



THE FUTURE OF AUSTRALIAN MANUFACTURING IS GLOBAL:

ARM HUB IS SETTING THE STANDARD

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IN SUMMARY

- Innovation in manufacturing is essential for Australia—it fuels productivity driving social and economic revitalisation, creates sustainable high-value jobs, invests in research and its commercialisation, and builds a resilient future for all Australians.
- The ARM Hub is a not-for-profit manufacturing innovation centre working in new and existing industry sectors. The Hub is dedicated to commercialising breakthrough ideas and research as well as driving productivity through the adoption of advanced technologies.
- By integrating its three strategic services—Data & AI, Scaleup Manufacturing, and Accelerators—the ARM Hub has set a new global standard for the ambition and operation of manufacturing innovation centres. The Hub's three services, delivered with our partners, are:

Service 1: **ARM Hub's Data Lakehouse and AI-as-a-Service** that unifies fragmented data across a businesses' operations to take advantage of transformative Generative AI tools to increase productivity.

Service 2: **ARM Hub's Scaleup Manufacturing Service** develops, tests and deploys new Industry 5.0 technologies and processes, including robotics, IoT, new materials and more.

Service 3: **ARM Hub's Accelerator Programs** help businesses innovate, test, scale and go to market. All Hub accelerators provide hands-on mentorship, rapid prototyping, market testing opportunities and connection to investment channels.

- Dive into our white paper to explore the evolving Australian technology and manufacturing landscape and discover how ARM Hub is seizing new opportunities—if our insights resonate with you, get in touch and join us in shaping the future.

INTRODUCTION

The Advanced Robotics for Manufacturing (ARM) Hub has established itself as Australia's premier institution for commercialising great ideas and research in manufacturing. As the nation's only fully integrated technology and manufacturing innovation centre, the ARM Hub operates across each stage of technology, manufacturing, and commercial readiness levels (TRLs, MRLs, and CRLs) to help companies scale. From collaborating with researchers to bring cutting-edge technologies to market, to guiding companies through the investment landscape, the ARM Hub is committed to creating impact.

The global manufacturing landscape is undergoing rapid transformation as nations overhaul their industrial policies to achieve greater self-reliance. Multiple factors are driving this shift including geopolitical instability, shifts in trade policies, demographic change, technological innovation, restructuring of the economy, and the transition to sustainable energy sources. Within this dynamic environment, the ARM Hub with its partners, has gained international recognition for delivering targeted, high-impact initiatives, to secure a place for Australian businesses in high value global supply chains. Industry wide uplift initiatives include Data Lakehouse for Generative AI projects, digital twin platforms and setting new guidelines for collaborative robotics.

The ARM Hub views manufacturing as a cross-sector capability, delivering initiatives across emerging technologies, defence, medical, energy, transportation, agriculture, food and beverage, metal fabrication sectors, and more. The Hub's work supports the growth of both large and smaller Australian companies. More specifically, the Hub's services have levelled the playing field for small to medium sized enterprises (SMEs) in the creation and adoption of new technologies.

This white paper highlights how the ARM Hub's products and services align with global industry standards. Also, how the Hub sets new standards of manufacturing excellence on new-to-the-world innovations. The paper begins with an overview of the ARM Hub business model and the current industry landscape. It then showcases the ARM Hub's three core services—Data & AI, Scaleup Manufacturing, and Accelerators—and how they drive operational excellence and impact for our industry clients. As a suite of services, the ARM Hub's programs form a comprehensive, end-to-end approach to creating uplift in Australian manufacturing, enabling businesses to test ideas, set standards, commercialise, scale, drive productivity, and build resilience in a constantly evolving business environment.

WHAT IS THE ARM HUB?

Established in 2020 as an independent, not-for-profit R&D commercialisation company, the ARM Hub is dedicated to building Australia's sovereign manufacturing capability. In pursuit of its mission, the Hub became a registered charity and an Australian Research Institute. The Hub's focus on supporting companies to align to, and set, global industry standards is playing a pivotal role in shaping Australia's global competitiveness.

Operating through a highly skilled team of technical and professional experts, the Hub orchestrates national and international partner network that includes technology firms, manufacturers, investors, governments and research institutions. The network effect generated by the Hub has created a self-reinforcing cycle of growth for its participants.

Headquartered in Brisbane, the organisation delivers services across Australia and engages internationally. Its Brisbane facility runs an advanced robotics and Industry 5.0 workshop, a Data Lakehouse and AI-as-a-Service, and provides dedicated factory spaces for client co-location. Within this precinct, anchor tenant UAP—the world's largest public art fabricator—operates across Australia, North America, China, the Middle East, and Europe.

Strong support for the ARM Hub comes from major global technology companies Microsoft, Databricks, NVIDIA, and Dassault Systèmes, among others. Also, collaboration with MassRobotics in the US, the world's leading robotics accelerator, as well as more than fifteen research and training institutions, government entities, and investors further bolstering the Hub's ecosystem. The Hub delivers three major multi-year national initiatives—the ARM Hub AI Adopt Centre, the Advanced Manufacturing Capability Network, and Accelerator programs—all powered by this extensive network of partners.

Recognised as an international exemplar of a thriving, place-based and highly networked innovation ecosystem, the ARM Hub fosters an ecosystem of collaborators and creates an environment that seamlessly connects people, businesses, research, markets and resources. The Hub demonstrates that innovation flourishes most when diverse actors can converge in an independent collaborative space. This proven ecosystem model could be rolled out nationwide to empower, connect and enable local communities.

In five years, demand for the ARM Hub services has grown significantly. The Hub has grown its staff from 4.5 full-time roles to almost 20, and from engaging 10 researchers on projects to over 50. The selected impact studies presented throughout this document demonstrate the results of this work. Among the company-level impact figures presented below, a highlight is raising over \$100M in project funding for clients to help them innovate and grow.

STATE OF AUSTRALIAN INDUSTRY

Australian industry had a tough year in 2024 characterised by low productivity levels and a contracted investment landscape¹. In the last decade, Australia experienced its lowest productivity growth in 60 years at 1.2 per cent a year². In 2024, a significant proportion of Australian businesses, especially small and medium-sized enterprises (SMEs), were assessed as being risk-averse and reported that they did not see the benefits of R&D innovation³. With most Australian companies being small enterprises (93% employ fewer than 20 people), it is critical for the Australian economy that businesses have a culture of innovation and risk taking in pursuit of growth. Australia lags far behind other OECD countries with only 1-5% of small companies becoming scale-ups (valued at US\$50M and employing 20+ people)⁴. In 2024, deep tech start-up sector was particularly tight, investments declining 54% from the previous year, and deals decreasing to 413 compared to 712 in 2023.⁵

Australia's shrinking investment in research and development (R&D), particularly R&D investments from businesses, correlates to three decades of decline in Australian Manufacturing. Over the last 15 years, Australian R&D has declined to 1.66% of GDP where the average OECD country has an intensity of 2.73% of GDP. Manufacturing has historically been the dominant contributor to higher levels of R&D in Australia and the country's ambition to rebuild its manufacturing sector will play an important role in the country's productivity as well as its ability to innovate and respond to both anticipated and unpredictable social, environmental and economic conditions⁶.

The current lack of demand for R&D and innovation in Australian industry is a well-documented challenge.⁷⁸⁹ What these reports indicate is that while R&D and innovation are widely recognised as a driver of economic growth, many Australian businesses are hesitant to invest in longer-term university-led R&D due to a lack of alignment between industry needs and research outputs. Businesses are more likely to invest in non-R&D innovation, such as implementing new technologies like artificial intelligence (AI) to meet shorter-term goals. Indeed, industry's view of technology and innovation is comparatively optimistic. Some studies indicate that

1 **Australian Industry Group.** Australian Industry Outlook for 2025. Australian Industry Group, 2025.

2 **Productivity Commission.** The Fraying Generational Bargain. 2024, www.pc.gov.au/media-speeches/speeches/generational-bargain. Accessed 5 Feb. 2025.

3 **Industry Innovation Science Australia.** Barriers to Commercialisation and Collaboration, 2023.

4 **Areana Mars.** Building a National Technology Scale-up Ecosystem, 2025.

5 **Gilbert + Tobin.** Venture Capital 2024 Australia. Gilbert + Tobin, 2024.

