Inaugural I4AMF Conference

Post event report

August 2019

INDUSTRY 4.0
ADVANCED
MANUFACTURING
FORUM

About I4AMF

The Industry 4.0 Advanced Manufacturing Forum (I4AMF) is a collaborative forum of industry leaders from: Ai Group, Advanced Manufacturing Growth Centre, AustCyber, AMWU, Engineers Australia; Innovative Manufacturing CRC, Siemens Ltd, Standards Australia, Swinburne University, and SAP, supported by the Department of Industry, Innovation and Science.

The I4AMF builds on the work of the former Prime Minister's Industry 4.0 Taskforce in promoting collaboration between government and industry in Australia and Germany on Industry 4.0, including initiating a collaborative approach to the development of global Industry 4.0 standards.

Contact

I4AMF Secretariat
Australian Industry Group
Level 2, 441 St Kilda Road
Melbourne, Vic, 3004
Australia Tel: +61 3 9867 0111

1 Foreword

The I4AMF is the successor to the Prime Minister's Industry 4.0 Taskforce. It is my honour to be the Convenor of this collaborative forum of leaders drawn from:

- Ai Group
- Advanced Manufacturing Growth Centre
- AustCyber
- The Australian Manufacturing Workers Union
- Engineers Australia
- The Innovative Manufacturing CRC
- Siemens Ltd,
- Standards Australia
- Swinburne University
- SAP
- Department of Industry, Innovation and Science.

Businesses and indeed all organisations need to stay informed and prepared to respond to the transformations associated with digitalisation.

New technologies and new ways of working are transforming the nature of work and reshaping the Australian and global economies. Automation is now moving well beyond routine manufacturing activities and has the potential, at least with regard to technical feasibility, to transform sectors that involve a substantial share of knowledge work. Developments in artificial intelligence, sensors, automation, 3-D printing, unprecedented computer power, the Internet of Things and big data, are underpinned by a number of major technologies which will change the nature of the links between technology and work.

The coincidence of improved automation, machine-to-machine and human-to-machine communication, artificial intelligence, continued technological improvements and digitalisation in manufacturing is sometimes referred to as Industry 4.0 or the 'fourth industrial revolution'.

The inaugural I4AMF conference sought to enhance collective understanding of future developments in industry transformation and what Australian businesses need to be doing now as they move to - or further along - the digitalisation journey. It facilitated discussion and cooperation between business leaders, policy makers, Industry Growth Centres, the education and research sector, unions and others on key strategic priorities for Australia related to Industry 4.0.

On behalf of I4AMF members, I would like to express our appreciation to the Department of Industry, Innovation and Science for their generous sponsorship of this event.

The outcomes of discussions have been captured in this report for dissemination to governments and other stakeholders and to elicit reactions and further input.

Innes Willox

Innes Willox
Convenor

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2 Introduction

The inaugural conference of the Industry 4.0 Advanced Manufacturing Forum was held on 7 August 2019 at the MCG. The event was attended by 160 delegates from business, research, education and training, unions and government. For the first time, a small group of New Zealand Business and union representatives attended the forum. The I4AMF looks forward to developing stronger relations on the challenges of Industry 4.0 with our New Zealand colleagues.

Conference delegates heard from and engaged with an outstanding line up of presenters who discussed current and future developments in Industry 4.0 and strategies to transform Australia's manufacturing industries and build global competitive advantage. Delegates also participated in strategic discussions at concurrent breakout sessions facilitated by I4AMF workstream leaders on Industry 4.0 Standards; Technology Applications and Digital Business Models; Cyber Security; or Testlabs, Future of Work & Skills.

This report captures key issues discussed by conference presenters in summary point form and includes reports by I4AMF workstream leads on key discussion points, outcomes and action items from their respective breakout sessions.

The conference was sponsored by the Department of Industry, Innovation and Science. The views expressed herein are not necessarily the views of the Commonwealth of Australia, and the Commonwealth of Australia does not accept responsibility for any information or advice contained herein.

3 Executive Summary

New technologies and new ways of working are transforming the nature of work and reshaping the Australian and global economies. Automation is now moving beyond routine manufacturing activities and has the potential, at least with regard to technical feasibility, to transform sectors that involve a substantial share of knowledge work. Developments in artificial intelligence, 3-D printing, unprecedented computer power, the Internet of Things (IoT) and big data, are underpinned by a number of major technologies which will change the nature of the link between technology and work.

The current trend of improved automation, machine-to-machine and human-to-machine communication, artificial intelligence, continued technological improvements and digitalisation in manufacturing is known as Industry 4.0 or the 'fourth industrial revolution'. Businesses need to stay informed and respond to the opportunities and challenges that this transformation will bring.

Current and future developments in Industry 4.0 and strategies to transform Australia's manufacturing industries and build global competitive advantage were discussed during the I4AMF conference plenary sessions and concurrent breakout sessions chaired by I4AMF workstream leads.

Essential to Australia's transition to Industry 4.0 is a sufficient and growing supply of appropriately skilled people. This requires industry, education and training organisations to work closely to design and develop an appropriate range of training opportunities for the existing and future workforce. One example of industry-led leadership is a unique apprenticeships program, between Ai Group, Siemens and Swinburne University of Technology, which has unleashed new talent, given Australians a chance to transition into new roles, and has shown just how real the benefits can be.

Australia is home to many great ideas and innovation in deep technology across a number of sectors. However, translating these into action requires collaboration between educational institutions, businesses, unions, peak bodies and government. Delegates heard about a number of initiatives the I4AMF is leading, including the development of the National Industry 4.0 Testlab Network and the report *Transforming Australian Manufacturing: Preparing businesses and workplaces for Industry 4.0*. Delegates were also updated on support initiatives by Industry Growth Centres AMGC and AustCyber and the Innovative Manufacturing CRC.

A strong Australian cyber security sector and cyber resilient industry is a vital enabler of digitally-driven growth. Widespread awareness of the cyber risks and the upskilling of people is essential, so that Australia can benefit from a capability and economic lift across the board. Conference delegates heard case studies on the relevance, and application of cyber security in the advanced manufacturing sector, including supply chain integrity, data integrity and availability, connectivity of equipment and security confidence and trust.

In transitioning to Industry 4.0, Australia needs to drive innovation, productivity and competitiveness by focusing on areas of competitive strength and strategic priority. Standards continue to underpin the systems we use, and the products we buy, including in relation to industry 4.0. Continued support of Australian expert participation in the development of Industry 4.0 standards through representation at relevant international standards bodies is in Australia's interests.

Managing the transition to industry 4.0, where businesses grow, roles are higher skilled and higher valued and where innovation thrives, requires leadership. Business, educational institutions, unions, standards bodies, and other decision-makers must work together with a focus on areas of competitive strength and strategic priority.

Outcomes of Conference Breakout Sessions

Conference delegates participated in strategic discussions at concurrent breakout sessions facilitated by I4AMF workstream leaders on Industry 4.0 Standards; Technology Applications and Digital Business Models; Cyber Security; or Testlabs, Future of Work & Skills.

The objectives of the breakout sessions were to:

- Communicate to broader business community and key stakeholders, developments in the respective I4AMF workstreams
- Identify the landscape of Industry 4.0 initiatives and priorities being pursued by organisations and institutions in Australia and any gaps to be addressed
- Foster collaboration and alignment between activities of I4AMF workstreams and other relevant related initiatives
- Discuss/refine/identify forward looking priorities

Key issues and discussion points from the breakout sessions are set out below.

1. Technology Applications & Digital Business Models Breakout Session

This breakout session facilitated by the IMCRC took the form of a workshop which explored priority areas of focus for the I4AMF and the 'Technology Applications and Digital Business Models' Workstream. Key conclusions from the discussion include:

Primary barriers and/or challenges to successful Industry 4.0 uptake in Australia

i. Lack of understanding of return on investment (ROI),
ii. Lack of vision, culture and leadership [within businesses]
iii. Lack of Industry 4.0 knowledge

Primary accelerators for successful Industry 4.0 uptake in Australia

iv. Collaboration [especially business to business]
v. Strategy [strategic planning within business]
vi. Case studies

Greatest opportunities, initiatives or priorities

- Collaboration, especially between businesses (noting that the Minister subsequently was commenting on the additional need for greater industry-research collaboration)
- National strategy approach
  - Prioritise regime of standards, guidelines and business mentoring programs [eg around collaboration, strategy, leadership]
- Communication
  - example case studies and business cases for investment (ROI)
  - continued communication around Industry 4.0 in general
  - broad sector impact demonstration around national capability
  - examples of collaboration
- Industry 4.0 moonshot projects in Australia
  - eg circular economy, defence, food and agribusiness
- Incentives
  - To drive proof of concepts and knowledge acceleration
  - More targeted, simpler, SME focus

Next steps are for the workstream to consider which of the above are to be workstream initiatives and to develop plans to focus on the accelerators and priorities. Based on this workshop, these priorities should

include the profiling and communication of Industry 4.0 and collaboration led case studies (technology, digital business models, business case, ROI, etc).

2. Industry 4.0 Standards Breakout Session

Standards Australia (SA) hosted a work stream discussion with a wide-range of stakeholders outlining how developing standards can help Australia embrace the next major industrial revolution.

Industry 4.0 requires an unprecedented degree of system integration across domain borders, hierarchy borders and life cycle phases. The important role of standards and specifications to facilitate connectivity, enable the ability for digital systems to talk to each other and allow the automatic connection and interaction of field devices was noted. As a manufacturing nation, it is imperative that Australia has a voice internationally.

