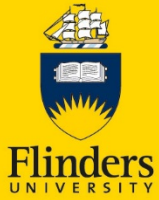




# The Vision: South Australia as the home for the Asia Pacific Region's First Industrial Scale Factory of the Future





**Flinders University**  
Australian Industrial  
Transformation  
Institute

# Tonsley Manufacturing Innovation Hub – Harnessing the Digital Dividend

WineEng 2019

Colin Thomas  
Sept 11, 2019



# Harnessing the Digital Dividend

- Why Digitise
- I4 Tools and benefits
- Sources for Assistance
- TMI Hub
- Flinders Uni Programs
- Tonsley Precinct
  
- Amir –
  - Wine Industry applications of some I4 Tools



# Harnessing the Digital Dividend

- People add value through good decision making.





# Harnessing the Digital Dividend

- People make better decisions with better information.



# Harnessing the Digital Dividend

## The Four Revolutions

1784



### Industry 1.0

Mechanical production  
Steam and water power  
Weaving loom

1870



### Industry 2.0

First assembly line  
Mass production  
Electricity  
Discovery of oil and production  
or petrol

1969



### Industry 3.0

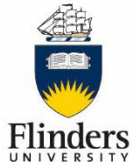
Computers and IT  
Micro circuits and processors  
Automated production  
Global supply chains

Today



### Industry 4.0

Interconnection of technology  
Internet of Things, Smart devices  
Artificial Intelligence, Machine  
Learning  
Big data analytics, Advanced  
algorithms  
Robotics, 3D printing  
Automation