6 **Commonwealth of Australia.** Strategic Examination of R&D discussion paper, 2025.

7 **Industry Innovation and Science Australia.** Barriers to Collaboration and Commercialisation. Commonwealth of Australia, 2023.

8 **Tech Council of Australia.** Lifting Tech Investment in Australia. Tech Council of Australia, 2024.

9 **The Economist Group.** Unlocking Enterprise AI: Opportunities and Strategies. The Economist Group, 2024.

industry perceives technology and innovation as transformative tools to improve productivity, reduce costs and alleviate wages pressures as well as skill shortages (see Figure 1 below).

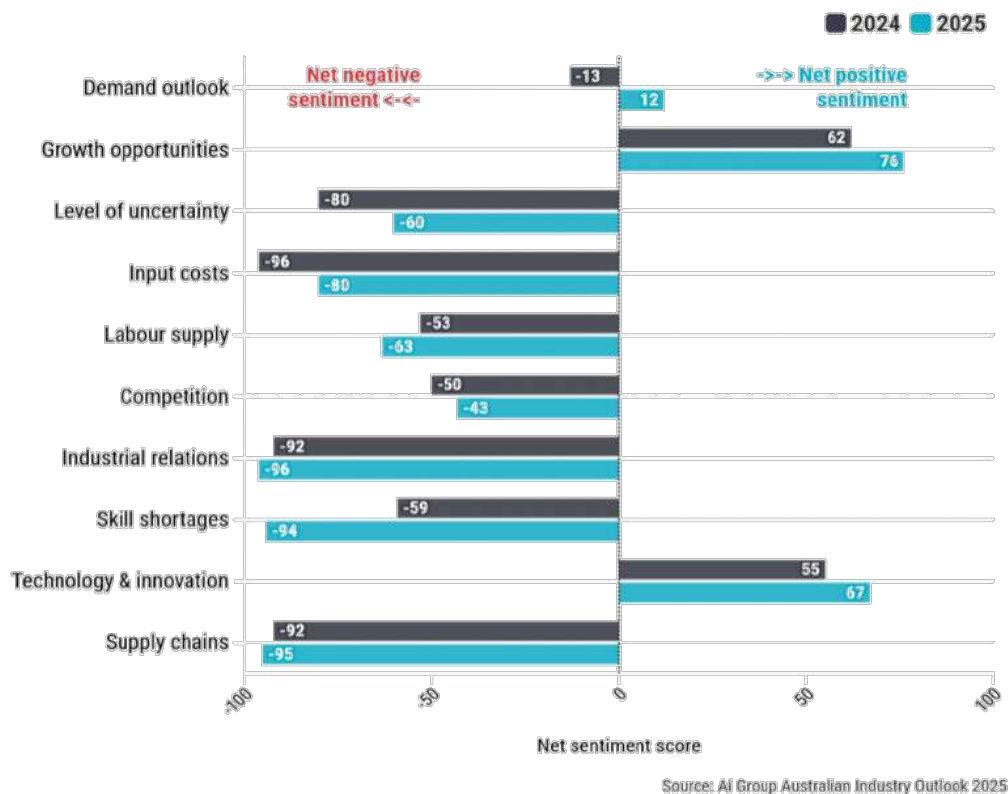


Figure 1: Industry Leader Sentiments or 2024 and 2025

The Australian Industry Group (AI Group) Industry Outlook for 2025¹⁰ highlights challenges facing Australian businesses, including low levels of consumer demand, persistent cost pressures and supply chain disruptions. Over 60% of the 220 senior leaders in businesses surveyed were manufacturers, with another 20% from the construction industry. While some industry leaders expect a slight improvement in demand, overall business confidence remains weak, with many companies struggling to maintain profitability. Like 2024, the report notes that 71% of businesses anticipate workforce shortages will continue to impact productivity and growth in 2025. In response, many businesses are shifting their investment focus, prioritising core operational improvements such as process optimisation and staff training, rather than committing to long-term R&D initiatives.

The Proactive Global Industrial Automation & Robotics Industry Sentiment Survey¹¹ further underscores these concerns. While 60% of the 180 industry leaders surveyed remain confident about their business prospects in 2025, low market demand emerged as a barrier to growth. Many companies report that customer hesitation and delayed capital expenditures are slowing project implementation, making it harder for firms to justify large-scale automation investments. Additionally, 58% of respondents identify rising market competition as their top

¹⁰ **Australian Industry Group.** Australian Industry Outlook for 2025. Australian Industry Group, 2025.

¹¹ **Proactive Global.** Industrial Automation & Robotics Industry Sentiment Survey. 2025.

challenge, while 40% of businesses continue to experience recruitment difficulties, exacerbating productivity concerns. In response to these pressures, firms are increasingly focusing on internal skills development and workforce upskilling, rather than relying on external hiring to address skill gaps.

Australia's soft of demand for R&D and innovation and the nation's related productivity crisis is a result of long-term stagnation in innovation and a lack of investment in manufacturing and technology. Without urgent action, the nation risks further economic decline and lower living standards. **The ARM Hub is responding to this challenge by aligning to, and setting, global industry standards for advanced manufacturing—standards that will support existing and new businesses to supply domestic and global markets.**

The ARM Hub is committed to delivering accessible and scalable services, described below, that empower manufacturers and technology vendors to build global businesses. By fostering an innovation-driven economy, ARM Hub is equipping Australian businesses to compete on the world stage.



ARM HUB SERVICES MEETING GLOBAL INDUSTRY STANDARDS

The ARM Hub has established three services for industry to drive the nation's industrial transformation:

- 1 Data and AI in Manufacturing
- 2 Scaleup Manufacturing
- 3 Accelerators

SERVICE 1

DATA AND AI IN MANUFACTURING

Data and AI in manufacturing

AI is evolving at an unprecedented pace, transforming industrial operations worldwide. China's recent launch of R1 by Deepseek and Qwen 2.5 MAX by Alibaba, competitors to United States' OpenAI GPT models, highlights the global competition in AI. For Australian manufacturers, such advances in global competition lower the economic barrier. For Australian AI businesses, it is evidence that seemingly hegemonic structures of big tech firms can be disrupted in the AI market.

A recent report sponsored by Databricks¹² on enterprise AI surveyed over 1,100 global C-suite executives and found that 85% of organisations already use Generative AI, with IT teams leading the adoption. Only 22% of these companies feel their data architecture is AI-ready, with data fragmentation remaining a key challenge. Overall, companies believe the future lies in customised AI models combining proprietary data with specialised algorithms for greater accuracy, security, and business impact.

ARM Hub observes two important trends in this fast-paced environment: the shift from software-as-a-service, and the rise of Natural Language AI interfaces.

The shift from 'Software-as-a-Service' to 'Service-as-Software'

The ARM Hub is observing a fundamental industry shift away from traditional software solutions (e.g. CRMs and ERPs) that augment human workflows but do not 'do' the job. In essence, traditional solutions are excel spreadsheets with a business logic placed over the top. Traditional software, for example, organises your customers details but does not contact your customers about new or faulty products, or alert you to future disruptions on your production line and provide potential actions.

Next-generation AI architectures focus on delivering tangible outcomes using Agentic AI rather than just managing data. This transformation aligns with Microsoft CEO Satya Nadella's recent statement: "The SaaS model is ending, giving way to AI-driven platforms where AI becomes the central driver of business logic".

The rise of Natural Language AI interfaces

The second transformative value of Generative AI for manufacturing is the use of natural language to interface with company data. Using these tools has effectively democratised access to data and allowed businesses to eliminate complex IT systems. For example, instead of running detailed reports, businesses can simply ask "How are our regional sales targets performing?". For SME manufacturers, this shift represents a major time and resource advantage. By modernising their data infrastructure and integrating AI Agents, manufacturers can:

- Unlock the full potential of data
- Develop new business models

¹² The Economist Group. Unlocking Enterprise AI: Opportunities and Strategies, 2024.

- Be more productive
- Innovate faster
- Understand and expand their market reach

The ARM Hub anticipated these Generative AI trends as early as 2022, pioneering a Generative AI RAG-based chatbot¹³ for Australian manufacturing. In 2024, the ARM Hub launched ARMBot, its Generative AI enterprise platform. The ARMBot is not just another chatbot, it is an advanced data science capability allowing businesses to access any or all of their data through a natural language interface. The interface is integrated with platforms such as Microsoft Teams, Whatsapp, Jira, Slack, CRMs, ERPs, emails, etc.

