ARC Industrial Transformation Research Hub for Future Digital Manufacturing

Growing and accelerating Australia's digital manufacturing (DM) transformation by developing novel DM technologies and adoption/commercialisation pathways to significantly enhance manufacturing productivity, resilience, and competitiveness through a hub-based partnership with the ARC, Australian and international universities, and industry partners.

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Digital Manufacturing Hub

What is digital manufacturing?

Digital manufacturing (DM) is the latest manufacturing transformation that starts with establishing data-driven management of industrial production. From this starting point, DM develops and utilises advanced computing technologies (such as digital twins and AI) to dramatically increase manufacturing productivity, resilience and competitiveness.

Why DM Matters

DM enables:

- Improved production efficiency
- Enhanced product quality and consistency
- Better preventive machine maintenance
- Reduced energy consumption.

Key Elements

Digital Twins

- Creating digital representations of industrial machines, products, materials, and humans involved in production.

AI and Machine Learning

- Developing AI and ML models that account for physical production constraints and dependencies, enabling accurate prediction of production outcomes.

- Using these predictions to make improvements and adjustments to production processes and related physical manufacturing entities, preventing issues before they occur.

Open DM Platform

- Building open platforms for developing DM solutions across the entire Manufacturing sector.

Co-Creation of DM Solutions

- DM solutions co-created with/for the manufacturing industry.

Message from the Director

Prof. Dimitrios Georgakopoulos
Director

I am a globally recognised research leader with extensive executive experience in world-class research organisations. I was Research Director at CSIRO, and held academic leadership positions at RMIT. In the USA I served in Telcordia Technologies (now Ericson), Microelectronics and Computer Corporation (MCC), GTE (now Verizon), and Bell Communication Research (Bellcore).

According to Elsevier's science-wide author databases of standardized citation indicators, I am in the 2% of top-cited authors globally (top 1% if self-citations are excluded) in both career and 2024 rankings. My research in digital manufacturing, IoT, AI ,and process management has attracted $77M of external grants and has been cited approximately 23,000 times. I have led Australia's largest computer science research program and directed several large cross-disciplinarity initiatives in human services, digital agriculture, water and defence.

Welcome to the ARC Industrial Transformation Research Hub for Future Digital Manufacturing (DMH).
The hub is a consortium funded by the ARC, industry partners, and university partners, with Swinburne University of Technology as the administering organisation.

The hub is driving the next major transformation of the manufacturing sector by bridging cutting-edge research with real-world industry impact. With world-class expertise in Digital Twins, AI, and Industrial IoT platforms, we collaborate with industry to jointly shape the future of manufacturing.

We invite thought leaders, industry peak bodies, industry partners— including technology providers, students, and research fellows to join us in transforming current manufacturing challenges into opportunities, fostering breakthrough solutions, and building a globally competitive, resilient manufacturing sector.

Funding

The hub has already secured $17.5 Million cash and in kind and is jointly funded by the Australian Research Council (ARC), five founding University Partners and 11 Industry Partners.

This includes $5 million of funding from the ARC Industrial Transformation Research Program.

Additional partnership opportunities are available to join the hub, enabling us to further expand our exciting research programs and, most importantly, reach as many manufacturers and technology providers as possible.

Australian Government

Australian Research Council

Current University Partners

To date, university partners have contributed $1.4 million in cash, along with the expertise and time of 17 world-leading research experts as in-kind support valued at $4.6 million. All cash and in-kind contributions can be used as co-investment in the hub's industry projects.

SWINBURNE UNIVERSITY OF TECHNOLOGY

THE UNIVERSITY OF QUEENSLAND AUSTRALIA

RMIT UNIVERSITY

THE UNIVERSITY OF SYDNEY

MACQUARIE University

Newcastle University

UNIVERSITY OF South Carolina

Current Industry Partners

To date, Industry Partners have contributed $3.75 million in cash and an equivalent value of in-kind support, including the time and expertise of Industry Principal Investigators, access to production line equipment, and other essential resources. These contributions directly support the industry projects each partner is involved in.