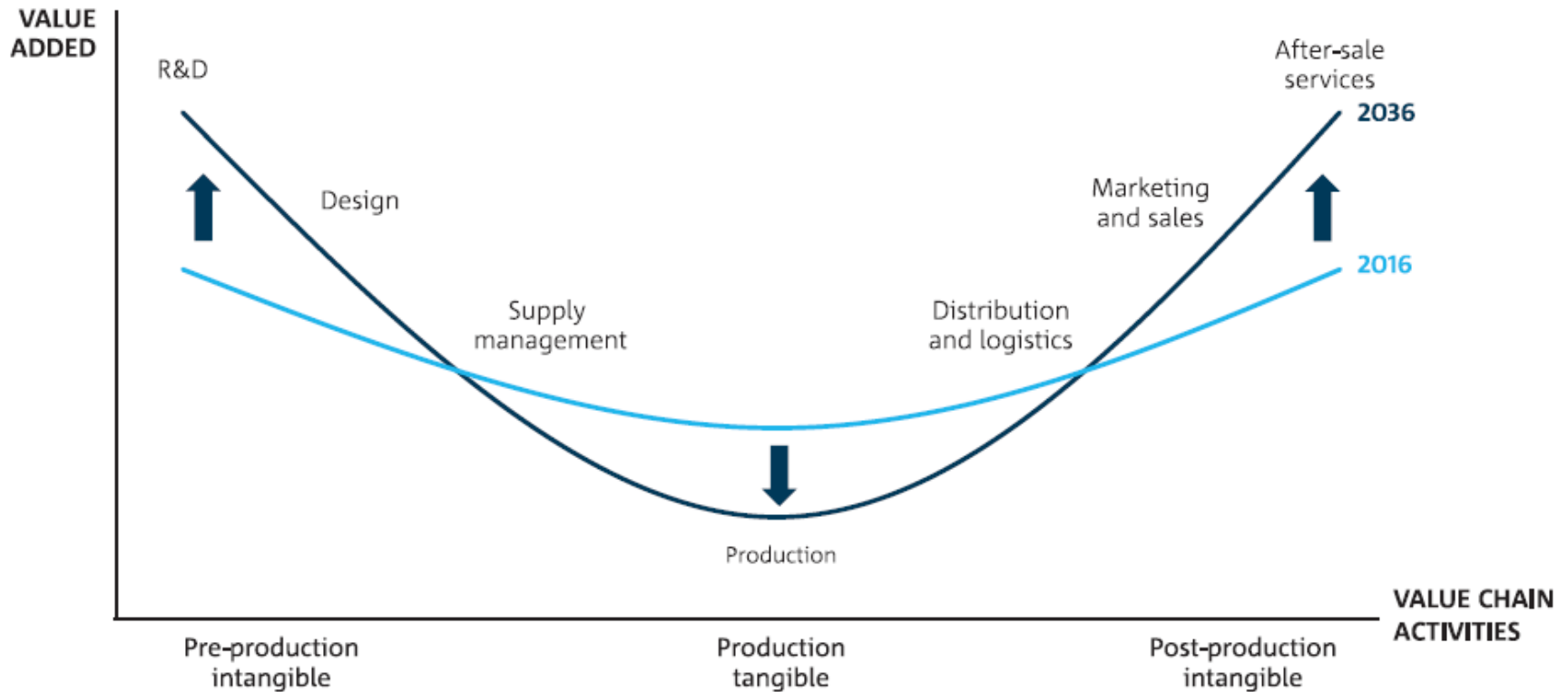


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