CATAPULT
High Value Manufacturing

Annual report 2025

Innovate UK
University of Sheffield AMRC Advanced Manufacturing Research Centre
cpi
mtc where progress happens
NATIONAL COMPOSITES CENTRE
NMIS National Manufacturing Institute Scotland
WMG THE UNIVERSITY OF WARWICK

Foreword

Steve Bagshaw CBE
Chair, HVM Catapult

Manufacturing matters.

From biopesticides to batteries, construction to coding, the sector we support is at the heart of our economy and our culture. Not only does it support 2.6m jobs, contribute £217bn each year to our economy and account for 42% of UK exports, it is also a cornerstone of the UK's net zero ambitions and national resilience.

To remain competitive on the world stage, manufacturers, large and small, must keep their productivity ahead of the curve. Whether it is fabricating silicon chips or assembling blades for floating offshore wind turbines, businesses need to overcome their technology challenges, develop pipelines of talent and stay sustainable.

That is why we innovate.

Productive manufacturers adopt the latest technologies, tools and services to grow profitably and sustainably. They create higher-value jobs, contribute more revenue to the economy and raise the living standards of their employees' families.

At scale they magnetise inward investment, anchor supply chains, build domestic industries and transform entire communities.

Jobs matter. Growth for the whole of the UK matters.
The future of our planet matters.

That is why manufacturing matters.

Contents

The High Value Manufacturing Catapult

The High Value Manufacturing Catapult is a strategic research and innovation hub for UK manufacturing, helping academia, industry and government solve the world's toughest engineering challenges.

Established and supported by Innovate UK, our network works together to accelerate industrial transformation. We are a market enabler, tackling key objectives in support of net zero, healthy living and national security.

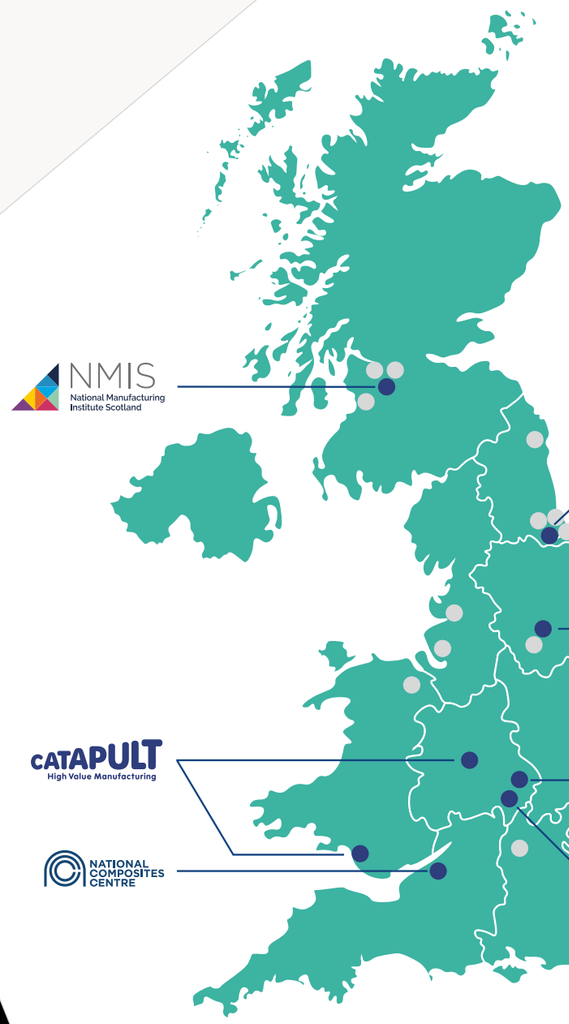
HVM Catapult drives the creation and adoption of innovative products, tools and services that deliver sustainable growth, secure high-value jobs, build national resilience and deliver net zero solutions for the UK.

Our network of centres provide companies access to world-class facilities and expertise that would otherwise be out of reach.

We are the link between academia and industry to apply research, commercialising the UK's most advanced manufacturing ideas and creating an environment for business to attract inward investment and compete on a global stage.

As partners to industry, we help ensure policy aligns with current and future business needs and creates the right incentives and operating environment to support delivery of the government's national missions.

Our network of centres have sites across the UK



Our impact since 2011

Number of projects

16,193

(all collaborative R&D and commercial)

36,655

companies worked with

20,878

SMEs worked with

42,450

SME engagements

£1.2bn

of core grant funding invested (inc. capital)*

*since 2013

HVM Catapult core grant funding

Grant Funding Agreement (GFA) period	Financial year	Annual award
GFA 2013-2018	2013/14	£36,542,000
GFA 2013-2018	2014/15	£28,799,000
GFA 2013-2018	2015/16	£55,098,000
GFA 2013-2018	2016/17	£79,820,000
GFA 2013-2018	2017/18	£90,173,000
GFA 2018-2023	2018/19	£109,617,000
GFA 2018-2023	2019/20	£127,974,000
GFA 2018-2023	2020/21	£134,491,000
GFA 2018-2023	2021/22	£134,501,000
GFA 2018-2023	2022/23	£145,525,000
GFA 2023-2028	2023/24	£158,360,000
GFA 2023-2028	2024/25	£155,248,000
Total to 31 March 2025		**£1,256,148,000**

CEO’s statement

Katherine Bennett CBE
CEO, HVM Catapult

Disruption excites some people and terrifies others.