In addition, Industry Partners mentor and provide real-world experience to the Hub's academic personnel and PhD students, who will become the future leaders of Australia's manufacturing sector. This partnership is not only collaborative but also a strategic investment in the future of Australian manufacturing.

BALLUFF

BAOSTEEL

CABLEX

corex

CITY OF LOGAN

EZY Chef
Gourmet Cooking Made EZY

INNOLABS

memko
Aviation, Aerospace and Defence

sutton

SYSBOX
Make your business shine.

Executive

We have Australia's leading experts in digital twin, cybersecurity, AI, Machine Learning and robotics leading our programs.

Prof. Prem Prakash Jayaraman
SWINBURNE UNIVERSITY OF TECHNOLOGY

Prof. Albert Zomaya
UNIVERSITY OF SYDNEY

Prof. Zahir Tari
ROYAL MELBOURNE INSTITUE OF TECHNOLOGY

Prof. Helen Huang
UNIVERSITY OF QUEENSLAND

Our Programs

DIGITAL TWINS FOR DM

Focuses on digital twins for complex machines, operators, and processes, enabling advanced monitoring, AI-based data analysis, and control. Research activities and outcomes include developing concept networks for digital machine, product, and operator representation, as well as establishing digital threads that enable cyber-physical interaction between DM solutions and physical manufacturing entities through Digital Twins.

AI AND MACHINE LEARNING FOR DM
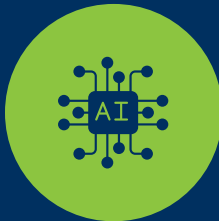
This program focuses on making improvements and corrections to production processes and related physical manufacturing entities to prevent production issues before they occur. Research focuses on producing outcomes that improve production efficiency, ensure product quality and consistency, reduce unscheduled machine maintenance, and enhance sustainability by reducing energy use. The AI/ML models use representations of manufacturing entities in conjunction with related production data provided by the Digital Twins.

OPEN PLATFORM FOR DM

Creates an adaptable, open platform for DM across industries. This includes developing software for the cost-efficient integration of programs, incorporating only the necessary program outcomes, optimising performance for time-sensitive tasks such as production control and quality, and assessing benefits through cost models using digital twins and AI/ML. We envision the development of an open platform to develop DM solutions across the entire manufacturing sector.

INDUSTRY CO-CREATED DM SOLUTIONS

Will use the Open DM Platform, will develop end-to-end solutions co-developed and evaluated with industry partners. These solutions aim to improve efficiency, enhance product quality, reduce unscheduled machine maintenance, and optimise supply chains for greater resilience and performance.

