioning and refrigeration control systems	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM234020A	Coordinate small lot manufacture using rapid manufacture processes	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM234034A	Manage heating, ventilation, air conditioning and refrigeration systems or projects	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM25002B	Form and integrate fibre reinforced structures	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM25011B	Install marine systems	Updated	Review and update

IRC name	SSO with responsibility for the IRC	Training package code	Training package name	Training product code (Qualification, skill set, unit of competency)	Training product name (Qualification, skill set, unit of competency)	Review status (New or updated)	Change required
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM25012B	Install and test operations of marine auxiliary systems	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM30027A	Prepare basic programs for programmable logic controllers	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM30031A	Operate computer aided design (CAD) system to produce basic drawing elements	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM30032A	Produce basic engineering drawings	Updated	Review and update
Manufacturing and Engineering	IBSA Manufacturing	MEM05	Metal and Engineering	MEM30033A	Use computer aided design (CAD) to create and display 3 D models	Updated	Review and update
Process Manufacturing, Recreational Vehicles and Laboratory	IBSA Manufacturing	PMB	Plastics, Rubber and Cablemaking	PMBPROD253	Operate an internal mill blender	Updated	Review and update
Process Manufacturing, Recreational Vehicles and Laboratory	IBSA Manufacturing	PMB	Plastics, Rubber and Cablemaking	PMBPROD308	Take a machine out of production	Updated	Review and update
Process Manufacturing, Recreational Vehicles and Laboratory	IBSA Manufacturing	PMB	Plastics, Rubber and Cablemaking	PMBPROD343	Shut down plant area	Updated	Review and update
Process Manufacturing, Recreational Vehicles and Laboratory	IBSA Manufacturing	PMB	Plastics, Rubber and Cablemaking	PMBPROD384	Operate multi axis router	Updated	Review and update
Process Manufacturing, Recreational Vehicles and Laboratory	IBSA Manufacturing	PMB	Plastics, Rubber and Cablemaking	PMBPROD385	Program computer controlled equipment	Updated	Review and update
Printing and Graphic Arts	PwCs Skills for Australia	ICP	Printing and Graphic Arts	ICPCBF220	Produce basic converted or finished product	Updated	Review and update
Printing and Graphic Arts	PwCs Skills for Australia	ICP	Printing and Graphic Arts	ICPCBF222	Set up and operate in line cutter	Updated	Review and update
Printing and Graphic Arts	PwCs Skills for Australia	ICP	Printing and Graphic Arts	ICPCBF225	Set up machine for basic flat bed die cutting or embossing	Updated	Review and update
Printing and Graphic Arts	PwCs Skills for Australia	ICP	Printing and Graphic Arts	ICPCBF228	Produce basic rotary die cut or embossed product	Updated	Review and update

IRC name	SSO with responsibility for the IRC	Training package code	Training package name	Training product code (Qualification, skill set, unit of competency)	Training product name (Qualification, skill set, unit of competency)	Review status (New or updated)	Change required
Printing and Graphic Arts	PwCs Skills for Australia	ICP	Printing and Graphic Arts	ICPCBF231	Set up machine for basic flat bed cutting	Updated	Review and update
Printing and Graphic Arts	PwCs Skills for Australia	ICP	Printing and Graphic Arts	ICPCBF232	Produce basic flat bed cut product	Updated	Review and update
Printing and Graphic Arts	PwCs Skills for Australia	ICP	Printing and Graphic Arts	ICPCBF235	Set up machine for basic rotary cutting	Updated	Review and update
Printing and Graphic Arts	PwCs Skills for Australia	ICP	Printing and Graphic Arts	ICPCBF236	Produce basic rotary cut product	Updated	Review and update
Printing and Graphic Arts	PwCs Skills for Australia	ICP	Printing and Graphic Arts	ICPCBF241	Set up machine for basic single or continuous folding	Updated	Review and update
Printing and Graphic Arts	PwCs Skills for Australia	ICP	Printing and Graphic Arts	ICPCBF242	Produce basic single or continuous folded product	Updated	Review and update
Printing and Graphic Arts	PwCs Skills for Australia	ICP	Printing and Graphic Arts	ICPCBF243	Set up machine for basic collating or inserting (sheet/section)	Updated	Review and update
Printing and Graphic Arts	PwCs Skills for Australia	ICP	Printing and Graphic Arts	ICPCBF244	Produce basic collated or inserted (sheet/section) product	Updated	Review and update
Printing and Graphic Arts	PwCs Skills for Australia	ICP	Printing and Graphic Arts	ICPCBF245	Set up and produce hand collated or inserted product	Updated	Review and update
Printing and Graphic Arts	PwCs Skills for Australia	ICP	Printing and Graphic Arts	ICPCBF261	Set up machine for basic adhesive, mechanical or thermal fastening	Updated	Review and update
Printing and Graphic Arts	PwCs Skills for Australia	ICP	Printing and Graphic Arts	ICPCBF262	Produce basic adhesive, mechanical or thermal fastened product	Updated	Review and update
Printing and Graphic Arts	PwCs Skills for Australia	ICP	Printing and Graphic Arts	ICPCBF281	Set up machine for basic laminating	Updated	Review and update
Printing and Graphic Arts	PwCs Skills for Australia	ICP	Printing and Graphic Arts	ICPCBF282	Produce basic laminated product	Updated	Review and update
Printing and Graphic Arts	PwCs Skills for Australia	ICP	Printing and Graphic Arts	ICPCBF305	Produce single faced web	Updated	Review and update
Printing and Graphic Arts	PwCs Skills for Australia	ICP	Printing and Graphic Arts	ICPCBF307	Produce double faced web	Updated	Review and update
Printing and Graphic Arts	PwCs Skills for Australia	ICP	Printing and Graphic Arts	ICPCBF309	Produce complex folded and glued cartons	Updated	Review and update
Printing and Graphic Arts	PwCs Skills for Australia	ICP	Printing and Graphic Arts	ICPCBF311	Prepare for cutting forme and stripper making	Updated	Review and update