SA will use the work stream discussions to inform strategic priorities and future standards development work which will be pursued in the months ahead.

Key actions include:

i. Consider a standards roadmap focusing on areas of competitive strength and strategic priorities for Australia. The roadmap should also identify gaps and opportunities for Australia's leadership and participation internationally.
ii. Explore the development of a guidance document for an Industry 4.0 self-assessment framework.

3. Cyber Security Breakout Session

This breakout session conducted by the Australian Cyber Security Growth Network (AustCyber) in partnership with the Advanced Manufacturing Growth Centre (AMGC) comprised a panel and a roundtable discussion. Case studies provided by panelists and discussion focused on the relevance and application of cyber security to the advanced manufacturing sector, the role of Industry4.0 in the intersection between security and new business models for advanced manufacturing, and related matters including supply chain integrity, data integrity and availability, connectivity of equipment and security confidence/trust.

There is a general lack of understanding and knowledge of cyber security and its enabling function for business growth, including lack of applied cultural and behavioural norms.

Key future priorities for the workstream include:

- Connect with Security of Networked Systems German counterpart – Siemens to do an introduction.
- Expand partnerships with Innovative Manufacturing CRC and Swinburne University on secure by design principles and other collaboration opportunities in partnership with AMGC and their Manufacturing Academy:
- In partnership with AMGC:
    - Marketplace presentation on Cyber Security by Michelle Price (recorded mid-August)
    - Develop a module for Cyber Security highlighting cases from advanced manufacturing companies that have strong cyber posture (such Quickstep and Boeing) and cyber security SMEs that provide insights and solutions offered by selected companies within AustCyber's portfolio.
    - Actively encourage cyber companies to participate in Germany 20 in 2020 program

4. Test Laboratories, Future of Work, Education and Training Breakout Session

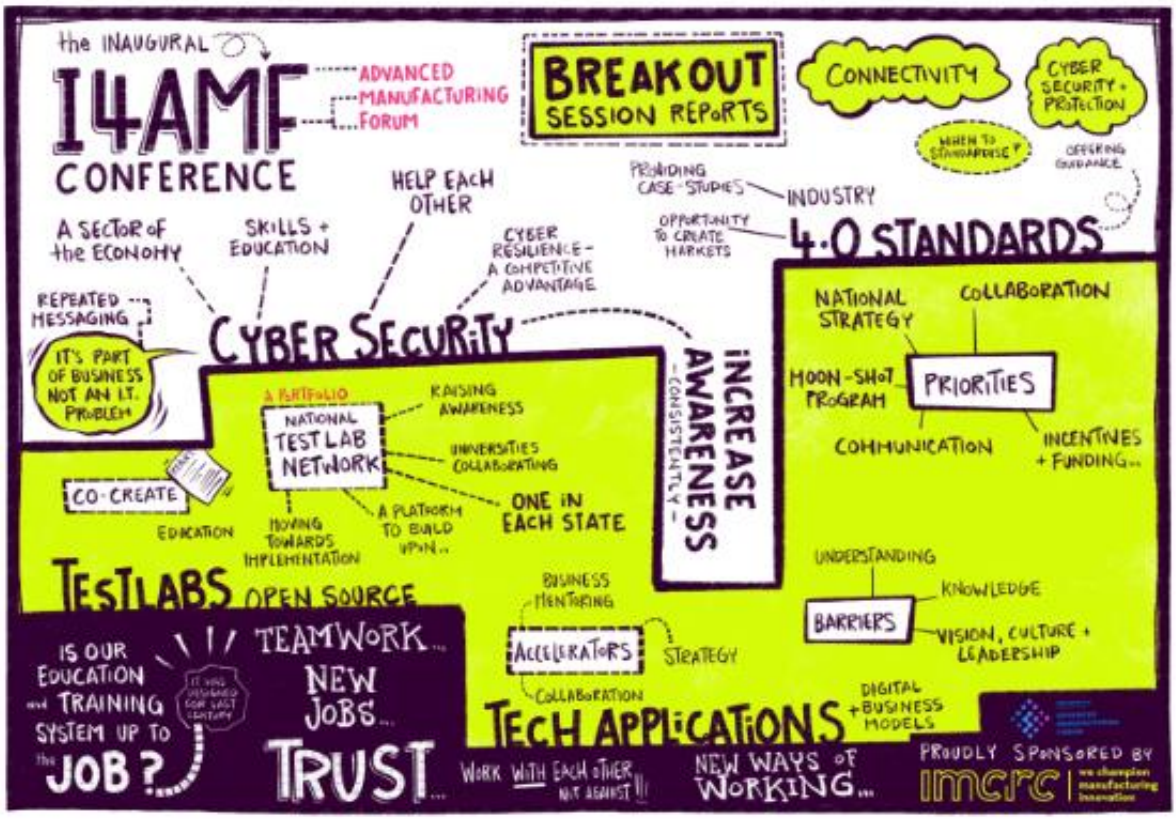
This session explored two key initiatives of the Testlabs and Future of Work and Skills workstream of the I4AMF: the *Transforming Australian Manufacturing Report*; and the National Industry 4.0 Testlab Network.

Some Australian businesses have begun to transform and are starting to reap the benefits but many have not and a 'call to action' is needed to ensure manufacturers can flourish and can engage in global supply chains. Businesses must become skilled collaborators in the Industry 4.0 environment and business culture, ways of working and practices need to be strengthened to ensure successful transformation. Industry 4.0 will require new skills, knowledge and a collaborative and an integrated approach between Higher Education, Vocational Education, Industry and Unions, and Peak Bodies, particularly in the case of worker transitions.

Through the Australian government funded National Industry 4.0 Testlab Network, Testlabs are being developed in 6 states focusing on a particular industrial application and will enable the research and education sector to work closely with the industry sector in order to progress Industry 4.0 transformation.

Key areas for action highlighted during the breakout session included:

- Need for a federal government led Industry 4.0 Advanced Manufacturing Strategy to progress report recommendations
- Co-create education and training across entire continuum – VET to Higher Education and lifelong learning – with policy barriers removed
- Industry to be encouraged to engage with Industry 4.0 to stay globally competitive and take their place in globally supply chains.
- The National Testlab Network to be utilised to scale-up pilot initiatives
- Industry, Government, education and training organisations, unions and peak bodies need to work as a team to fast track Industry 4.0 uptake and initiatives and ensure standards developed allow for interoperability across supply chains nationally and globally.