If you are working to a tight production deadline, have supply chains at risk due to unpredictable weather, or simply at the mercy of public transport each day, it is a concept likely to keep you awake at night.

At the High Value Manufacturing (HVM) Catapult, however, being disruptive is our calling card.

For 14 years, we have matured pioneering technologies, harnessed emerging trends, opened doors for SMEs, developed supply chains, unlocked alternative investment models and trialled new approaches to talent and skills development.

By embracing disruption, successful companies grow; our 2025 Annual Report is testament to that.

The expert engineers, industry specialists and top-class technicians in our network are committed to solving manufacturers’ toughest challenges. From a space transport operation on the Shetland Islands, to a fibre cement manufacturer in Cornwall, and everywhere in between, our teams worked with over 6,000 companies in 2024, giving them access to world-class facilities and expertise to make step changes in their products, tools and services.

In this report we see the impact of some of those projects: increasing capacity for a family run sweet manufacturer, helping a MedTech company grow and working with an aerospace prime to optimise its aerodynamics.

It is important to reflect our impact across the UK and the changes in our network as Nuclear AMRC becomes a group within the Advanced Manufacturing Research Centre (AMRC); but we give just as much focus to what comes next.

The UK government has signalled with its Industrial Strategy that manufacturing is a key growth sector at the heart of our future economy. This will turbo charge our ability to stride forward, boosting our net zero ambitions and ensuring sustainable growth by harnessing the UK's industrial assets.

Supported by Innovate UK, the applied research activities of HVM Catapult will be essential to the government’s core missions. Our value lies in our ability to develop critical clean energy industries, grow clusters, develop skills and transform high-value industries.

This year’s Annual Report sets out how our centres are working together and alongside our partners in industry, government and academia to tackle four strategic priorities and five landscape transformation priorities for UK manufacturing.

As Dr Lynne O’Hare says (page 28-29), 2025 is about building on cross-Catapult successes such as the Hydrogen Innovation Initiative (HII) and Carbon Accounting programme, with new collaborative programmes that deliver for UK manufacturing.

Our programmes are built on the strong foundation of technological excellence and the unrivalled capabilities of our centres; also in this report, Professor Chris Dungey describes how our network is connecting national priorities with practical technological solutions (page 34-35).

And, as Karen Green (page 40-41) explains, none of this will be possible without a pipeline of talent, skilled in the technologies of today and tomorrow.

2025 will bring challenges and opportunities for UK industry. Here’s to staying disruptive.

2023-24 in numbers

We worked with...

6,050

companies

Of which...

55%

were SMEs (3,327)

SME engagements...

