Industry 4.0 Foresight

…‘the ability to predict what will happen or be needed in the future.’

preparedness

forethought

caution

vigilance

anticipation

attentiveness

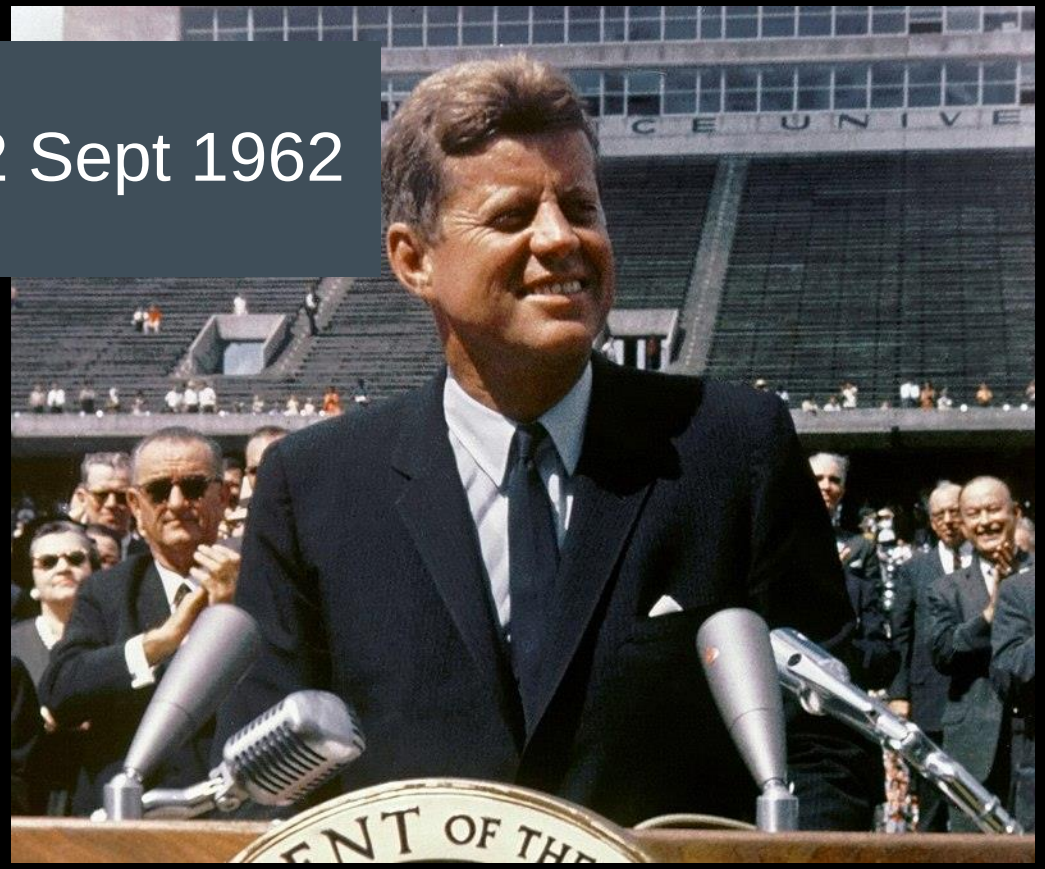
readiness

planning

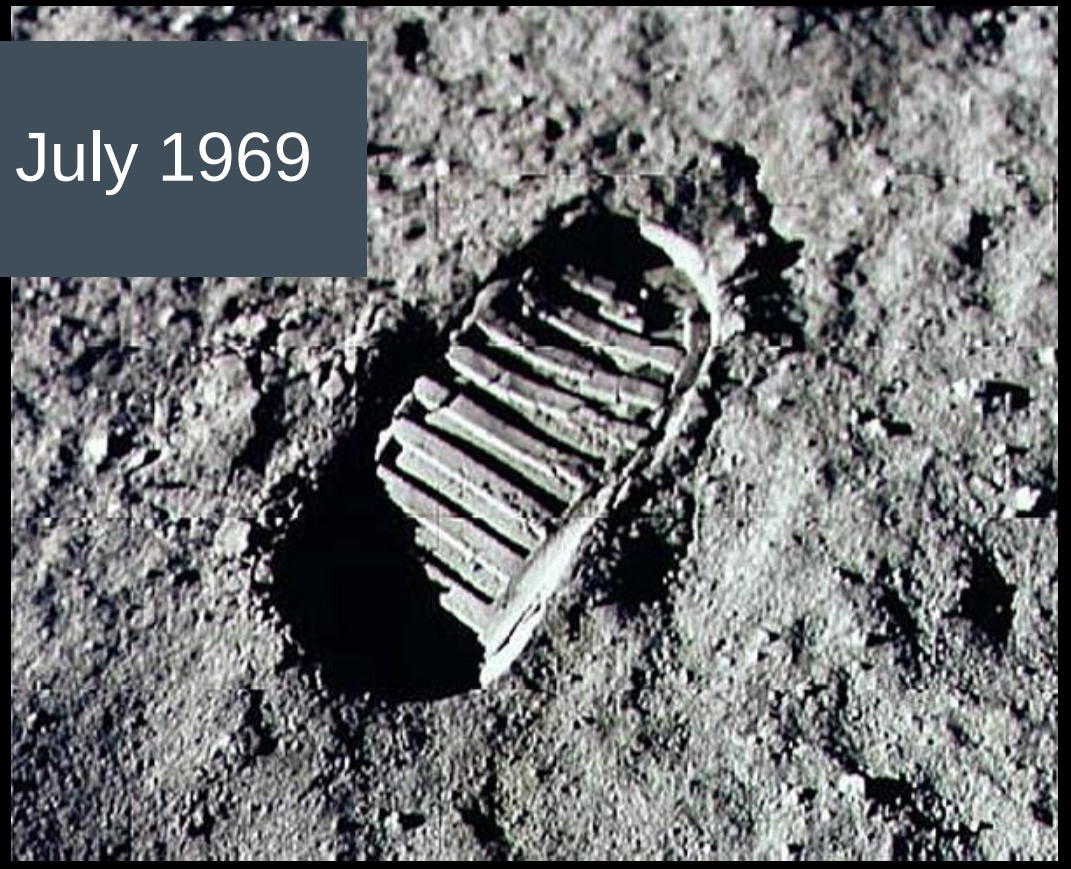
prudence

provision

12 Sept 1962



16 July 1969



Any great vision takes great foresight

Double edged sword of Industry 4.0

Competition
Ability to compete with anyone in the world – (anyone can compete with us)

Economic
By 2030, machine learning could contribute nearly $16 trillion to the global economy (ours to lose)

Jobs
Better jobs, safer and more highly paid. Entirely new business models arise. (not ready with the skills)

Liveability
Address climate change, transport gridlock & aging population, healthier for longer (or less attractive living standards)

$21 trillion opportunity