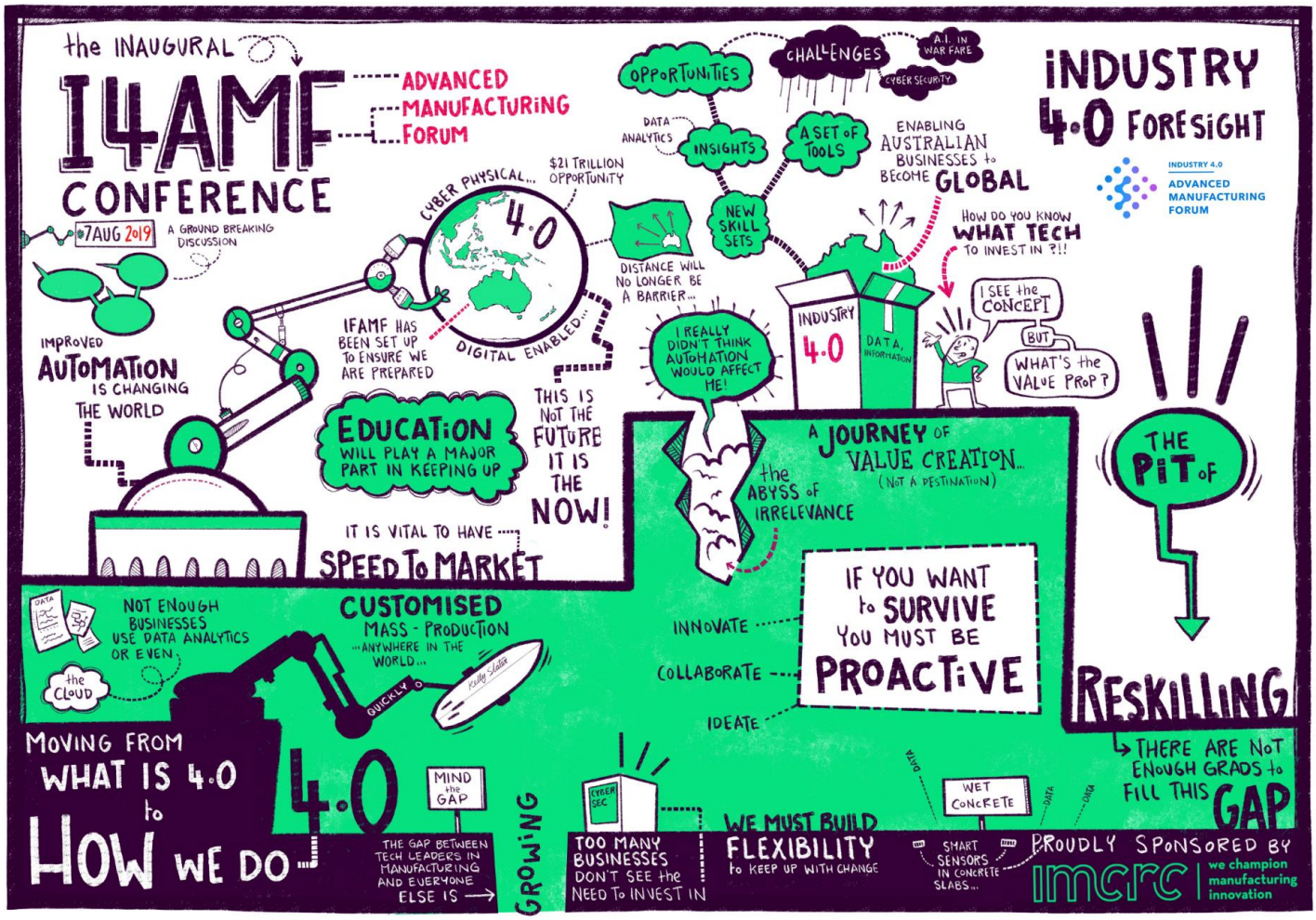


4 Conference Program

8.30am	**Registration and networking**	
9.00am	**Opening presentation**	Innes Willox Convenor I4AMF Chief Executive Ai Group
9.15am	***Panel Session 1 – Industry 4.0 foresight***	*Chair: Jeff Connolly - Chairman & CEO Siemens Ltd* Panel members Hon Trish White - President of Engineers Australia David Chuter - CEO & Managing Director, Innovative Manufacturing CRC Kate Louis - Head Defence & Industry Policy, Ai Group David Hart - CEO Dematec Automation
10.20am	**Morning tea**	
10.50am	***Panel Session 2 – Operationalising Industry 4.0***	*Chair: Jens Goennemann – Managing Director, AMGC* Panel members Trevor Power - Head of Division – Industry Growth, DIIS Ian Ryan - Head of the Institute of Digital Government, SAP Chris Bridges-Taylor - Director & General Manager, B&R Enclosures Sharon Wilson - Australian Capability Director, Hunter Class Frigate Program, BAE Systems
11.55am	**Lunch and networking**	
	Concurrent breakout sessions on I4AMF Workstreams	*Session Leads*
1.00pm	**Industry 4.0 Standards** • *Understanding the Industry 4.0 standards landscape – Areas of opportunity for Australia* • *Strategic priorities for Australia's international standards participation, adoption and development*	Daniel Chidgey - Head of Stakeholder Engagement, Standards Australia
1.00pm	**Technology Applications and Digital Business Models** • *Identifying industry needs and pain points* • *Defining strategic priorities for Australian policies and initiatives* • *Supporting transformation of Australian manufacturing businesses*	David Chuter - CEO & Managing Director, Innovative Manufacturing CRC

1.00pm	**Cyber Security** • *Understand the application of cyber security in the advanced manufacturing sector – panel discussion* • *Engage with the Cyber Security Industry Roadmap and priorities for the advanced manufacturing sector – workshop and discussion*	Michelle Price - Chief Executive Officer, AustCyber (in partnership with the Advanced Manufacturing Growth Centre)
1.00pm	**Test Laboratories, Future of Work, Education and Training** • *Panel discussion of the findings and implications of the Transforming Australian Manufacturing report* • *National Testlab Network – progress and opportunities for industry engagement*	Andrew Dettmer - National President, Australian Manufacturing Workers Union Professor Aleksandar Subic - Deputy Vice Chancellor (R&D), Swinburne University
2.30 pm	**Afternoon tea**	
3.00 pm	**Plenary session:** **Session leads report back on discussions and key strategic actions**	Chair: Hon Trish White - President of Engineers Australia Daniel Chidgey - Head of Stakeholder Engagement, Standards Australia David Chuter - CEO & Managing Director, Innovative Manufacturing CRC Michelle Price - Chief Executive Officer, AustCyber Andrew Dettmer - National President, Australian Manufacturing Workers Union Professor Aleksandar Subic - Deputy Vice Chancellor (R&D), Swinburne University Leanne Barnes - Senior Advisor to DVC, Swinburne University
4.00 pm	**Key note address**	Hon Karen Andrews MP Minister for Industry, Science and Technology
4.20 pm	**Closing comments**	Innes Willox Convenor I4AMF Chief Executive Ai Group
4.30 pm	**Conclusion**	

5 Industry 4.0 Foresight



Panel Session 1: Industry 4.0 Foresight

The panel session on Industry 4.0 Foresight was chaired by Jeff Connolly - Chairman & CEO Siemens Ltd.

Panel members:

- Hon Trish White, President of Engineers Australia
- David Chuter, CEO & Managing Director, Innovative Manufacturing CRC
- Kate Louis, Head Defence & Industry Policy, Ai Group
- David Hart, CEO Dematec Automation

Key discussion points

Key points raised during the panel session are captured below in summary point format.

Jeff Connolly - Chairman & CEO Siemens Ltd

- The economy and community are undergoing substantial change.
- The fourth Industrial Revolution is underway. The previous three revolutions created significant disruption and upheaval (especially with regard to jobs), but also big long-term benefits. Australia needs to manage the latest transformation well.
- Industry 4.0 moves us to cyber-physical production systems. There is tremendous benefit potential but also risks. Previously, Australia's distance from markets served both as a barrier and also protection. With the advent of Industry 4.0 Australia can readily access global markets and the rest of world can access and compete in the Australian market.
- Automation and robotics will impact on large numbers of jobs but create even more.

- A net gain in employment is expected, but there will be a huge churn to get there. Australia's education and training system needs to both educate students appropriately and reskill older workers. Lifelong learning must be encouraged.
- Ai Group's skills research shows that industry is facing serious skills challenges.
- Industry awareness of Industry 4.0 and digitalization is growing but there is still a long way to go.
- Industry 4.0 is not just a German marketing term but a necessary solution to declining manufacturing productivity. Capital productivity growth, not labour, is the problem
- Industry 4.0 case studies include mass customization in surfboard production; use of digital twins to slash quality problems; rapid design evolution with faster iteration in F1 racing - speed to market is essence of competitiveness.
- The Industry 4.0 Advanced Manufacturing Forum (I4AMF) evolved from the PM's Industry 4.0 Taskforce and brings together industry, research, unions, standards, cyber security and government, coordinated by Ai Group
- The Industry 4.0 message has changed from "it's the future" to "get on the journey" to "implement now".

Trish White, National President of Engineers Australia

- 2 years ago, hardly anyone knew what 4.0 was, today hard to find an engineer who is unaware or unexcited.
- But many in industry are not yet implementing Industry 4.0. Technology adoption is not just about the technology – it needs sustainable business models, management focus, good team interactions.
- A hurdle for many businesses is the question of buying and adapting external systems or building their own.
- During the supply disruptions caused by World War II, the University of Tasmania birthed a specialist artillery sighting producer that became a world leader for decades. Australia is capable of great things when we try.
- Engineers Australia has looked at the reskilling task if automation disrupts jobs as forecast by the World Economic Forum. Australia would see big change in next decade. The skills pipeline looks challenging – school students are not studying pre-engineering STEM subjects in sufficient numbers.

David Chuter, CEO of Innovative Manufacturing CRC

- Many now understand the Industry 4.0 concept but not the value proposition.
- Many businesses are investing in internal productivity enhancement, not yet in transformation, platform structures and global supply chains.
- The IMCRC is investing public funding in technology innovation, catalysing more private investment.
- Australia ranks low on R&D and collaboration; we need to shift the perception of manufacturers from "I'm a producer" to "I provide an integrated service", entailing collaboration.
- The CSIRO's Australian National Outlook 2019 presents alternative scenarios where manufacturing creates more value than any other sector; and another of slow decline. We can achieve the former. But in last 20 years the list of most innovative Aust manufacturing hasn't changed.
- Building more Australian connections to global supply chains will help propagate innovation through more Australian businesses.

Kate Louis, Head of Defence & Industry Development at Ai Group

- $200b in funding is going into the defence sector and driving the need for transformation.
- Opportunities: Very significant investment even in Defence infrastructure such as the Adelaide shipyard which will rely on advanced technologies.
- Challenges: cyber threats - everyone is at risk; AI ethics.
- Noted many SMEs are doing 4.0 things without labeling it as such.

David Hart (CEO of Dematec Automation)

- Dematec is an SME engineering business and system integrator across manufacturing, water, defence.
- Industry 4.0 is a toolset for value, but the challenge is for businesses to understand what that value might be. Those businesses already implementing lean manufacturing understand how automating that helps.
- For those businesses not already at the previous frontier, the new leading edge is less comprehensible.
- In one example, Dematec has worked with a concrete pourer who used to guess when concrete ready for next pour. The business now uses sensors to make it an exact science and consequent improvement in quality and speed.
- Key barriers are awareness - most businesses could get Industry 4.0 value but don't necessarily see how. The cost of implementing 4.0 has come right down, accessible for business of any size if they see the value.

Q&A Session

How do we address the challenge of turning smaller businesses into bigger businesses?

- Some businesses have grown in order to survive. Lean manufacturing helps, but success relies on engaged people to maintain lean systems. We need to build corporate knowledge of new ways of working
- Just talking to consultants about manufacturing improvement is too costly. Many businesses find in-house is more manageable.

6 Operationalising Industry 4.0

Panel Session 2: Operationalising Industry 4.0

The panel session on Operationalising Industry 4.0 was chaired by Dr Jens Goennemann, Managing Director of the Advanced Manufacturing Growth Centre.

