AMPI
ADVANCED MACHINERY PRODUCTIVITY INSTITUTE

AMPI Insights Report

August 2024 – March 2026

‘Driving UK advanced machinery innovation, skills & industrial growth’
A Strength in Places Programme, funded by UKRI

UK Research and Innovation

Contents

Dan Brooks,
AMPI Institute Director.

Foreword

Why we needed the Advanced Machinery Productivity Institute

For nearly two centuries, the North of England was one of the world's centres for machine tools, precision engineering, and industrial know-how. It produced global leaders in lathes, tooling, and heavy machinery, and for much of the nineteenth and early twentieth centuries was widely regarded as a world leader.

Its strength did not lie in individual companies alone, but its industrial ecosystem – which combined machine builders, specialist suppliers, manufacturing customers, skilled labour, and access to finance aligned with long-term industrial investment. Local banks and investors understood manufacturing risk, supported capital-intensive growth, and allowed firms to reinvest patiently in tooling, skills, and incremental innovation.Knowledge, skills, and capital circulated continuously within this system, allowing capability to compound over generations.

Post-war industrial decline hollowed out this ecosystem. Many highly capable firms remained – particularly in aerospace, defence, and niche precision engineering – alongside a deep cultural memory of manufacturing. But without the surrounding system of suppliers, skills, and adjacent industries, it became far harder for firms to sustain scale, innovate consistently, or compete globally.

AMPI is working to create an ecosystem for the modern era so that UK Machinery firms can thrive.

Through our Strength in Places funding, our focus to date has been on Greater Manchester and West Yorkshire – which has a fantastic machinery heritage to build on. Here, we are working to connect regional SMEs with the expertise and knowledge to overcome technical problems.

Our network of companies and academia in manufacturing has generated many collaborations that have solved problems and unblocked paths to advanced machinery commercialisation. And through our purpose-built AMPI funding streams – as well as our deep knowledge of UK innovation funding levers – we have ensured funding for many of these collaborative projects.

To date, this approach has delivered impact to 50 companies in the region, many of whom now have commercial products on the market that would not have been possible without us.

Beyond individual successes, the bigger picture is the ecosystem we are creating.

SMEs increasingly know where to go for support, as word about AMPI has spread through machinery events, media and networks. UK manufacturers are able to find the advanced machinery capabilities they need without looking abroad. And as SMEs, academia and large manufacturers talk to each other, the direction of research and innovation naturally becomes more aligned to industry needs.

Individual examples show what success can look like. But it is when these compound over time, when ecosystems reappear, the value moves from helping companies solve problems, to providing a system that empowers companies to help themselves. Though we have some way to go to create a modern take on the industrial age, that is the journey we are on with AMPI.

We launched in 2021, and report on our First Phase activity to July 2024 can be found here **https://ampiuk.org/wp-content/uploads/2025/08/AMPI-Insights-Report.pdf**. As activity ramps up and our early work starts to translate into real commercial impact for machinery companies in West Yorkshire and Greater Manchester – as well as their buyers and partners around the UK – this report looks at what we have delivered from August 2024 to March 2026, and why it matters.

AMPI Highlights

TIMELINE

2021

£22.6m Strength in Places Fund announced for a consortium to deliver a 5-year innovation initiative in Greater Manchester and West Yorkshire, which became AMPI. The consortium was led by the National Physical Laboratory (NPL) and included four regional companies and five academic partners.

2022

AMPI formally launches

2023

First wave of Innovation for Machinery (I4M) funding launches, to deliver short-term expert consultancy projects to help machinery SMEs overcome technical challenges, funding 27 projects.

AMPI Innovation Fund Launched. Eight new industry projects funded, with six new SMEs joining the consortium.

2024

Advanced Machinery: Innovation Competition, in collaboration with Innovate UK, funds three projects led by three new SMEs in collaboration with academic consortium partners.

UK advanced machinery technology roadmap published: the UK's first advanced machinery technology roadmap.

2025

I4M Round 2 launches, funding 18 projects.

Future State of the Machinery Sector report launched describing UK machinery promise and long term ambition for a sustainable machinery sector.

