

Automation & Robotics

The Invisible Infrastructure Challenge

Jacqui Coombes



Our Purpose

ENHANCE

enhance standing of the resources industries
amongst stakeholders locally and globally

SUSTAIN

sustainable development of the resources
industries that is acceptable to society

DELIVER

delivery of new data, knowledge, technologies,
products and services in order to help Members



Our Operational Mission

01

Thought Leadership

Create platforms and opportunities for Industry Thought Leadership to drive the direction of Transformational Change in the Minerals Industry



02

Collaboration

Build global collaborations to deliver pre-competitive, transformational R&D + Innovation at key technological breakthrough points



03

Pathways to Implementation

Accelerate implementation and commercialisation pathways to enable translation and implementation of key breakthrough technologies to improve Members' businesses and the minerals industry



An Integrated Approach



amira 

Futures Programs



Future Tailings Program

Advance R&D+I² in tailings management, recycling, elimination and closure

Future Water & Waste Program

Advance water consumption, generation, disposal, and recycling R&D+I² programs in resources sector

Future Processing Program

Advance R&D+I² in minerals extraction and processing to meet demand and SDG imperatives

Future Energies & Emissions Program

Advance energies and renewables R&D+I² programs in resources sector

Future Mining Program

Advance R&D+I² in mining methods in an Industry 6.0 World

Future Copper Program

Advance integrated R&D+I² in global copper value chain to serve future electrification demands

Future Resources Program

Advance R&D+I² in exploration, discovery and technology for future supply chain needs programs in resources and urban recycling



Enabling Futures Program



Standardisation & Benchmarking

Standardisation and benchmarking to accelerate, support and sustain R&D+I2 transfer and implementation;

Align with Standards and Guideline groups to accelerate pragmatic integration to industry

Knowledge & Capacity Building

A Future Workforce Program fostering development of global talent pipeline

Focus on implementing and integrating knowledge and technology from Amira Programs back into industry

Deploy training and certification courses arising from Amira Programs

Global Test Facilities Network

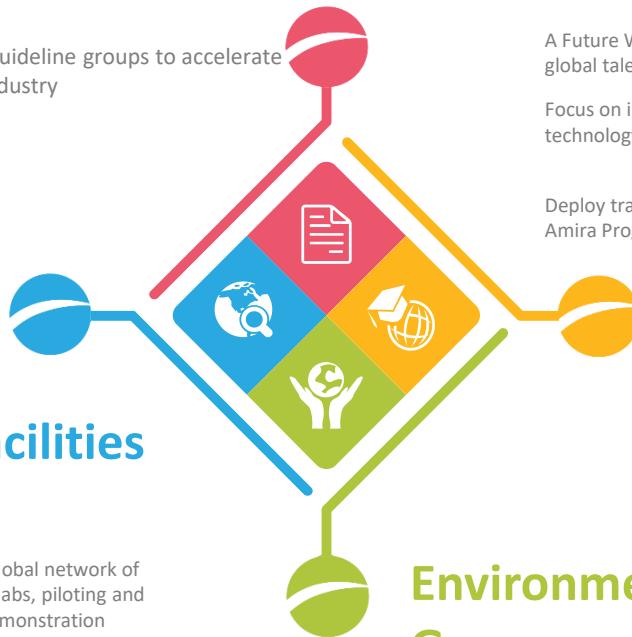
Facilitate accelerated access to a global network of diverse test sites, test labs, virtual labs, piloting and upscaling spaces for design and demonstration CoLabs

Accelerate knowledge, technology and analytics testing and scaling, limiting members' production disruption and exposure.

Environment, Society & Governance

Ensure pervasive ESG focus on solutions and integration into the mining value chain

Develop capabilities in communities to drive and foster shared benefit



Thought Leadership to Futures Program

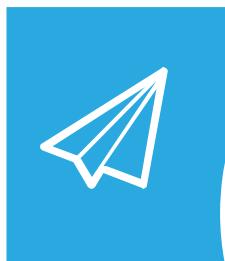
Thought Leadership

Create platforms and opportunities for Industry Thought Leadership to drive the direction of Transformational Change in the Minerals Industry



Mega-Challenge Workshops

Work with community to identify mega-challenges and key stakeholders, and priorities for developing preliminary industry-led R&D Roadmaps and Frameworks for address key technological breakthrough points



Budget and Planning

Support Members build their business case for R&D budgets and delivery by showcasing Programs of Works and providing R&D Budget workshops



Ideas Factories

Within mega-challenge frameworks, develop R&D program of works to shape Futures Programs and enable R&D development priorities to solve key technological breakthrough points



An Integrated Approach



amira 





STAYING AHEAD OF THE GAME

HOW AUSTRALIA CAN HARNESS NEW TECHNOLOGIES IN THE MINING AND OIL AND GAS INDUSTRIES TO ADD OVER \$70 BILLION TO THE ECONOMY IN 2030 AND CREATE THOUSANDS OF NEW JOBS IN THE DOMESTIC SUPPLY CHAIN

alphaBeta
strategy x economics



NERA

METS
IGNITED





“

Embracing the use of automation technologies in Australia’s resources industries could, if coordinated and well managed, **add \$74 billion in value to the Australian economy**, in both regions and cities, and **create over 80,000 new jobs by 2030**.