Panel members:

- Trevor Power - Head of Division – Industry Growth, DIIS
- Ian Ryan - Head of the Institute of Digital Government, SAP
- Chris Bridges-Taylor - Director & General Manager, B&R Enclosures
- Sharon Wilson - Australian Capability Director, Hunter Class Frigate Program, BAE Systems

Key discussion points

Key points raised during the panel session are captured below in summary point format.

Jens Goennemann Managing Director, AMGC

- Digitisation and implementation are priorities in Germany because they know they don't have a resource endowment to fall back on.
- 95% of Australian manufacturers are small - employing fewer than 20 people. It is a big task to bring these businesses along.

Chris Bridges-Taylor, General Manager, B&R Enclosures

- B&R's innovation journey started with computerization through a Commonwealth innovation grant in 1986. Government programs do have a positive impact on business transformation.

- B&R re-examined reviewed its business and found that it was a services business, not just an enclosure maker.
- B&R identified supply opportunities with primes and major projects which required the company to be highly advanced to participate. The company consequently became interested in Industry 4.0.
- The first step was to improve internal operations. The business had high tech equipment, but variety created complexity. In conjunction with AMGC, B&R undertook a project on rapid decision-making-gathering information for decisions in the workshop, with full customer visibility. The business transformed its workshop with apps, iPads
- Workforce engagement is essential to transitioning the business. B&R has long standing workers. Connecting these experienced workers with augmenting technology is improving their capability and role satisfaction.

Sharon Wilson, Australian Capability Director, Hunter Class Frigate Program, BAE Systems

- The Commonwealth ship program is a massive chance for generational renewal in manufacturing. The new shipyard is to be operational in July 2020 and will be cutting steel on the first ship in December 2022.
- This initiative represents a big transition from old ways of manufacturing to digital prototyping, digital testing of production processes is underway. New skillsets and "digital workers" are required.
- Establishing continual shipbuilding capability requires a lot of applied R&D.
- BAE aims for a shipyard that is the envy of the world. The company wants to capture and share their innovation and training across industry.

Ian Ryan, Head of the Institute of Digital Government, SAP

- SAP is a business process company - processes have got to fit the user.
- The best process is using the most appropriate technologies for context, not just the shiniest high tech, to maximize use of the available data.
- Customer feedback needs to be incorporated in a loop with ongoing product redesign.
- Small and medium businesses need lots of cloud services (light footprint) that enhance the visibility of the business
- Larger businesses can leverage more in-house systems.

Trevor Power Head of Industry Growth at DIIS:

- Businesses will take up Industry 4.0 where they see a specific problem that it solves, not where it is a more generic business improvement recommendation.
- Australia can't win the labour cost game and wouldn't want to - we must aim to win on productivity and technology.

Q&A Session

How is collaboration going - are universities keen?

- B&R is collaborating with university mechatronics students. The business is also working with the SA shipyard -this has provided an avenue for SMEs to work with universities in a non-threatening environment.
- Good collaboration puts lots of skills and information resources at partners' disposal, bolstering the business value beyond formal project outcomes.
- In the UK, naval manufacturing has made advances in collaboration across multiple dispersed shipyards.

What does the next revolution look like - what is 5.0?

- SAP has projects that are utilizing artificial intelligence, machine learning and blockchain. Outputs need to be explainable. We don't yet have needed standards for AI and ML.

- The frontier is in gradation of machine-to-human processes - more flexibility in degrees of human involvement, not just black and white automated/manual.

How does government address pain and benefit of automation?

- Tasks of displaced people are likely to be very relevant to new labour needs, so upskilling should work. But current skills system doesn't quite match this.
- Micro-credentialling can help.
- Business also needs to be committed to skilling.

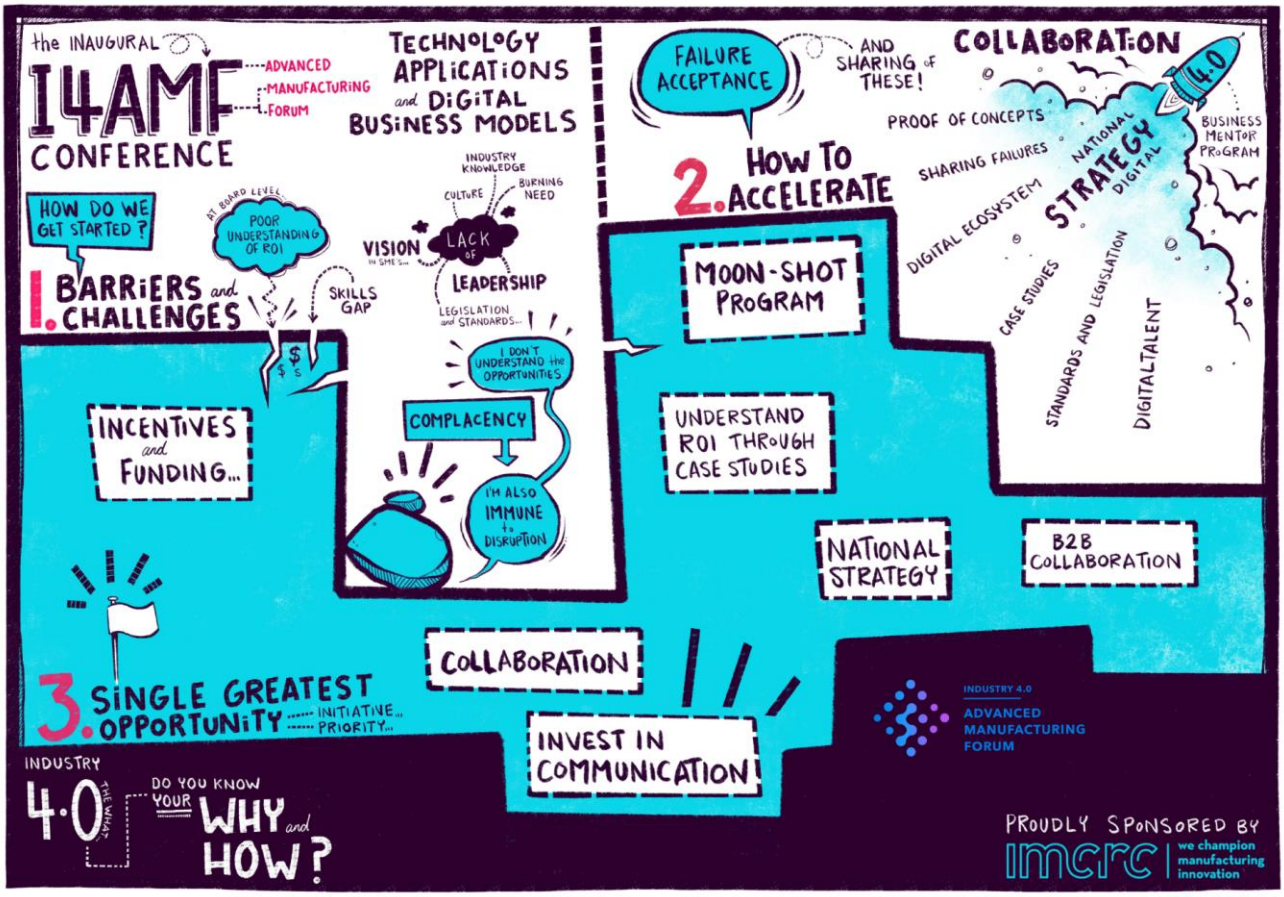
How should SMEs build collaboration with bigger companies?

- BAE systems are keen to be open with its supply chain – they have shared issues and are keen to learn as well as share. Many companies worry about sharing with competition. But open collaboration is essential
- SAP has a gradation of collaboration with big companies - sometimes purely transactional, sometimes deeper. Systems need to support the range.

What is the relationship of Industry 4.0 to sustainability and emissions reduction?

- This varies worldwide. In Germany Industry 4.0 is closely aligned with the circular economy agenda. The open question is whether this translates to Australia. Corporations like BHP see value in the circular economy.
- SMEs needs to think about how the market and customer and community expectations will evolve. Using resources better is part of this. Industry 4.0 is absolutely a revolution
- Union involvement and works councils can be significant (eg Germany, Japan) - if workers demand the company modernize and innovate, the context is totally different - less stasis, less imposition of change on the workforce.

7 Technology Applications & Digital Business Models



Breakout Session: Technology Applications and Digital Business Models

Industry 4.0 Advanced Manufacturing Conference, 7th August 2019, MCG

Workstream report (Technology Applications + Digital Business Models)

David Chuter, CEO and Managing Director, IMCRC

Executive Summary

A workshop was held at the Conference with around 40 contributors from across industry, research and government. The purpose of the workshop was to assist determine priority initiatives that the Forum and the combined 'Technology Applications and Digital Business Models' Workstream should focus on. It should be noted that – while the workshop was targeted at the workstream - contributors provided input and feedback more generally regarding accelerating the broader successful uptake of Industry 4.0 in Australia. Therefore, there are considerations for the Forum as a whole to address beyond the specific initiatives of the workstream alone. In summary the group concluded in aggregate that:

The primary barriers and/or challenges to successful Industry 4.0 uptake in Australia are

1. Lack of understanding of return on investment (ROI),
2. Lack of vision, culture and leadership [within businesses]
3. Lack of Industry 4.0 knowledge

The primary accelerators for successful Industry 4.0 uptake in Australia are

1. Collaboration [especially business to business]
2. Strategy [strategic planning within business]
3. Case studies

The greatest opportunities, initiatives or priorities are

- Collaboration, especially between businesses (noting that the Minister subsequently was commenting on the additional need for greater industry-research collaboration)
- National strategy approach
  - Prioritise regime of standards, guidelines and business mentoring programs [eg around collaboration, strategy, leadership]
- Communication
  - example case studies and business cases for investment (ROI)
  - continued communication around Industry 4.0 in general
  - broad sector impact demonstration around national capability
  - examples of collaboration
- Industry 4.0 moonshot projects in Australia
  - eg circular economy, defence, food and agribusiness
- Incentives
  - To drive proof of concepts and knowledge acceleration
  - More targeted, simpler, SME focus

Next steps are for the workstream to consider which of the above are to be workstream initiatives and to develop plans to focus on the accelerators and priorities.