Industry 4.0 is poised to deliver growth and change, with digitalization and smart automation to add 14% to global GDP by 2030.
Source: Industry 4.0 Workforce Transformation Report 2019

By 2022, artificial intelligence and robots could displace almost …

75 million jobs

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Ingenuity for life

However, another
133 million new roles may
emerge by 2022.

Net gain of …

58 million new jobs

Sounds great but…

Are we producing people with the right skills?

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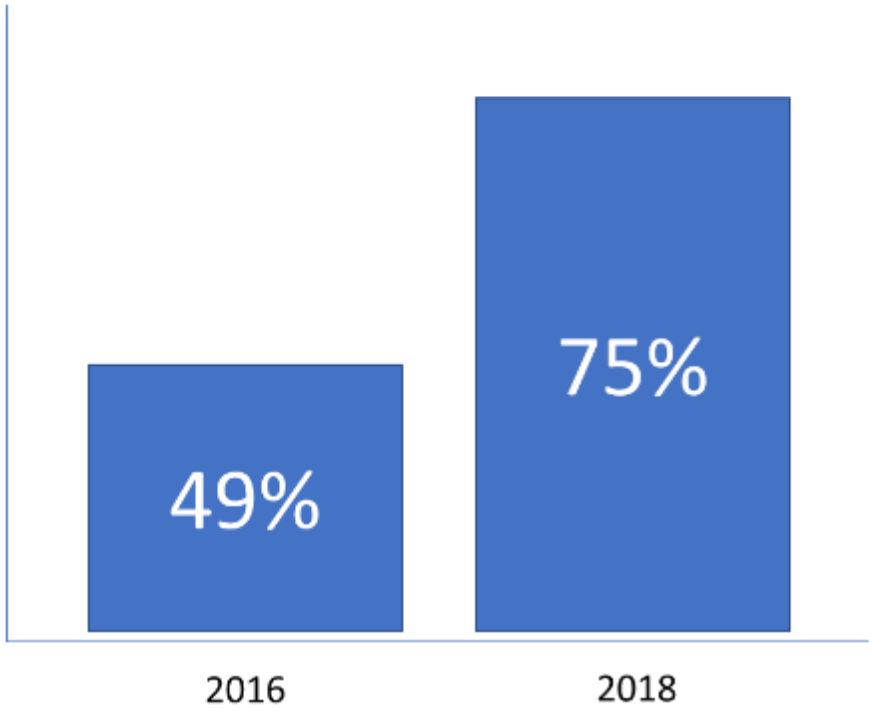
More employers reporting skills shortages (AiGroup survey)



…and yet we have more university students than ever

Total Undergraduates Enrolled
2016 = 895,468
2018 = 938,894
Up 4.8%

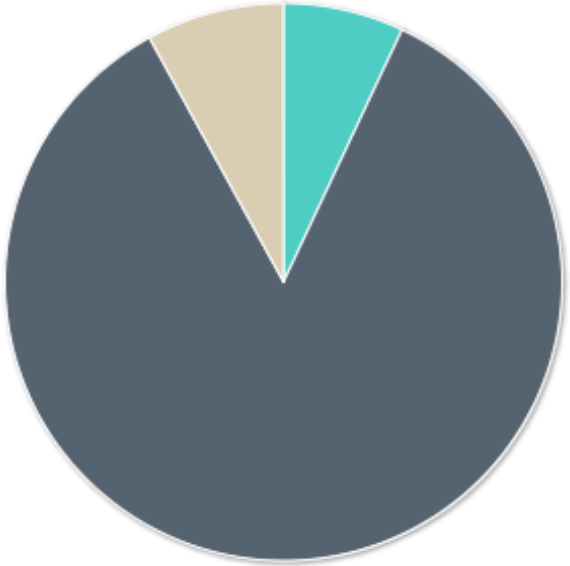
The total number of people doing Post-Grad
2016 = 322,785
2018 = 362,484
Up 12.3%

As individuals are we blind and deaf to the reality?