Managing change well is not just about adoption, but is also about seizing new opportunities in technology supply and developing the required workforce skills.

Emphasis in the study is on the opportunity in strengthening Mining Industry’s Supply Chain





EXHIBIT 25

A four step roadmap is proposed to develop this competitive advantage



CALL TO ACTION

Recommended actions

- **Leadership commitment from government, industry bodies, universities** to build world-leading cross-industry clusters around automation and robotics



CREATE CLUSTERS

- **Set up clusters in appropriate location/s** co-located with industry / universities / supply chain
- **Establish an effective brand** for each cluster



DEVELOP AN ENTREPRENEURSHIP ECOSYSTEM

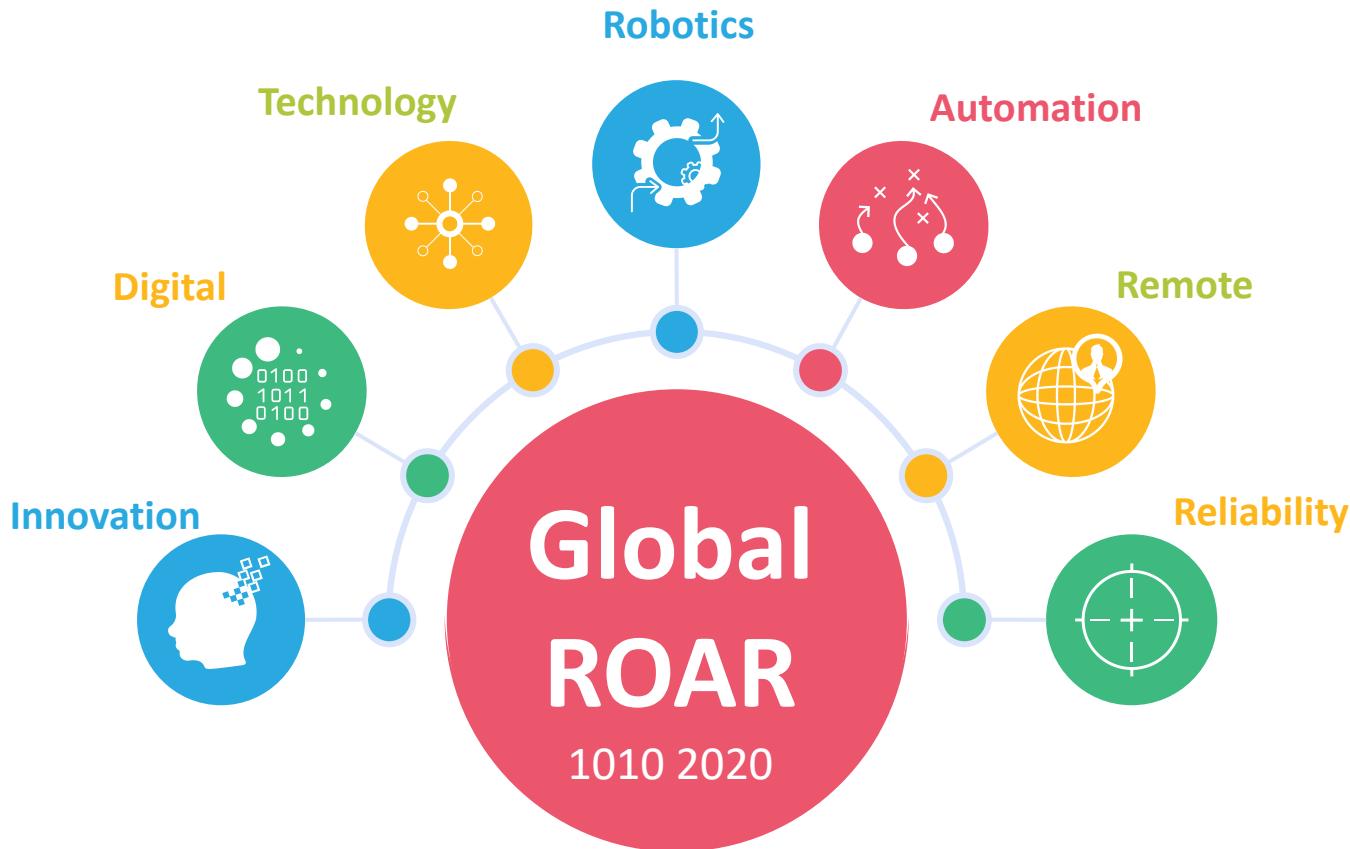
- **Co-ordinate funding** for sponsored programmes, joint industry projects to stimulate scale-up & start-ups
- **Scale up collaboration** through shared plans, public registries of suppliers, Living Labs, incubators etc