Objectives

The hub operates through four interconnected programs, delivering industry co-created digital manufacturing solutions. These solutions enable digital representations of complex machines, products, and people, addressing roadblocks associated with scarce, constrained, and interdependent manufacturing data. By overcoming these limitations, the hub enhances the adoption of AI-driven solutions and reduces platform inefficiencies.
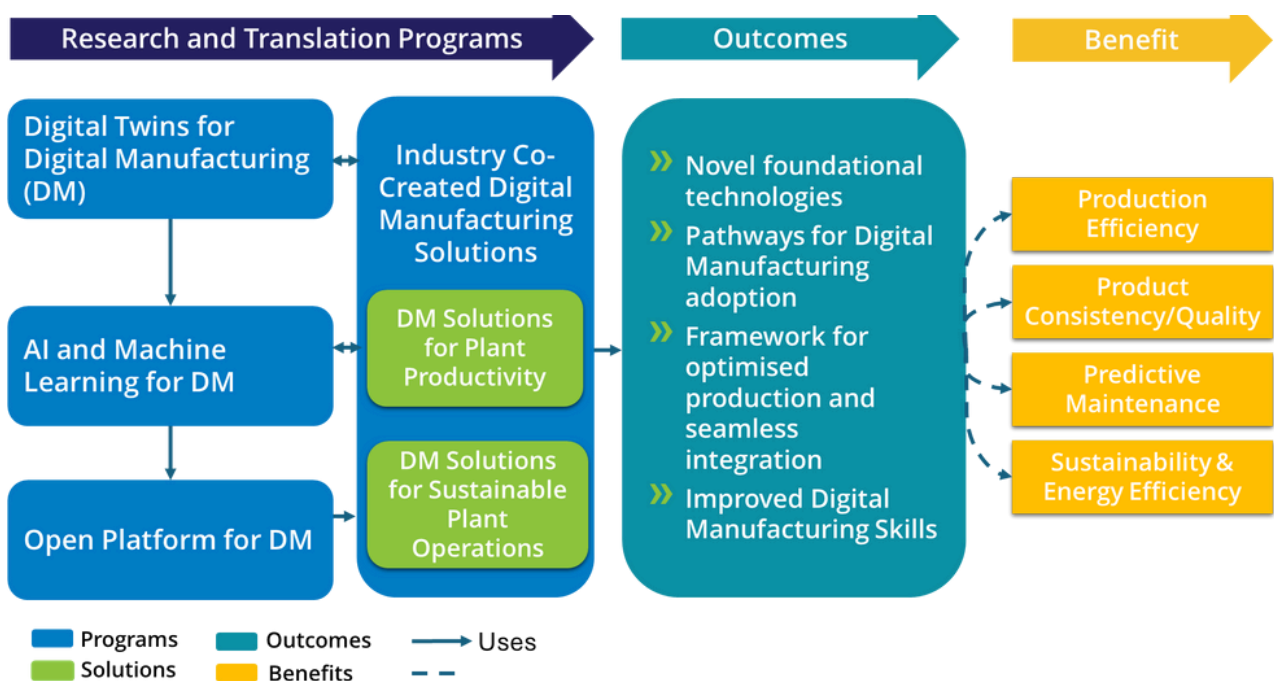
The programs work synergistically to provide global solutions beyond specific production lines, fostering innovation and scalability across industries. This integrated approach supports Australia's sovereign manufacturing goals by optimising processes, enabling predictive maintenance, improving productivity, and contributing to sustainability and efficiency through digital transformation.

Hub Project Showcase

CREATING SAFER, MORE ACCESSIBLE PROCESSED FOODS WITH INNOVATIVE AI-POWERED DIGITAL TWIN SYSTEM

The ARC Research Hub for Future Digital Manufacturing is partnering with Ezy Chef to develop AI-powered digital twin solutions for optimising the production of texture-modified foods, improving product quality and consistency and ensuring safer and more accessible food options for vulnerable Australians, such as those at risk of dysphagia and aspiration.

Ezy Chef Pty Ltd incorporated in Australia in 2008 with a core belief of establishing a company that value-added food into the Aged Care & Hospital sector. Ezy Chef's work is about more than just food; it's about helping people feel cared for, particularly the sick and elderly.

"Swinburne's research has been invaluable in delivering real-world outcomes. We're proud to collaborate on R&D and innovations that not only improves manufacturing outcomes but also contributes to making a real positive difference in people's lives who are dependent on texture modified food solutions."