IRC name	SSO with responsibility for the IRC	Training package code	Training package name	Training product code (Qualification, skill set, unit of competency)	Training product name (Qualification, skill set, unit of competency)	Review status (New or updated)	Change required
Printing and Graphic Arts	PwCs Skills for Australia	ICP	Printing and Graphic Arts	ICPCBF320	Produce complex converted or finished product	Updated	Review and update
Printing and Graphic Arts	PwCs Skills for Australia	ICP	Printing and Graphic Arts	ICPCBF327	Set up machine for complex rotary die cutting or embossing	Updated	Review and update
Printing and Graphic Arts	PwCs Skills for Australia	ICP	Printing and Graphic Arts	ICPCBF328	Produce complex rotary die cut or embossed product	Updated	Review and update
Printing and Graphic Arts	PwCs Skills for Australia	ICP	Printing and Graphic Arts	ICPCBF341	Set up machine for complex sequenced or multiple folding	Updated	Review and update
Printing and Graphic Arts	PwCs Skills for Australia	ICP	Printing and Graphic Arts	ICPCBF342	Produce complex sequenced or multiple folded product	Updated	Review and update
Printing and Graphic Arts	PwCs Skills for Australia	ICP	Printing and Graphic Arts	ICPCBF343	Set up machine for complex collating or inserting (sheet/section/reel)	Updated	Review and update
Printing and Graphic Arts	PwCs Skills for Australia	ICP	Printing and Graphic Arts	ICPCBF344	Produce complex collated or inserted product	Updated	Review and update
Printing and Graphic Arts	PwCs Skills for Australia	ICP	Printing and Graphic Arts	ICPCBF361	Set up machine for complex adhesive, mechanical or sewn fastening	Updated	Review and update
Printing and Graphic Arts	PwCs Skills for Australia	ICP	Printing and Graphic Arts	ICPCBF381	Set up machine for complex laminating	Updated	Review and update
Printing and Graphic Arts	PwCs Skills for Australia	ICP	Printing and Graphic Arts	ICPCBF382	Produce complex laminated product	Updated	Review and update
Printing and Graphic Arts	PwCs Skills for Australia	ICP	Printing and Graphic Arts	ICPCBF391	Use electronic monitoring systems (converting and finishing)	Updated	Review and update
Printing and Graphic Arts	PwCs Skills for Australia	ICP	Printing and Graphic Arts	ICPCBF392	Produce product on window gluer	Updated	Review and update
Printing and Graphic Arts	PwCs Skills for Australia	ICP	Printing and Graphic Arts	ICPCBF406	Set up and load in line smart card machine	Updated	Review and update
Printing and Graphic Arts	PwCs Skills for Australia	ICP	Printing and Graphic Arts	ICPCBF407	Operate a smart card machine and pack product	Updated	Review and update
Printing and Graphic Arts	PwCs Skills for Australia	ICP	Printing and Graphic Arts	ICPCBF410	Set up machine for complex carton folding and gluing	Updated	Review and update
Printing and Graphic Arts	PwCs Skills for Australia	ICP	Printing and Graphic Arts	ICPCBF426	Produce complex flat bed die cut or embossed product	Updated	Review and update
Printing and Graphic Arts	PwCs Skills for Australia	ICP	Printing and Graphic Arts	ICPPRN395	Set up and produce 3D print	Updated	Review and update