BOOST SKILLS & R&D

- **Create a cross-industry approach** to build a strong short- and long-term skills program
- **Partner with leading robotics universities** around the world to immediately kick-start skills & R&D approach





Remote Operations, Automation & Robotics

Emerging Themes



Current technology

Emerging technology

Conceptual technology

Associations

Testing facilities

Innovation hubs

Labour/Education challenges

Regional challenges

Energy & Emissions challenges

Industry integration challenges

Showcase Research, Roadmaps, and Challenges

Invisible infrastructure



Invisible infrastructure

Data Growth &
Future Bandwidth



Interoperability
& interconnectivity



Cybersecurity &
Operational control



ROAR

Human interfacing
& Global capability building

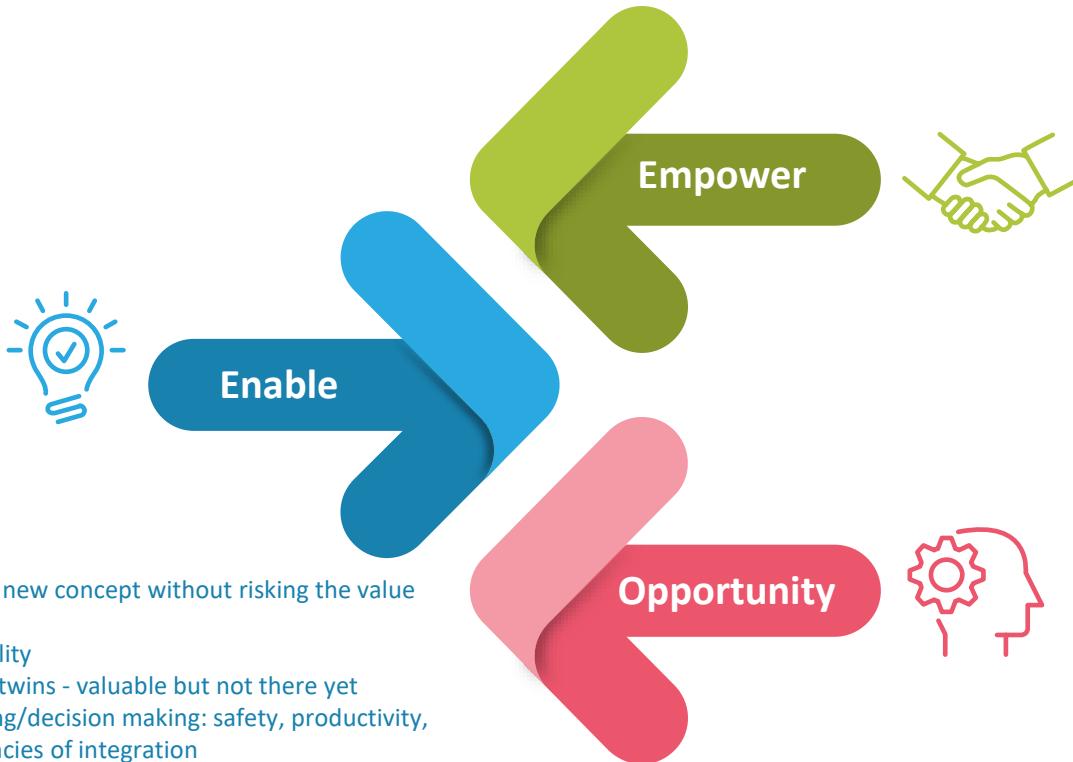


Responsible Interfacing with
& developing of Communities



Power of Positioning

- Desilo-ing of data, standards and availability
- Communications
- Sharing and transferability of data - interoperability (legacy tech)



- Enable new concept without risking the value chain?
- Scalability
- Digital twins - valuable but not there yet
- Planning/decision making: safety, productivity, efficiencies of integration
- Device agnostic - nirvana state
- Interoperability
- Integration between Positioning and other sensed data - SAR