Gavin Clifford
Ezy Chef CEO and Cofounder

Benefits of Joining the Hub

CASH CO-INVESTMENT OPPORTUNITIES (INCLUDING OPPORTUNITIES FOR JOINT IP DEVELOPMENT) TO UNDERTAKE R&D PROJECTS

OPPORTUNITY TO DEVELOP AND DEPLOY CUTTING-EDGE DIGITAL MANUFACTURING SOLUTIONS
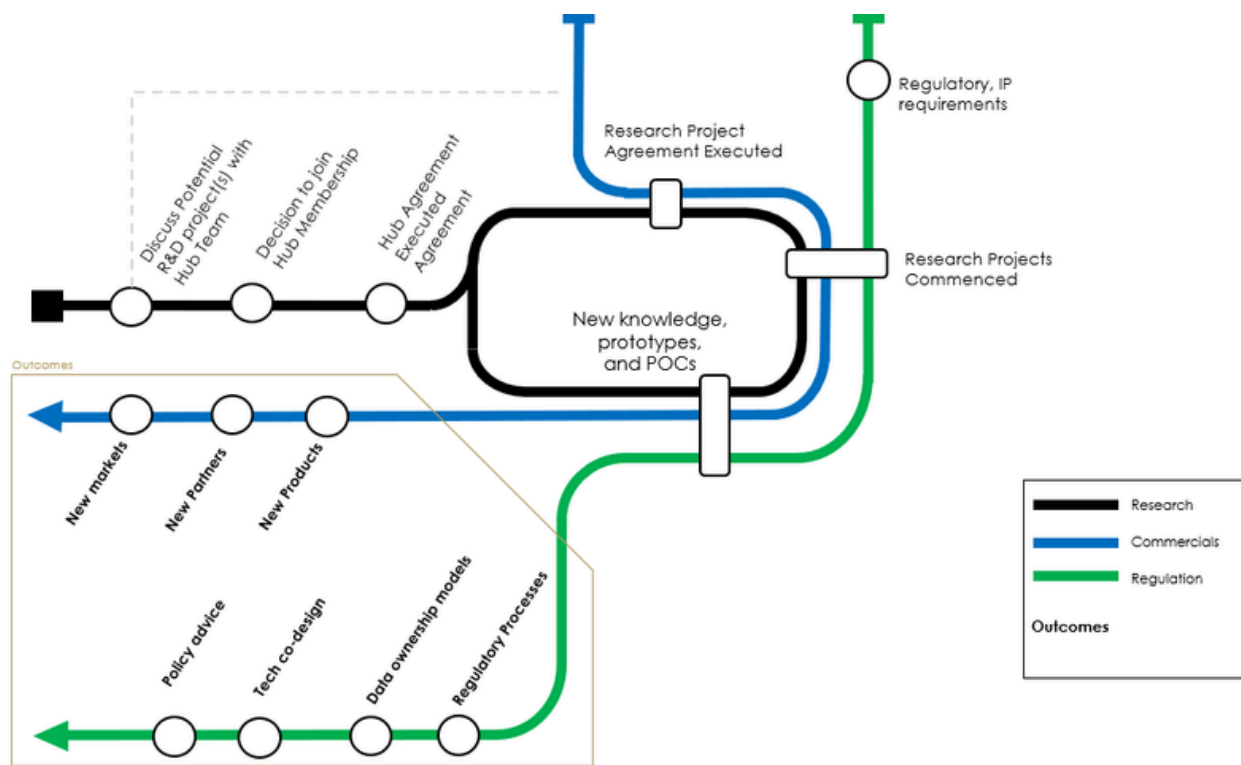
BE PART OF A CONSORTIUM OF MANUFACTURERS AND LINK INTO THEM FOR FUTURE ENGAGEMENTS

DEVELOPING NEW TRAINING PROGRAMS AND OFFERINGS TO SUPPORT THE DEVELOPMENT OF THE NEXT GENERATION OF THE DIGITAL MANUFACTURING WORKFORCE

Your Industry Partner Journey

The hub will unite experts across the manufacturing sector alongside leading technology providers in digital manufacturing. This is more than just product implementation or customisation—it is cutting-edge research and development that individual SMEs cannot achieve alone. By combining the research expertise and commercial experience of all partners, the hub provides the innovation, scale, and capability needed to drive true digital transformation. The hub can match partner contributions to increase the value of a project.

PARTNER PROJECT CONTRIBUTIONS EXAMPLE

Partner Investment (Cash per year)	Hub Matched Funding (Cash per Year)	Hub Matched Funding (In-Kind per Year)	Total Project Value (Per Year)
$150K/Year	$150K	$50K	$350K

Leadership Opportunities

The hub governance structure ensures strategic direction, stakeholder engagement, and risk management.

- **Industry Advisory Committee:** Guides industry trends, technology, and commercialisation, led by senior industry leaders.

- **Research Translation & Commercialisation Committee**: Oversees IP management, revenue-sharing, and research commercialisation.

