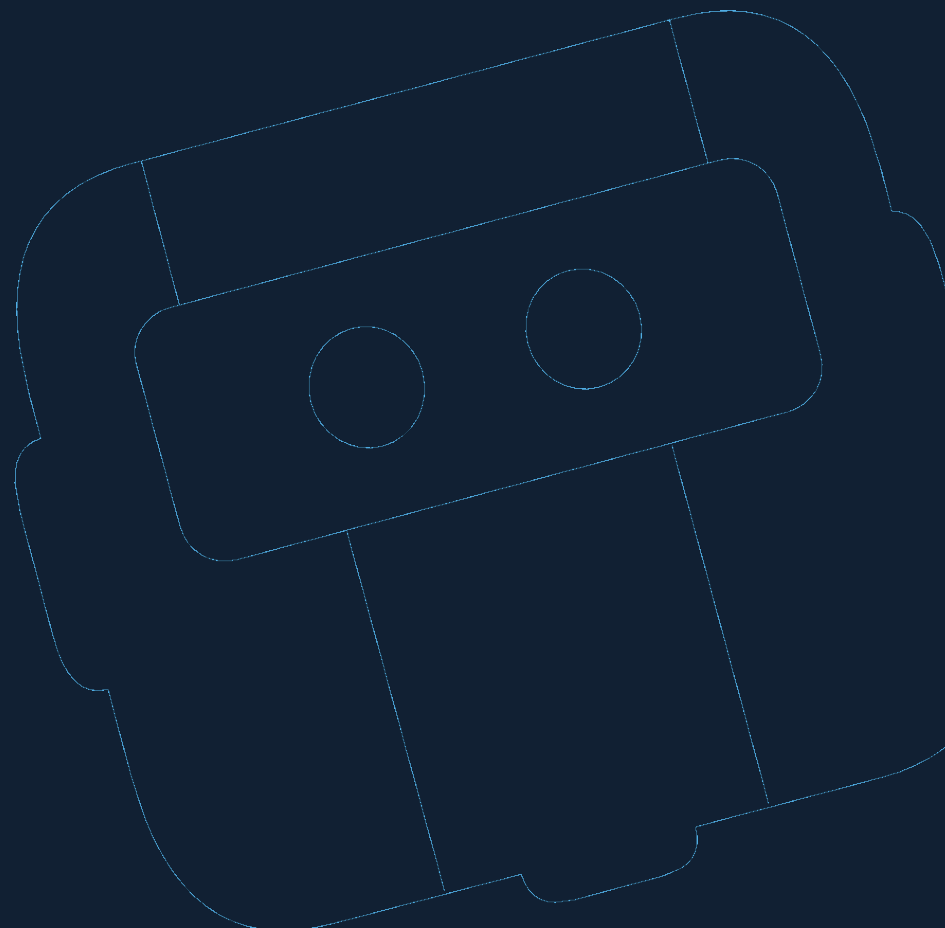
ROBOTICS
AUSTRALIA GROUP

4TH INDUSTRIAL REVOLUTION MINING/AG ROUNDTABLE

Technology Change in Mining



CONTEXT

The Falling Productivity Trend of Mining

The 4th Industrial Revolution is not about technologies themselves – it is about the convergence of nine technologies and how we redesign our approach to mining through innovation

Accelerate

TODAY'S DISCUSSION FOCUS

TODAYS CONVERSATION – KEY MESSAGES

Jobs

Contrary to the belief that it replaces jobs....

The use of robotics and automation technologies will provide an **increase** in jobs for regional QLD

Skills

A plan is required to take a targeted approach to growing our digital and robotics skills

Critical is a focus on skills development in the trades focused on maintaining digital technologies in the fields

Opportunity

Australia is today seen globally as a leader in industrial field robotics

The call to action is for Central QLD to step strongly into this opportunity and leverage it cross-sector

The result will be new diversified industry and job opportunities

AI AND ROBOTICS – IT'S ALL ABOUT THE PEOPLE

Robotics & Automation provides a significant opportunity to build jobs in Queensland

Automation has led overall to an increase in labour demand and positive impact on wages. Robots are driving an increase in demand for workers at the higher-skilled end of the spectrum, with a positive impact on wages.[1]

"Local METS companies could create a 4% increase in employment to the Australian economy by supporting a single fully integrated and autonomous iron ore mine"[2]

Robotics does not replace jobs – It grows jobs!