2026

I4M Round 3 launches, funding five projects.

HIGHLIGHTS TO DATE

Many new innovations created across the region in **machine tools, automation, metrology, condition monitoring, and digital systems** as a result of AMPI funding and collaborations.

More than **£24m** in new revenue generated by UK machinery companies - of which **£15.8m** in exports - from products developed through AMPI funding.

79 collaborations forged between industry and academia to solve technical challenges and unblock routes to market

56 Industry-led projects funded by AMPI's funding programmes

43 SMEs supported through Innovation for Machinery (I4M) across Greater Manchester and West Yorkshire

66 new highly skilled jobs directly attributed to AMPI, with many more indirect roles created

£8.6m invested in industry driven projects

£14m in additional grant funding secured by partners made possible by AMPI-formed collaborations

Our consortium and the companies we partner with

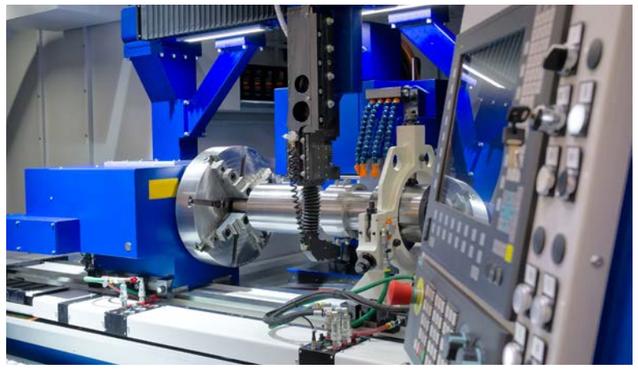
PTG Holroyd
Fives Landis
Wayland Additive
CR Solutions
Holdson
Craftsman Tools
Craven Fawcett
Highfield Gears
Halifax Numerical Controls
Machine Tool Technologies
Hydra Manufacturing
Zikodrive
Digital Transit
Cogri
Service Engineering CNC
Olympus Technologies

Zephlinear
Flexitallic
Chelker Design
Thomas Fawcett & Sons
Syscada
Revival-Cryo
My Eco Space Group
FOTENIX
Perfectly Fresh Cheshire
Baresh Optical
Farrel
Beer Piper International
Fibre Extrusion Technology
e4 Structures
Elcometer
Anomalyse
John Hunt
LBBC Group
Halifax Fan
Coleherne
Dathan Tools
Ex-Pressed Steel Panels

PECM Systems
Heyside Plastics
M Thornton Engineering
Azenta
Centrifuge Engineering Services
Lightcoatings
Cubit
B&M Longworth
Machine Tool Technologies
AI GPR (Visionry)
Manufacturing Technologies Association
Engineers Without Borders
Additive Manufacturing UK
Primary Engineer
Pilz Automation Technology
West Yorkshire Manufacturing Services
Rochdale Development Agency
University of Salford
University of Leeds
University of Manchester
University of Huddersfield
University of Greater Manchester
University of Bradford
National Physical Laboratory

What is AMPI?

AMPI is an industry-defined initiative with the goal of stimulating the UK's advanced machinery sector, starting with Greater Manchester and West Yorkshire.



We are a partnership between academia, industry, local government and NPL. Through a combination of initiatives we aim to boost innovation in machinery manufacturing across these two regions.

AMPI is funded by £22.6m from the UKRI's Strength in Places Fund (SIPF), which helps areas of the UK build on existing regional strengths in research and innovation to deliver benefits for their local economy, and the UK as a whole. This funding covers a five year programme running February 2022 to March 2027.

Where AMPI focuses

AMPI directly supports companies that design, develop and build advanced machinery, by **accelerating the development of next-generation machinery** and **building the skills to design, build, install and maintain advanced machinery**.

By 'advanced machinery' we mean high-performance equipment used in manufacturing and complex industrial operations, and which might integrate cutting-edge technologies for efficiency, precision, productivity, flexibility and safety. AMPI concentrates on two core technology areas: **Machine tools** and **Autonomous systems.**

Our work and its impact

To deliver on our goals of growing the UK's machinery sector, we have a number of levers we can pull, from a network of UK industry and academic expertise to access to funding streams. Whilst the core of our work so far has been about supporting new innovations, we have also been building the ecosystem around it that ensures that the sector continues to thrive.