Do you think your job could be automated in the next 5 years?

View:

Choices	Results
Yes	7%
No	85%
Unsure	8%



Polling from Siemens Digitalize 2019 (Brisbane July)

“Automation affects other people’s jobs but not mine!”

Industry 4.0 – the Fourth Industrial Revolution

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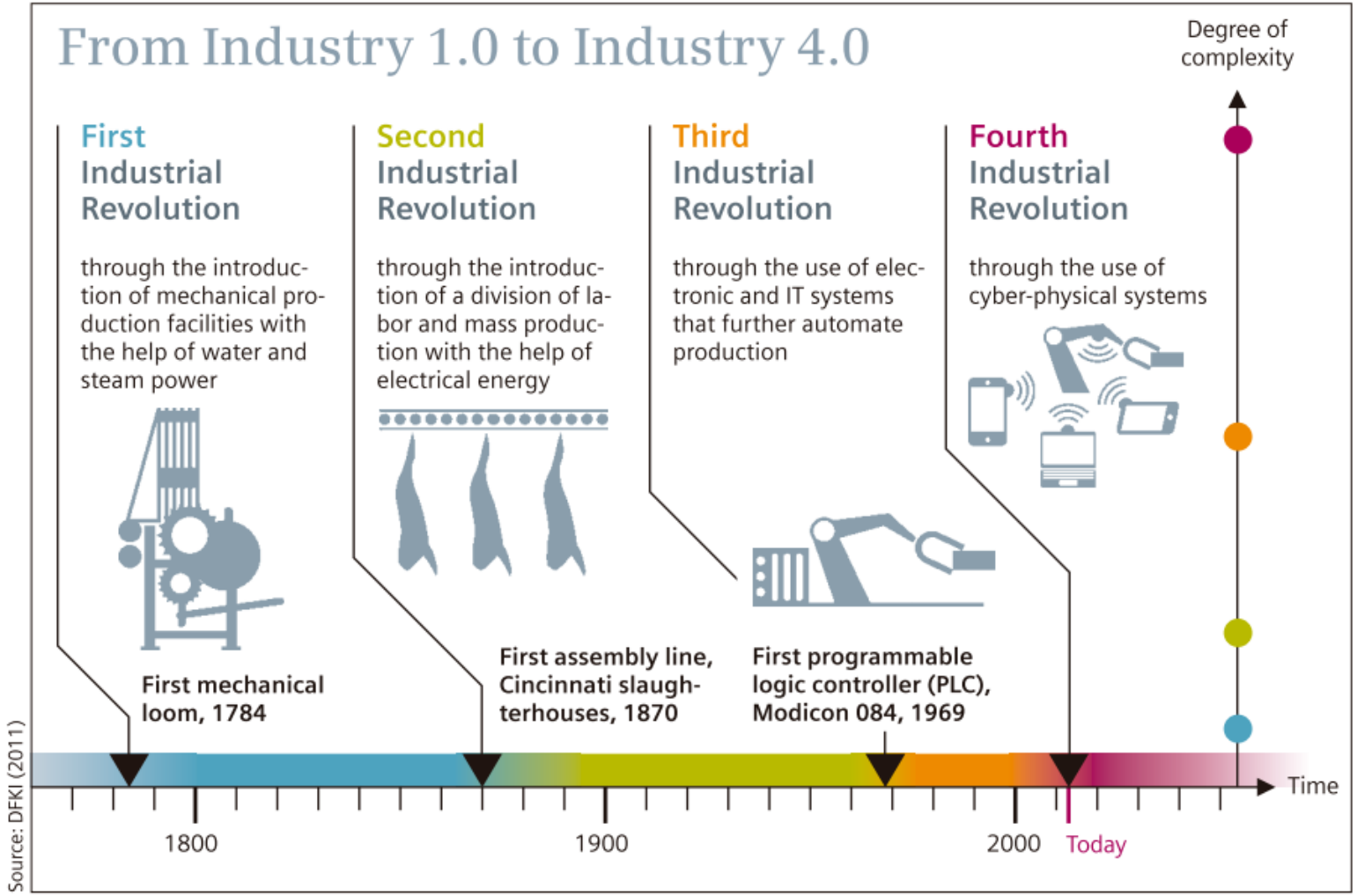
From the computer to the production line, new technologies are shrinking the time between virtual planning and manufacturing.