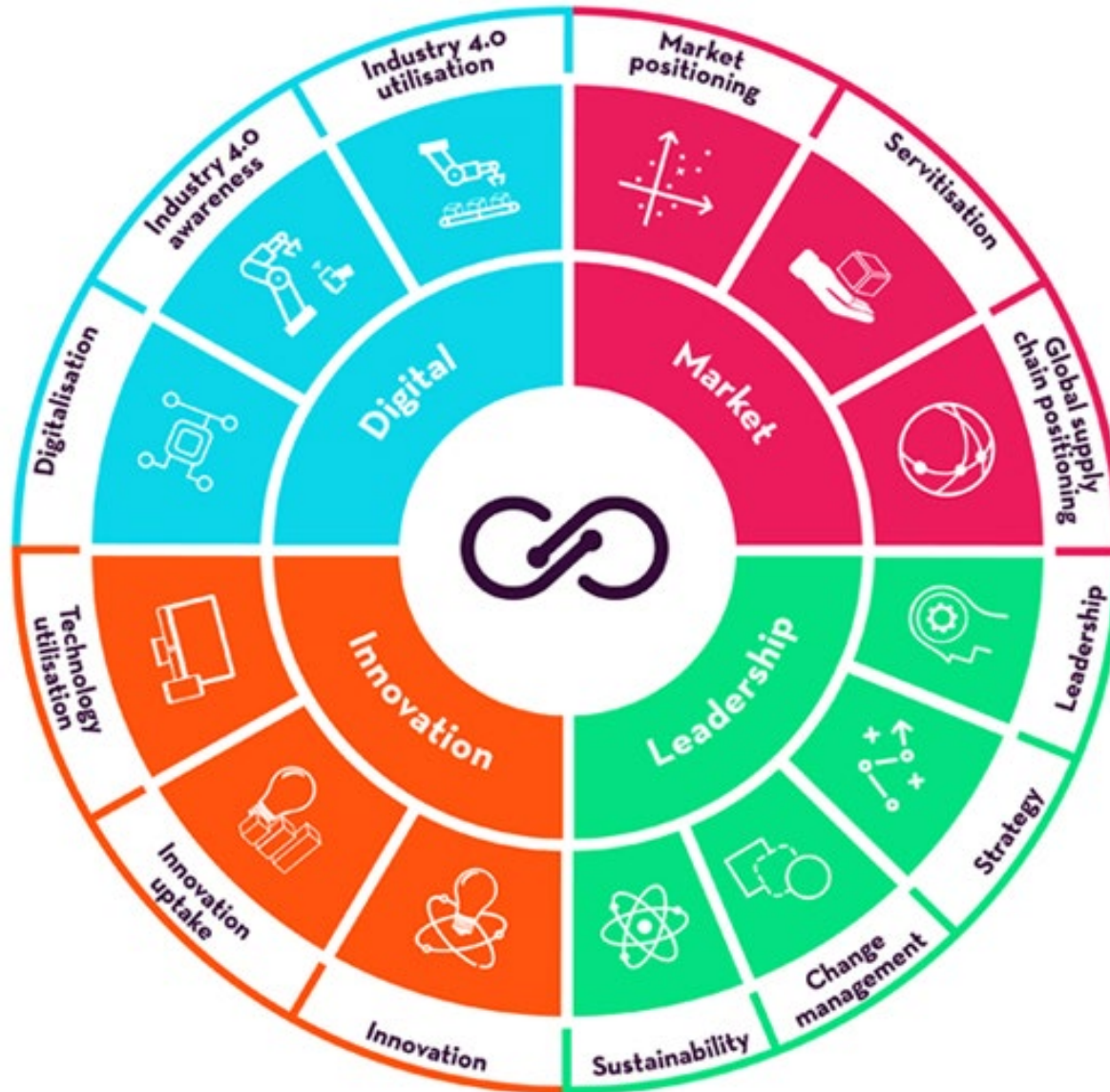
Source: ABS (2017) Cat. No. 6202.023