4,384

3,611

commercial and collaborative projects

791

engagements with academic institutions

422

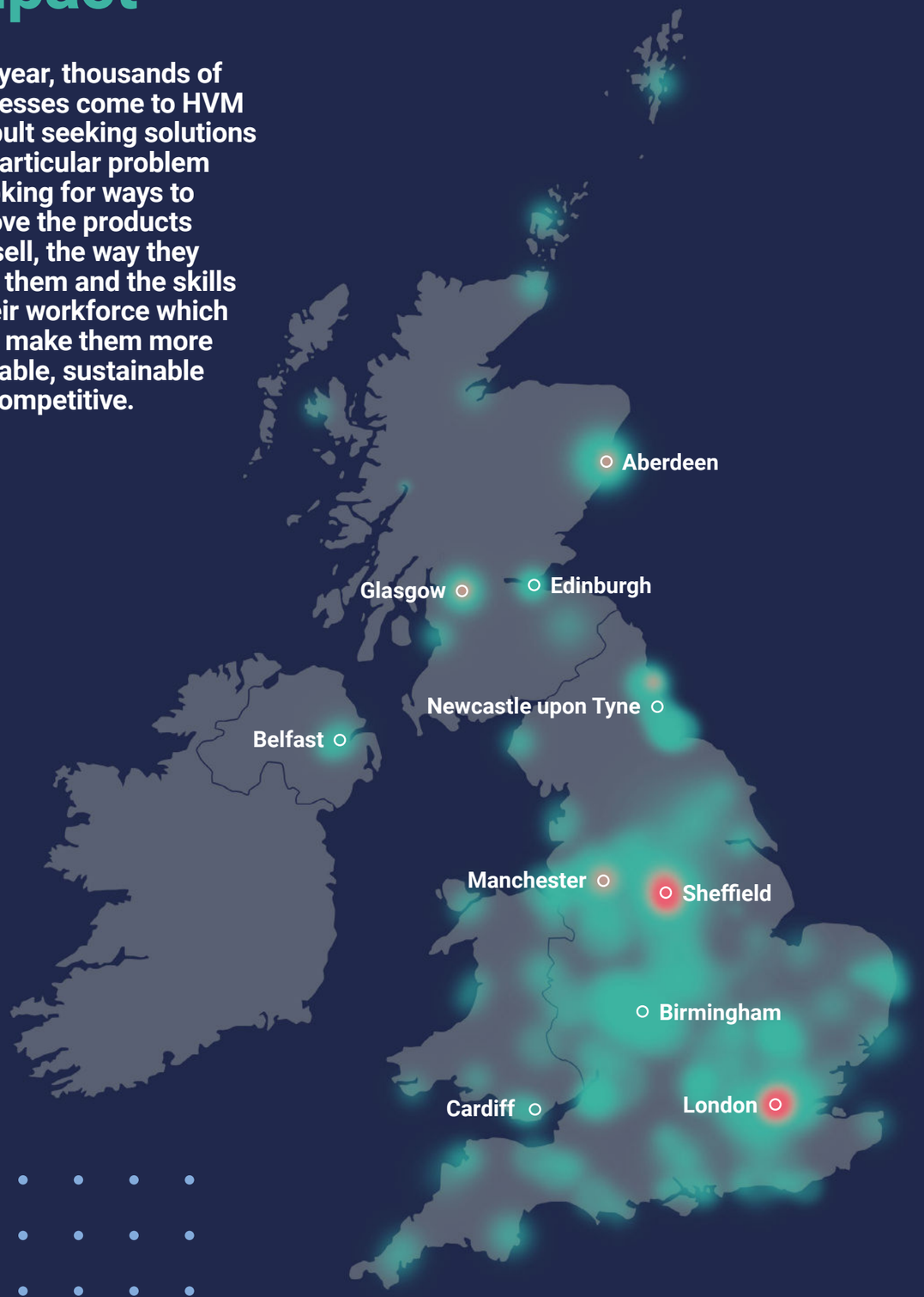
new pieces of IP formally established

Some of these boxes are interactive

You can click on the boxes and they will take you to the relevant page.

Our UK-wide impact

Each year, thousands of businesses come to HVM Catapult seeking solutions to a particular problem or looking for ways to improve the products they sell, the way they make them and the skills of their workforce which could make them more profitable, sustainable and competitive.



We worked with 6,050 companies in 2023-24

Smart production line unlocks more jobs and new contracts

The AMRC partnered with LISI AEROSPACE, a global leader in high-technology aerospace components, to deliver a smart factory production line which has increased productivity by over 100%.

The new line at its Rugby facility led to record turnover figures, 12 new jobs and the expansion of its apprenticeship programme. LISI AEROSPACE, which is part of French-owned LISI Group, has also won additional contracts worth over £2m and provisionally secured additional funding for two more production lines by 2027.

The project has become a showpiece case study within the LISI group and will now be used as a template for future projects.

Productivity doubled, record turnover and new jobs

> **This partnership has transformed our approach to project management, providing us with the fundamentals of running projects in an agile way.**
>
> **Taahir Patel**
> Process Development Manager
> LISI AEROSPACE

Factory simulation hits the sweet spot

NMIS helped a family-run sweet manufacturer streamline its processes and increase capacity by 43% by creating a digital simulation of its fudge production line.

The project identified potential bottlenecks and explored various 'what-if' scenarios, such as adding new equipment or modifying workflows. Engineers identified that heavy lifting and transporting products from one area of the factory to another could be reduced by 20% if boiling and mixing processes were combined into one station.

The simulation also revealed that by investing in boilers with a higher capacity than current equipment, Aldomak could produce an extra 260 kilograms of fudge per shift.

> **The project with NMIS was our first introduction to using manufacturing simulation and, as well as seeing the measurable benefits of the model, it highlighted the potential impact of collaborating with researchers to take Aldomak and our products to the next level.**
>
> **Dario Riccomini**
> Managing Director – Aldomak

Increased capacity by 43%

Making wings of the future – Airbus eXtra Performance Wing

NCC engineers delivered the design and manufacture of vital one-off flying parts to facilitate the UK's capability towards accelerating new technologies to decarbonise the aviation industry.

The wing demonstrators supported Airbus' innovative eXtra Performance Wing project to optimise wing aerodynamics and aircraft performance through hinged wingtips inspired by the biomimicry of seabirds.

The added rigour, knowledge and experience gained through the project helps to build and maintain the UK's position as a global centre of excellence and innovation, whilst also helping to support and develop the supply chain for aircraft wing manufacture.

Optimised wing aerodynamics and aircraft performance

Teaching the skills for low-carbon technologies

MTC worked with Quantum Group Renewables LLP, one of London's largest air source heat pump installation companies, with the aim of attracting 13,000 students a year onto college courses to give them the skills needed to install and maintain low-carbon technologies.

MTC supported Quantum with the development, prototyping and launch of its demonstration and teaching bays for green technologies for the further education sector. Portable equipment units for sixth form colleges have been developed to teach younger pupils about how the renewables and green technology works, while the collaboration also helped Quantum run over 200 courses for upskilling staff.

13,000 students a year could have the skills needed to install and maintain low-carbon technologies

> **MTC has been vital for the enhancement of our processes. We would not be in the position we are today without the collaboration, support and partnership between MTC and Quantum.**
>
> **Maria Gonella**
> Managing Partner – Quantum

In 2023-24 we worked on 3,611 commercial and collaborative projects

Cutting carbon emissions for construction giant

The AMRC worked with the University of Cambridge to help construction giant Laing O'Rourke cut its carbon emissions from concrete by 28% – a 14.4m kgCO2e saving, the same as planting 120,000 trees.