- As information generated in the virtual world flows into real manufacturing processes, new production environments will emerge.
- Design and manufacturing processes are changing – how we service equipment will also change.
- **Next steps require collaboration between major industrial companies, academic research institutes, and governments.**



Industry 4.0 and why we care

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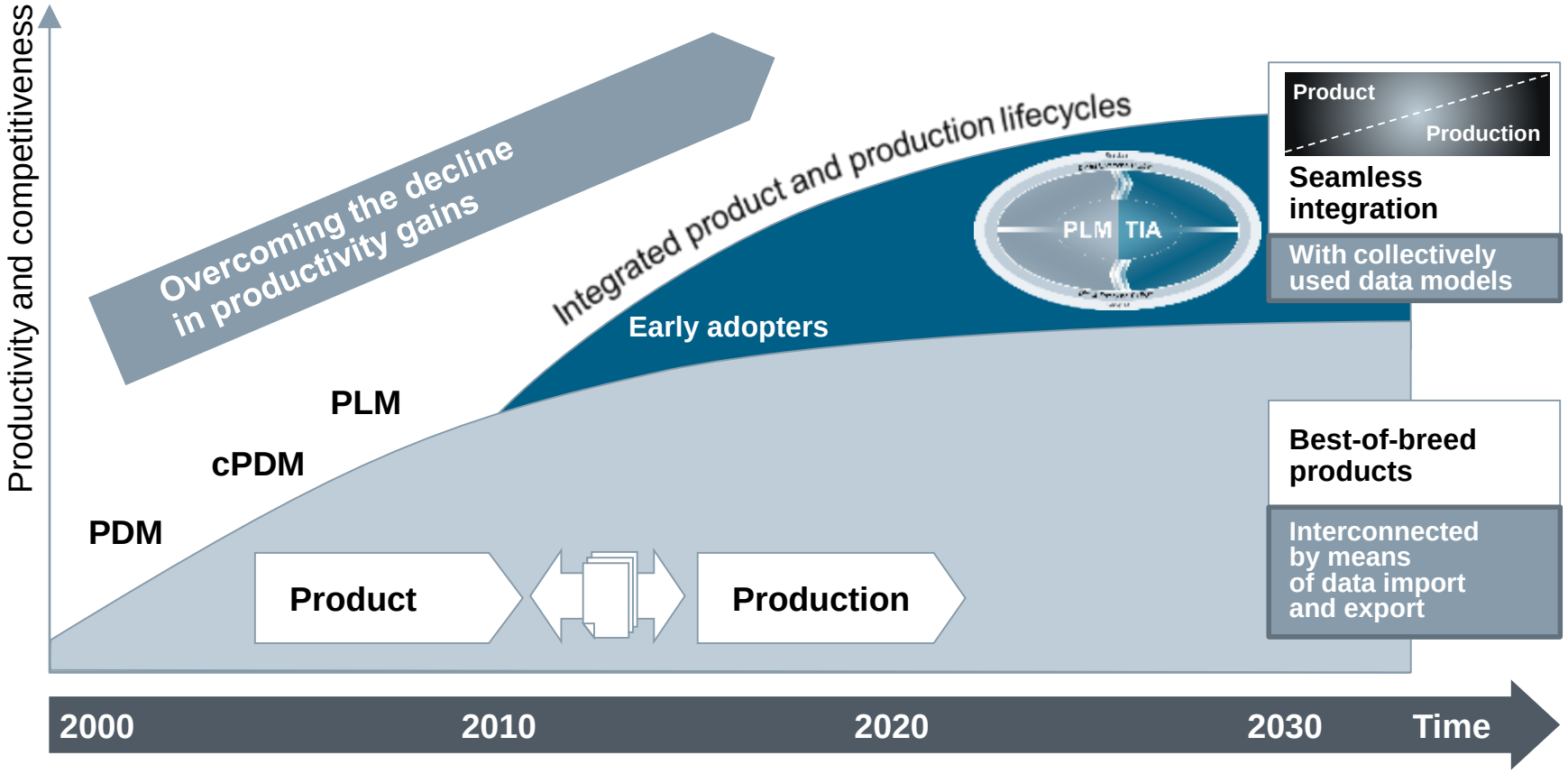
Manufacturing productivity is declining. Industry 4.0 delivers the next productivity gains. From 1995-2008 manufacturing productivity was 2.4%. From 2008-2018 it was 0.6%.



Integrating product and production lifecycles can reduce time-to-market by 50%

“Manufacturing creates value across the economy through its demand for research and development, design and engineering services, production, logistics and after sales service”

Karen Andrews
Government Media Release: August 2019

… “what we know for certain is that productivity is the key to sustained growth and higher incomes.”

Josh Frydenberg Federal Treasurer.
22 June 2019
The Weekend Australian

What does Industry 4.0 technology look like?

What does Industry 4.0 look like?

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Industry 4.0 - Digital Twin underpins the future of manufacturing with many examples

Firewire Surfboards

Siemens PLM Software, has helped Firewire revolutionize surfboard design and production
Rapid prototyping
Batch of 1 – customised mass production

Siemens Amberg Factory

1,200 different products -production line must change configurations 350 times a day. Through digital twins, technicians can see quality defects in real time, immediately make design changes and adjust supplies and materials:

Formula 1 Racing

1,000 design changes every week are first tested in a virtual world before being implemented physically.
30,000 design modifications in the course of a season.
800 different components for a new front wing.

Paperless Manufacturing

- Batch size 1 (100 litres)
- 1/50th of the size
- 1/8th of the time
- Removed 75,000 manual steps

Dulux Australia: Hannover Fair 2018

Process Industry Best practice I 4.0 on show for the world.

Australia can re-shore manufacturing!

What are we doing about it?