# Harnessing the Digital Dividend



# Harnessing the Digital Dividend



IMCRC.org  
futuremap



# Harnessing the Digital Dividend

- Humans add value through good decision making.
- Decisions are made based on the information available.
- Sensors can now gather more data than humans ever could.
- Computers can process that data like never before.
- AI can assist in converting that data into meaningful information and either making the decision or presenting the information to assist decisions.
- See patterns that were not visible to humans.
- Gathers the world's wisdom to your fingertips.





# Harnessing the Digital Dividend

Do people do the wrong things, make the wrong decisions?

Because they're stupid?

They don't have the right information?

The data's wrong.

It's confusing.

They don't understand it.

They have a different plan / intention.





# Harnessing the Digital Dividend

- Are your businesses as good as they can be?
- As good as they should be?
- Is that ok?
- Can something be done?





# Harnessing the Digital Dividend

Sure there are decisions that are still based on things we haven't digitised yet, and even some things we never will digitise.

But for those that we can digitise and haven't, and they'll help us make better decisions, reduce uncertainty , conflict, waste, cost, safety – lets have a look at whether they can be affordably digitised and lets make a plan to do it.





# Harnessing the Digital Dividend

Efficiency

Better Decisions

Remote Connection , Repair, Training

Save Resources – Water

Protect Plants – less pesticides and herbicides

Increase Uptime – Sense, predict

Efficient transport – through smart connections

Knowledge to the user – pest identification

Less transport – localised manufacture

Flexible manufacture

Better product and process design

Better Training

Less waste through mistakes





# Harnessing the Digital Dividend Tools

Augmented Reality

Virtual Reality

Blockchain

Simulation

Digital Twin

RFID

Mass Customisation

Artificial Intelligence

Machine learning

Vision

Robotics

Automation

Collaborative Robots

Predictive Maintenance

Internet of Things

Industrial Internet of Things

Wearables

Exoskeletons

Cyber Physical Systems

Big Data

Data Analytics

Edge Computing

Cloud Computing

Mobile Devices

Smart Sensors

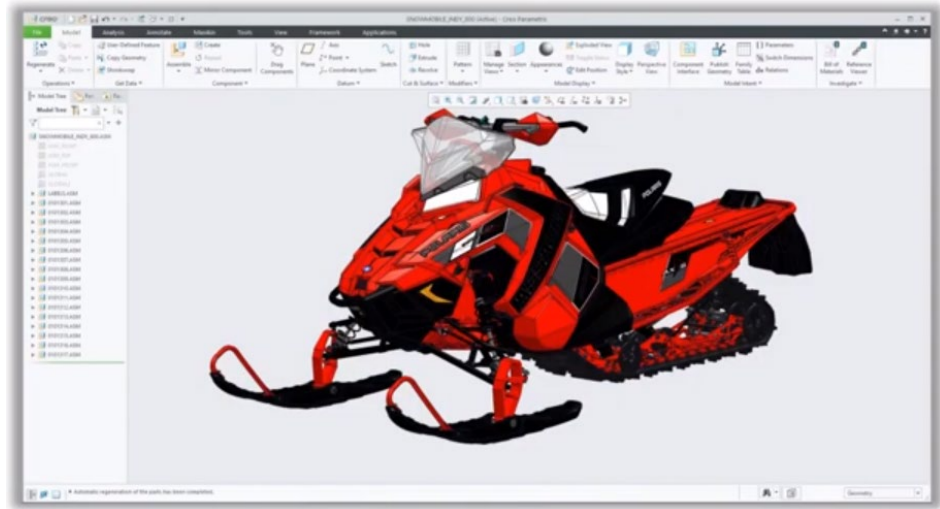
Additive manufacturing



# Harnessing the Digital Dividend

## The Digital Twin

### Snowmobile



<https://www.youtube.com/watch?v=NFIEsW5CcUc>

Start at 18 sec. Run to 1:12

Then 2:20 to 3:36



# Harnessing the Digital Dividend Tools

A Tonsley startup using  
Mobile Devices  
AI  
Additive Manufacturing

To assist farmers in analysis of insects, fungi,  
mildew, etc.

Multi layer imaging on your mobile phone that  
will knock your socks off, with analysis systems  
they are teaching to school kids.



# Connecting farmers to agronomist for analysis and advise

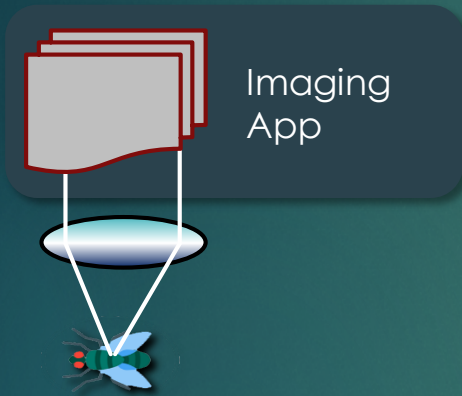


# Device & App



- ▶ *...that allows farmers to get timely response from their agronomist on pest, leaf and seed issues.*