The long-term research programme, co-funded by Laing O'Rourke and Innovate UK, proved that a low-carbon concrete alternative can be used in place of traditional concrete.

The AMRC developed a simulation of the Laing O'Rourke Centre for Excellence for Modern Construction facility, in Nottinghamshire, to understand its process flows and investigate potential changes without affecting real-life production lines.

Carbon emissions from concrete cut by 28%

Very soon all our new projects will only use low-carbon concrete. I want to thank the team whose hard work has made it possible.

Rossella Nicolin
Head of Sustainability for Europe – Laing O'Rourke

Safety critical railway components

MTC helped Network Rail develop a low-cost, fast and effective inspection solution for rail fastener housings that could become a central element of future routine checks.

Rail fastener housings are a vital component of a track, ensuring the rail is secured to the sleepers. The Eastleigh derailment in January 2020 was caused by several RT60 fastener housings which had fractured and then failed.

An ultrasonic inspection process, using a custom 3D-printed probe holder, was developed by MTC to detect fracture defects in challenging rail-side conditions.

The inspection technique allows RT60 fastener housing components to be tested for fracture defects effectively for the first time.

Through a targeted selection process MTC helped identify a non-destructive-testing solution to identify where hidden defects are present in a critical component. The work has been instrumental in finding an effective solution quickly and efficiently.

Phil Winship
Principal Engineer, Asset Enhancements Team – Network Rail

Critical components can be tested for defects effectively for the first time

Embedding cross-sector capabilities

NCC early career engineers designed and manufactured an optimised paracanoe seat for Paralympic champion Emma Wiggs MBE, helping her win gold at Paris 2024.

Using digital tools, including embedded sensor technology, the team reduced material in low-stress areas and increased support where needed. The new seat is lighter, five-times stiffer and enhances power transfer from Emma's paddle strokes to the boat, boosting speed over the 200m course and enabling her to win gold in 58.88 seconds at the 2024 Paralympic Games.

While focused on sports, the capability to monitor structural health of the paracanoe seat in future Games has broader applications to deliver impact for the UK, be it smarter, more sustainable wind turbines or hydrogen storage solutions.

New seat is lighter, five-times stiffer and enhances power transfer

Foundational ISO standard for the safety of self-driving vehicles

WMG has led the establishment of the first international standard for safe operation of self-driving vehicles. A major step towards commercialisation, the standard will be relevant to every self-driving vehicle developed and manufactured anywhere in the world.

WMG's Safe Autonomy Research Group worked with global partners in the United States, Germany, Japan, China, France, Austria, Canada, Israel, Sweden, Finland, South Korea and Australia to develop and finalise the ISO standard.

Autonomous vehicle developers can now design and test their technology based on internationally aligned safety benchmarks, while international organisations, local governments and regulatory agencies can use it as a guide to develop their regulations and policies on self-driving vehicles.

We look forward to continuing to work closely with WMG to ensure that safety standards for self-driving technology are rigorous, and to increase confidence in the exciting technology we are developing.

Sarah Gates
Director of Public Policy – Wayve

A major step towards the commercialisation of self-driving vehicles

55% of the companies we work with are SMEs

Stamping down packaging emissions by 60%

WMG helped a Birmingham precision stamping and tooling manufacturer reduce packaging emissions across the company by 60% and cut costs by 15%.

Brandauer approached WMG's SME team to get a better understanding of its carbon footprint and tackle the amount of single-use packaging materials it was using for clients. As part of the Net Zero Innovation Network, WMG engineers mapped the packaging system and calculated greenhouse gas emissions.

Using the data, WMG recommended swapping conventional pallets for reusable packaging which could save the equivalent of 9.5 tonnes of CO_2 and slash costs.

The project has won Brandauer new clients that exclusively use reusable packaging.

Packaging emissions reduced by 60% and costs down by 15%

Revolutionising stroke therapy

CPI partnered with a next-generation MedTech company to create a game-changing solution for stroke survivors. By reducing the size of KnitRegen's stroke rehabilitation device from a bulky backpack to a sleek, wrist-worn wearable, the innovation offers greater independence and continuous therapy beyond traditional clinical settings.

KnitRegen's smart textiles use cutting-edge muscle stimulation to aid stroke recovery; CPI re-engineered the electronics to be more energy-efficient and compact, integrating a rechargeable Bluetooth-enabled battery.

This made the device accessible and life-changing for those with neurological conditions. By enabling home-based rehabilitation, it could also alleviate pressure on healthcare resources.

The collaboration helped KnitRegen secure £275,000 in investment to scale up its technology and grow its team by 20%. The project demonstrates how groundbreaking innovations in MedTech can transform patient lives, enhance healthcare delivery and support NHS efficiency goals.

£275,000 investment to commence product scale up

CPI designed the electronics that enabled us to repackage our technology into a wearable and portable form. The collaboration has also enabled us to rigorously test all the components to meet safety standards. We can now bring this technology to more people to help with their stroke rehabilitation.