In this section we look at how this ecosystem has delivered value to SMEs, and the wider UK economy, over the period this report covers (Aug 2024 – Mar 2026).

How we support UK advanced machinery innovation

The AMPI consortium consists of innovators and academia, who come together to define collaborative projects that develop or enable new valuable technologies, and so grow the advanced machinery sector.

Some of these projects are led by a company with a goal of developing new advanced machinery with commercial potential – with academic support along the way in technical areas such as CNC machine tools, additive manufacturing, measurement and testing.

Others are research-led, where academics seek to advance scientific foundations that will underpin next-generation machinery, with industry partners feeding in real use cases to focus research, and trialling solutions as they emerge. Across the projects, these academic-industry partnerships are investigating themes including modular machine architectures, human–machine systems, simulation and design tools, autonomy, error control, and intelligent monitoring.

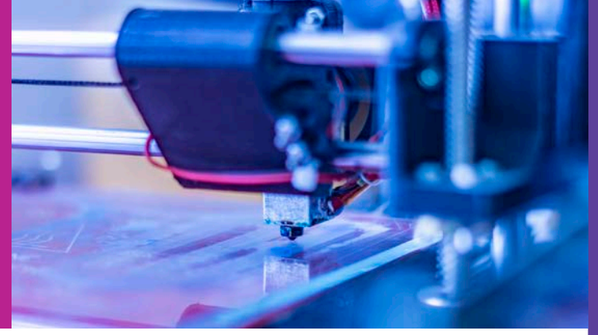
For smaller challenges, AMPI created I4M (Innovation for Machinery) a funding mechanism which provides short-term consultancy from our academic partners to help machine manufacturers explore early stage ideas or solve thorny problems that block routes to commercialisation.

Combined, these projects have generated over £24m in new revenue for our partners.

Some consortium members have contributed to – and benefitted from – several projects.

All of these projects are designed to stimulate collaboration, so companies form connections with local academics and institutions. That makes future problem solving easier as the art of the possible spreads through the advanced machinery world, and companies become more engaged with the members of the AMPI ecosystem.

Machinery innovation projects:
Success stories



Introducing our latest industry collaborators

When **Holdson** applied for funding, they were a few engineers with an idea. Now, with AMPI's support, they have developed and commercialised an electrochemical polishing machine for high-precision surface finishes of complex geometries. The machine combines an innovative polishing method with a digital control systems to produce repeatable, uniform results.

Holdson has already sold one machine to fellow consortium member **Wayland Additive**, and has more in production – with interest across Europe and Singapore. It has since secured £1.65m in investment to advance its technology, expand it facilities and scale up production.

Craftsman, known for toolholding and workholding solutions, first engaged with AMPI through an I4M project before becoming a consortium member. Its AMPI-supported project is equipping its live toolholders with sensors to monitor vibrations and temperature, turning that data into real-time production insights. This will transform how numerical control lathe users can obtain live performance feedback and adjustments, helping optimise machining processes and reduce waste. They have employed five new skilled employees as a direct result of their AMPI-funded project and have a sizeable export opportunity with a large manufacturer which could amount to £90K/month.

Halifax Numerical Controls grinds large rubber rollers used in applications such as print mills. These rolls wear quickly in use and need to be reground regularly. AMPI helped the company introduce a multi-point measurement system integrated into its machine controls, allowing the grinder to measure the rubber profile and adapt dynamically during grinding – delivering a step change in production efficiency and output quality.

In parallel, the company developed a new solution to extract dust generated during grinding, which can erode machine components and pose health risks to operators if inhaled. Thanks to an AMPI-facilitated partnership with the **University of Huddersfield**, it was able to use Computational Fluid Dynamics (CFD) to model how dust moves away from the grinding head and design a system that optimises extraction. The resulting design was 3D printed at Huddersfield, enabling a bespoke solution that improves operator safety and machine lifetime.