To leverage this chatbot technology, and Generative AI technology more generally, companies first need to unify fragmented data silos. This requirement led ARM Hub to build its Data Lakehouse and AI-as-a-Service platforms.

The ARM Hub Data Lakehouse and AI-as-a-Service



In late 2023, the ARM Hub introduced Australia's first dedicated Data Lakehouse and AI-as-a-Service for manufacturers, developed in collaboration with Databricks, Microsoft and local AI startup DKE Company. These global tech leaders are actively setting and aligning with global industry standards for data management, the operationalisation of AI and the use of responsible AI. The ARM Hub's AI Adopt Centre, supported by the Australian Government, leverages these standards and facilitates initiatives with SMEs to help deliver their AI ambitions and implement responsible AI frameworks. The ARM Hub's commitment to aligning and setting global industry standards is critical because it supports the growth and export focus of our clients.

¹³ Stewart, C., and Derakhshan, R. "Deploying AI in Australian Manufacturing." **Architecture and DevOps for AI Systems**, edited by L. Bass, I. Weber, L. Zhu, and Q. Lu, Addison-Wesley Professional, Boston, USA, 2025.

The value of the ARM Hub's Data Lakehouse and AI-as-a-Service is in providing manufacturers and industrial technology companies with access to modern data platforms and AI capability without them requiring in-house data science teams. Most manufacturers do not seek to become technology companies or manage dedicated data and AI teams. Instead, they require data and AI services that enhance:

- Productivity
- Value for money
- Workplace safety
- Data and cyber security
- Regulatory compliance
- New product and service development
- Global competitiveness

The figure below illustrates how ARM Hub's Databricks Azure Platform addresses the security and compliance of operational data and underpins the responsible creation and use of AI. Databricks has been shaping global standards for operationalising AI and aligning AI products and services to emerging regulatory frameworks. For instance, Databricks has collaborated with the US National Institute of Standards and Technology (NIST) to develop global science-based guidelines and standards for AI measurement and policy. Similarly, ARM Hub partner Microsoft has collaborated with NIST, worked on Europe's EU AI Act, and partnered with OpenAI and others to pioneer Responsible AI Frameworks.

Highlighted in the figure below is ARM Hub's Data Lakehouse and AI-as-a-Service, which offers sustainable, transparent, affordable, secure by design, and relevant data and AI services to manufacturers and related supply chain businesses.

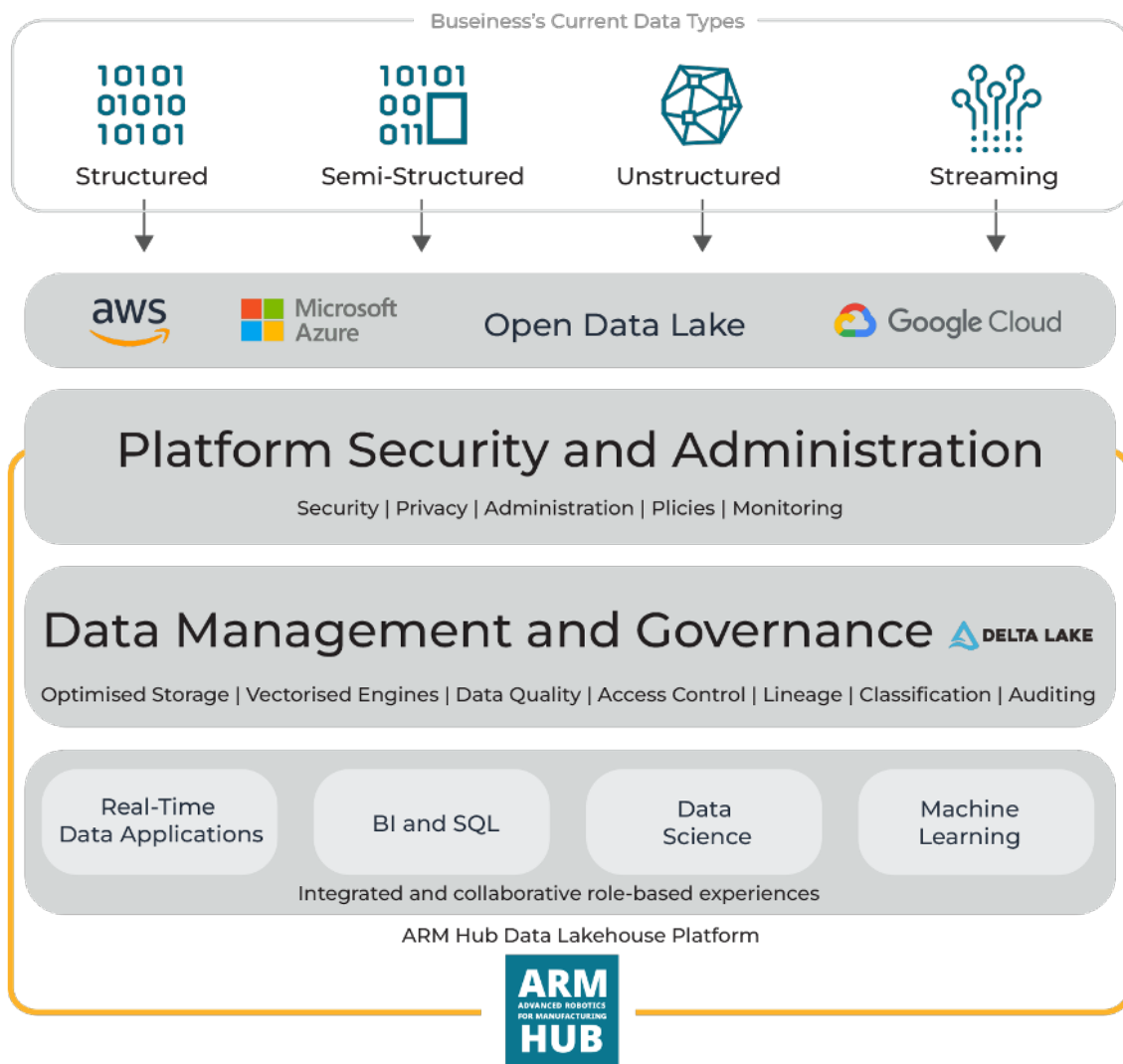


Figure 2: ARM Hub Data Lakehouse and AI-as-a-Service

For existing businesses, work is typically required to curate data and ingest it into a modern data platform like ARM Hub's Data Lakehouse. The challenges manufacturers are addressing when moving to a new platform include:

- Fragmented data across corporate information technology (IT) and factory operational technology (OT) systems with varying levels of cyber security
- Existing systems are expensive to maintain and make compliance difficult
- Poor data infrastructure prevents businesses from adopting Generative AI and leveraging new business models
- Manufacturing IT teams lack data engineering and AI expertise, limiting their ability to build and improve AI-driven solutions

The ARM Hub and its partners are now working with manufacturers and technology vendors to overcome these hurdles so they can reap the benefits of Generative AI.

IMPACT STUDY | URBAN ART PROJECTS (UAP)



Companies that are on the data transformation journey using ARM Hub's Data Lakehouse and AI-as-a-Service include established SMEs as well as start-ups and scale-ups.

For example, UAP is an established manufacturer of large-scale public art, employing 350 staff worldwide. UAP is undertaking a whole of organisation transformation, working with ARM Hub and our partners to unify their data and use Generative AI to drive the company's effectiveness and efficiency.

ARM Hub has been collaborating with UAP for five years across Industry 5.0 technologies. Between 2019 – 2022, UAP:

- Increased staff by 52% after adopting robotics and AR&VR technologies
- Increased global sales by 89%
- Launched a spin out company, FARM Architectural.

Then from 2023-2025, UAP:

- Continued to adopt of advanced technologies (including now using ARM Hub's Data Lakehouse and AI-as-a-Service) giving UAP confidence to expand its manufacturing to the Netherlands, Middle East and Melbourne.
- Increased staff another 30% (total staff now 350)
- Increased global sales another 50%
- Made a five-fold increase in investment in new technologies

IMPACT STUDY | MICROBIO



An Australian startup is using the ARM Hub Data and AI-as-a-Service to become a zero-waste knowledge organisation that saves lives from sepsis around the world.