# Imaging App



Imaging  
App

Combines multiple images  
taken at different depths

Multi-Depth imaging

TECHNOLOGY



Shot with Phone Camera with GoMicro



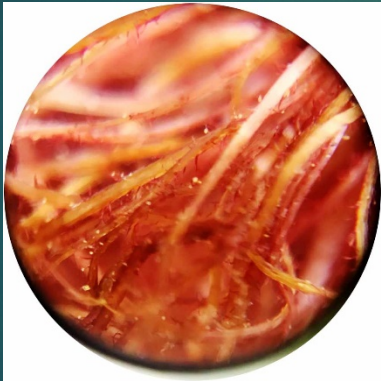
Weevil



Frost Damage



Aphid



Pollen



Grape wine crawler



Mealy Bug

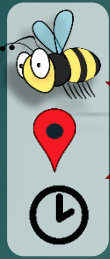
# AI Identification

## Ask AI

Instantaneous  
Diagnosis



# Farm App



For the attention of the Agronomist

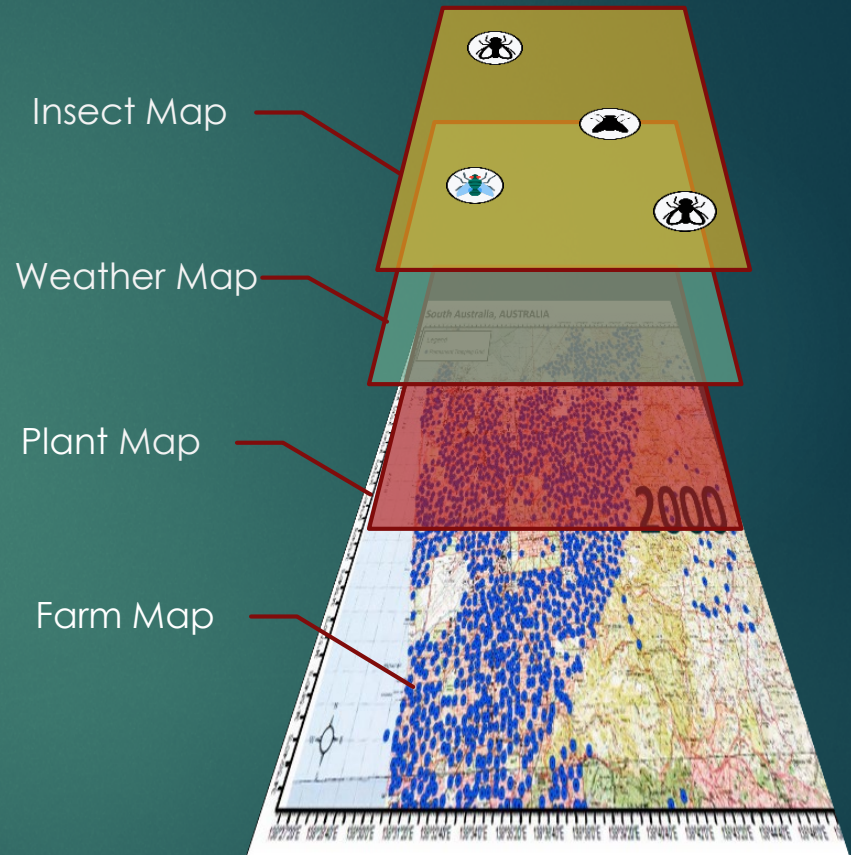
Submitted for Verification



# Insect Analytics

The combination of insect, plant, weather, soil, and cropping data will allow the agronomist to provide valuable remedial advice to farmers

[demo.gomicro.co](http://demo.gomicro.co)



## Industrial vs. Collaborative Robotics

### Industrial Robotics

- “Integrated”
- High Speed
- Precise
- Caged
- Fixed Position
- Expensive
- Task Specific



### Collaborative Robotics

- Ease of setup / programming
- Reconfigurable tasks
- Human interaction
- Mobile
- Lower cost
- Task Flexible

Carl Vause  
Soft Robotics Inc.







# Harnessing the Digital Dividend

Where can you get the understanding of the technologies skills or the people with the skills...  
It's emerging

Universities and TAFEs

I4.0 Higher Apprenticeship Training

AiGroup – Swinburne Siemens

Assistive Organisations

AMGC

IMCRC

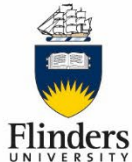
Industry Organisations

Industry dependent, of course

Technology Providers

Learn about the technologies

SA - Emerging Technology Interest Groups



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# Harnessing the Digital Dividend

Where to go to gain understanding of the technologies skills or the people with the skills...

## Technology Providers

Siemens  
Bosch  
Phoenix Contact  
IFM  
SMC  
FESTO  
ABB  
Universal Robots  
Rockwell Automation  
Ailytics  
Dassault Systemes  
LEAP – PTC  
KUKA Techman Doosan AUBO

## Specialist Organisations

LEAP  
SAGE  
Matthews  
APC  
Dematec

## Machine Builders , Integrators

Mobile Automation  
Scott Technology  
Australis Engineering  
HMPS  
Foodmach





# Harnessing the Digital Dividend

## ETIGS- Emerging Technology Interest Groups

Five separate groups have been established around (and facilitated by):