Dr Laura Salisbury
Founder – KnitRegen

Taking ultrasonic scalpels to the next level

NMIS worked with Nami Surgical, a spin-out from the University of Glasgow that develops miniaturised ultrasonic scalpels for robotic assisted surgery, to progress its prototype to the next technology readiness level.

Nami Surgical received an Innovate UK grant to enlist the support of NMIS, which used its expertise to develop a bespoke test rig that allowed engineers to conduct a vessel sealing burst pressure test (VSBPT).

The results have been instrumental in the development of the Nami Surgical business, with the company on track to secure £2.5m in investment.

On track to secure £2.5m in investment

Transforming e-waste recycling

CPI partnered with DEScycle, a pioneering deep-tech company, to accelerate the commercialisation of groundbreaking e-waste recycling technology with the potential to transform the metals industry. By proving the concept at scale, CPI enabled DEScycle to unlock £5m in private investment, setting the stage for a sustainable revolution in recycling electronic waste.

DEScycle's disruptive technology offers a clean, low-carbon alternative to traditional metal recycling, which hasn't changed in over a century. Unlike conventional methods, DEScycle's circular approach recovers high-quality metals from discarded electronics, significantly reducing the environmental footprint of metal production and contributing to the global shift toward a greener economy.

With CPI's support, DEScycle advanced from proof of concept to large-scale demonstration. CPI's expertise in filling process gaps and connecting DEScycle with investors was instrumental in bringing the game-changing innovation to market.

CPI enabled DEScycle to unlock £5m in private investment

Thanks to CPI and partners' investment and in-house experience, we will rapidly commercialise this technology and bring real disruption to the metals market.

Fred White
Chief Commercial Officer
– DEScycle

Strategic priorities for UK manufacturing

HVM Catapult and its centres are working toward a series of priorities, taking a strategic approach to solving some of the most pressing challenges faced by the UK. The challenges are bigger than those of any one partner, customer or centre could address alone.

HVM Catapult and its centres are addressing the nation's strategic imperatives:

Net zero: industrial sustainability

Investing in systems change, including design, materials, digital and AI.

Net zero: clean energy transition

Creating UK clean energy supply chains for electrification, wind, hydrogen and nuclear.

Healthy living

Driving engineering biology, agritech and health tech development and scale up.

National security capability

Advancing defence and security product design, engineering and manufacturing to enhance response and preparedness.

Landscape transformation

Transforming the UK industrial landscape through supply chains and access to finance, skills and workforce, AI and digitalisation, SME support and place.

Driving industrial transformation

We will achieve our goals by working as a collective, bringing to bear the considerable strength and expertise of our industrial research centres and sites across the whole of the UK.

UK industrial transformation

Productivity

Resilience

Four strategic priorities

- Net zero: industrial sustainability
- Net zero: clean energy transition
- Healthy living
- National security capability

Five landscape transformation priorities

Critical enablers for products, processes, services and investment

- Access to finance
- Skills and workforce
- Supply chain
- SME support
- Place

Technical and academic capability

CATAPULT High Value Manufacturing

University of Sheffield AMRC Advanced Manufacturing Research Centre

cpi

mtc where progress happens

National Composites Centre

NMIS National Manufacturing Institute Scotland

WMG The University of Warwick

Delivering impact at scale

Dr Lynne O’Hare
Chief Portfolio Officer, HVM Catapult

The High Value Manufacturing Catapult launched a portfolio of priority programmes in 2024 to enhance our domestic capabilities, give our businesses competitive advantage in a global marketplace and help UK industry deliver positive change.

The four priority areas target the journey to net zero, in industrial sustainability and clean energy, national resilience, healthy living and national security. These strategic programmes are underpinned by a suite of critical enablers delivering transformative work in skills, for SMEs, increasing access to finance, focusing on AI and digital technologies, and spanning across the UK’s communities.

Funded by Innovate UK, our programmes in these strategic priority areas will deliver impact at scale by bringing together the considerable capabilities of the HVM Catapult centres and key partners.

Focusing on a small number of challenges, we will tackle challenges at scale and pace to deliver significant impact across our portfolio.

We are bringing together the collective expertise of the 3,500 people that work within HVM Catapult, leveraging billions of pounds of investment in the network to date and collaborating with government, regulators, industry and academia to solve our greatest industrial challenges.

This may include developing new technology to make diagnosis, treatment and prevention in the NHS more efficient, resulting in significant cost savings. Or it could include uprating UK industry to have a greater role in manufacturing for the defence sector at a time of increased global uncertainty.

It could include supporting the creation of a hydrogen economy, as set out in our flagship Hydrogen Innovation Initiative. Equally, it could see UK manufacturing evolve and grow to help us shift from a net importer to a net exporter of goods, balancing the service industry.

The general election saw a new government with an increased emphasis on economic growth and the redoubling of efforts in achieving the UK’s legally binding net zero targets. Manufacturing has a major role in reaching those goals through the Industrial Strategy.

Greater emphasis on green energy and green jobs with sustained economic growth will require innovation to achieve success. That’s where HVM Catapult can make the biggest impact for UK manufacturers and where our priority programmes will target those areas expected to have the biggest impact.