The challenge

Microbio is a startup biotechnology company with a revolutionary diagnostic assay, InfectID™-BSI that can detect 26 sepsis-causing pathogens directly from whole blood in under three hours. To achieve global commercialisation, large-scale clinical trials are required, generating vast amounts of complex, high-volume data that demand advanced analytical capabilities. Microbio has already secured distribution agreements in Europe, India, the Middle East, and North Africa, highlighting the international demand for this life-saving sepsis diagnostic technology. However, to efficiently execute these trials, the company requires a streamlined data architecture capable of supporting advanced predictive analytics to process and interpret patient data from multiple trial sites. As Microbio progresses towards commercialisation, it must evolve from a scientific research enterprise into a data-driven commercialised manufacturing business, integrating AI-driven analytics and scalable production systems. This transformation will require strategic investment at each stage to support data infrastructure development, advanced manufacturing capabilities, and global regulatory compliance, ensuring its diagnostic technology reaches markets efficiently and at scale.

Working with the ARM Hub

The company leveraged the ARM Hub's Data and AI-as-a-Service to test and implement a highly efficient and scalable data architecture using a Databricks' AI Lakehouse technology. This architecture allows them to seamlessly manage and govern their clinical trial data from multiple sites. The project involved a co-design workshop that developed a Data and AI Roadmap that would deliver global clinical trials, establish the business' future data foundations, and support data sharing.

Outcomes

The outcome was a clear pathway for a cost-effective and sustainable solution that did not dilute company equity or IP ownership. The approach incorporated Large Language Models as AI tools enabling non-tech staff to conduct internal data analysis and manage the clinical trials from different locations across the globe safely and responsibly. As the project progresses, Microbio is poised to further reduce clinical trial timelines, enhance trial accuracy, and better manage diverse datasets, ultimately supporting the company's goal of expanding InfectID™-BSI globally. Microbio received competitive matched funding through the ARM Hub's Biomedical AI Sprints Accelerator (BASA) and the ARM Hub Scaleup Manufacturing for Female Founders Accelerator to undertake the project.

SERVICE 2

SCALEUP MANUFACTURING PROGRAMS

Scaleup manufacturing programs

The ARM Hub provides services to help businesses scale their products and services through the adoption of advanced manufacturing technologies. Around the world, innovation centres like the ARM Hub facilitate scale-up manufacturing by supporting breakthroughs from the laboratory or concept stage into prototype and full-scale commercial production. These centres also often help business adapt and integrate existing technologies into unique production environments. The adaption of existing technologies is important in Australia because of the large productivity impact it can make given the country's low level of infrastructure investment and aging factory equipment.¹⁴

Our mission at the ARM Hub is to ensure that technological advancements are not only scalable to meet future global supply chain demands but also commercially viable. To support this, we have developed **standardised assessments and implementation frameworks** that play a critical role in shaping clients' technology roadmaps. These roadmaps, designed with a global outlook, guide businesses on their unique **Industry 5.0 technology adoption journeys**, ensuring they remain competitive and future-ready.

Industry 4.0 is a German industry framework that describes the digital revolution's impact on industrial transformation. It defines the role of key technologies such as robotics, AI, advanced materials and the Internet of Things (IoT) in optimising and scaling up manufacturing processes. Industry 5.0, complements Industry 4.0, bringing the human back into the centre of manufacturing, where they are augmented by advanced technologies and empowered to work alongside intelligent systems, enabling greater mass customisation or personalisation, creativity, and efficiency in production¹⁵.

Notably, there are interests seeking to limit the uptake of Industry 4.0 and particularly robotics for fear that it will take away jobs. In the US, Longhorseman, a major labour union, has been at the forefront of ensuring that the integration of robotics into manufacturing workplaces is done with worker protections in place. This has led to the first cases of robotic automation being explicitly included in enterprise bargaining agreements (EBAs) with workers. These agreements focus on ensuring that automation is used to augment rather than replace jobs, mandating retraining programs, safety measures, and mechanisms for worker oversight on robotic implementations. What has been negotiated is an Industry 5.0 approach to human-centred robotics, Longhorseman has provided a framework that balances technological progress with worker job security, setting a precedent that other labour groups may follow globally.

Scaling back from full automation (Industry 4.0), Tesla now exemplifies Industry 5.0 with its AI-human integration in manufacturing, where automated systems and human workers collaborate for optimised production. Similarly, Siemens leverages AI-powered energy efficiency while ensuring human oversight for ethical decision-making.

¹⁴ Department of Industry, Science and Resources. National Robotics Strategy 2024.

¹⁵ European Commission. What Industry 5.0 Is, Its Role in Transitioning to a Sustainable, Human-Centric and Resilient Europe and How It Contributes to Top Commission Priorities. European Commission, research-and-innovation.ec.europa.eu/research-area/industrial-research-and-innovation/industry-50_en. Accessed 5 Feb. 2025.

Adidas advances hyper-personalisation by evolving from mass-produced smart shoes (Industry 4.0) to AI-driven, co-designed footwear tailored to individual biomechanics. Patagonia follows a regenerative business model, prioritising gear repair and recycling, where AI-assisted logistics streamline operations, but human artisans handle final adjustments. Additionally, the shift towards distributed AI-augmented manufacturing sees companies moving away from centralised mega-factories to networked micro-factories, utilising AI to adjust production dynamically while allowing local human creativity in final assembly. These examples highlight how Industry 5.0 integrates technological advancements with human ingenuity to drive more sustainable, efficient, and personalised manufacturing.

The formation of Industry 5.0 standards or guidelines in Australia needs to emphasise collaboration between humans and machines, sustainability and resilience, distributed production and allow industries and people to reimagine manufacturing as an adaptive, human-centric ecosystem. The ARM Hub is at the operational forefront of this new era and has been rewriting Industry 5.0 standards and practices with our research partners and clients. The Hub has been creating a future where AI, robotics, and automation work in tandem with human expertise to drive innovation, efficiency, new markets and sustainability in manufacturing. To foster a globally competitive manufacturing ecosystem in Australia, the ARM Hub is also equipping a diverse workforce with new skills needed to harness the benefits of these advancements.

Industry 5.0 technologies being used at the ARM Hub include:

- Human-AI collaboration and cognitive automation: intelligent systems that support human decision-making, enhancing creativity and efficiency.
- Advanced robotics and cobots (collaborative robots): machines designed to work alongside humans, improving safety and precision in manufacturing.
- Sustainable and circular manufacturing: processes that minimise waste, optimise resource use, and integrate renewable energy solutions.
- Mass customisation and hyper-personalisation: AI-driven manufacturing that allows for tailored, flexible, and customer-specific production at scale.
- Resilient and adaptive manufacturing systems: smart factories that leverage IoT, digital twins, and predictive analytics to anticipate and respond to disruptions dynamically.

Through ARM Hub's scaleup manufacturing programs, the maturity of advanced manufacturing technologies are assessed using standard global frameworks of Technology Readiness Levels (TRLs), Manufacturing Readiness Levels (MRLs) and Commercial Readiness Levels (CRLs). When getting a product or service to market, relevant frameworks are often progressed in parallel rather than in a strict linear sequence.

- TRLs are often used first in the development cycle to determine if the technology itself is viable.
- MRLs should be used when assessing and preparing for production reviewing manufacturing risks and feasibility.

- CRLs are used to evaluate the commercial viability of a product or a service, focusing on market acceptance, regulatory compliance, investment readiness, and overall business model maturity.

Originally TRLs were developed by NASA and have been adopted globally across various industries to provide a consistent understanding of technology status and to inform funding and development decisions. The ARM Hub has similarly adopted guidelines for conducting MRL levels from the U.S. Department of Defense which is globally recognised as best practice for evaluating manufacturing maturity. CRLs have evolved over time and are often published by Governments as a guide to determine if a product or service can be successfully introduced and scaled in the marketplace.

TRLs, MRLs and CRLs are complementary—you may have a technology at TRL 7 (demonstrated in an operational environment) but still at MRL 4 (pilot production only), meaning the technology is ready, but manufacturing is not. The CRL level could be as low as 1, indicating that the commercial strategy and market readiness still need development.