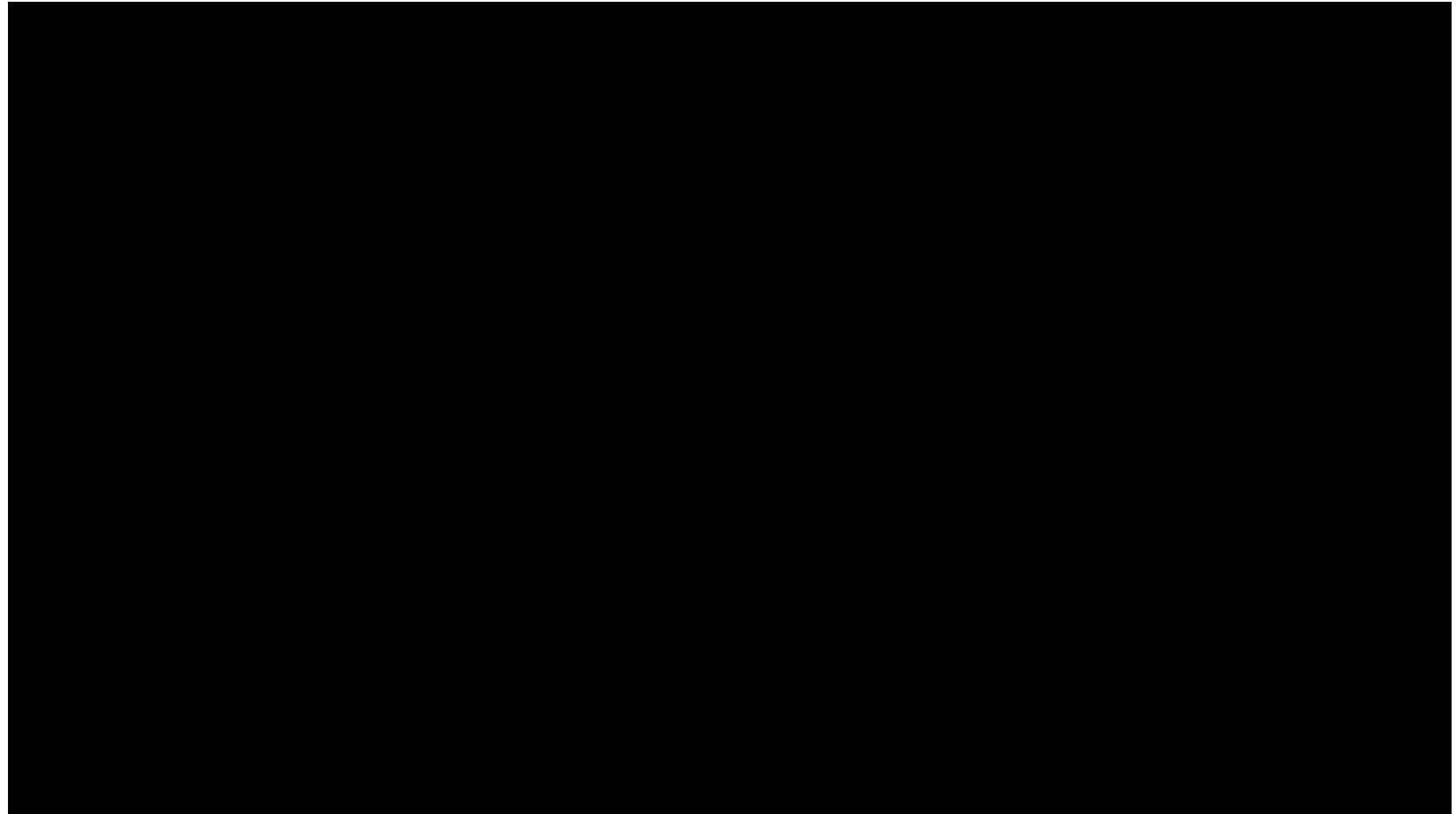
- ▶ Robotics and automation (Australian Industrial Transformation Institute, Flinders University)
- ▶ Virtual and augmented reality (Australian Research Centre for Interactive and Virtual Environments, The University of South Australia)
- ▶ Additive manufacturing (3D printing) (Institute for Photonics and Advanced Sensing, The University of Adelaide)
- ▶ Data-driven decision making (Advanced Computing Research Centre, The University of South Australia)
- ▶ Machine Learning (Australian Institute for Machine Learning, The University of Adelaide)

Membership for South Australian companies and researchers is free, and companies can participate in multiple groups.