Our first tranche of projects are set to deliver at the end of the 2024/25 financial year, delivering outcomes which will have an even greater positive impact on our industry industry and our economy.

Hydrogen Innovation Initiative

> **It is only through working together that we will address the potential opportunities. It was really exciting to be here and see the enthusiasm buzzing around the room.**
>
> **Professor Julia Sutcliffe**
> Chief Scientific Adviser – Department for Business and Trade, speaking at the launch of the Hydrogen Innovation Opportunity

The Hydrogen Innovation Initiative is driving a vision of UK technology powering a global hydrogen economy that could be worth $8tn.

Hydrogen will have a critical role to play in delivering net zero. As part of this, demand for hydrogen technology, such as electrolysers, hydrogen gas turbines and fuel cells, is expected to increase to $1tn annually by 2050.

Led by the High Value Manufacturing Catapult, seven Catapults are working together with technology centres and research organisations, supported by an industrial advisory board. Across the programme there has been engagement with over 250 organisations, including 20 sector bodies.

Targeting a 10% share of this technology market could deliver £46bn each year to the UK economy by 2050, including 410,000 jobs. This was the headline finding in the **Hydrogen Innovation Opportunity** which was published in April 2024. The report brought together the varied insights from published data, combined with market analysis, direct input from leaders and industry across the hydrogen landscape to create a consensus view in one report. It builds a common understanding of the opportunity that the emergent global hydrogen economy presents the UK and to what extent innovation must play if the UK is to become truly world leading.

This work is now informing a case for action that the programme is developing alongside government and industry.

This will set out how the UK can capture 10% of the hydrogen technology market in ten years, looking at areas that provide cross-sector opportunities that offer the highest potential economic benefit. Sustained investment over the next decade will establish the UK's position – boosting public and private investment into key areas to get ahead of international competition. Insights from across industry and key stakeholders have brought clarity to technology requirements and identified four focus areas that represent the greatest potential benefit for the UK:

1. Production of hydrogen and conversion into carriers
2. Propulsion systems for transport and power
3. Industrial hydrogen for feedstock and heat
4. End-to-end hydrogen storage.

The work has been underpinned by the collective knowledge, footprint and expertise of 13 partners and live demonstrators across the UK. These have included NCC's work on composite cryogenic storage tanks for liquid hydrogen – expected to be an alternative fuel solution for several industries, including aerospace.

This action forms a key part of the UK drive to stake a claim in a growing hydrogen technology market.

Turbo charging battery materials scale-up

HVM Catapult is enabling the Faraday Battery Challenge (FBC) to enhance battery scale-up capability in the UK by delivering the Advanced Materials Battery Industrialisation Centre (AMBIC).

The £12m facility is being delivered by CPI and WMG. It provides innovation capability for the synthesis and processing of immediate and next generation battery materials.

AMBIC brings together scalable, commercially relevant equipment into one facility to fast-track battery materials development, enabling rapid, cost-effective product and process design. CPI's expertise in chemicals processing and WMG's cell development capabilities will unite to allow companies and researchers to scale their innovations from the laboratory to commercially relevant scale and enable "powder to cell" support.

The funding is part of a co-investment strategy between the FBC and HVM Catapult in order to support the development of a battery supply chain in the UK.

> **In CPI and WMG, the Advanced Materials Battery Industrialisation Centre has two centres that are at the very forefront of chemical processing and battery cell development; together they can turbo charge battery materials scale-up.**
>
> **Katherine Bennett CBE**
> CEO – HVM Catapult

> **With AMBIC and previous investments in UKBIC and the wider ecosystem, the UK will now be in a position to support businesses from 'powder to pack' and from lab to commercial scales.**
>
> **Thomas Bartlett**
> Challenge Deputy Director
> – Faraday Battery Challenge

A standardised framework for carbon accounting

The Carbon Accounting programme is a three-year collaboration of five members of the Innovate UK Catapult Network aiming to simplify and streamline existing processes for manufacturing businesses looking to measure their greenhouse gas emissions (GHG).

Led by the High Value Manufacturing Catapult, it also includes Digital Catapult, Connected Places Catapult, Energy Systems Catapult and Satellite Applications Catapult.

With manufacturing accounting for approximately 12% of the UK's total territorial emissions, but as much as 43% of consumption emissions, these challenges must be overcome quickly and successfully.

UK businesses are faced with a myriad of standards, methods and tools to measure carbon emissions, which are often inconsistent with each other and open to the interpretation of the user.

The data required, particularly for supply chain or upstream "Scope 3" emissions, is often lacking in transparency and accessibility, and there is no governance and co-ordination from any central body.

Companies report either being confused about where to begin, or frustrated and concerned at the excessive administrative burden they must endure to comply with varied legislative and buyer demands for carbon reports.

Due to conclude in 2025, the programme is developing a framework to simplify accounting, verifying, tracking and reporting GHG emissions associated with a company or product.

HVM Catapult has teamed up with the University of Leeds, the University of Bath and Carbon Chain to develop a website which gives a broad picture of sector emissions. You can find out how your industrial sector is doing on our Carbon Accounting website **hvmc.carbonchain.com**.