Turning research into real-world products

Readers of our first Insights report may remember the five initial industrial projects to develop new machinery. These are now successful commercial products.

PTG Holroyd's Helical Grinding Machine is on the market and with sales orders to the value of over £5m, and more in the pipeline.

CR Solutions have continued to improve their machine for automated sterilisation of cow teats, and have 15 machines in farms around Europe, and orders for 10 more, generating over £5m in revenue.

And **Wayland Additive's** electron beam additive metal manufacturing machines continues to deliver innovative products and materials to a wide range of customers in high performance industries like aerospace and medical.

Fives Landis was involved in two AMPI projects. The first helped it develop a Twin Turret Grinding Machine, which sold its first unit in 2025, and has helped a customer reduce a process – which previously involved nine machines, two sites, and took months – down to a single 30-minute run. The controller it developed in its second project has found use in its other machines which – by removing third party control software – allows rapid data processing, which enables real time grinding adjustments. A single customer ordered 19 of its machines after seeing the results, generating £20m in revenue.

Highfield Gears specialises in servicing large industrial gearboxes and electric motors. **Craven Fawcett** has a line of clay preparation machinery. Through separate AMPI projects, both are developing AI-enabled models to detect early signs of motor degradation. **Highfield** is testing its models with a steel manufacturing customer to help them deliver predictive maintenance services, whilst **Craven Fawcett** is integrating them into their own machines which are being trialled at a brick manufacturer.

Finally, **Machine Tool Technologies** has been servicing industrial machines for over 20 years and has built up rich datasets on machine wear and its impact on long-term durability. With AMPI funding, the company is using this historical data to develop software to predict wear on machines over time. This capability will move **MTT** beyond reactive servicing, offering customers data-driven, long-term maintenance strategies alongside its traditional service support.

Boosting precision manufacturing through advanced surface engineering

A research-led case study

Advanced machinery relies on precision cutting and grinding tools to produce precise components like gear teeth and turbine shafts used in cars, planes and wind turbines. Tiny surface defects cause components to wear out, crack, or fail much sooner than smooth surfaces, so polishing or coatings are used to improve performance and durability. As demand increases for higher precision, longer tool life, and greater sustainability, new polishing and coatings techniques are needed to support the next generation of advanced machinery.

Richard Moorhouse, Technical Director at Dathan Tool & Gauge Co Ltd, said:

“We are grateful to the team at UoM for their work on Electrolytic Plasma Polishing. Without their in depth knowledge and support, a small company like ours would not have the resources to embark on the research needed to improve tooling in the increasingly important area of cutting edge geometry.”

Solution – advancing electrochemical polishing

Under an AMPI research project, **The University of Manchester** investigated electrochemical polishing techniques – notably Electrolytic Plasma Polishing (EPPo) – to create more precise, durable and sustainable tooling.

EPPo is a non-contact surface-finishing process which involves dipping a metal into a liquid electrolyte and applying a voltage. This creates a thin layer of microscopic plasma bubbles at the surface, which gently removes raised spots and roughness. The process polishes the metal evenly and without mechanical contact, making it ideal for complex or delicate tool geometries. The research team explored several interconnected industrial challenges around EPPo.

Impact

The project advanced understanding of electrochemical polishing and translated that academic insight into practical industrial capability for three companies.

Bury-based **Wallwork Heat Treatment** – which sells heat treatment equipment and processes – improved the scalability and sustainability of their EPPo capabilities. Through the programme they accessed greener electrolyte formulations, new tools for extending electrolyte life, and a technique for applying electrical energy in controlled bursts, which improves surface finishes and is more efficient than their previous approach.

For **Holdson**, an electrochemical polishing technology company, the team unlocked paths to making electropolishing more sustainable, by identifying routes to recovering titanium from electrolytes in a reusable form, lowering environmental impact and recovering value from existing processes.

For **Dathan Tool & Gauge**, based near Huddersfield, the work showed how combining EPPo with purpose-built digital measurement tools can precisely control cutting-tool edge geometry. That helps improve tool resistance to chipping and laid the groundwork for the company to develop longer-lasting, higher-precision tooling.