Australia Germany Advisory Group Established in 2014 following the G20 held in Brisbane

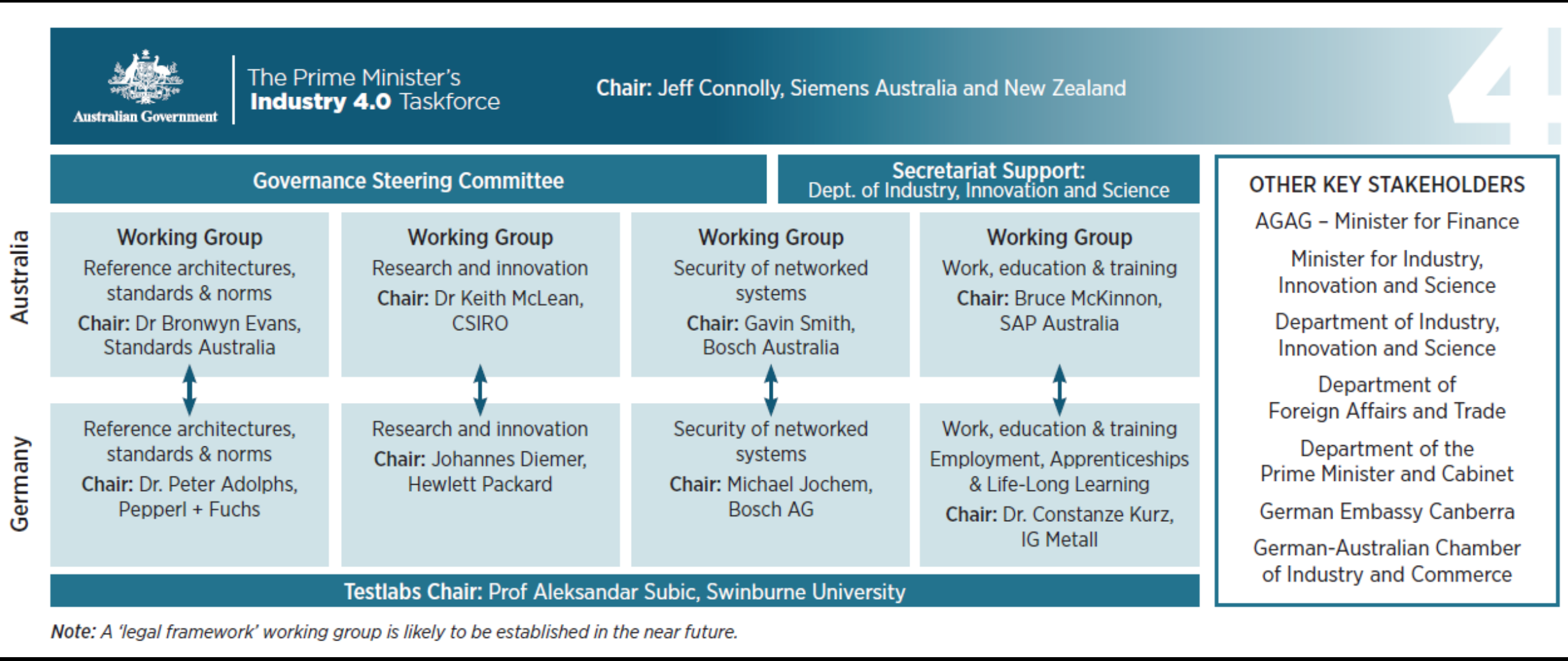
Co-chaired by Hon Mathias Cormann and German Minister of State at the Federal Foreign Office Professor Dr Maria Böhmer,

The group comprised senior leaders from business, academia, and the arts.

59 recommendations

The report was presented to Prime Minister Turnbull and Chancellor Merkel in Berlin on 13 November 2015.

10. SAP and Siemens will collaborate with government and industry in both countries to promote increased thought leadership on digital transformation, including initiating a **collaborative approach to the development of global Industry 4.0 standards.**



Note: *A 'legal framework' working group is likely to be established in the near future.*

This led to an international collaboration agreement signed in April 2016 in Hannover – the world's largest industrial trade fair. With Minister Zypries and Ambassador Lynette Wood.

One of only 5 countries to have such an agreement.

Embedding into Australian industry – above and beyond any individual political persuasion

Australia

Ai GROUP Industry 4.0 Forum

Executive Council

Ai GROUP · SIEMENS · AMGC ADVANCED MANUFACTURING GROWTH CENTRE LTD · ENGINEERS AUSTRALIA · SAP · Australian Government, Department of Industry, Innovation and Science

work streams

Reference Architecture Standards & Norms	Technology & Application Scenarios	Security of Networked Systems	Work, Education & Training & Test Labs
STANDARDS Australia	imarc	AustCyber Australian Cyber Security Growth Network	SWINBURNE UNIVERSITY OF TECHNOLOGY · AMWU

Germany

Connecting to equivalent work streams in Germany to collaborate, learn and contribute.
Embed and connect deeply with Australian Industry

PLATTFORM INDUSTRIE 4.0

Note: Germany has additional work streams of ‘Legal Framework & ‘Digital Business Models in Industry 4.0’