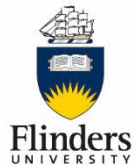




# Harnessing the Digital Dividend



Bosch Flexible Factory



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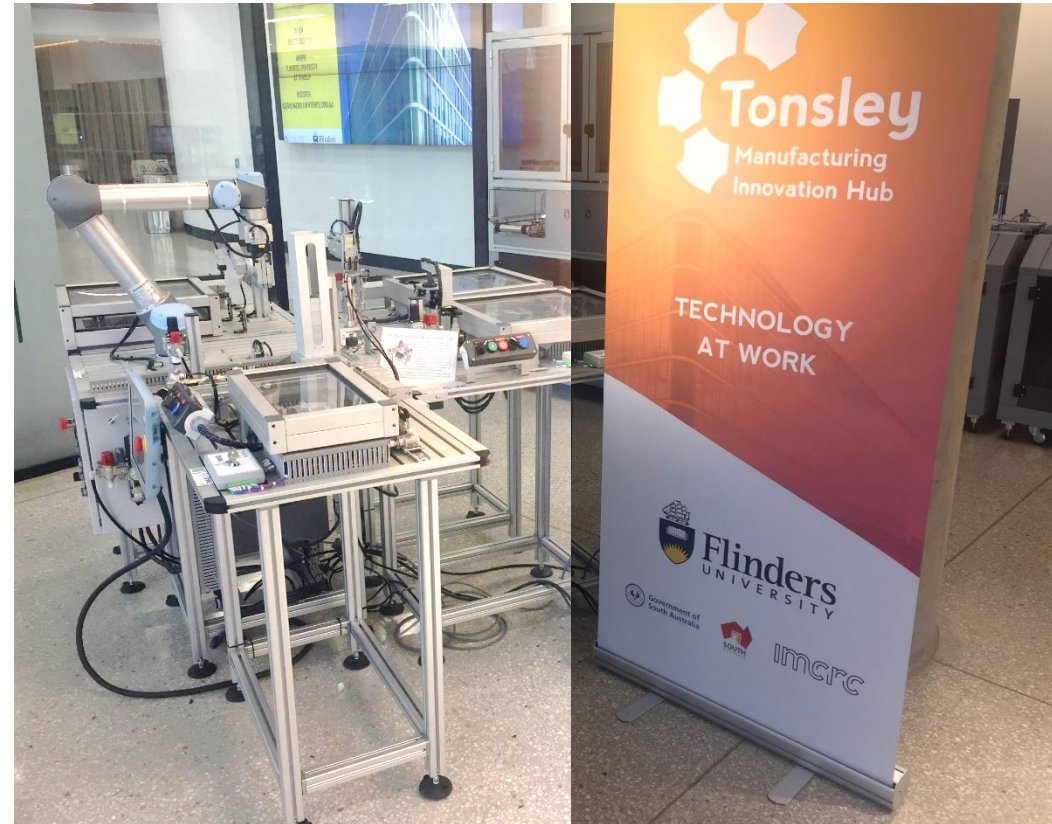
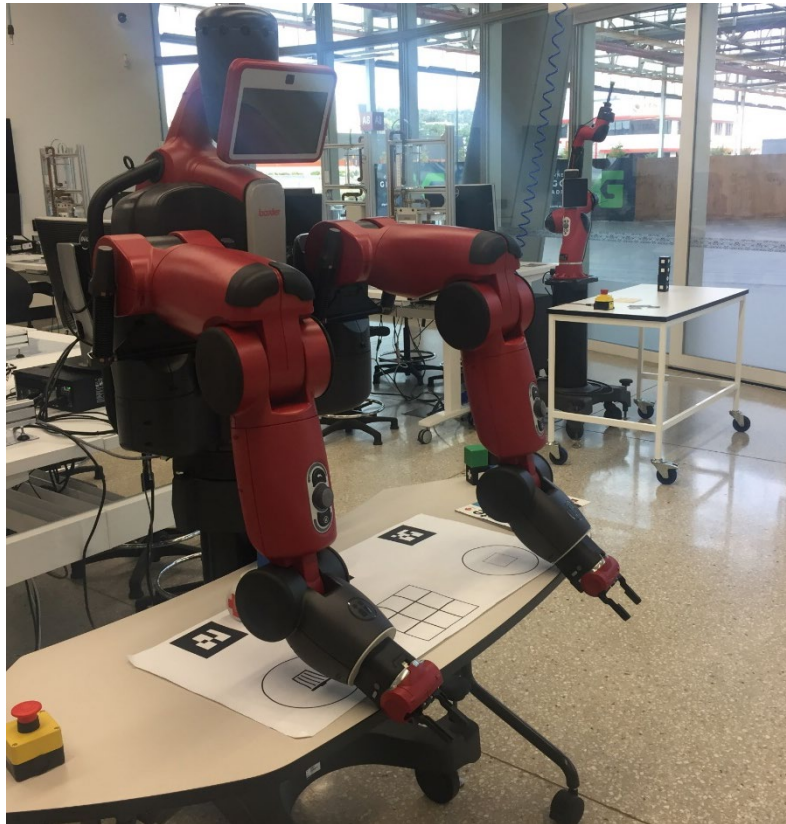


# The Cyber Physical Factory at TMI



## Other Facilities in the TMI / Robotics Lab

- Collaborative Robots - Baxter and Sawyer, and an Assembly Cell using SMC components and a Universal Robot.