Across these projects, the team advanced understanding of EPPo for precision tooling. Not only does that strengthen the capabilities of specialist UK machinery SMEs, it also benefits the manufacturing companies they supply, giving them access to higher-quality, more durable tools that reduce costs and improve product performance.

Out-of-the-box predictive maintenance for advanced machinery

An Innovation for Machinery case study

Most predictive maintenance involves training a machine learning model on specific machine behaviour. **Anomalyse's** approach uses a general-purpose machine learning platform that can interpret sensor data from an industrial machine it has never seen before, and quickly learn to recognise emerging problems.

Anomalyse's customers needed confidence that the model did what it claimed, and that their sensor data – which can vary dramatically in sensitivity, calibration accuracy, and reliability – would be good enough for the platform to deliver meaningful insights.

So **Anomalyse** needed a credible, validated use case to show their approach produced trustworthy insights out of the box.

Anomalyse tested its platform on **NPL's** in-house CNC milling machine – a common fixture in manufacturing, and one example of the many industrial assets the platform is designed to support.

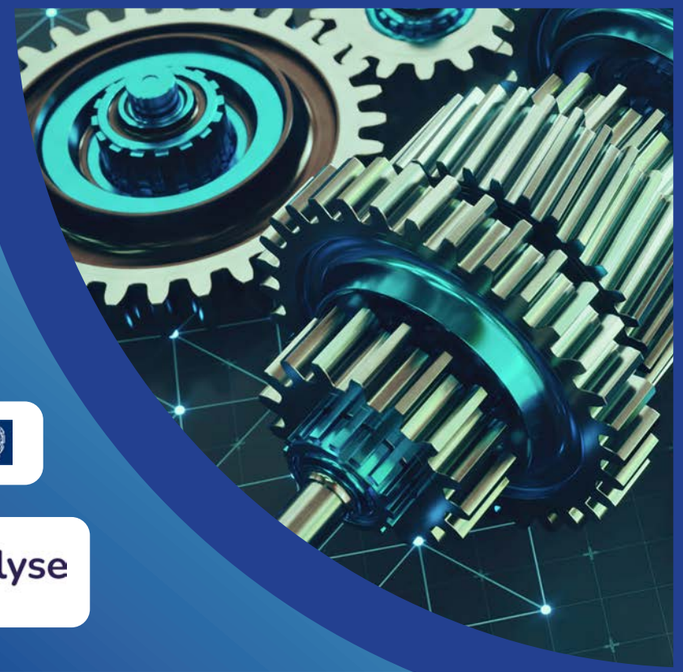
NPL installed two sets of vibration sensors on the machine: one high-grade, one low-cost and less refined. These were positioned side by side, allowing a direct comparison of "good" and "bad" data from the same machine under the same conditions.

Over the course of the test, **NPL** subtly reduced the grip of the machine's vice over successive milling runs, simulating a real industrial fault that would eventually lead to a part slipping or a process failing.

The **NPL** team measured the characteristics of the fault using a well-understood vibration data analysis technique. This allowed **Anomalyse** to compare its own results to a set of rigorous measurements.

James Rynn, CEO and Co-founder of Anomalyse, says:

> **"The key value for us is credibility – independent, academically grounded validation that what we're building is producing sensible, trustworthy outputs. As a new business, we don't have years of customer track record, but this gives us validation we can stand behind when speaking to customers and investors. It's still early days, but I'm confident this work will be key to commercial opportunities in the future."**



NPL

anomalyse

The Impact: Evidence to take to customers

The project showed that **Anomalyse's** platform detected the fault correctly, producing results consistent with **NPL's** vibration measurements. It showed that the platform provided valuable anomaly detection even with lower-quality sensor data. The study also demonstrated the platform could offer more detailed insights as data quality improved, for example, the high-quality data showed a step change in "error score" each time the vice was loosened, which could be used to estimate how close a machine is to failure, rather than simply detecting that something is wrong.

Anomalyse can now prove to customers that its platform can extract meaningful signals from sensor data without explicit training, even with low-grade data.