Evolving the work to prepare for the future

Australia

Industry 4.0 Forum

Executive Council

AMGC ADVANCED MANUFACTURING GROWTH CENTRE LTD

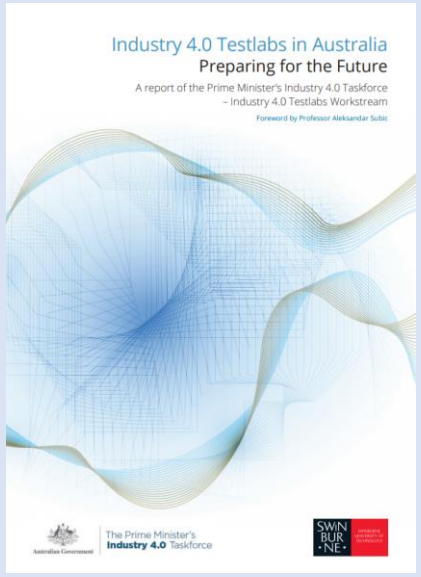
Australian Government
Department of Industry, Innovation and Science

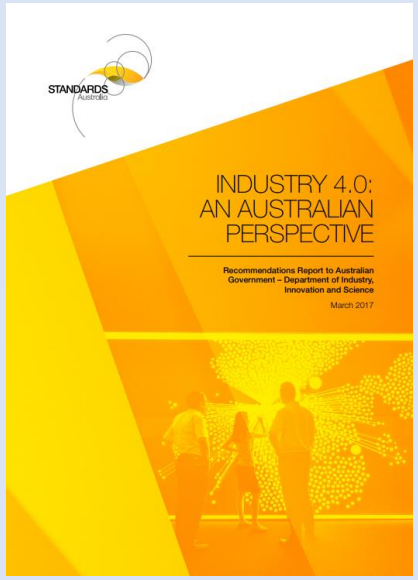
work streams

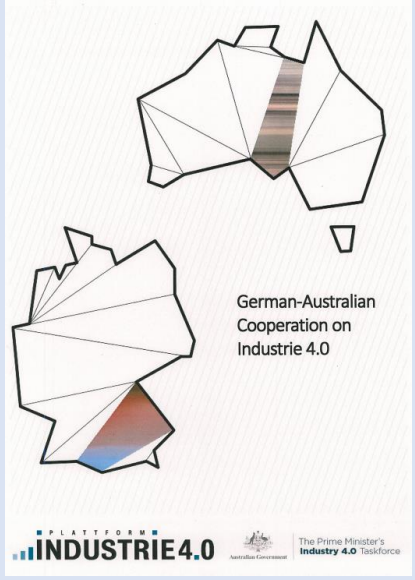
- **Legal Framework**
- **Reference Architecture Standards & Norms**
- **Security of Networked Systems**
- **Digital Business Models in Industry 4.0**
- **Technology & Application Scenarios**
- **Work, Education & Training & Test Labs**

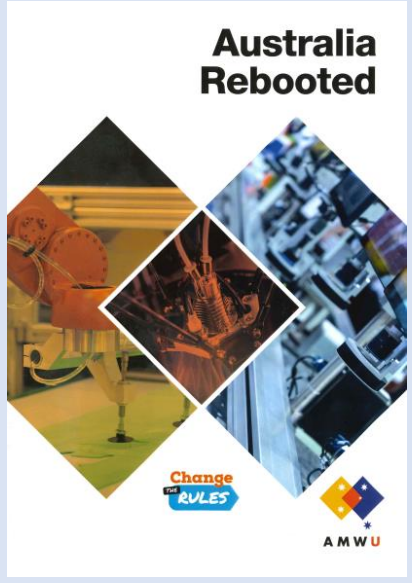
PLATTFORM INDUSTRIE4.0

Body of work stemming from the Prime Minister's Industry 4.0 Taskforce and Industry 4.0 Forum









Unrestricted

From Australia to the World – adding value at a global level

Professor Bronwyn Fox, Swinburne University of Technology representing Australia's Prime Minister's Industry 4.0 Taskforce at pre-G20 meetings in Germany

Collaboration in Action: Australia – Germany Work Stream meetings at Hannover Messe April 2019

Industry 4.0 is a framework for Societal Transformation

Preparation for the future of work, skills and education

Over $1.5 billion hi-tech industrial software Grants

Tertiary students will have access to globally recognised skills and tools

+

Industry 4.0 Advanced Apprenticeships

New vocational learning models more closely linked to Germany's 500 year old system

+

Industry 4.0 Test Laboratories

SME's will gain experience with state-of-the-art Industry 4.0 processes, and be able to test new technologies to inform manufacturing strategies and business models.

Strategic program to build Industry 4.0 'capability' across Australia – future orientated skills