- Cultural readiness and change management
- Safety
- Predictive modelling - dynamic mine face monitoring, terrain modelling, enable precision mining
- Learn from outside the mining sector - autonomous vehicles



Invisible infrastructure



“ Australian figures indicate a lower number of respondents having an overall information security strategy in place with Australian numbers lower than both global and regional standards, and in sharp decline on prior years

The global importance of cybersecurity awareness

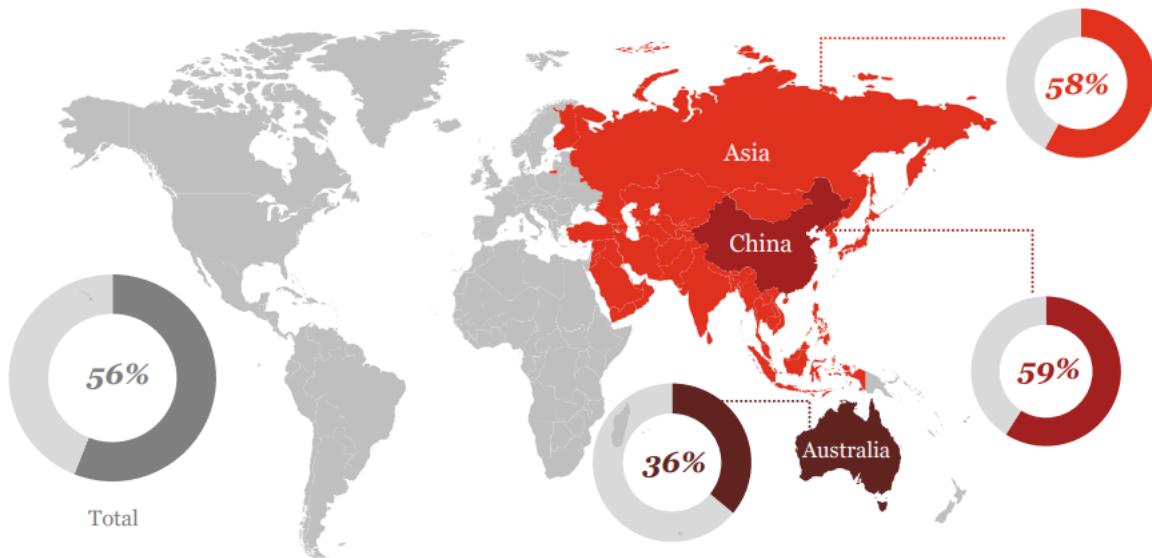
A broader spectrum of Australian organisations embrace cyber capabilities



PwC's 2018 Global State of Information Security® Survey (GSISS)



Overall information security strategy



The rapid adoption of emerging technologies is greatly increasing efficiency while adding dynamic cybersecurity challenges for organizations. **Cyberattacks have moved beyond identity theft and online account hacks.**

They **threaten our code-enabled physical world**—our homes, our cities, our infrastructure, and even the medical devices in our bodies.

A host of digital technologies such as AI, automated botnets, Internet of Things (IoT), and cloud computing both facilitate attacks and defend against them at a **scale, speed, and level of sophistication never seen before.**



A software company lost millions in revenue after it fell prey to a malware attack that scrambled computer hard drives, which affected its order receiving and processing systems.



Security researchers unveiled vulnerabilities in connected medical devices that can be exploited by hackers remotely to alter vital signs of patients in real time and potentially cause medical staff to make inappropriate critical care decisions.