This evidence base is expected to become a major competitive advantage, helping **Anomalyse** win customers from large manufacturers with advanced monitoring systems to SMEs with more basic setups in a predictive maintenance market forecast to reach $60B globally by 2030.

AMPI supports SME with high-performance, 3D-printed materials

AMPI academic partner, **The University of Manchester** (UoM) has deployed 3D printing capabilities at its world-class Additive@ Manchester Lab **https://www.scieng.manchester.ac.uk/tomorrowlabs/additive-manchester/** to help a local SME produce precision-engineered parts for high-specification engineering markets – and so expand its market to customers operating in challenging environments such as pumps and compressors used in oil and gas.

The company in questions wanted to develop an innovative bearing using an advanced polymer-composite made from two materials. Through the I4M programme, the UoM team helped develop a bespoke 3D printing processes that could deliver specific material properties and geometries, drawing on its suite of specialist equipment, digital tools, and expertise.

A 3D printing system was selected which harnesses a rotating screw to mix the two materials in a way that forces them into a uniform combination as they travel through the heated barrel. To further improve consistency, the team added a sifting tool at the point where the materials enter the 3D printer, which supports powder to disperse more evenly. They also deployed digital systems to control screw speed and temperature to deliver a printed material with the optimal properties.

The Impact:

The project provided the company with an effective approach to producing its new bearing, and advanced its understanding of additive manufacturing and composite materials. Once developed, the new bearing could deliver sales of around £120k per annum, much from new markets and exports. At the same time, it is expected to reduce parts, labour and materials costs by around 50% compared with initial expectations for producing this product.

Advanced Machinery: Innovation Competition – AMPI designed, Innovate UK delivered

Digital Transit collaborated with the **University of Huddersfield** to develop an on-rotor sensing system for CNC machines, enabling condition data to be captured directly from rotating components.

Round Bank Engineering worked with the **University of Manchester** to develop embedded monitoring technology for during high-speed drilling and milling tools, integrating sensors directly into spindle housings.

Hydra Manufacturing partnered with the **University of Leeds** to develop advanced machinery capable of processing high-performance but hard-to-machine materials, including ceramics and metal matrix composites. **Hydra** recently secured additional investment of £320,000 equity investment for their next phase of development of production-grade ceramic manufacturing technology designed for real-world scale.

Supporting industry skills

Businesses need a pool of people entering the industry with relevant skills, as well as the ability to keep upskilling their own people. Even more critically, researchers and innovators need the skills to commercialise their products.

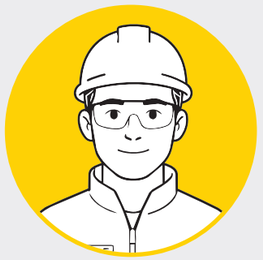
AMPI is developing skills initiatives that address challenges from multiple angles, from exciting primary school children about engineering, to equipping innovators with commercial skills, to offering targeted professional development for machinery manufacturers **(see infographic)**. In each case we are partnering with relevant education and skills organisations to inject a machinery focus into proven skills development programmes.

This multi-generation approach is crucial. At primary school age, we need to foster positive attitudes about STEM before stereotypes form, and showcase to all children that there is viable pathway to STEM careers. For post graduates and early career researchers, this work supports the translation of their engineering know-how to solving industry challenges, and also supports their understanding the real-world practicalities and constraints that they may later operate within. Finally machinery professionals, who face constantly advancing technology possibilities, need to stay up to date.

The programmes we run are summarised on Page 19.

These are still underway, and we will report on their outcomes in our final report in 2027.

The AMPI skill programme

Who	Skills partner	What we're doing
 Primary age children	Primary Engineer	Members of the consortium have signed up to visit schools and talk about their experiences of being an Engineer, followed by a Q&A with students.
 Undergraduates	Engineers Without Borders	A design competition that invites UK university students to design sustainable additive manufacturing solutions.
 Post grad and early career researchers	Innovate UK ICURe (in collaboration with the UK Robotics and Autonomous Systems Network).	Delivering ICURe Discover, a market discovery programme designed to support researchers working in advanced machinery and robotics & autonomous systems to take their first step towards commercialisation.
 Machinery professionals	Various	A suite of short CPD courses aligned to skills gaps identified through the consortium.