Industry 4.0 Apprenticeship Program

Unique partnership to prepare workforce of the future…

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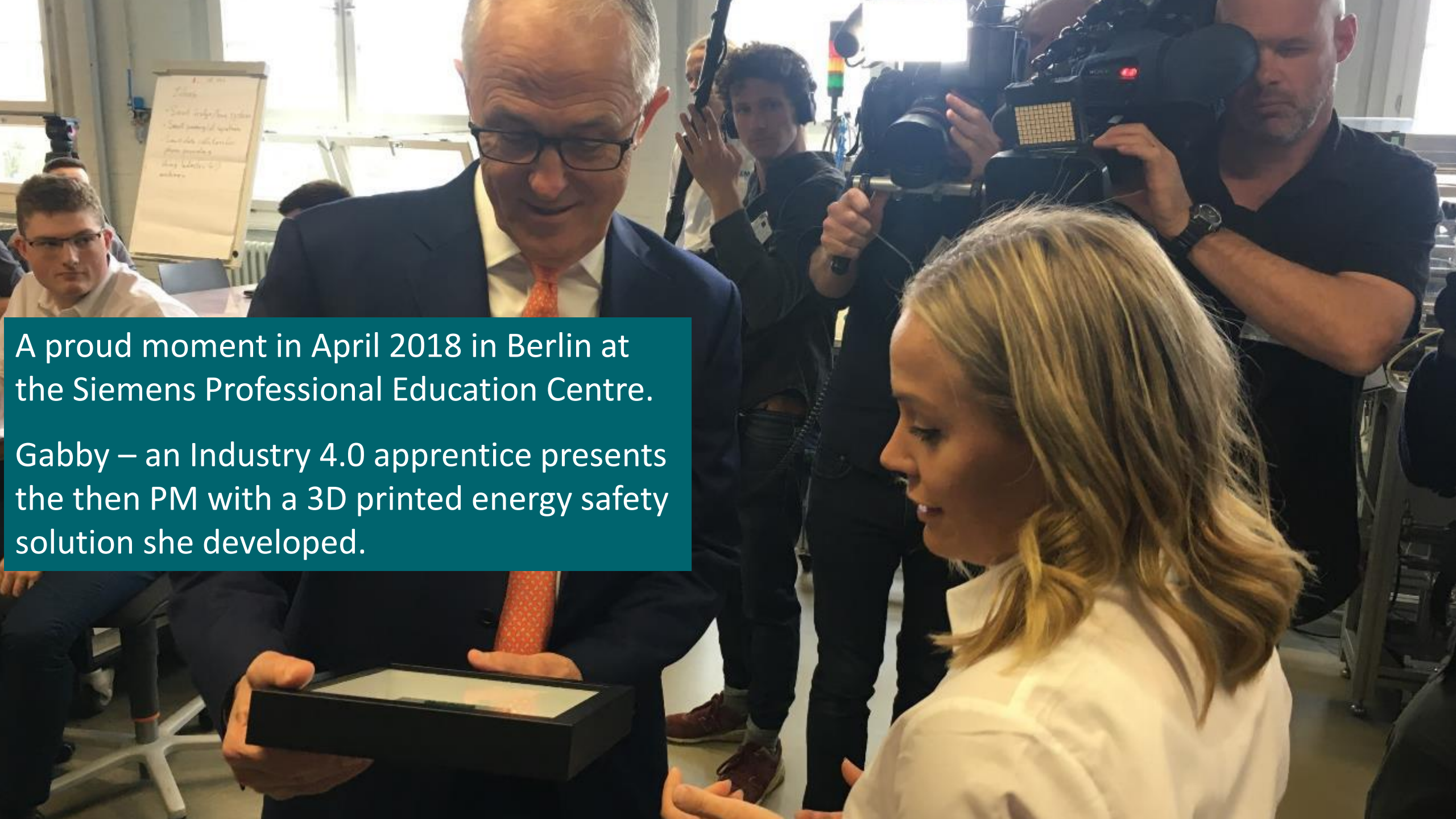
SWINBURNE UNIVERSITY OF TECHNOLOGY

Ai GROUP

April 2018, Siemens Professional Education Centre Berlin



A proud moment in April 2018 in Berlin at the Siemens Professional Education Centre.

Gabby – an Industry 4.0 apprentice presents the then PM with a 3D printed energy safety solution she developed.

Job ready people: diverse outcomes from one program

Out of the first batch of Industry 4.0 Apprenticeship graduates:

- **Engineering System Architects in future Tech**
- **Cyber Security Sales Support Professional**
- **Predictive Data Analysts**
- **Digital Engineering Technician**
- **Application Services Engineer**
- **Digital Service Engineer**
- Digital Customer Service Sales Consultant

Preparing the workforce of the future

$1.5 billion in hi-tech Siemens PLM software

SWINBURNE UNIVERSITY OF TECHNOLOGY

University of South Australia

SIEMENS

University of South Australia

SIEMENS

Accelerating Australia's journey to a digital economy and the fourth Industrial revolution