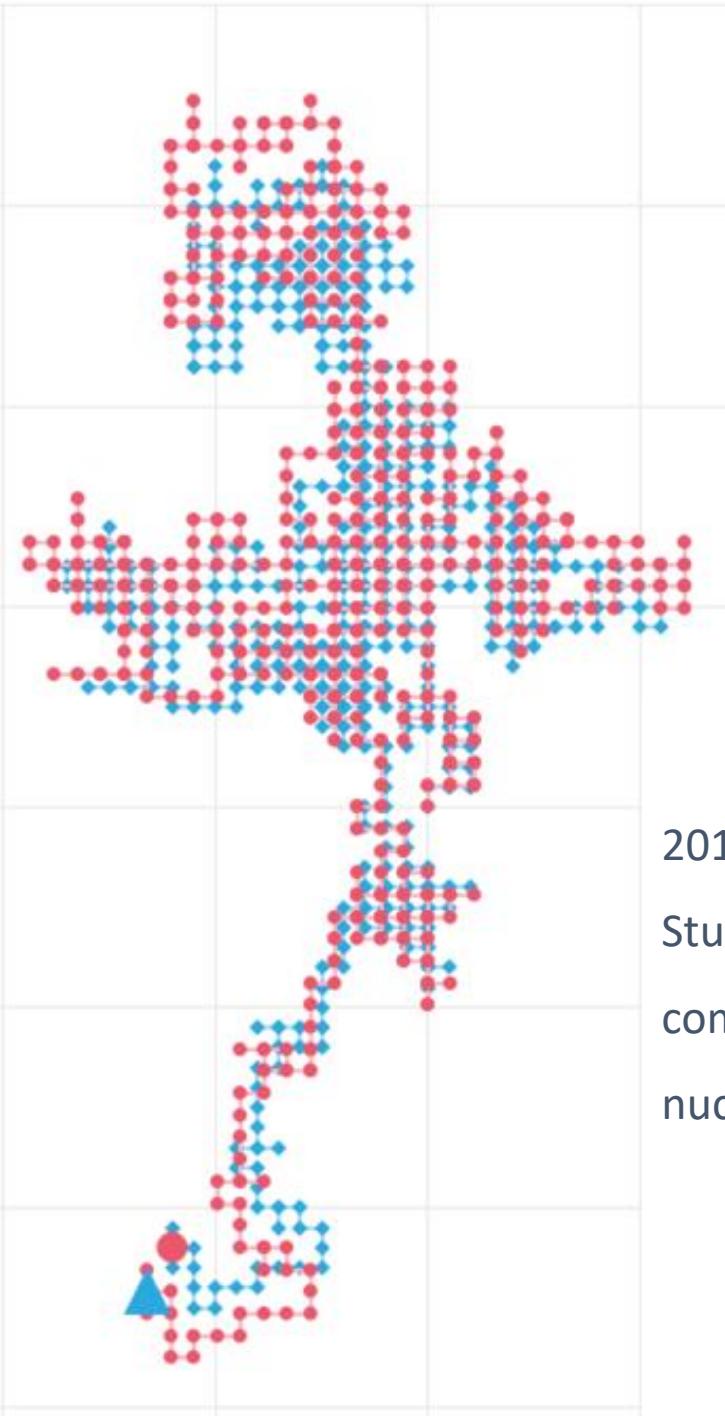
A financial services firm experienced financial losses due to a software glitch in its high-frequency trading algorithm that forced the company to automatically sell overvalued shares back to the market at a lower price.





“ Mining companies may think they’re an unlikely target for cyberattacks, but **as reliance on autonomous and digital technology grows, so too does the cybersecurity risk.** And the consequences can be a matter of life or death.





2010:

Stuxnet, a malicious and insidious computer worm, ruined 20% of Iran's nuclear centrifuges ... SLOWLY

[Maersk Incident Response \(red-goat.com\)](https://red-goat.com)

The Attack

In late June 2017 Maersk employees started noticing “Oops your files are encrypted” appearing on their laptops. Around the same time a staff member noticed that suddenly his PC restarted. He looked around the office and described a “wave” of screens turning black. They were irreversibly locked.

Across Maersk the scale of the incident was becoming clear. 45,000 PCs and 4,000 servers.

It took hours to halt the spread of this malware. Many employees were told just to go home. They must have left work that day wondering if they would even have a job to go back to.





ASIC
Australian Securities &
Investments Commission

ASIC media releases are point-in-time statements. Please note the date of issue and use the internal search function on the site to check for other media releases on the same or related matters.

Friday 21 August 2020

20-191MR ASIC commences proceedings against RI Advice Group Pty Ltd for alleged failure to have adequate cyber security systems

ASIC has today commenced proceedings in the Federal Court of Australia against RI Advice Group Pty Ltd (RI), an Australian Financial Services (AFS) licence holder, for failing to have adequate cyber security systems.

ASIC's action follows a number of alleged cyber breach incidents at certain authorised representatives (ARs) of RI, including an alleged cyber breach incident at Frontier Financial Group Pty Ltd as trustee for The Frontier Trust (Frontier) from December 2017 to May 2018.

RI was, until 1 October 2018, a wholly owned subsidiary of Australia and New Zealand Banking Group Limited. On 1 October 2018, RI became a wholly owned subsidiary of IOOF Holdings Limited (IOOF).

ASIC alleges that Frontier was subject to a "brute force" attack whereby a malicious user successfully gained remote access to Frontier's server and spent more than 155 hours logged into the server, which contained sensitive client information including identification documents.

ASIC alleges that RI failed to have implemented (including by its ARs) adequate policies, systems and resources which were reasonably appropriate to manage risk in respect of cybersecurity and cyber resilience.