Aspect	Technology Readiness Levels (TRLs)	Manufacturing Readiness Levels (MRLs)	Commercial Readiness Levels (CRLs)
Purpose	Measures the maturity of a technology from concept to deployment	Measures the maturity of the manufacturing process required to produce a technology	Measures the commercial feasibility, market acceptance, and business viability of a technology
Scale (Levels)	1-9 (Basic research to operational deployment)	1-10 (Basic concept to full-rate production)	1-6 (Concept validation to full commercial rollout)
Focus Areas	Technical feasibility, validation, and system integration	Manufacturing feasibility, supply chain readiness, and production capability	Market analysis, regulatory compliance, investment readiness, and business model validation
Key Users	R&D teams, engineers, and policymakers	Manufacturing engineers, industrial planners, and supply chain managers	Business development teams, investors, marketing departments, and strategic decision-makers
Industry Adoption	Used in aerospace, defence, energy, healthcare, and software	Used in defence, aerospace, automotive, and typically high-volume manufacturing	Used across industries where significant market acceptance and financial investment are required for commercialisation
Timing in Product Lifecycle	Used from early-stage research through system validation (TRL 1–9)	Used when transitioning from prototype to full-scale production (MRL 4–10)	Most often used once technology feasibility is established, and production methods are identified, through commercial launch
Primary Goal	Determines if the technology is functional and ready for practical use	Ensures that the technology can be efficiently manufactured at scale	Determines if the technology can succeed commercially and be sustainably adopted in the marketplace

Table 1: Technology Readiness Levels and Manufacturing Readiness Levels

SCALEUP MANUFACTURING EXAMPLE



The banana de-handing project illustrates a real-world scale-up manufacturing process. A banana de-handing system is an advanced agricultural automation technology designed to enhance efficiency, worker safety, and productivity in banana processing. The system the ARM Hub and its partners are working on integrates AI-driven vision, precision robotics, business model innovation, and Industry 5.0 principles to create a human-centric, sustainable, and resilient manufacturing ecosystem.

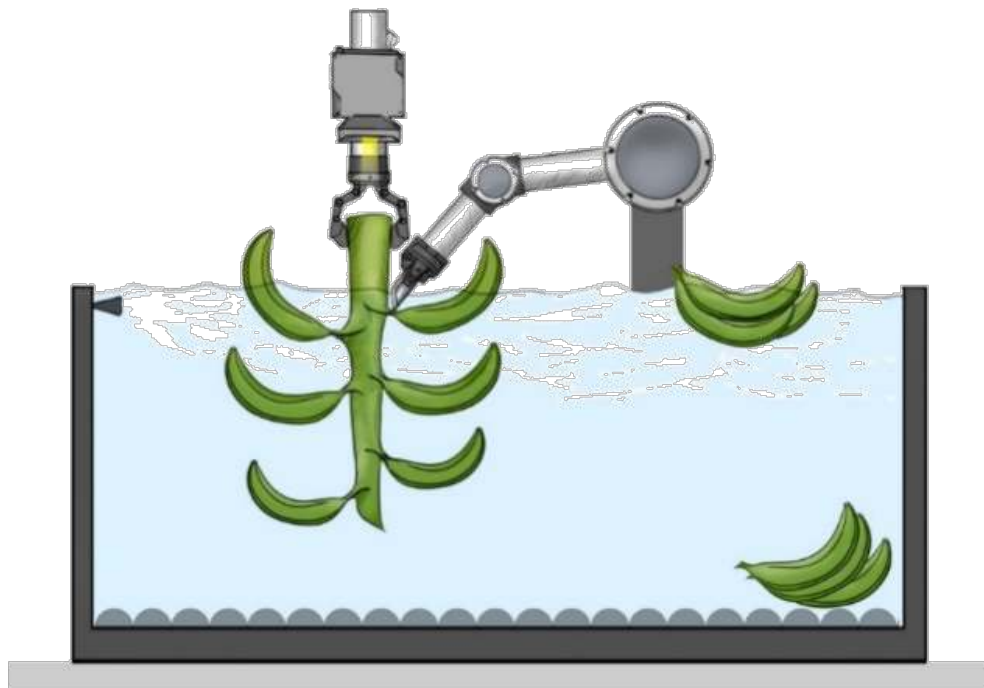


Illustration: An approach proposed to de-hand bananas.

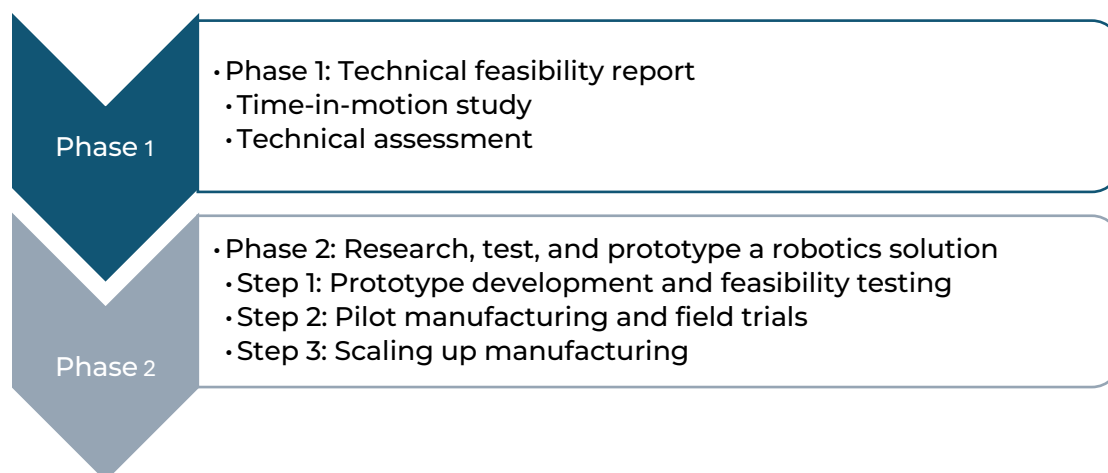


Table 2: The multi-phase scaleup process for a banana de-handing robot

Step 1	Goal: A working prototype successfully tested in controlled environments, ready for field testing
• Use machine learning-based image processing to detect banana bunches • Develop a custom-removal mechanism for removing banana hands from bunches • Complete a regulatory assessment • Develop processes and systems for handling the banana bunches and hands without damaging the skin and causing bruising • Develop a robotic solution able to accurately position the bunches for hand removal (bunches weigh up to 60kg) • Develop an indicative testing station for demonstrating the banana de-handing process	
Step 2	Goal: Design improvements based on real-world data, increasing durability and reducing costs for mass production
• Deploy pilot units in commercial banana farms • Optimise AI and robotics for speed, accuracy and human interaction, adjusting algorithms to match desired de-handing speeds and production processes • Use modular manufacturing design to lower production costs and simplify maintenance • Food-grade material integration, working with regulatory bodies for compliance	
Step 3	Goal: Cost-per-unit reduced, enabling widespread adoption across banana farms
• Partner with manufacturers to produce components at scale • Implement robotic-assisted assembly lines for efficiency (lean manufacturing) • Establish distribution hubs in major banana-producing regions • Deploy training programs and predictive maintenance software to reduce downtime • Engage customers to access investment options.	

Table 3: The actions taken for each step toward prototype and commercialisation

By adhering to established frameworks the ARM Hub ensures that innovation is structured, scalable and in strong demand. Through continuous monitoring and assessment of technology roadmaps, the Hub remains agile, adapting to the evolving needs of industry and emerging global standards or practices. The ARM Hub's engagement with global technology leaders, industry consortia and standardisation bodies helps navigate new and emerging standards — we routinely work with the Australian Cobotics Centre, Standards Australia, the National AI Centre, Steel Manufacturers Australia, and Weld Australia, as well as global partners including Microsoft, Databrick and NVIDIA.



The Australian Cobotics Centre (ACC) works with industry to create safer, more efficient and globally competitive manufacturing industry. The Centre is a five-year Australia Research Council funded project established in 2021. ARM Hub is a partner in the Centre, alongside seven other companies and four universities.

The challenge

A key challenge for industry adopting collaborative robotics, or cobotics, is the lack of Australian industry standards or guidelines to support their use. If Australian companies are to adopt cobotics the barriers of compliance, workplace health and safety, and workforce skills development all need to be addressed.