Building an advanced machinery innovation ecosystem

The foundation of everything we do is to strategically support the Advanced Machinery Industry in Greater Manchester, West Yorkshire, and beyond. We can only direct our tangible levers – funding and access to expertise – if we are connecting to the right people and they know about us.

EUSPEN
Precision & Performance Conference 2025

60%
of conference proceedings shaped by AMPI partners

40%
of posters delivered by AMPI collaborators

AMPI
positioned at the centre of key industry conversations through sponsorship of the networking dinner

As such we have a strategic focus on connecting to people.

Our **Technology Forums** are one expression of this. These are working sessions where academics and industry come together around shared themes – such as using data to inform design – to surface opportunities. Researchers showcase emerging capabilities that could unlock new machinery performance. Companies share lessons from the shop floor. Conversations turn into collaborations.

Alongside this, we work hard to ensure innovators know where to turn when they need support by promoting **Innovation for Machinery (I4M)** across the region. I4M has been embedded into **business engagement workshops with the University of Manchester, Innovate UK funding webinars,** and major events like the **Machine Building North Expo**. Those activities have helped drive applications.

Beyond our own platforms, AMPI actively participates in the wider machinery and manufacturing calendar. Whether contributing to **EUSPEN's Precision & Performance Conference**, helping shape the **Manufacturing Technologies Association Forecast Seminar**, speaking to machinery sub-sectors at the **Henry Royce Institute** and the **British Textile Machinery Association**, or sharing our insights via **The Manufacturer Magazine** **https://www.themanufacturer.com/articles/a-sovereign-machinery-supply-chain-is-critical-to-the-uks-industrial-future/**, the goal is to connect companies with problems to people who can solve them.

Often, the most valuable outcomes come from informal conversations. A discussion at a Strength in Places event between NPL and Lucideon (lead organisation for Midlands Industrial Ceramics Group, or MICG) led to an introduction between Lucideon and The University of Leeds' Prof Robert Kay. The University of Leeds went on to spin out Hydra with AMPI support. Lucideon then became Hydra's first customer, as well as providing valuable advice on how to evolve its technology commercially. That is just one example of how ecosystems deliver value in ways that are individually unpredictable, but inevitable when well-designed ecosystems exist at scale.

Where Next?

The year and a half since our last Insight Report has seen a huge growth in commercial impact from the AMPI Insights programme.

Most of this is simply a function of time. As our earlier projects reach maturity, machines developed under year-long projects hit the market and start attracting real customers. The fact that they have done so successfully – generating £24m in new revenue for UK machinery companies – is testament to our approach of focusing on commercialising machinery with clear value to industry. The current AMPI programme runs to the early 2027 and more such successes are expected as newer projects progress.

But success is also because we have become better at what we do. The first projects took longer to set up while we worked out funding and collaboration mechanisms. Later projects benefitted from a tried and tested process, and lessons learned, as well as a larger academic support ecosystem which has grown over time, as the benefits of network effects became apparent to industry and academia alike.

And herein lies the greater value of what we have built. The ecosystem of industry, academia and government funders that we have created holds potential beyond the programme, and perhaps beyond Greater Manchester and West Yorkshire. We started this report by discussing the history of the North as a manufacturing ecosystem, but in the modern era, manufacturing is more diverse and ecosystems are less geographically constrained.

As we conclude the programme over the rest of 2026, we will focus on ensuring our existing innovation projects deliver value and our skills initiatives make the regional machinery industry more resilient. As we do so, we will also explore how this highly successful model can evolve to deliver as wide an impact as possible to the UK.

This report was compiled by NPL,
who lead the AMPI SIPF Programme.

NPL
National Physical Laboratory

The National Physical Laboratory (NPL) is the UK's National Metrology Institute. Our mission is to to provide the measurement capability to underpin the UK's prosperity and quality of life.

Learn more about the support we offer SMEs:
https://ampiuk.org/

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