Forum objective

- Successful Australian uptake of Industry 4.0 technology and digital business models.

Breakout session objective

- For attendees to assist determine the priority initiatives that the Forum and the combined 'Technology Applications + Digital Business Models' Workstream should focus on.

Workstream description – primary objectives

Technology Application Scenarios		Digital Business Models
• Value creation, benefits • User case studies, exemplars • Collaboration • Linkages to test beds / living labs • Research and innovation focus	+	• Value creation, benefits • User case studies, exemplars • Breeding ground for adoption in companies and across industry • Key success enablers

Breakout session plan

Facilitated brainstorming (6 people per table, 7 tables) using IMCRC and Ai Group facilitators.

Scene setting

Q1 Where is Australia on the Industry 4.0 journey

Q2 What are the primary barriers and/or challenges to Industry 4.0 uptake in Australia?

Q3 What can and/or should be done to accelerate the uptake (and what could be done differently)?

Q4 Which of these accelerators do you consider to be the single greatest opportunity, initiative or priority, and why?

Attendees

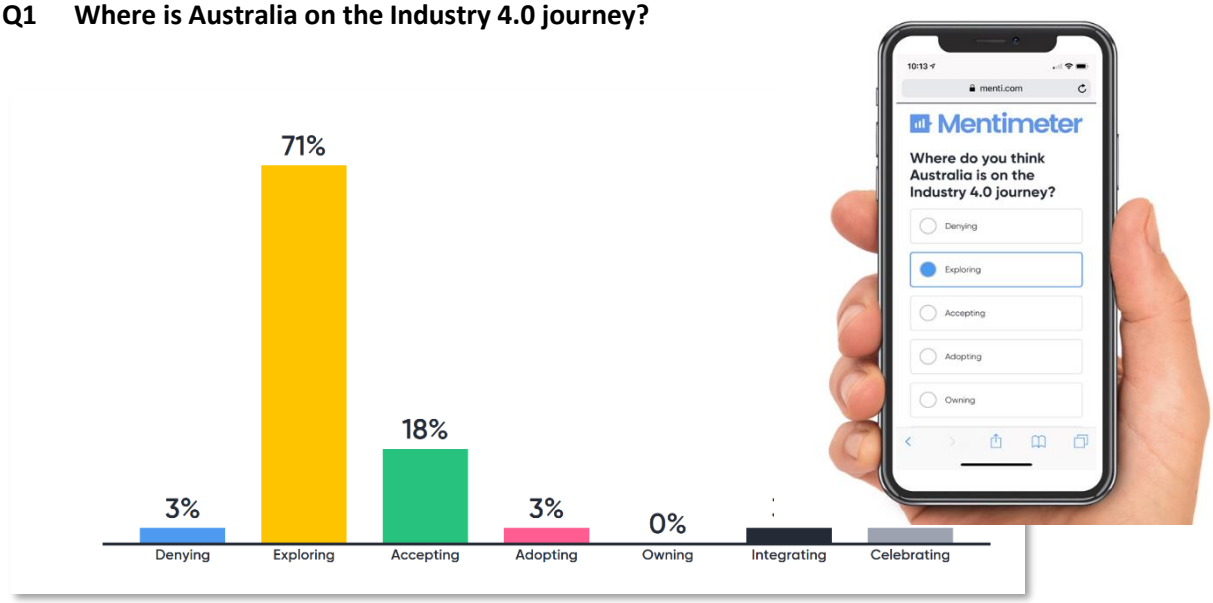
Attendees self-selected this workshop, with a pre-determined seating plan to ensure diversity of sector, State and gender across each of 7 tables, with a facilitator at each.

Breakout session summary and outcomes

David Chuter, Workstream Lead, provided a brief scene setting presentation as well as guidance on how the workshop would operate.

- 2019 Hannover Messe and Siemens Germany visit key takeaways
- Industry 4.0, the journey so far – the focus on value and not just technology
- Germany's Platform Industrie 4.0 working groups structure, and Australia's model
- Focus areas of the combined Technology Applications and Digital Business Models workstreams
  - General consensus that this combined approach in Australia makes sense
- Early IMCRC futuremap® manufacturing SME Industry 4.0 findings – Industry 4.0 awareness
  - More than half are aware of Industry 4.0
  - Less than 10% have a well-defined digital strategy as an integral part of an overall strategic plan
  - Employees are pushing more actively than customers for greater digitalisation
  - CEOs believe business is more active than mid management consider
- Early IMCRC futuremap® manufacturing SME Industry 4.0 findings – Industry 4.0 utilisation
  - Business interest and investment is primarily to improve performance, productivity and lower costs
  - Only 15% have real time information and digital assistance available to all employees for decision making
  - Medium and larger companies are more advanced in utilising Industry 4.0 technologies
  - Only 25% invest in and operate cybersecurity technology and business resilience systems and processes

Q1 Where is Australia on the Industry 4.0 journey?



Around 34 digital responses from 40 attendees voting online using www.menti.com.

Q2 What are the primary barriers and/or challenges to Industry 4.0 uptake in Australia?

Each table brainstormed primary barriers and/or challenges, with the aggregate summarised in the chart below

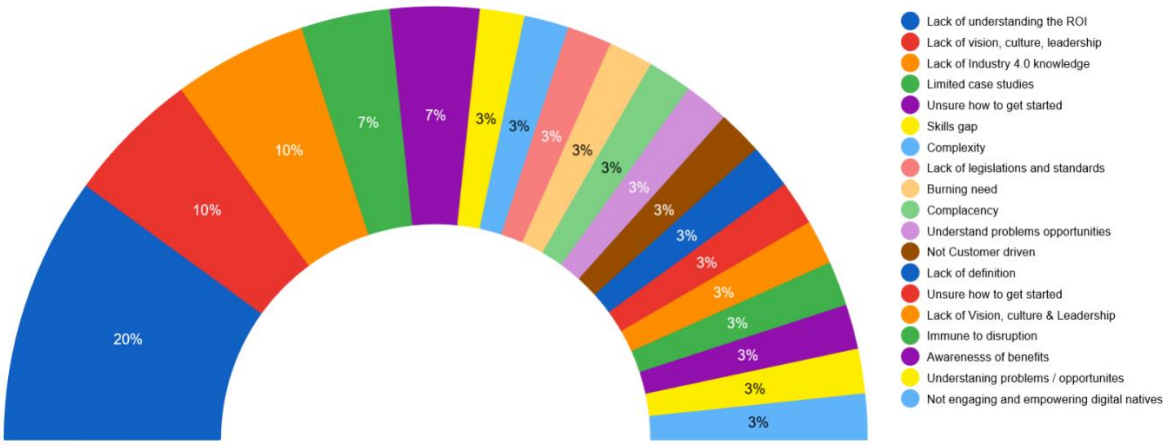
The top five

1. Lack of understanding of return on investment (ROI)
2. Lack of vision, culture and leadership [within businesses]

3. Lack of Industry 4.0 knowledge
4. Limited case studies
5. [Businesses] unsure of how to get started

Next five

6. Skills gap
7. Complexity
8. Lack of legislations and standards
9. [No] burning need
10. Complacency



Q3 What can and/or should be done to accelerate the uptake (and what could be done differently)?

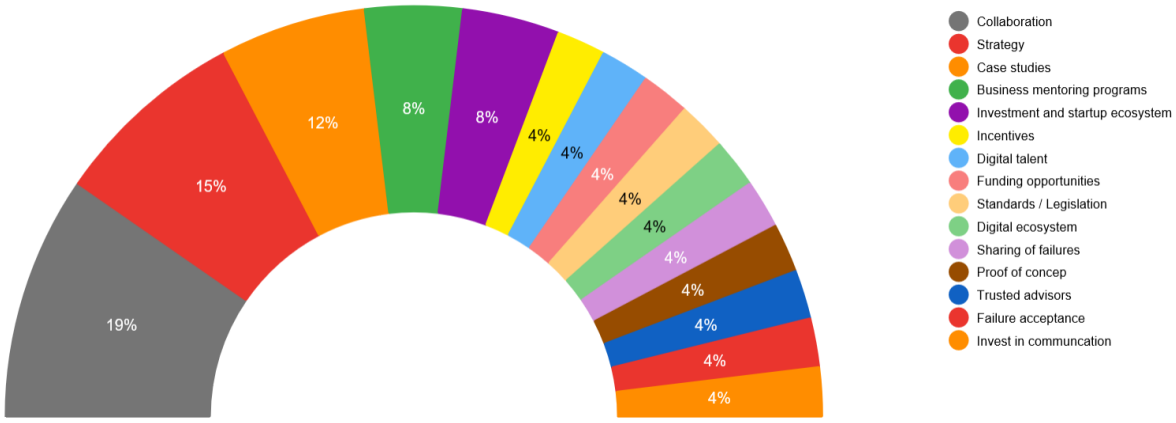
Each table brainstormed primary accelerators, with the aggregate summarised in the chart below

The top five

1. Collaboration [especially business to business]
2. Strategy [strategic planning within business]
3. Case studies
4. Investment and startup ecosystem
5. Incentives

Next five

6. Digital talent
7. Funding opportunities
8. Standards / legislation
9. Digital ecosystem
10. Sharing of failures



Q4 Which of these accelerators do you consider to be the single greatest opportunity, initiative or priority, and why? What does good look like and in what timeframe?