Outcomes

In the absence of standards, the Centre evaluated the best fit tools that would encourage as well as provide direction for businesses on the successful and compliant integration of cobotics into manufacturing sites. The result have been:

- New 'Guidelines for Safe Collaborative Robot Design and Implementation' developed by UTS with the NSW Government. The guidelines recognise the concerns and gaps in current work, health and safety knowledge and practices, and then established five fundamental principles to enable the safe use of collaborative cobots in the workplace.
- A new 'Framework for Defect Detection' developed by Swinburne University in partnership with industry partner, Cook Medical. The Framework establishes innovative approaches to defect identification, rework analysis, and waste reduction strategies. The Framework emphasizes root cause analysis and preventive measures, enabling manufacturers to detect defects as well as prevent their recurrence. The Centre's research delivered a systematic procedure model that guides manufacturers in implementing effective quality control through human-robot collaboration.
- New cobotics short courses are now being developed by QUT with industry partner, Weld Australia to educate manufacturers and other workers on the appropriate use of cobotics in the workplace. These courses are designed to support safe and secure compliance using cobots while maximising the potential for the technology.

Another strong global example of Industry 5.0 transformation for scale-up manufacturing is in the biomedical industry. This industry must maintain strict regulatory compliance. As demand for personalised medicine, biologics, and advanced therapeutics rises, manufacturers must balance efficiency, scalability, and compliance with stringent regulatory frameworks such as Good Manufacturing Practice (GMP), FDA and Therapeutic Goods Administration (TGA). Unlike traditional automation, which often requires extensive infrastructure changes, AI-driven systems and advanced robotics provide agility, precision, and traceability, ensuring production scale-up without compromising compliance or product quality.

A key advantage of AI and robotics in biomedical manufacturing is its ability to streamline highly repetitive and labour-intensive processes, particularly in areas adjacent to regulatory-critical workflows. For example, AI-powered vision systems and robotic arms are increasingly used for automated sterilisation, precision material handling, and sample preparation, ensuring consistency, repeatability, and contamination control. Humanoids equipped with dexterous manipulation capabilities are forecast to assist in tasks such as preparing labware, organising bioassays, or handling hazardous materials, reducing human exposure to sensitive environments while maintaining regulatory integrity. AI-driven monitoring systems further enhance compliance by providing real-time traceability, anomaly detection, and predictive quality assurance, ensuring that deviations from regulatory standards are addressed proactively.

The integration of AI and advanced robotics enables biomedical manufacturers to scale production efficiently, unlike full automation, which often introduces rigid production constraints. Industry 5.0 technologies offer a flexible, human-centric approach, allowing for adaptability in compliance-heavy environments. AI-powered systems can dynamically adjust workflows, ensuring that manufacturing processes remain aligned with evolving regulatory requirements. Moreover, digital twins and AI-driven process simulation allow manufacturers to test scale-up strategies before implementation, reducing the risk of non-compliance. As biomanufacturing evolves, the strategic adoption of AI and advanced robotics will increase production resilience and regulatory integrity to drive biomedical innovation at scale.

ARM Hub's support of Australia's medical devices industry

There is a growing demand in Australia for domestic manufacturing capabilities, regulatory support, and investment in commercialisation pathways. Yet companies often struggle with the high costs of local production, stringent regulatory compliance such as ISO 13485 and TGA approvals, and securing sustainable export revenue.

ARM Hub is actively working to address these challenges by integrating industrial automation with AI-driven informatics, reducing compliance and production burdens on businesses, and securing R&D commercialisation funding. In collaboration with Field Orthopaedics, for example, ARM Hub is developing robotic solutions within GMP manufacturing environments to streamline assembly processes and automated Quality Control (QC) validation. These AI-enabled solutions enhance efficiency, regulatory traceability, and cost-effectiveness, helping companies scale production without compromising quality or compliance.

Demonstrated impact of scale-up manufacturing

Below is a selection of impact studies that demonstrate the ARM Hub's scale-up manufacturing service.

IMPACT STUDY | YOUNG GUNS CONTAINER CREW



Young Guns Container Crew engaged the ARM Hub to use automation to improve safety, productivity, and efficiency in the supply chain.

The challenge

Founded in 2004 by Queensland Indigenous brothers Scott and Trent Young, Young Guns Container Crew (YGCC) packs and unpacks shipping containers in Australia, New Zealand, and Canada. The company, which employs 1500 people, is transforming a typically unskilled, unreliable and transient work force into a highly engaged one that delivers best practice service and drives improvements in the supply chain industry. With the supply chain industry evolving, YGCC wanted to automate to maximise the effectiveness of its workforce. It chose to sync the manual workforce with automation rather than introducing full automation, believing a partnership would be the most productive approach well into the future.

Working with the ARM Hub

The ARM Hub conducted concept development, visualisation, simulation, design-and-build (including meeting safety standards), business analysis, and operational testing with end users. At hand-over, the prototype complied with: AS4024 Australian Safety of Machinery Standards; Type C Standards; and the *Australian Workplace Health and Safety Act 2011*. The project involved detailed co-design workshops that resulted in a list of options to create a new-to-world automation technology in the logistics industry.

Technology innovation

A sophisticated digital twin was built of the team's preferred automation. The device enables a forklift to supply up to two empty pallets at a time, has integrated rollers, a wrapping station, and an integrated blocker device. The device enhances traditional container unloading methods by using automated processes and robotic equipment to maximise the process time of the unloading team. This innovation increases the speed of building pallets of stock while significantly improving safety standards through enhanced risk mitigation measures. AI on the device enables the capture of data, such as pallet timings and stock type variables, which are valuable for both YGCC and its clients.

Outcomes

YGCC and the Hub prototyped a new-to-the-world logistics automation technology. For the business, the technology has been tested and improves productivity in the container unloading process between 25-50%. Additional outcomes include the expansion of their Australian and international customer network, job creation, and newly created skilled jobs in maintenance, analytics, and software development.



The ARM Hub is scaling up EM Solutions manufacturing capabilities to deliver a \$150m contract to upgrade the Royal Australia Navy's satellite communications (SATCOM) systems.

The challenge

EM Solutions is a Brisbane-based technology company specialising in the development and manufacturing of advanced microwave and radio frequency (RF) communication systems. The company manufactures, assembles, installs, and maintains the King Cobra SATCOM terminals for the Royal Australian Navy. In 2023, EM Solutions won a \$150m contract to upgrade the Navy's SATCOM systems across its existing fleet of vessels. A King Cobra terminal is a large structure fitted to the top of the ships, designed to work around the clock, in any ocean, and in all weather conditions to enable communication. It consists of 22,000 individual components, including hundreds of hand-made cables. Currently, cable faults cannot be identified until the terminal is assembled. Any fault can cause a production delay as teams search for the cause and resolve the problem.

Working with the ARM Hub

EM Solutions is a Member of the ARM Hub. The ARM Hub completed a technical assessment and co-design workshop and built a digital twin with the company. Funding submissions are under considerations to help automate the complex cable-making process.

Technology innovation

EM Solutions approached the ARM Hub to scale up its manufacturing to meet national and international demand. A co-design workshop created a list of options that would lead to improved quality control, fault detection, and increased production speed.

EM Solutions subsequently engaged the ARM Hub to build and test the digital twin of the satellite to reduce testing time from one month to one week. The digital twin replaces an earlier version that is no longer representative of the satellites. It uses open-source software and is far more accurate in pinpointing issues.

Outcomes

EM Solutions adopted Industry 5.0 digital technologies to scaleup its manufacturing, meeting national and international client demand. It has led to a significant reduction in testing time.



Orrcon Steel engaged the ARM Hub to reduce energy intensity and carbon output to meet 2030 targets.

The challenge

Orrcon Steel is a leading Australian distributor and manufacturer of steel, tube and pipe. The company has a 2030 target to decrease energy intensity and carbon output by 30% from 2018 base levels.

Working with the ARM Hub

Orrcon Steel has been a valued Member of the ARM Hub. Over its two year membership, the ARM Hub and its partner QUT provided data insights and engineering expertise to guide Orrcon Steel in an energy audit. The ARM Hub also managed post-doctoral, PhD, and undergraduate students to work with Orrcon Steel.