ASIC is seeking:

- declarations that RI contravened provisions of the Corporations Act, specifically sections 912A(1)(a), (b), (c), (d) and (h) and (5A);
- orders that RI pay a civil penalty in an appropriate amount to be determined by the Court; and
- compliance orders that RI implements systems that are reasonably appropriate to adequately manage risk in respect of cybersecurity and cyber resilience and provide a report from a suitably qualified independent expert confirming that such systems have been implemented.



Invisible infrastructure



Why an Automation and Robotics R&D?

In many ways, Automation and Robotics is already here...



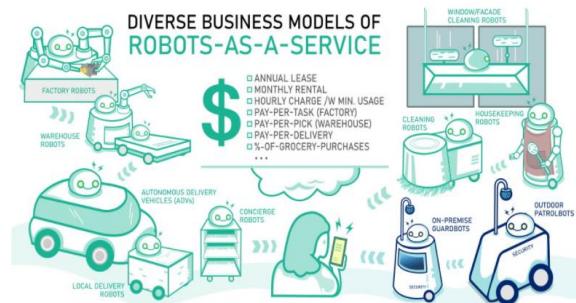
<http://www.austmine.com.au/Events/category/industry-insights-reports/considerations-when-implementing-autonomous-haulage-in-open-cut-mining>



One example is Robot as a Service startup Robomart, which is running a grocery-on-wheels pilot with Stop & Shop to serve shoppers in the Boston area (source).



<https://www.theguardian.com/australia-news/2016/jun/04/transforming-the-bush-robots-drones-and-cows-that-milk-themselves>



Diverse Business Models of Robots-as-a-Service

<https://insights.iifit.io/p/report-robot-as-service-monetization.html>



© Reuters

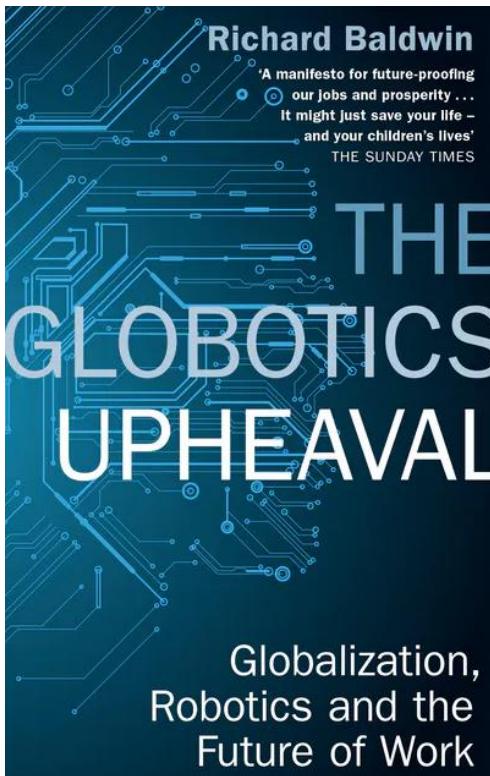
<https://www.ft.com/content/8926c1e-1d8f-11e9-a46f-08f9738d6b2b>



The robots served drinks and cleared tables in the cafe

REUTERS

Japanese cafe uses robots controlled by paralysed people <https://www.bbc.com/news/technology-4646531>