Summaries from each of 7 groups are detailed in the tables below

When combined and considering common themes, the following are the agreed primary accelerators, noting these are not listed in any order of priority

- Collaboration
  - especially between businesses (noting that the Minister was additionally focused on industry-research collaboration)
- National strategy approach
  - Prioritises regime of standards, guidelines and business mentoring programs [eg around collaboration, strategy, leadership]
- Communication
  - example case studies and business cases for investment (ROI)
  - continued communication around Industry 4.0 in general
  - broad sector impact demonstration around national capability
  - examples of collaboration
- Industry 4.0 moonshot projects in Australia
  - eg circular economy, defence, food and agribusiness
- Incentives
  - To drive proof of concepts and knowledge acceleration
  - More targeted, simpler, SME focus

It is further worth noting that these accelerators are broader than just the workstream itself and reflect on the broader needs within Australia that the Forum as a whole should consider across both the Executive and all workstreams.

What?	Example case studies, business cases
Why?	Demonstrates execution, skills and capital needed
What does good look like?	Showcases less complexity, collaboration
By when?	Short term

What?	National strategy - that prioritises establishing a regime of standards, guidelines and business mentoring programs
Why?	Incentivises business to move to / adopt Industry 4.0
What does good look like?	Australia is a leading adopter of Industry 4.0
By when?	2022

What?	Moonshot projects, eg Circular economy, Defence, Food and agribusiness
Why?	Broad sector impact demonstration, promotes longer term thinking (timeframe)
What does good look like?	Branding 'Team Australia', national capability
By when?	5 + 5 years

What?	Incentives / funding
Why?	Increase proof of concepts and first stage implementation to increase knowledge gained / shared
What does good look like?	Widely shared learnings driving broader uptake, more proof of concepts, more success and outcomes
By when?	6 months to see acceleration but never ending

What?	Collaboration
Why?	Low on OECD metrics, need to move up rankings; low B2B' unlock creative abilities
What does good look like?	Australia able to value add with impact measured
By when?	2025

What?	Collaboration, including B2B
Why?	Demonstration of success
What does good look like?	Peer to peer best practice, successful clusters
By when?	2022

What?	Invest in communication
Why?	Drive urgency, low awareness, need vision; can't see risks and opportunities
What does good look like?	Local examples – success stories
By when?	2022

Next steps

Next steps are for the workstream to consider which of the above are to be workstream initiatives and to develop plans to focus on the accelerators and priorities. Based on this workshop, these priorities should include the profiling and communication of Industry 4.0 and collaboration led case studies (technology, digital business models, business case, ROI, etc).

Future conferences and workshops will benefit from practitioner level use cases to provide a forum for collaboration and to learn from those on the Industry 4.0 journey.

8 Industry 4.0 Standards

Breakout Session: Industry 4.0 Standards

Standards Australia (SA) hosted a work stream discussion with a wide-range of stakeholders outlining how developing standards can help Australia embrace the next major industrial revolution. The session was chaired by Daniel Chidgey, Head, Stakeholder Engagement, Standards Australia. The discussions presented an opportunity for SA to present the current International landscape, understand Australia's Strategic priorities and what role SA could play to support the transition to Industry 4.0.

Key discussions included:

- Industry 4.0 requires an unprecedented degree of system integration across domain borders, hierarchy borders and life cycle phases. The important role of standards and specifications to facilitate connectivity, enable the ability for digital systems to talk to each other and allow the automatic connection and interaction of field devices was noted.

- Standards are an effective instrument of putting the results of research into practice in a user-friendly manner. They can, under some circumstances, also function as 'value differentiation tools.' In the Industry 4.0 realm, constitutive materials (for physical manufacture), such as graphene, as well as digital platform standards focused on information security, privacy, condition monitoring and artificial intelligence are current priority areas.

- With respect to international opportunities, as a manufacturing nation, it is imperative that Australia has a voice internationally. Australia can succeed on the world stage, and with the right enabling environment, can be a global leader, by contributing strategically to the development of international standards. SA will continue to proactively work alongside industry and government to drive international participation in priority areas.

- In transitioning to new areas of Industry 4.0, the provision of a self-assessment framework and guidance around best practice case stories was recommended to assist small to medium sized manufacturers' transition to modernise, grow and utilise digital capabilities. This could take the form of a Technical Report or Technical Specification, or a dynamic digital playbook.

SA will use the work stream discussions to inform strategic priorities and future standards development work which will be pursued in the months ahead.

Key actions for Standards Australia:

1. Consider a standards roadmap focusing on areas of competitive strength and strategic priorities for Australia. The roadmap should also identify gaps and opportunities for Australia's leadership and participation internationally.

2. Explore the development of a guidance document for an Industry 4.0 self-assessment framework.

About Standards Australia

Standards Australia is Australia's National Standards Body, with a 97 year history in developing and adopting standards to meet Australia's economic, social and community needs. We facilitate Australian participation in International Standards development, as Australia's voice and vote to both the ISO (International Organization for Standardization) and IEC (International Electrotechnical Commission). We do not enforce, regulate or certify compliance with these Standards.

We form technical committees by bringing together relevant parties and stakeholders. Through a process of consensus, these committees develop standards for Australia's net benefit. We also undertake stakeholder engagement activities to support Australian government agencies and industry partners, with identifying, developing and adopting standards for the Australian context.

9 Cyber Security

Breakout Session: Cyber Security

This breakout session was chaired by Michelle Price, CEO of the Australian Cyber Security Growth Network (AustCyber) and lead of the Security of Networked Systems Workstream, in partnership with Dr Jens Goennemann, Managing Director of the Advanced Manufacturing Growth Centre (AMGC). The breakout session was attended by around 30 representatives from the advanced manufacturing and cyber security sectors as well as government and other interested parties.

The session comprised a panel and a roundtable discussion with active participation from:

- Tracie Thompson, CEO and Co-Founder, Serinus Security (panel speaker)
- Carl de Koning, General Manager Corporate Affairs QuickStep (panel speaker)
- Craig Searle, Co-Founder Hivint (panel speaker)
- Cyber security companies Tesserant, Red Piranha, Cyber Aware
- Amazon Web Services
- BioMelbourne Network
- Boeing
- Ai Group
- Department of Industry, Science and Technology
- Austrade
- Centre of Defence Industry Capability

Case studies provided by panelists and discussion focused on the relevance and application of cyber security to the advanced manufacturing sector, the role of Industry4.0 in the intersection between security and new business models for advanced manufacturing, and related matters including supply chain integrity, data integrity and availability, connectivity of equipment and security confidence/trust.

Key discussion points:

- What is holding us back? There is a general lack of understanding and knowledge of cyber security and its enabling function for business growth, including lack of applied cultural and behavioural norms.
- Biggest commonality is trying to get the basics right. What is a good security posture relative to individual businesses?
- Businesses need to understand the value add of having a strong cyber security posture. Need to give hands on experience – according to the Australian Bureau of Statistics, 96% of companies in the Australian economy have 19 or less employees, but if we start to expose small manufacturers with the experience of what an Industry 4.0 overlay could look like, then the benefits of investing in secure digital technologies become attractive. Information becomes valuable. Businesses need to see this in conjunction with the digital experience to protect their information and ultimately use it as their competitive advantage.
- Technical skills are underplayed – this needs to improve with upskilling across all sectors especially in Industry 4.0. Constant messaging around education and reinforcement of the need for these skills, is important
- Protection of data is paramount.
- Understanding legislation and its impact, and meeting relevant regulations and certifications for specific sectors, such as the US regulatory requirements for Defence, is extremely important.

Outcomes/action items:

Opportunities, challenges and actions from the discussion that align with Australia's Cyber Security Competitiveness Plan 2018 and the Australian Cyber Security Industry Road Map:

Growth Opportunities	Cyber Security Challenges	Priority actions
• Customer willingness to pay • Greater loyalty • Novel processes and products • Collection of more data • Greater potential for range expansion	• Security confidence • Insider threats • Supply chain integrity • Data integrity • Data availability • Connected equipment	• Educate and build knowledge around the importance of strong cyber posture • Improve channels for supply chain data sharing • Ensure secure integration of cyber-physical manufacturing systems • Promote skills and training

Future priorities for the workstream:

- Connect with Security of Networked Systems German counterpart – Siemens to do an introduction.
- Expand partnerships with Innovative Manufacturing CRC and Swinburne University on secure by design principles and other collaboration opportunities in partnership with AMGC and their Manufacturing Academy:
- In partnership with AMGC:
    - Marketplace presentation on Cyber Security by Michelle Price (recorded mid-August)
    - Develop a module for Cyber Security highlighting cases from advanced manufacturing companies that have strong cyber posture (such Quickstep and Boeing) and cyber security SMEs that provide insights and solutions offered by selected companies within AustCyber's portfolio.
    - Actively encourage cyber companies to participate in Germany 20 in 2020 program.