There is a positive correlation in US Robot Sales vs Manufacturing Employment

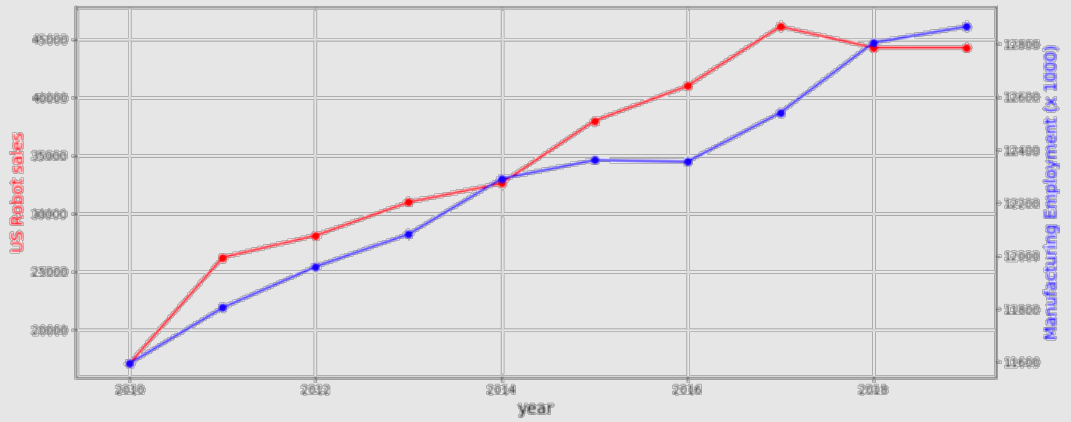


Figure 2.1 Relation between robot sales and employment (derived from FRED and IFR World Robotics, 2019)

1. *International Federation of Robotics (2019) World Industrial Robot Market report.*
2. *AlphaBeta (2019) Staying Ahead of the Game.*

GLOBAL LEADERS IN MINING AND AGRICULTURE INNOVATION

Australia has been leasing the way in development and operational capability to deploy field robotics with a series of firsts:

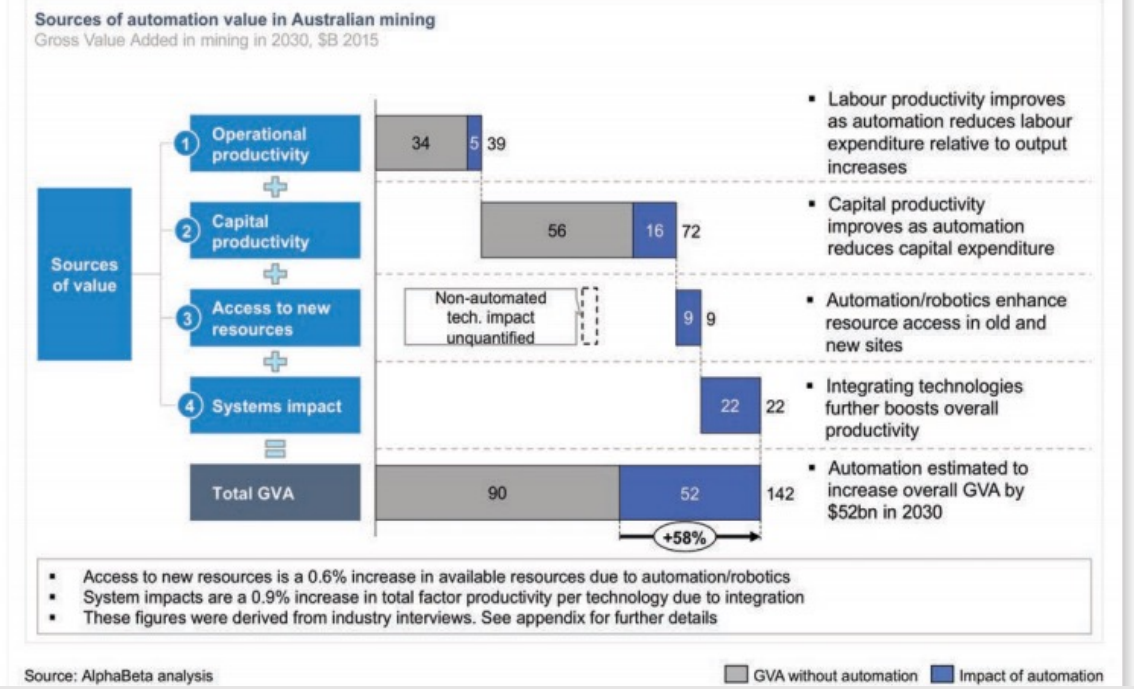
- The first to develop and deploy automated underground mining load haul dump equipment
- The first to deploy production level automated trucks across iron ore mines
- The first to deploy automated dozers for mining remediation

ROBOTICS AND SYSTEM THINKING YIELDS STEP-CHANGE VALUE

Embracing the use of automation technologies in Australia's mining, oil & gas 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. The export potential of these technologies is also likely to be in the tens of billions by 2030.[1]

"The mining and METS sector added $241.9 billion for the Australian economy during the 2019-20 financial year, both directly and indirectly. Directly, they provided $145.3 billion in value during the period."[2]

Automation technologies are estimated to add $52bn in value to the mining sector in 2030, lifting total value added by 58%



1. *AlphaBeta (2019) Staying Ahead of the Game.*
2. *Deloitte (2021) Economic contributions of the mining and METS sector*