Technology innovation

Orrcon Steel will meet its target by improving production, making efficiency gains, and increasing its use of renewable energy. A key aspect of its approach is to understand and measure the most energy-intensive areas of business. The energy audit was conducted at Salisbury Mill in Brisbane using a methodology developed by the Energy Intensity and Carbon Reduction Program Manager, Lorraine Welsh. Ms Welsh says the audit calculated how much energy is required to produce one tonne of tubular steel and identified it down to days of operation and individual shifts. This information is enabling the company to identify energy hot spots in which to introduce carbon reductions solutions for the company's three tubular steel mills, distribution centres, and branches across the nation. "Using collaborative partnerships with organisations such as ARM Hub, we're able to draw upon expertise in specialised areas. This enables us to fast-track our work towards lower emissions and improved outputs with less carbon emissions," Ms Welsh said.

Outcomes

Orrcon Steel adopted Industry 5.0 data analytics and data-driven decision-making. The ARM Hub aided the design and installation of an energy monitoring system to successfully reach energy use targets in pursuit of fast-tracking lower emissions



A Queensland startup has collaborated with the ARM Hub to become a world leader in the billion-dollar building inspection market.

The challenge

Building inspection is an ongoing, costly process for companies. Owners rely on manual, low-tech yet high-risk technology (e.g. photographs and visuals from a person abseiling the building) to determine the building's condition. With increases in population and urbanisation, the demand for building inspection services to guarantee occupant safety is immense. The global market is expected to double from its current value of USD \$9.4B to \$18.2B by 2032.

Working with the ARM hub

Voltin won the ARM Hub Sprints Accelerator in 2022 and received \$50,000 in support to develop the AutoBAT technology. Together, the companies took the technology from prototype to commercialisation. A further collaboration developed robotic tooling to develop AutoBAT versions 2.0 and 3.0. The ARM Hub has worked alongside Voltin since its launch at the ARM Hub Learning Factory in 2020, providing expert advice and access to resources. In 2023, Voltin received \$100,000 from the Advance Queensland Ignite Ideas fund to market in New Zealand and the Asia Pacific. In 2025 Voltin secured a place in Advanced Queensland Scale-up Accelerator further expand their global reach. Over time, the ARM Hub has helped Voltin generate more than \$1M in R&D funding.

Technology innovation

Voltin has created Autobat 3.0, the world's first AI-enabled building façade inspection system that automates the recording, evaluation, and reporting of defects, and integrates it with a company's Building Information Management program.

The product -- an automated drone-like technology -- can be operated safely from the ground as it captures visual and thermographic data. An inspection report is generated automatically to provide a clear picture of the condition of the building's exterior. Voltin Director Stephen Thorton says it 'makes big data an asset managers' friend'.

Outcomes

Voltin is exporting to the Middle East and plans to expand into the US and European markets. The company, which has experienced an 800% growth (2022-24), is enlisting licensees to use the equipment globally. It has three international HSEQ standards.

SERVICE 3

ARM HUB ACCELERATORS

The ARM Hub offers a suite of startup and scaleup accelerators (or sprint programs) designed to link companies with technology, capital, global markets, professional services and talent. By doing so, the Hub completes its end-to-end manufacturing innovation services. These accelerators focus on industry sectors such as biomedical, defence, and robotics, as well as on specific groups like female founders and entrepreneurs preparing to exit their businesses.

A key aim is rapid scaling: enabling companies to grow quickly through intensive support and expert guidance. Participants receive help becoming investment-ready, prototyping their technology, honing their pitches and refining their business plans to secure new markets and funding. Market validation is a priority, ensuring that companies confirm their product-market fit through real-world testing. The programs facilitate the creation of go-to-market strategies and offer support to build global businesses and teams. The accelerators seek to create sustainable business models that can thrive over time, and, for those planning a transition, one accelerator provides tailored advice on how to exit a business smoothly.

The ARM Hub's programs follow established best practices in acceleration. They employ a cohort-based structure, enabling participants to learn from each other and collaborate. Mentorship and education are provided by seasoned experts guiding participants through product refinement, market strategies and operational challenges. Access to resources is equally crucial; the Hub connects startups with funding, technology, legal services, and professional advice. Structured networking opportunities—such as demo days—give participants a platform to pitch to investors, sponsors, industry partners and customers.

Meeting industry standards and regulatory requirements is woven into the curriculum. The accelerators provide compliance guidance, connect participants with legal and regulatory experts. In this way, founders learn not only how to grow quickly but also how to do so responsibly and sustainably.

Looking forward, ARM Hub will continue to position Australia as a global gateway for high-value manufacturing and manufacturing innovation. The collaboration with MassRobotics through Propel-AIR highlights this potential. ARM Hub could formalise partnerships with additional leading global accelerators and industry scale up services, like Arena Mars in Toronto, to offer international soft-landing programs for Australian manufacturers expanding overseas, with world-class expertise and mentorship flowing back into ARM Hub accelerators, and importantly the capability to attract foreign investment into the Australian advanced manufacturing and technology ecosystem. ARM Hub current accelerators include:

Propel-AIR Sprint



The ARM Hub's Propel-AIR program is Australia's first AI and Robotics Sprint, designed to drive innovation and showcase local talent on a global stage. It is led by the ARM Hub AI Adopt Centre and aims to fast-track Australian robotics startups, scaleups, and innovators in developing essential solutions for the industry. The program is structured in phases, guiding participants from concept refinement to international collaboration, focusing on practical development, product-market-fit, expert mentorship, and global networking to maximise growth and impact.

The program includes a collaboration with MassRobotics, the world's largest robotics accelerator located in Boston. The winning team will have the opportunity for a month's exchange to MassRobotics with scheduled visits to key companies, invites to major investor pitch events and access to institutions including Boston Dynamics and MIT.

The Propel-AIR program aims to empower Australian startups, businesses, researchers, and entrepreneurs to create transformative AI and robotics solutions, access to world-class expertise and facilities, and build globally successful businesses.

The ARM Hub Female Founders Accelerators

The ARM Hub Scaleup Manufacturing Accelerator for Female Founders is helping Queensland businesswomen scaleup new products and services to be more competitive in global markets. The program helps female business owners or women leading companies to advance their technology readiness, ultimately developing a proof-of-concept or proof-of-deliver.

Objectives: The accelerator is designed to help female founders to bring new products or services to market.

Eligibility: The program is open to women in Queensland who have founded a business, are in a business that is 50%+ female-owned, or are leading a company as a CEO, Director, or Executive. The business should have a technology component or require manufacturing.

Structure: Participants work with the ARM Hub experts to develop proof-of-concepts or proof-of-delivery.

Partnerships and support: The accelerator is supported by the Advance Queensland Female Founders Accelerator Program. It provides access to ARM Hub's network of technical experts and resources.

Program Duration: The accelerator runs for nine months.

Biomedical AI Sprints Accelerator

The ARM Hub's Biomedical AI Sprints Accelerator (BASA) program is designed to support Australian biomedical SMEs by providing access to advanced AI and data analytics services. The program aims to enhance Australia's capabilities in biomedical manufacturing through strategic AI integration, driving innovation and economic growth.

The BASA program focuses on bridging the skills gap in data analytics within the biomedical industry, particularly for SMEs that lack resources to engage with major AI technology providers. It aims to enhance local operational activities, retain talent, and attract further private investment into the sector.

Objectives: The program seeks to upskill participating companies in AI and data analytics, enable SMEs to retain talent and enhance operational effectiveness locally, and attract additional non-dilutive and private investment by demonstrating the viability and success of participating companies.

Audience: The program is for biomedical SMEs based in Australia, especially those without substantial resources to access large AI providers or in-house data science teams. It also includes global companies establishing their footprint in Australia.

Structure: The program provides AI-as-a-Service tailored to the needs of biomedical SMEs, access to ARM Hub's Data Lakehouse and co-design workshops to create individualised data and AI technology roadmaps for each company.

Partnerships and support: The accelerator is a joint collaboration with MTPConnect.

Program duration: The program was officially announced at the June BIO2024 conference in San Diego and will span nine months, concluding in March 2025.