IRC name	SSO with responsibility for the IRC	Training package code	Training package name	Training product code (Qualification, skill set, unit of competency)	Training product name (Qualification, skill set, unit of competency)	Review status (New or updated)	Change required
Printing and Graphic Arts	PwCs Skills for Australia	ICP	Printing and Graphic Arts	ICPPRP481 Design complex carton		Updated	Review and update
Printing and Graphic Arts	PwCs Skills for Australia	ICP	Printing and Graphic Arts	ICPPRP495 Manipulate 3D graphics files in preparation for 3D printing		Updated	Review and update
Textiles, Clothing and Footwear	IBSA Manufacturing	LMT07	Textiles, Clothing and Footwear	LMTMF6002A Design, evaluate and make patterns for medical grade custom made footwear		Updated	Review and update
Textiles, Clothing and Footwear	IBSA Manufacturing	MST	Textiles, Clothing and Footwear	MSTFD5021 Conduct digital patternmaking and grading		Updated	Review and update
Textiles, Clothing and Footwear	IBSA Manufacturing	MST	Textiles, Clothing and Footwear	MSTFD5022 Develop digital costing markers		Updated	Review and update
Textiles, Clothing and Footwear	IBSA Manufacturing	MST	Textiles, Clothing and Footwear	MSTFD6007 Implement specialised patternmaking technologies		Updated	Review and update
Textiles, Clothing and Footwear	IBSA Manufacturing	MST	Textiles, Clothing and Footwear	MSTGN4009 Design production tooling		Updated	Review and update
Textiles, Clothing and Footwear	IBSA Manufacturing	MST	Textiles, Clothing and Footwear	MSTLG3001 Make a prototype		Updated	Review and update
Textiles, Clothing and Footwear	IBSA Manufacturing	MST	Textiles, Clothing and Footwear	MSTTD5004 Design and produce experimental textiles		Updated	Review and update
Textiles, Clothing and Footwear	IBSA Manufacturing	MST	Textiles, Clothing and Footwear	MSTTD5010 Produce computer aided textile design folios		Updated	Review and update
Textiles, Clothing and Footwear	IBSA Manufacturing	MST	Textiles, Clothing and Footwear	MSTTD6002 Apply electronic systems to textile design and production		Updated	Review and update
Textiles, Clothing and Footwear	IBSA Manufacturing	MST	Textiles, Clothing and Footwear	MSTTX3011 Set up, adjust and monitor a machine for TCF production		Updated	Review and update
Textiles, Clothing and Footwear	IBSA Manufacturing	MST	Textiles, Clothing and Footwear	MSTTX3012 Identify and deal with mechanical and low voltage electrical faults in textile		Updated	Review and update

Addendum: Units accredited by the VRQA which may need review:

- VBP240- Use extended features of CAD
- VBP241- Manage CAD systems
- VBP242- Manage CAD in a business
- VBP252- Apply computer aided manufacturing (CAM) processes
- VBP253- Apply computer aided manufacturing (CAM) 2D programming
- VBP254- Apply computer aided manufacturing (CAM) lathe programming
- VPAU541- Produce basic computer aided manufactured (CAM) signs - vinyl
- VU21160- Use extended features of CAD
- VU21161- Manage CAD systems
- VU21162- Manage CAD in a business
- VU21212- Apply computer aided manufacturing (CAM) processes
- VU21213- Apply computer aided manufacturing (CAM) 2D programming
- VU21214- Apply computer aided manufacturing (CAM) lathe programming
- VU21706- Create products using 3D printing
- VU21971- Produce 2-D architectural landscape drawings using CAD
- VU21986- Utilise 3D printing for plastic product manufacturing
- VU21987- Utilise 3D printing for plastic product prototyping