AUTOMATION IS AN ENABLER FOR DECARBONISATION

Best opportunity for QLD to pursue is:

A utomation

C onnectivity

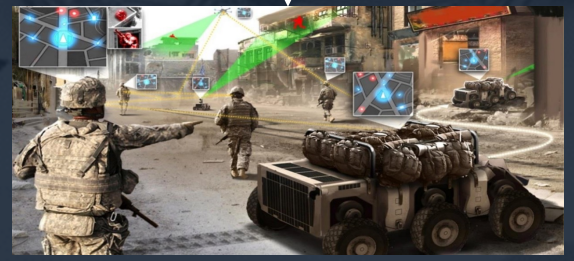
E lectrification

GROWING DIGITAL SKILLS ON THE BACK OF OUR STRONG GDP INDUSTRIES

- Skilling our people for the future → digital skills that are very transferable across different industries
- Regional focus – Maintaining digital and robotics technologies in the field; hardware manufacturing

Advanced IT	Programming	Data visualization	IoT
Digital integration	Data science	Cyber security	SaaS
Technical knowledge			

Robotics: Grow Digital Skills and Hardware Manufacturing Opportunities



AN OPPORTUNITY THAT HAS BEEN PUT FORWARD FOR CQ
AUSTRALIAN ROBOTICS VENTURES FACTORY

The Proposal incorporates:

1. A new Robotics Technology Park at Emerald for the testing and demonstration at scale of field robotics for all industries

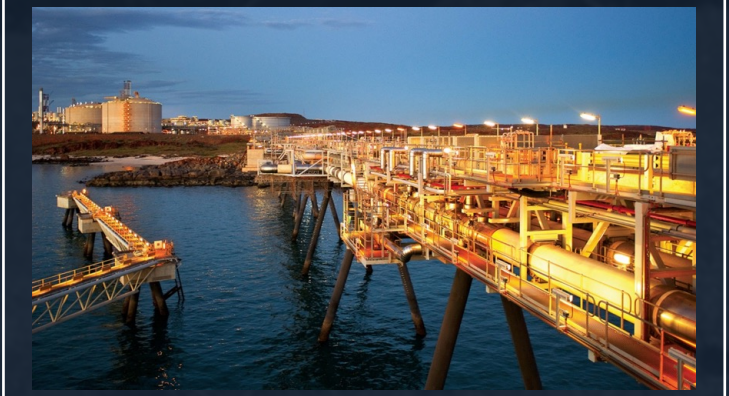
2. A digital platform that connects QLD leading robotics demonstration test beds together with other National robotics tech parks

HOMEGROWN QLD ROBOTICS CASE STUDIES

ARTEMIS ROBOTICS

Marine Pile Inspection

Revolutionising non-destructive testing and inspection of marine piles that increases the lifetime of marine assets while reducing the risk of emergency repairs.



UNIVERSALL FIELD ROBOTS

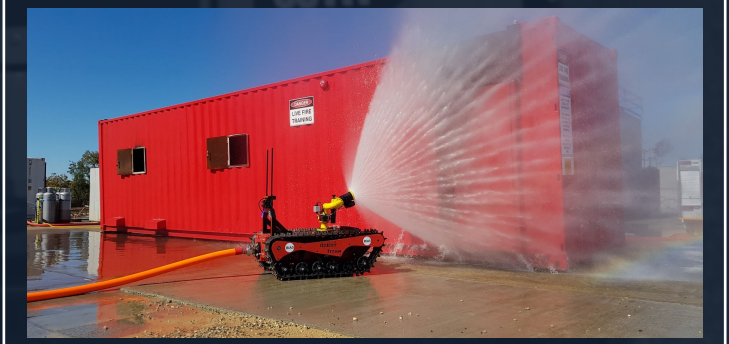
Blastdog

An autonomous system that optimizes mining blasting based on material models built from sensor data. The machine drives to the blast holes autonomously and uses robotic vision to verify the blast hole location.

BIA5

OzBot Titan

An all-terrain robot that removes the risk to fire fighting personnel while maintaining the ability to fight and inspect a number of fire types. It can travel at speeds over 10km/h, lift its own weight (300kg) and navigate rough terrain.



OPPORTUNITIES – ISAAC REGION

Uniquely positioned

The Isaac Region is uniquely positioned to lead and create a new technology industry on the back of our innovations in mining and agriculture

Significant benefits

The benefits of deploying robotic technology will generate indirect social and economic benefits, including significant environmental and safety performance improvements and a smaller industrial footprint

Jobs Growth

Significant job growth opportunities across the Issac primary industries, supply chains and wider economy

Technical Capability

Grow our QLD regional technical capability with a skilled workforce

Safety & Productivity

Significant increases in safety and productivity by putting robots in dangerous environment

Cross-sector technology transfer across Australia's key sectors

Industries face similar challenges and share opportunities to develop robotic technology for: interoperability, autonomy, network security and human-machine collaboration

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