'A manifesto for future-proofing our jobs and prosperity' THE SUNDAY TIMES

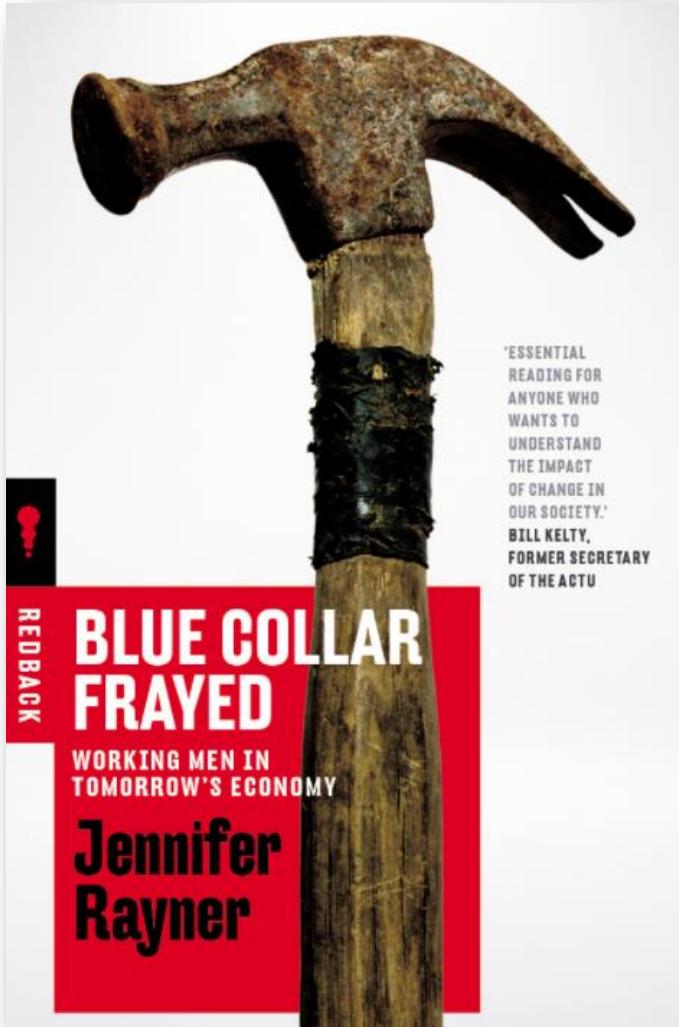
We stand on the edge of a new era that will bring change to our world on a par with the Industrial Revolution. Automation, artificial intelligence and robotics are changing our lives quickly - but digital disruption goes much further than we realize. Richard Baldwin, one of the world's leading globalization experts, argues that the inhuman speed of this transformation threatens to overwhelm our capacity to adapt. But while the changes are now inevitable, there are strategies that humanity can use to adapt to this new world, employing the indispensable skills that no machine can copy: creativity and independent thought. THE GLOBOTICS UPHEAVAL will help each of us prepare for the oncoming wave of the advanced robotic workforce.

“Automation and globalisation are century-old stories. is different for two big reasons.

Globotics

It is coming inhumanly fast, and it will seem unbelievably unfair”

“Protect Workers, Not Jobs”



'ESSENTIAL READING FOR ANYONE WHO WANTS TO UNDERSTAND THE IMPACT OF CHANGE IN OUR SOCIETY.'
BILL KELTY,
 FORMER SECRETARY
 OF THE ACTU

REDBACK

BLUE COLLAR FRAYED

WORKING MEN IN TOMORROW'S ECONOMY

Jennifer Rayner

TABLE 1: CHANGE IN PARTICIPATION RATES BY LABOUR MARKET REGION, TOP 20 DECLINES

	MEN		
	JUN 2008	JUN 2017	DIFFERENCE
Queensland - Outback	79.9	61.3	-18.6
Murray	72.0	57.3	-14.7
Southern Highlands and Shoalhaven	58.3	46.2	-12.1
Brisbane - west	78.7	66.6	-12.1
Bendigo	70.9	59.3	-11.6
Mandurah	64.7	54.2	-10.6
Cairns	75.2	65.0	-10.2
Logan - Beaudesert	77.6	67.9	-9.7
Darling Downs - Maranoa	76.1	67.8	-8.3
South Australia - south-east	69.6	61.7	-7.9
Townsville	73.5	65.7	-7.8
South Australia - outback	74.0	66.7	-7.3
Sydney - outer south-west	80.1	72.8	-7.3
Wide Bay	63.2	55.9	-7.2
Bunbury	79.7	72.7	-7.0
Sydney - Sutherland	78.6	71.8	-6.8
Western Australia - Wheat Belt	71.8	65.2	-6.6
Adelaide - south	72.6	66.2	-6.4
Ipswich	73.1	66.8	-6.3
Riverina	76.8	70.6	-6.3

“There are some companies, particularly in energy and mining, that realistically do not have a life span beyond the next 15 to 20 years.

The markets they operate in are changing so fundamentally that closure or near complete reinvention are the only likely outcomes. **Either way, the jobs they currently provide are going.**”

“It’s time to realistically evaluate **what alternatives communities have**, so that government and the private sector can

start seeding new industries with a real chance of taking root.”

Developing opportunities to build new jobs and protect workers



Critical Role of Blue Tech and Digital Skills in Australia's Economic Recovery

Submission to the Australian Government
August 2020



OPTUS

Blue tech jobs (noun):
Occupations and skills that are
technology-intensive but
require a sub-degree
qualification