Attachment C: Stakeholder Consultation Method and Scale

Name and organisation of stakeholder	Stakeholder Type	State	Coverage	Detail method(s) and scale of consultation
Nico Adams (Innovative Manufacturing IRC)	PRG Member Industry subject matter expert	VIC	National	Face-to-face
Shanti Krishnan (Swinburne University of Technology)	PRG Member Registered Training Organisation Industry subject matter expert	VIC	VIC	Face-to-face
Ben Eade (Manufacturing Australia)	Industry Body / Member Organisation	VIC	National	Face-to-face
David Peterson (CASA)	PRG Member Industry subject matter expert	ACT	National	Face-to-face
Craig Robertson (TAFE Directors Australia)	Industry Body / Member Organisation	ACT	National	Face-to-face
Ron Jackson (TAFE Directors Australia)	Industry Body / Member Organisation	ACT	National	Face-to-face
Lyndell Manson (TAFE Directors Australia)	Industry Body / Member Organisation	ACT	National	Face-to-face
Mark Walker (ICM Consulting)	PRG Member Industry subject matter expert	NSW	NSW	Face-to-face
Leon Drury (NSW Industry Training Advisory Board (NSW ITAB), Manufacturing Skills Australia)	PRG Deputy Chair IRC Chair: Textiles, Clothing and Footwear IRC	NSW	National	Face-to-face
Robert Petherbridge (TAFE Queensland)	Registered Training Organisation	QLD	QLD	Face-to-face
Jenny Dodd (TAFE Queensland)	Registered Training Organisation	QLD	QLD	Face-to-face
Neil Miller (ACPET)	Industry Body / Member Organisation	QLD	National	Face-to-face

Name and organisation of stakeholder	Stakeholder Type	State	Coverage	Detail method(s) and scale of consultation
David Sweeney (Telstra)	PRG Member IRC Member: Information and Communications Technology (ICT) IRC	VIC	National	Telephone interview
Susan Carter (Siemens)	Industry Employer	VIC	International	Face-to-face
Steve Dowey (Suttons Tools)	Industry Employer	VIC	National	Face-to-face
Michael Grogan (Advanced Manufacturing Growth Centre)	PRG Chair IRC Chair: Textiles, Clothing and Footwear IRC	VIC	National	Face-to-face
Paul Mitchell (Printing Industry Association of Australia (PIAA))	Industry Body / Member Organisation	VIC	National	Face-to-face
Wendy Cooper (Milspec)	Industry Employer	VIC	National	Face-to-face
Matthew Twist (Laser Bond)	Industry Employer	NSW	National	Face-to-face
Tristan Opie (Opie Manufacturing Group)	Industry Employer	NSW	NSW	Face-to-face
Laszlo Magyar (Roblan Plastics)	Industry Employer	NSW	NSW	Face-to-face
Alex Hollingsworth (Rio Tinto)	Industry Employer	WA	International	Face-to-face
Graeme Young (Quality Press)	Industry Employer	WA	WA	Face-to-face
Karen Humphreys (TAFE NSW)	Registered Training Organisation	NSW	NSW	Telephone interview
Bill Hamill (Rural Industry Skills Training)	Registered Training Organisation	VIC	VIC	Telephone interview
Paul Kennett (Manufacturing and Engineering Skills Advisory Board)	Industry Body / Member Organisation	VIC	VIC	Face-to-face
Marcel Bick (CSIRO)	Industry subject matter expert	NSW	National	Telephone interview

Name and organisation of stakeholder	Stakeholder Type	State	Coverage	Detail method(s) and scale of consultation
Pat Burke (North Metropolitan TAFE)	Registered Training Organisation	WA	WA	Telephone interview
Bradley Burrows (North Metropolitan TAFE)	Registered Training Organisation	WA	WA	Written advice
Julie Hobbs (Design Institute of Australia and Future Now)	PRG Member IRC Member: Printing and Graphic Arts IRC	WA	National	Face to face
Ann-Marie Ryan (Future Now)	Industry Body / Member Organisation	WA	WA	Face to face
Nigel Haywood (National Energy Resources Australia)	PRG Member IRC Member: Process Manufacturing, Recreational Vehicles, and Laboratory IRC	WA	National	Telephone interview
Jan Newmarch (Box Hill Institute)	Registered Training Organisation	VIC	VIC	Face to face
Ian Curry (Australian Manufacturing Workers Union)	Industry Body / Member Organisation IRC Chair: Manufacturing & Engineering IRC	SA	National	Face to face
Chris Dean (TAFE SA)	Registered Training Organisation	SA	SA	Face to face
Tania Montesin (Asahi Beverages)	Industry Employer	NSW	International	Face to face
Megan Lilly (Ai Group)	Industry Body / Member Organisation	VIC	National	Face to face
Michael Taylor (Ai Group)	Industry Body / Member Organisation	VIC	National	Face to face
James Fazzino (Incitec Pivot)	Industry Employer	VIC	International	Face to face
Russell Burgess (Qantas)	IRC Chair: Aerospace IRC	NSW	National	Face to face
Prashanth Mysore (DASSAULT Systems)	Industry Employer	SA	International	Telephone interview

Attachment D: Supporting Research

Preparing for Industry 4.0 – will digital skills be enough?