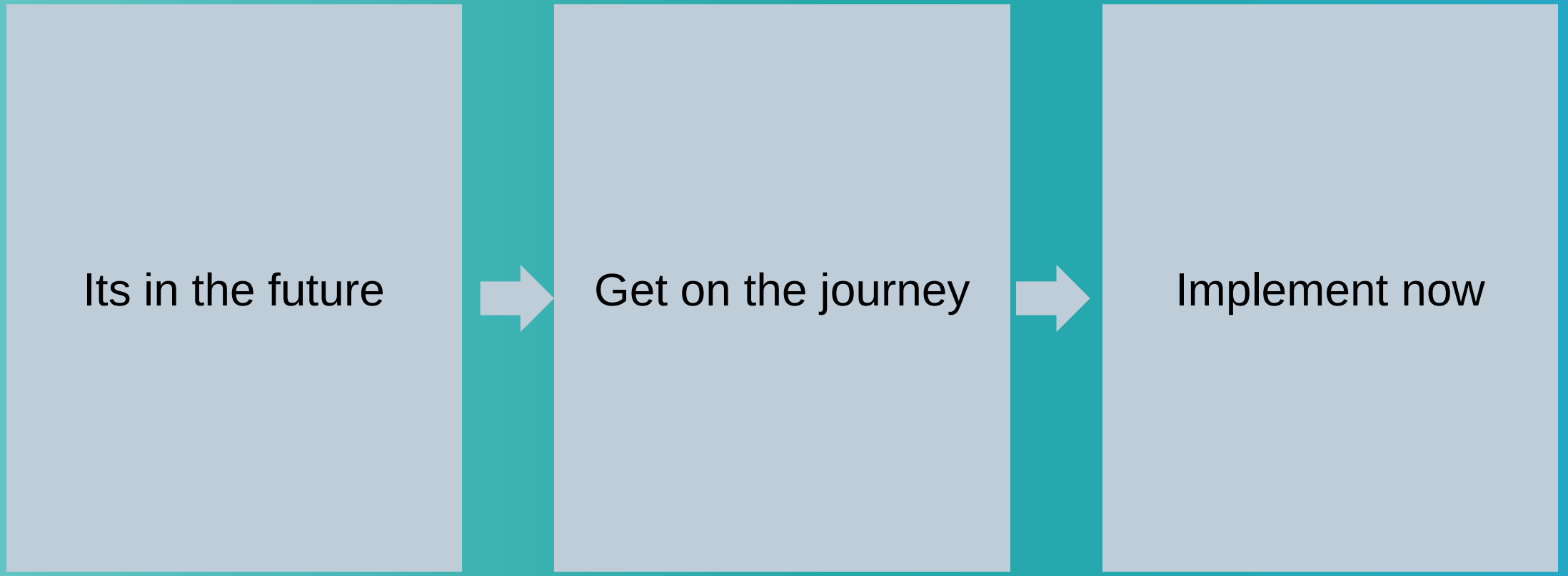
National skill building program stemming from work of Prime Minister's Industry 4.0 Taskforce

THE UNIVERSITY OF WESTERN AUSTRALIA

THE UNIVERSITY OF QUEENSLAND AUSTRALIA

Collaboration – Industry partnerships with academic institutions to provide the skills and tools

Industry 4.0 – a changing landscape*… feel the urgency*

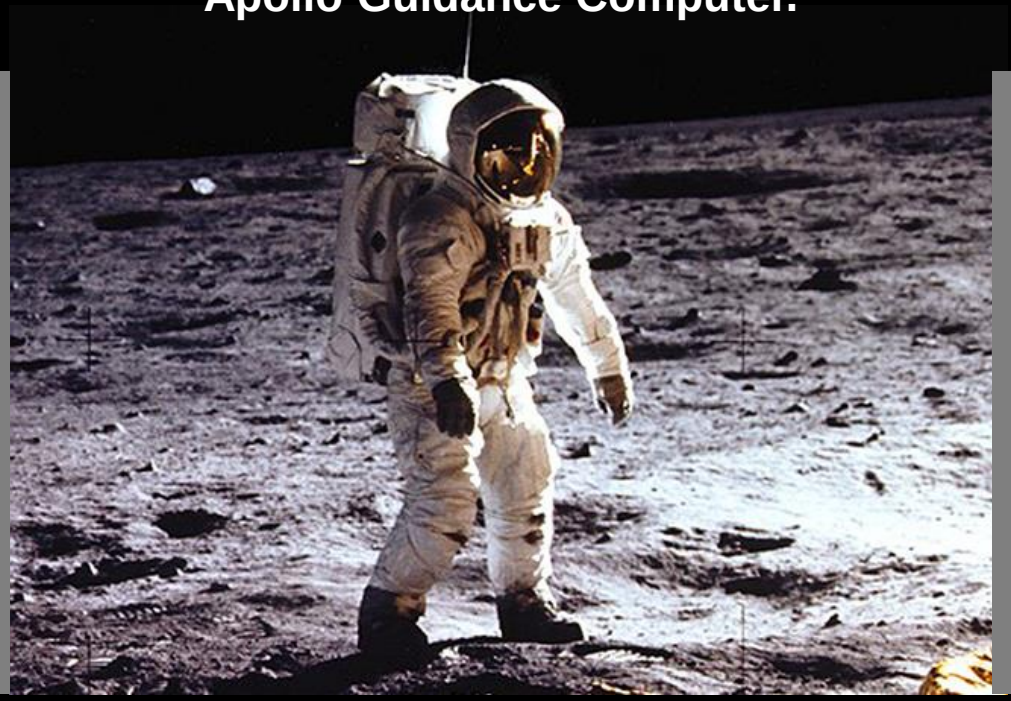


The message has changed since we began talking about Industry 4.0

Fifty years later… a modern phone has 100,000 times more processing power than the Apollo Guidance Computer.

The Apollo Guidance Computer:

- 4 Kb RAM
- 72 Kb of ROM
- 0.043 MHz Processor
- Landed man on the moon



My iPhone:

- 4GB RAM
- 512 GB ROM
- 2490 MHz processor
- Let's me watch a video of man landing on the moon.

By embracing Industry 4.0, imagine what we can achieve if we have the foresight