- **Education, Training & Development Committee**: Develops training programs, mentoring, and professional development for staff and industry partners.
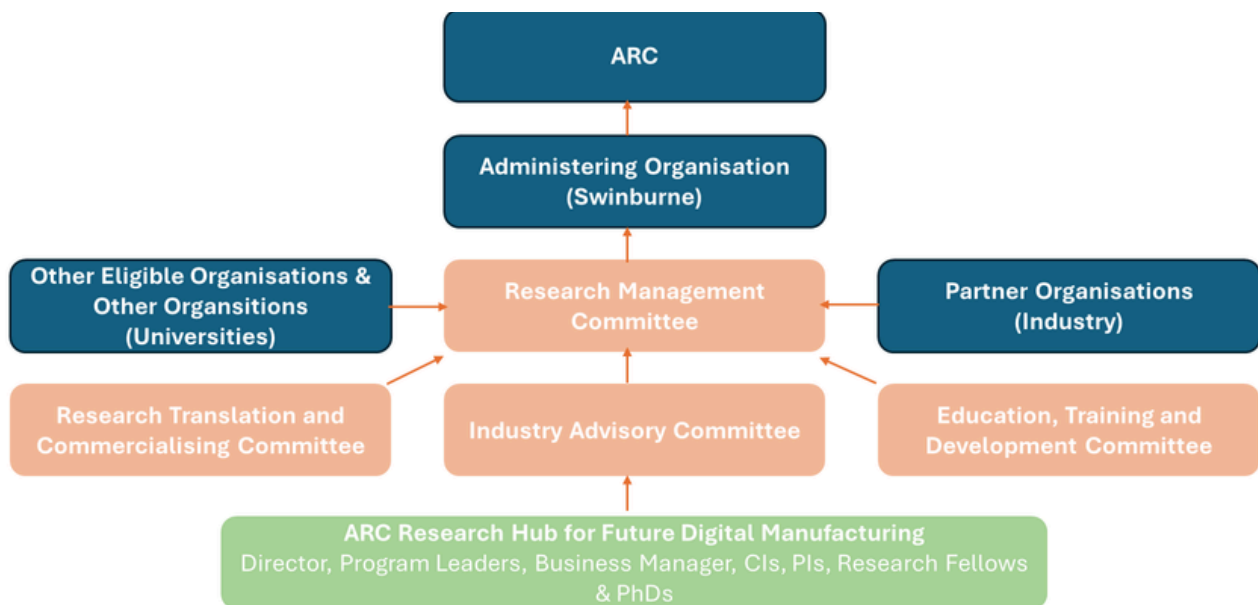
We invite expressions of interest from industry, government and academic leaders to join these committees and shape the future of digital manufacturing. Get involved to drive innovation and transformation.

PhD Opportunities

Apply for funded PhD positions and drive Australia's industrial transformation through smart, sustainable, and competitive manufacturing innovations.

CURRENT PHD PROJECTS:

- **Digital Twins for Digital Manufacturing** – 2 scholarships at Swinburne University of Technology.
- **AI and Machine Learning for Digital Manufacturing** – 2 scholarships at University of Queensland.
- **Open Platform for Digital Manufacturing** – 2 scholarships at University of Sydney.
- **Industry Co-Created Digital Manufacturing Solutions** – 1 scholarship at RMIT

New Partner investment opportunities are available to fund additional PhD scholarships, either fully or partially.

By contributing to a scholarship, you help grow the industry, drive innovation, and support the development of the future workforce.

Host PhDs

- Host a PhD student at your facility, focusing on cutting-edge technologies that add direct value to your business while strengthening Australia's manufacturing sector.
- Your support plays a vital role in STEM growth, upskilling, and creating new opportunities for the next generation.

SUBSCRIBE TO OUR NEWSLETTER

Whether you're just beginning your digital manufacturing journey or looking to stay updated on the latest research advancements, our newsletter keeps you informed with the latest news, upcoming events, workshops, and training opportunities. Scan the QR code or email us to subscribe!

FOR FURTHER INFORMATION CONTACT

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