Harnessing HVM Catapult's unrivalled technology capability

Professor Chris Dungey, Chief Technology Officer, HVM Catapult

Over the last two years we have brought together the strength of our technology capability to, not only share and collaborate, but to build roadmaps that will ensure we can deliver productivity and net zero gains for the UK.

Our work connects national priorities with practical technological solutions. The technology capability roadmapping activity has transformed how we coordinate and deploy our network's extensive capabilities, deepening the strategic alignment and collaboration across and beyond our centres and giving us unprecedented clarity on current capabilities and future requirements.

Through collaborative workshops engaging experts across our network, we identified key industrial trends, challenges driving technological innovation and alignment between our core technical capabilities and the strategic priorities at the heart of UK economic growth.

We have identified the critical technology capability families: additive manufacturing, biomanufacturing, composites, joining, near net shape and subtractive technologies. Additionally, there are underpinning cross-cutting technologies whose development and deployment are critical to supporting the UK manufacturing base: assurance, advanced materials, digital engineering, digital manufacturing, and robotics and automation.

This gives us a clear offer to UK industry, using our facilities and experts to help businesses grow and develop new products and processes which will enhance productivity and drive economic growth.

Continual research and innovation is needed to ensure there is a consistent flow of ideas and supply chains are able to address emerging research and innovation challenges that arise during the scaling-up of manufacturing and deployment into full-scale production.

Our work goes beyond traditional technology planning and this dynamic framework – connecting national strategy, research excellence and industrial needs – will ensure the UK stays at the forefront of global manufacturing innovation.

As we move through 2025, we are focused on validation, integration and implementation.

There is strong alignment with Innovate UK's Materials and Manufacturing Vision 2050 and we will work closely with government, including Innovate UK, as well as undertaking industry consultation and validation of our capability roadmaps.

We will build on early successes, having already:

- Created an integrated vision that aligns our technical capabilities with national manufacturing priorities
- Established a framework for strategic investment decisions
- Fostered stronger collaboration between our centres, leveraging our collective capability and accelerating innovation.

By providing clear direction for technology capability development, delivery and cross-sector collaboration, we are guaranteeing HVM Catapult remains a trusted partner at the forefront of innovation and that UK manufacturing remains globally competitive.

We are guaranteeing HVM Catapult remains a trusted partner at the forefront of innovation.

UK Manufacturing Forum

The UK Manufacturing Forum gathers leading academics, knowledge experts and senior figures from industry and government to explore emerging trends and cultivate opportunities for collaboration across manufacturing.

Established in 2018, it is a collaboration between the High Value Manufacturing Catapult and the Institute for Manufacturing (IfM) at the University of Cambridge. An advisory board helps guide the forum's work, chaired by Professor Sarah Sharples, Chief Scientific Adviser for the Department for Transport.

In March 2024, the UK Manufacturing Forum and the Engineering and Physical Sciences Research Council (EPSRC) hosted the Future of UK Manufacturing conference at Cutlers' Hall in Sheffield.

Through presentations, panel discussions and workshops, the manufacturing research and innovation community looked ahead to future research priorities, investment areas and opportunities to support the growth of a resilient, industrially sustainable and balanced UK economy.

Leading figures from government, academia, innovation agencies and industry reviewed current successes, opportunities and challenges for UK manufacturing; examined the connected roles of manufacturing research and innovation in supporting the development of UK manufacturing; and designed an approach to ensure manufacturing research and innovation activities support net zero targets, delivering sustainable and balanced growth for the UK economy.

Helping South Wales manufacturers to innovate

HVM Catapult is working with Welsh Government to enable manufacturers in South Wales to boost their productivity, sustainability and competitiveness.

HVM Catapult Baglan, in Port Talbot, is the Catapult's newest site and the first in South Wales. It includes a working space, collaborative design and innovation zone and digital factory hub allowing businesses to tap into the world-leading expertise, facilities and support of HVM Catapult.

The office is managed by HVM Catapult and the digital factory hub, containing state-of-the-art equipment provided by Welsh Government, is run by AMRC Cymru, part of the Advanced Manufacturing Research Centre.

Manufacturing accounts for 18.4% of Wales' economic output, equivalent to £11.3bn per annum which supports 147,000 jobs. However, investment in research and development in Wales is 40% of the UK average and there is a high percentage of innovation inactive small and medium-sized enterprises (SMEs).

HVM Catapult is initially working with the estimated 100 middle-sized enterprises in South Wales which do not currently undertake any R&D activity. Targeted support to those businesses in the first five years, is estimated to create an additional £18m of additional GVA per annum.

The digital factory hub has a SMART workbench, robot and manufacturing assurance station, virtual reality and augmented reality equipment and additive manufacturing technologies.

Workforce development and skills

Karen Green
Chief People and Skills Officer, HVM Catapult

A talented and productive workforce is vital for business success.

It must be enabled to adopt and use technologies so that the full benefits of research and innovation can be realised within the UK. A skilled workforce is also a critical enabler for industrial transformation, underpinning the successful delivery of our strategic priorities. With around 3,500 employees including highly skilled scientists, engineers and technicians and 1,700 apprentices across the network, HVM Catapult is a significant employer, strategic influencer and provider in the UK engineering and manufacturing skills landscape.