# Harnessing the Digital Dividend

What's next for robots...

- Integrated control Systems so that Industrial Robots can safely collaborate. (Speed)
- Out of the box AI – for more complex tasks, easily taught.
- VR for quick programming
- More custom built, easy to use applications  
eg Welding Cells
- Adoption of sensing capabilities – Polish, grind , deburr
- Large (heavy payload) collab robots for undefined, but heavy tasks to reduce operator loads and risks.





# Harnessing the Digital Dividend



# FOMENT

SA'S WINE AND TOURISM  
TECH REVOLUTION



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# Harnessing the Digital Dividend

## Flinders Uni and the Wine Industry

1. Research with researchers at UniSA and ANU Triggers' to buying decisions for premium wines by US and UK importers and fine wine retailers
2. Small Business and Family Enterprise Ombudsman wine production and sales in the digital age.
3. A new UG degree (working title) Wine Business, Tourism and Export launch in 2020.  
evaluating wine markets, branding, product preferences, trends, exporting etc - but with a strong focus also on wine tourism and events.)
4. Investigating the drivers of choice for international tourists, particularly those seeking a wine related experience. world. -collaboratively with the Barossa Valley and colleagues in Strasbourg on an international Wine Tourism Project -





# Harnessing the Digital Dividend

Foment: Australia's Wine and Tourism Tech Accelerator Program.

Flinders New Venture Institute has partnered with [Hydra Consulting](#) and [Wine Industry Suppliers Australia](#) (WISA) to put together a strategy for the accelerator, which has received seed funding from the South Australian government's Department of Primary Industries and Regions (PIRSA). The pilot program will run in October, with a focus on growth hacking, mentor connections, strategies for going out to market, and much more.

If you're interested in getting involved as a sponsor of the program, participant or mentor, fill out the expression of interest form on [www.nviflinders.com.au/foment](http://www.nviflinders.com.au/foment)

There's also a Meetup with Oli Madgett of Platfarm coming up. people can sign up here: <https://www.meetup.com/Adelaide-AgTech-Meetup/events/264366851/>



TUES 24TH SEPT  
1730-2000

1730 - 1900:  
PRES + Q&A

1900: DRINKS +  
NETWORKING

  
**meetup**



Equity Crowd Funding in AgTech +  
wine industry accelerator programme

New Venture Institute, Flinders Uni,  
1284 South Rd, SA 5042



[meetup.com/Adelaide-AgTech-Meetup/](https://meetup.com/Adelaide-AgTech-Meetup/)



Town Square in the MA8

# Tonsley progress

Innovation District

A 61-hectare mixed-use district providing the opportunity for the manufacturing sector in South Australia to adapt and transition from traditional to high-value manufacturing.

Over  
**1,700**  
people now work at Tonsley.



1,700

1,000

That is  
**70%**  
more  
than when  
Mitsubishi  
announced  
their closure.

Plus over:

**35**  
businesses.



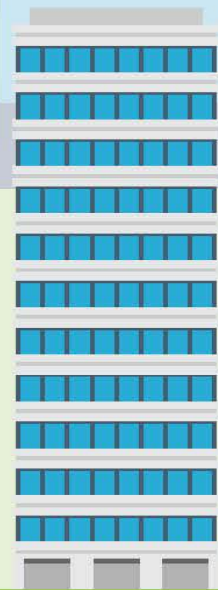
**290**  
co-working  
members.

**8,000**  
students each  
year.



**1<sup>st</sup>**  
residents  
of Tonsley Village  
have moved in.

Leased space  
equivalent to  
**1.5** times  
the floor area  
of the CBD's  
20 storey  
ANZ House.





# Tonsley

Innovation District

RenewalSA  
people ▾ partnerships ▾ progress



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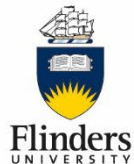




# Harnessing the Digital Dividend

Why digitise....

Because the new technologies allow you to, and your operations will run better because the organisation will make better decisions.



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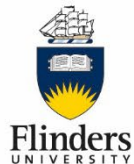




# Harnessing the Digital Dividend

Thank You...

.... Amir



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