10 Test Laboratories, Future of Work, Education & Training

Breakout session: Test Laboratories and Future of Work, Education and Training

This breakout session was attended by around 50 representatives from industry, government and the research sector and explored two key initiatives of the Testlabs and Future of Work and Skills workstream of the I4AMF: the *Transforming Australian Manufacturing Report*; and the National Industry 4.0 Testlab Network.

Transforming Australian Manufacturing Report

Andrew Dettmer, National President of the AMWU and co-leader of the workstream presented an overview of the report and facilitated a panel discussion. Panel members included:

- Jeff Connelly, Chairman & CEO, Siemens, Australia Pacific
- Aleks Subic, Deputy Vice-Chancellor R&D, Swinburne University of Technology
- Sara Caplan, Partner & CEO, PWC, Skills for Australia

Key discussion points:

- Industry 4.0 is poised to deliver growth and change, with digitalisation and smart automation expected to add 14 per cent (US$15 trillion) to global GDP by 2030.

- Some Australian businesses have begun to transform and are starting to reap the benefits, but many have not and a 'call to action' is needed to ensure manufacturers can flourish and can engage in global supply chains. 37% of manufacturing businesses have limited understanding of Industry 4.0.

- The key objectives of this report were to:
    - Better understand the impact of Industry 4.0;
    - Identify business and workforce transformation issues;
    - Identify best practice examples of business and workforce transformation; and
    - Identify guiding principles and recommendations for transformation.

- This report aims to provide practical information and advice to stakeholders to advance the transition of Australian manufacturing businesses and workers towards Industry 4.0.

- Businesses must become skilled collaborators in the Industry 4.0 environment – business to business and with education and training organisations, government, unions and peak bodies:
    - Allows businesses to learn from one another and share resources
    - Ensures education and training content is relevant and timely
    - Government programs are aligned; and
    - Government, unions and peak bodies can facilitate appropriate and timely collaborations

- Industry 4.0 will require new skills, knowledge and a collaborative and an integrated approach between Higher Education, Vocational Education, Industry and Unions, and Peak Bodies, particularly in the case of worker transitions:
    - Emerging skill requirements in intelligent data analytics, digital and advanced cognitive skills will require upskilling current workers and creating and encouraging new entrants
    - Industry needs to lead this upskilling, working closely with education organisations
    - Skill and competency standards need to be updated to accompany this

- Business culture, ways of working and practices need to be strengthened to ensure successful transformation:
    - A positive change culture will ensure successful implementation of new practices
    - Increased demand for digital skills requires creating a digital culture shift
    - International mindset is needed

- Recommendations from the Report:
    - Commonwealth Government to facilitate the development and release of a manufacturing Industry 4.0 Strategy
    - Development of a new online portal that provides consolidated and easy to access information on government incentives and programs for manufacturing businesses
    - Establish hubs for Industry 4.0 commercial manufacturing activity focused on priority industry sectors
    - Continue to remove barriers between Vocational Education and Training and Higher Education in Australia's tertiary education system to facilitate collaboration opportunities and seamless learner pathways
    - Establish a workforce transformation leadership program
    - Create funding and accreditation models to support lifelong learning, reskilling and upskilling throughout the work lifecycle
    - Enhance the integration of manufacturing business supply chains through strategic procurement

The National Industry 4.0 Testlab Network

Professor Aleks Subic, DVC R&D, Swinburne University of Technology and co-leader of the workstream presented an overview of the national Testlab network and facilitated presentations and panel discussion by the following Testlab representatives:

- Nico Adams, Director- Factory of the Future, Swinburne University of Technology
- Bronwyn Fox, Director Manufacturing Futures Research Institute, Swinburne University of Technology
- Nikki Stanford, Testlab Director, University of South Australia
- Andrew Chan, Head of School of Engineering, University of Tasmania
- Michael Brünig, Dean & Head of the School of Business, University of Queensland
- Jochen Deuse, Professor, School of Mechanical & Mechatronic Engineering, University of Technology Sydney
- Darren Rowland, Testlab Project Lead, University of Western Australia

Key discussion points:

- The Prime Ministers Industry 4.0 Taskforce was established in 2016, initially to connect Australian and German Industry leaders for collaboration and sharing of Industry 4.0 knowledge and advances. Understanding gained of importance of establishing innovative learning platforms and facilities to support SMEs, students and workforce transformation.

- German Labs Network Industrie 4.0 driving development of Testbeds in Germany

- In 2018, the Australian Government provided $6m support for National Industry 4.0 Testlab Network ($1m to 6 Universities) and Siemens provided significant support through software grants

- Testlabs are innovative learning platforms and facilities across the entire continuum of education and training

- Enable the research and education sector to work closely with the industry sector in order to progress Industry 4.0 transformation

- Supportive, non-competitive, cooperative environments that act as co-creation spaces

- Industry can immerse in Industry 4.0 concepts and experiment with new technologies and processes, digitally integrated systems and new Industry 4.0 embedded business models

- Industry engaging with Testlabs will develop capabilities that will enable adoption and workforce transformation.

- Testlabs are being developed in 6 states, based on a pilot-plant concept, focusing on a particular industrial application, and are to be completed by end 2019:
    - Victoria - Swinburne University of Technology – *Reconfigurable Manufacturing Facility as an Open Demonstrator, Teaching and Industry Outreach Testlab* as well as a lab focussed on *Composite Product Automation Testlab*
    - South Australia - University of South Australia – *Defence Manufacturing*
    - Tasmania - University of Tasmania – *Food Quality and Integrity Testlab*
    - Queensland - University of Queensland – *Green and Smart Energy Testlab*
    - New South Wales - University of Technology Sydney – *Intelligent Biomanufacturing Accelerator Testlab*
    - Western Australia - University of Western Australia – *Energy and Resources Digital Interoperability Testlab*

Key areas for action

The panel discussions and Q&A highlighted the following key areas for action:

- Need for a federal government led Industry 4.0 Advanced Manufacturing Strategy to progress report recommendations

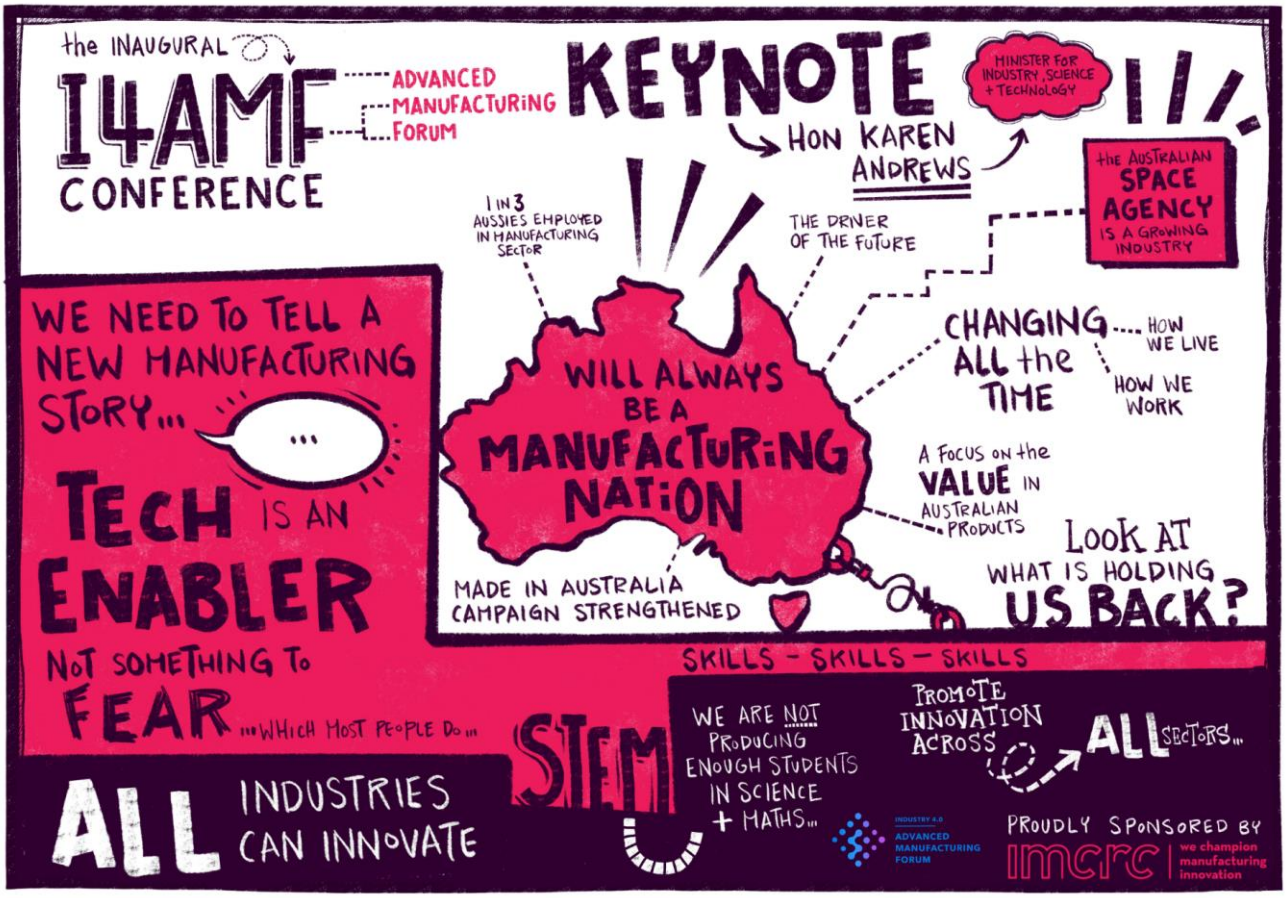
- Education and Training across entire continuum – VET to Higher Education and lifelong learning – co-created with industry, with policy barriers to be removed

- Industry to be encouraged to engage with Industry 4.0 to stay globally competitive and take their place in globally supply chains.