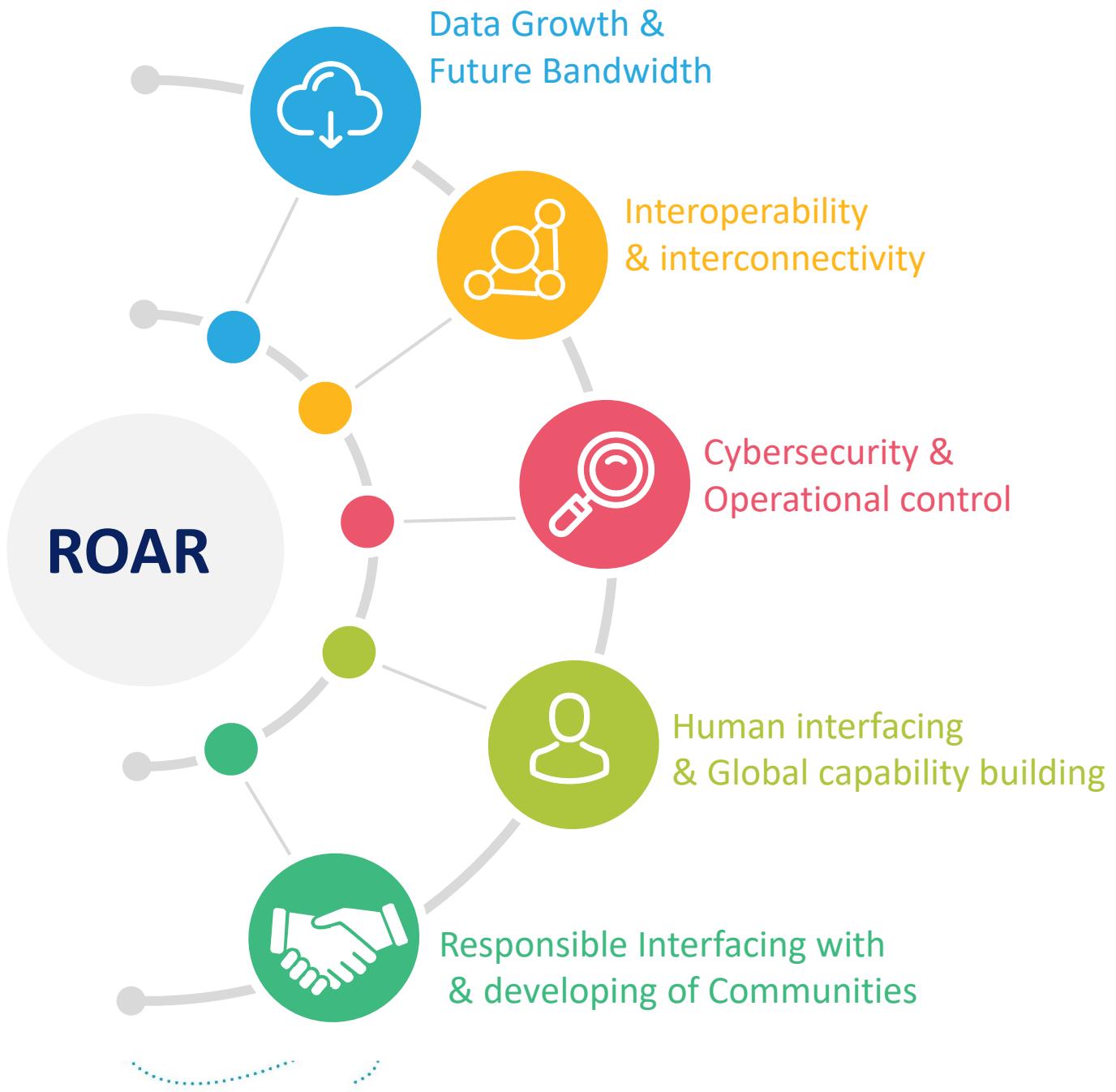
‘Increasingly, employers are describing robotics and automation as imperatives for their businesses. Due to the likelihood that most manual processes will eventually be automated, employers are looking for laboratory services technicians, who are comfortable and practised in their use of automation. These workers will require higher skill levels to maximise the use of new technology.’

Green Tech Jobs:

The shift to a green economy is increasing the pace of change in labour markets and skill needs. This study of 21 countries, which represent 60 % of the world population, shows that economies moving towards greener production can seize the potential for job creation if they deal effectively with the coming structural change and transformation of existing jobs.

International Labour Organisation

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Delivery on Our Purpose

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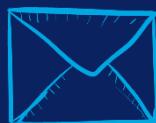
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Contact Amira Global

Role	Name	Email
CEO & MD	Jacqui Coombes	Jacqui.Coombes@amira.global
Futures Program Director	Adele Seymon	Adele.Seymon@amira.global
Member Engagement	Sara Sulway	Sara.Sulway@amira.global
Enabling Futures	Anil Subramanya	Anil.Subramanya@amira.global
Technology & Innovation	Olga Verezub	Olga.Verezub@amira.global
Future Processing	Terry Braden	Terry.Braden@amira.global
Finance	Kim Ong	Kim.Ong@amira.global