ARM Hub Defence Accelerator

The ARM Hub Defence Accelerator is designed to fast-track the development and adoption of advanced manufacturing technologies for Australia's defence industries. The program provides a robust pathway for SMEs to access defence procurement opportunities. It helps reduce prohibitive pre-income costs for defence

procurement entry, which are currently borne by SMEs, and accelerates the development and ruggedisation of products to make them defence-ready faster.

Objective: The program aims to accelerate the availability of desired technologies for Australia's defence industries and warfighter efforts. It focuses on directing proven manufacturing technology acceleration models and services towards defence and defence industries.

Structure: The program offers more than \$100,000 in tailored training in production automation and robotics, along with introductions to defence and networking opportunities. The training covers production automation fundamentals, practical applications for cobotics, digitisation and simulation, and production technologies for management.

Partnerships and support: The ARM Hub collaborates with various stakeholders, including the Queensland Government, research institutions, the Advanced Strategic Capabilities Accelerator and industry partners, to support the growth of companies by de-risking the digital transformation at the heart of Industry 5.0.

2030 Exit Strategy Group

The ARM Hub will launch this exclusive mastermind group in mid-2025, designed to support business owners and founders prepare for a successful exit. The Exit Strategy Group provides a structured and high-value approach to navigating business transitions, helping founders maximize their exit potential while leveraging expert insights and peer collaboration.

Objectives: This is a mastermind group for owners/founders of advanced manufacturing businesses looking to exit within a 3–5-year horizon.

Structure: Exclusive membership is offered to 14 participants with monthly meetings, quarterly strategy workshops and speaker sessions, and an annual 2-night strategy retreat.

Partnerships and support: The accelerator is a collaboration with Spark Consultants.

Demonstrated impact of scale-up manufacturing

Below is a selection of impact studies demonstrating value from the ARM Hub's accelerators.



The ARM Hub has collaborated with female founder Stephanie Bofinger on her Industry 5.0 scaleup manufacturing journey.

The challenge

In 2019, Stephanie Bofinger struggled her way through an off-road endurance motorcycling event with ill-fitting protective equipment. She says she watched women of all sizes and shapes ‘fidgeting and pulling’ at equipment that had been designed for men. The marketplace offered no female-specific alternatives that protected breast tissue, ribs and organs from damage.

Working with the ARM Hub

Stephanie was one of six women in the ARM Hub Technology Roadmap Accelerator for Female Founders in 2023. The accelerator provided an opportunity to identify Stephanie’s manufacturing challenges and create a personalised technical and business roadmap to implement solutions. The accelerator was a joint initiative between the ARM Hub and VenturePro and was funded through the Queensland Government’s Accelerating Female Founders program. The direct outcomes include the future onshoring of the company’s injection moulding for the armour components, discussions with an international defence contractor, and interest from investors. Fempro Armour has been selected as a participate in the Advanced Queensland Scale Up Accelerator program where she aims to further expand company’s market reach.

Technology innovation

Stephanie created Fempro Armour as a result of her motorcycling experience. From her base in Kingaroy (200km north-west of Brisbane), Stephanie produces world-leading chest and body protective equipment for women and men for sport, healthcare, and defence. The armour is a new-to-the-world protector made of viscoelastic memory foam. The smart-tech molecules in the foam ensure it disperses energy on impact (the wearer does not feel the full intensity of hit, which reduces the chance of injury) and does not lose its shape. The foam protector is designed to function for at least 10 years, in contrast to silicon or poor quality foam that loses its shape with repeated impact. The product has secured international certification for safety.

Outcomes

Fempro Armour is a female-owned business that adopted Industry 5.0 cobotic technology with the ARM Hub. Their product trials are underway with the Paramatta Eels, St George Dragons, Brisbane Broncos, and Queensland Reds. She is working to acquire World Rugby Council approval and uptake by the Southport Sharks and the Queensland Cowboys.



The ARM Hub is the innovation partner of female founder Umar Nguyen on her journey to automate her seafood business.

The challenge

Seafood provedore Umar Nguyen is Australia's sole producer of wild-caught scampi caviar. The product is extremely popular with Australian chefs with Umar selling 3kg (150 x 25g tins) to customers each month. Each batch requires 6kg of raw product to be carefully sorted by hand with tweezers to remove impurities. The laborious work (one kilogram takes between 5 and 6 hours to sort) has led to repetitive-style injuries (severely strained hands, shoulders, and back) and forced Umar to decline large and international orders in favour of maintaining current clientele.

Working with the ARM Hub

Umar was one of six women to participate in the ARM Hub Technology Roadmap Accelerator for Female Founders. The accelerator identified Umar's manufacturing challenges and created a personalised roadmap to implement solutions. A direct outcome of the accelerator was the development, adaption and implementation of a new machine to suit Umar's purpose. Following the success of the new machine, Umar is working with the ARM Hub to fully automate the process using computer vision. The ARM Hub Female Founders accelerators have been supported by the Queensland Government and run in partnership with companies such as VenturePro.

Technology innovation

During the Female Founders Accelerator, the ARM Hub team devised a new method for sorting the caviar. The ARM Hub used its engineering expertise to modify an aspirator used in dental surgeries to replace tweezers. This alternative has also paved the way for research and development on a first-of-type caviar sorting platform using computer vision to identify eggs, sort them and remove waste products.

Outcomes

The Fish Girl project stemmed from the ARM Hub Technology Roadmap Accelerator for Female Founders who adopted Industry 5.0 technologies to scaleup for export. The automation has reduced sorting time from 6 to 2 hours per kilogram, increased production, eliminated hand strain, and reduced fatigue while increasing accuracy and consistency, resulting in less waste.



The ARM Hub is helping Stratoship commercialise equipment that will revolutionise high-altitude monitoring capabilities

The challenge

Stratoship is a Brisbane startup that has designed and manufactured a remotely piloted high-altitude airship to carry equipment into the stratosphere and remain fixed for extended periods. It is designed to provide real-time, high-resolution data to organisations looking for continuous communications for localised areas (e.g. bush fires). The airship is payload agnostic and can hold equipment at 20km – twice the height of airlines. It addresses current challenges with sporadic and unreliable monitoring systems, such as satellites and earth observation cameras.

Working with the ARM Hub

Stratoship is also a valued tenant at the ARM Hub Learning Factory in Brisbane. Stratoship is working with the Australian Manufacturing Capability Network (AMCN), led by the ARM Hub, on its Australian Government Industry Growth Program (IGP) funding application.

Technology innovation

Stratoship is currently proving out the technology, which is an Australian-first. In particular, it is working to ensure the airship is gas-tight during manufacture as the rate at which helium escapes limits the time it can spend in the atmosphere. Stratoship is also working to improve the airship's design and assurance, leading to aviation certification. The company has applied to the Australian Government's IGP grant for funding to streamline and/or automate the production process to reduce time and deliver consistent quality.

Outcomes

Stratoship is obtaining certification to operate in Australian airspace.

CONCLUSION

The ARM Hub is a global leader in manufacturing innovation.

In an era defined by rapid technological advancement, uncertainty in global supply chains, and intensifying international competition, the ARM Hub stands as Australia's preeminent force in manufacturing transformation. By aligning with global industry standards—from AI governance frameworks to MRLs, TRLs and CRLs—the ARM Hub is ensuring that Australian manufacturers meet and exceed global expectations and are ready to do business.

With our partners, ARM Hub does not merely follow standards – we also set them. From pioneering a Data Lakehouse dedicated to manufacturers seeking to adopt Generative AI to rewriting the guidelines and frameworks of scale-up manufacturing to use collaborative robotics, ARM Hub is defining the next generation of advanced manufacturing. By integrating a suite of programs, ARM Hub underpins a comprehensive, future-ready ecosystem that enables businesses to adapt, scale, and compete globally.

The ARM Hub's work is already having a profound impact on businesses. It is a proven model for fostering place-based innovation and commercialization in Australia. With ARM Hub's robust national and international network of technology companies, investors, research institutions, and government partners, the Hub is not just keeping pace with global change, but successfully solving problems on a global scale.

As the world transitions to an AI-driven and human-centred industrial future, the ARM Hub is positioning Australia as a global leader in manufacturing innovation—one that is attractive to the world and embraces change, drives productivity, and transforms challenges into opportunities. By continually aligning to and setting new benchmarks, ARM Hub is ensuring that the businesses it supports today will define the industries of tomorrow.



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