- The National Testlab Network is being developed and through this SMEs will have opportunity to better understand and engage with Industry 4.0 technologies, explore ways to upskill workers, develop new business strategies and gain access to experts to fast track innovation through R&D. This vehicle should be utilised to scale-up pilot initiatives (ie programs trialed linking VET and Higher Education and knowledge transfer and business strategy and mentoring programs)

- Industry, Government, Education and Training Organisations, Unions and Peak bodies need to work as a team to fast track Industry 4.0 uptake and initiatives and ensure standards developed allow for interoperability across supply chains nationally and globally.

Annexure: Key Note Address: Hon Karen Andrews, Minister for Industry, Science & Technology



Industry 4.0 Advanced Manufacturing Forum – MCG, Melbourne

Melbourne

7 August 2019
Check against delivery

Distinguished guests, ladies and gentlemen.

Thank you to the Advanced Manufacturing Forum for the opportunity to address your inaugural conference.

I am very proud to say Australia will always be a manufacturing nation.

Yes, it may look a little different and we'll come to that … but today's attendance is testament to the fact Australia has what it takes to not only maintain our manufacturing industries but to see them thrive.

I'm pleased to see such a broad range of business leaders and policymakers coming together to discuss how we can make the most of Industry 4.0.

Industry 4.0 will be instrumental in driving economic productivity.

For example – Internet of Things technologies has been estimated to be worth up to $88 billion for our manufacturing industries.

Australia is in its 28th year of economic growth … that's unmatched anywhere in the world.

But we can't take that for granted.

Growing our core and emerging manufacturing industries is a key part of the Morrison Government's economic plan … including our commitment to deliver 1.25 million new jobs over the next five years.

Now as I just said … Australia will always be a manufacturing nation.

What we need to do is look at the future of our manufacturing industries.

Manufacturing is about so much more than just production … there are great opportunities both before and after … from design and engineering through to after sales service.

If you look at manufacturing through this lens … the number of people employed jumps from 850,000 to almost 1.3 million.

These are jobs in major cities as well as our regional areas.

If you break it down … manufacturing provides jobs for almost one in 10 Australian workers. That is massive.

Our manufacturing sector is also a leader in R&D, spending almost $4 billion each year.

That's almost a quarter of Australia's total business R&D expenditure.

The value of our manufacturing exports has also grown over the past decade, to more than $120 billion in the last financial year.

We know that exports are a big part of the equation to grow our manufacturing industries and create new jobs.

The Government has a range of support measures in place to grow export opportunities … including our SME Export Hubs Initiative.

Another Morrison Government commitment is our funding towards the Australia Made campaign, to build the Australian, clean, green high quality, brand overseas in our key export markets.

But we know it's not just the exports we need to get right.

We know it's important we also make it as easy as possible for you to import the ingredients you need to manufacture … and I want you to know the Morrison Government is committed to eliminating the red tape that can make it difficult for you to do business.

One of my main focuses over the next three years will be the future of manufacturing in this country.

World-class manufacturing businesses are the backbone of our economy.

But how do we compete with the rest of the world when it's often much cheaper to manufacture overseas?

The answer is: to compete on value, not on cost.

This will only become more important in the coming decades as technology continues to spread.

As I said – production is much wider than just making things.

Pre-production manufacturers can use design to develop niche products, tailored to each customer.

Post-production manufacturers can carve out their business by selling an outcome … not just a product.

Almost half of the manufacturing workforce is focused on pre and post-production.

These pre and post-production opportunities are particularly important to pursue, because we know this is where the high-value jobs lie.

CSIRO recently released the 2019 Australian National Outlook report.

This report created scenarios of how our country could look in 2060.

It found that if we get the settings right, manufacturing could contribute more than 25% in additional GDP growth compared to today.

Industry 4.0 technologies, like robotics and artificial intelligence, will be key to realising this.

Clearly the opportunities for Australia are significant.

But when it comes to manufacturing … we can't be all things to all people.

We need to target areas where Australia is competitive and where we can build on our strengths.

Building competitive advantage will be key to industry transformation.

This should include building on the advantages within our regions, such as the food supply chain and mining technology and equipment.

We need to look at our key strengths to capitalise on the opportunities ahead.

This includes developing management capability and identifying the skills that industry needs to create high-value jobs.

We already have a highly educated workforce and access to world-class research institutions; but we should aspire to set the benchmark globally.

The Advanced Manufacturing Growth Centre estimates that up to 113,000 jobs in R&D, design, higher-skilled production, and sales and service positions will be created by 2026.

This is a huge opportunity to continue to re-skill and upskill our workforce and create new and better jobs.

This is especially important given one in five manufacturing businesses recently identified skills shortages as a concern and there are ongoing challenges in recruiting experienced staff with STEM skills.

We know we need to build the STEM pipeline, and this begins with our children. Our role as parents is to support our children and make them realise that the jobs of the future will rely on jobs. 75% of those jobs in fact!

The Government's $100 million Advanced Manufacturing Fund is already helping develop job-ready graduates.

The fund is creating a pipeline of skilled engineering graduates for the automotive industry.

Encouraging the uptake of new technology is another critical element of growing our manufacturing sector.

Australia's most successful manufacturing businesses are using state-of-the-art technology.

That's why the Morrison Government is establishing a Manufacturing Modernisation Fund.

This will provide grants to businesses to invest in transformative technologies such as 3D printing, robotics, AI and nanotechnologies.

There will be $50 million in funding from Government and at least $110 million from industry.

This will help small and medium-sized manufacturers to modernise, grow and employ more Australians, particularly those in regional and outer-suburban areas.

A great example of a business in an emerging industry is the South Australian company Fleet Space Technologies which specialises in nanosatellite technology.

Fleet's technology is opening the door for Australian businesses to capitalise on the Internet of Things.

Fleet has recently launched four new satellites, expanding its active network to 20 satellites.

Fleet's constellation of satellites has the potential to boost productivity across multiple sectors, from agriculture to mining to logistics.

They are a great example of finding your niche in manufacturing and how Australian manufacturers can contribute to a global ecosystem.

I want to briefly touch on the manufacturing roundtable I hosted at Parliament House last week.

It brought together leaders from peak industry associations, businesses, research organisations and universities.

It was a great meeting, with lots of vision about the future of manufacturing.

We shared our perspectives on the opportunities and also the challenges for Australian manufacturing.

I know one of the main challenges raised was the cost of production, given current energy costs. One of the big things you called for, was further measures to try and drive down the cost of gas.

I'm pleased to say just yesterday Ministers Canavan and Taylor announced a gas policy review, to put pressure on the states and territories to open up new gas reserves in an effort to drive down prices.

Driving down prices, reliable supply and keeping Australia globally competitive are this Government's priorities.

I know yesterday's announcement was well received by many in this room but I'm conscious it's not a fix-all, and I am committed to working with Ministers Canavan and Taylor to deliver for you.

The roundtable I hosted last week also looked at how we can support the transformation of our core industries and the development of our emerging sectors.

And there were great ideas on how to build competitive advantage and thrive in global markets and supply chains.

Most importantly, though, there was a common view that the best days for Australian manufacturing are ahead of us.

We now need to work together to get that message across to the broader economy and the general public.

Over the coming months, I will continue to work with you and for you to develop a plan that will set the agenda for manufacturing into the future.

A vibrant and competitive manufacturing sector is vital to Australia's economic future and the adoption of Industry 4.0 technologies will be a key driver of industry transformation.

But this change cannot be achieved by Government alone.

We need to work together to put manufacturing on the right trajectory so it can be a cornerstone of our economy.

It's essential, because a strong economy delivers a better way of life, high-value jobs and more opportunity for all Australians.

I4AMF Leaders

I4AMF Forum Executive Council

Mr Innes Willox – Chief Executive of Australian Industry Group Convenor

Mr Jeff Connolly – Chairman and CEO of Siemens Australia and New Zealand

Ms Trish White – National President and Chairman of Engineers Australia

Dr Jens Goennemann – Managing Director of Advanced Manufacturing Growth Centre

Workstream	Workstream lead
Reference architectures, standards and norms	Daniel Chidgey, Head of Stakeholder Engagement, Standards Australia
Security of networked systems	Michelle Price, CEO of AustCyber
Research and innovation	David Chuter, CEO and Managing Director of Innovative Manufacturing CRC (IMCRC)
Test laboratories and future of work, education and training	Prof. Aleksandar Subic, Deputy Vice-Chancellor (R&D), Swinburne University of Technology and Andrew Dettmer, National President, AMWU

Members

Ian Ryan - Head of the Institute of Digital Government - SAP

Trevor Power - Head of Division - Industry Growth, Department of Industry, Innovation and Science

Australian Government
Department of Industry, Innovation and Science

INDUSTRY 4.0
ADVANCED MANUFACTURING FORUM