Catapults play a vital role due to their expertise in developing and scaling technologies and through convening powers with industry, educators and trainers. HVM Catapult, working with the network and Innovate UK, has developed a portfolio of workforce and skills projects that are targeted at where we add most value across the skills value chain due to our technology expertise.

In 2024/25 there has been a strong focus on clean energy vectors. By working with industry, education and training providers at national and local levels, these projects have increased our ability to understand and respond to future skills needs. We are delivering change through:

> **These projects have increased our ability to understand and respond to future skills needs.**

Convening

Bringing stakeholders together to address critical skills needs in emerging technologies such as electrification and hydrogen, including:

- The Hydrogen Skills Alliance, co-founded by NCC, collaborates with industry partners to address skills gaps in the hydrogen sector. It has identified future workforce requirements through foresighting and enabled the creation of training programmes from basic awareness to specialised roles.
- The Innovate UK Workforce Foresighting Hub, led by the Manufacturing Technology Centre, develops processes and tools to understand and anticipate future skills needs across sectors.

Provision of specialist training

Our comprehensive offer includes:

- 248 courses, ranging from basic to advanced levels, designed to enhance workforce capabilities in the competitive clean energy landscape. Our training catalogue features modular short courses and continuing professional development (CPD) programmes.
- Apprenticeships at various levels, with 677 apprentices in training across the network during 2023/24.
- Collaborative doctoral training (CDT) programmes and specialised initiatives like CPI's RNA Academy.

Developing strategic partnerships

We are forging partnerships to develop curriculum content, influence standards and support STEM outreach. Collaboration with industry, the Institute for Apprenticeships and Technical Education (IfATE) and education providers ensures that standards and training meet industry needs, aligning with Local Skills Improvement Plans (LSIPs) and local growth strategies.

STEM support

In 2023/24 we conducted over 400 outreach events, reaching more than 100,000 young people. These initiatives aim to foster interest in STEM careers and increase awareness of opportunities in the clean energy sector.

Supporting diversity

We are committed to promoting diversity, including through:

- The Women in Manufacturing initiative, led by the High Value Manufacturing Catapult, Institute for Manufacturing (IfM) and Innovate UK.
- A network of affinity groups that champion diversity and inclusion, supporting individuals from ethnic minority backgrounds, the LGBTQ+ community and women, and neurodiversity programmes including those to support young learners.

2025 will be an important year for UK manufacturing and we will continue to build on our portfolio of projects in support of the UK Industrial Strategy to deliver lasting change for industry.

Innovate UK Workforce Foresighting Hub

The Innovate UK Workforce Foresighting Hub, now in its second year, is building a greater understanding of the impact of technology on current and future jobs.

Funded by an £8m investment from Innovate UK, its largest single investment in workforce activity, the Hub is delivered through the Manufacturing Technology Centre, in collaboration with the Innovate UK Catapult Network.

Workforce foresighting is a systemic approach to anticipating future skills and capabilities for new technologies, industrial growth and wider government priorities. It involves identifying the skills required for tomorrow's jobs, the gaps in the current provision and ensuring our education and training systems can enable the workforce to adopt new technologies.

The Hub collaborates with the Innovate UK Catapult Network's technologists, education and industrial partners to address national challenges and capitalise on market opportunities. The foresighting cycle process combines human expertise, open access data and AI capability to analyse and generate outputs on which industry, and workforce and skills professionals can make decisions.

Thirty foresighting cycles with 18 associated reports have been completed to April 2025. Impact in sectors such as floating offshore wind, RNA therapeutics and in-orbit satellite applications is demonstrated by the integration of workforce foresighting into sector growth plans and strategies, as well as through collaborations with universities and commercial training partners to develop new degree apprenticeships and short courses. HVM Catapult centres have also secured funding to develop curriculum modules for delivery in further education.

The Hub continues to develop its data-led approach, working with strategic partners to collaboratively anticipate UK and global trends, and inform how integration of new technology will impact industry. This is helping to shape a shared understanding of the current and future workforce skills required to support industrial transformation within the UK.

Women in Manufacturing

Women represent nearly half of the UK's workforce, but account for only 26% of employees in the manufacturing sector earning 16% less than their male counterparts.

To encourage more diversity and inclusivity in the sector, the High Value Manufacturing Catapult, Institute for Manufacturing (IfM) and Innovate UK established the Women in Manufacturing initiative in 2022 with the aim of raising women's participation in manufacturing to 35% by 2035.

Panel sessions, workshops and presentations are organised at industry events as part of the initiative, culminating in an annual conference.

In 2024, the programme commissioned the Women in UK Manufacturing 2024 report, which presented an overview of the progress and challenges encountered by women participating in UK manufacturing over the past year.

The report found that little progress has been made in women's representation in the previous 12 months, with only a slight increase in women's participation from 25.9% to 26.1%. It also said that the UK lags behind other leading manufacturing countries in women's participation; among the top 15 global manufacturing leaders, the UK ranks last.

The Women in Manufacturing initiative is supported by an industry advisory board which offers strategic advice and insights to a steering committee to help shape direction and priorities and facilitates engagement with key stakeholders to foster partnerships and collaborative efforts.

You can read more on the **Women in Manufacturing** website.

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