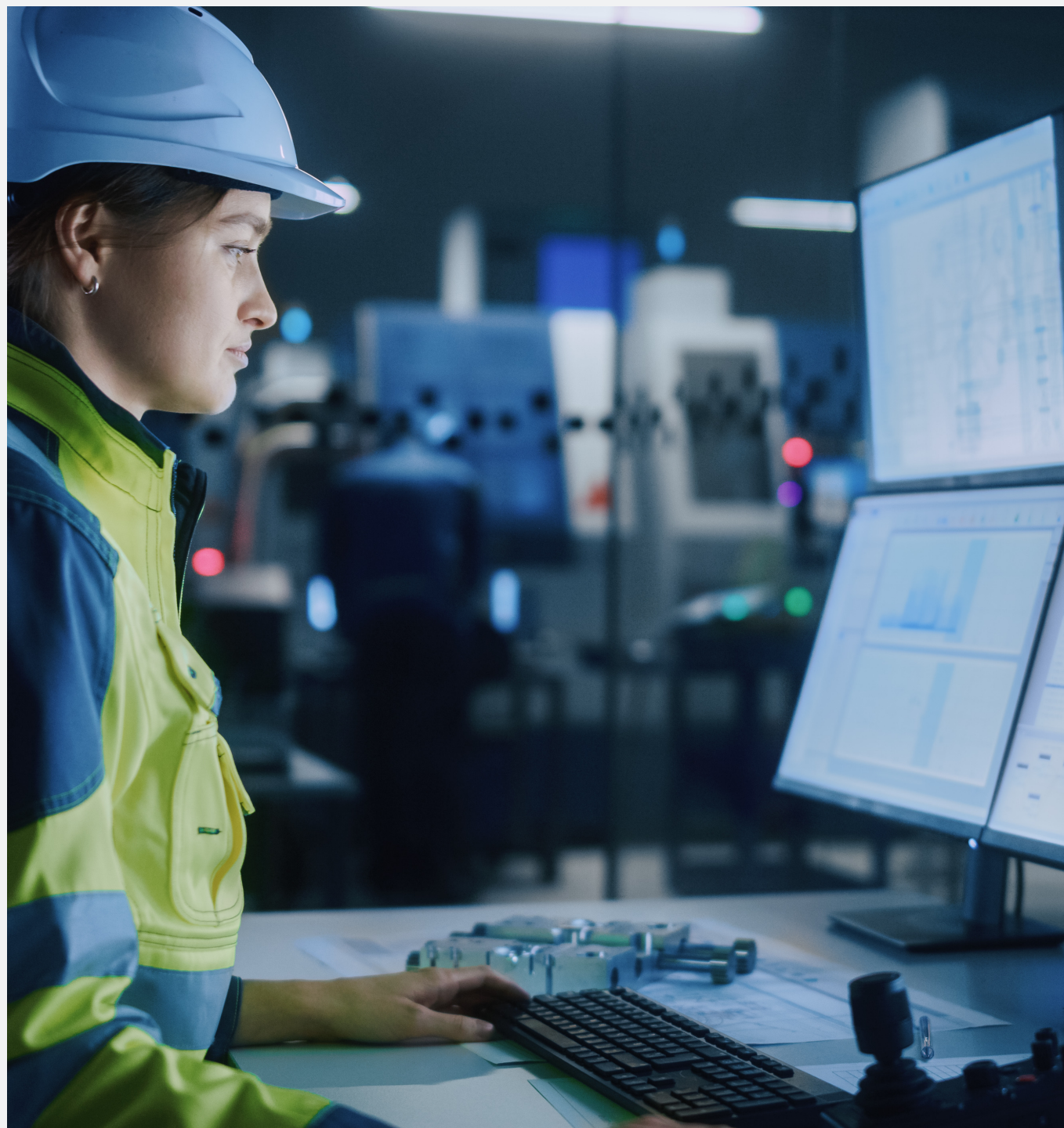


Overview of the UK Advanced Manufacturing sector

David Elson, Innovate UK



Reimagining materials and manufacturing

David Elson



Innovate
UK

Materials and Manufacturing

Critical and changing

Economy

- £203bn GVA
- 45% UK exports
- 2.5m jobs
- 61% UK R&D spend

Challenges

Emissions

- >15% domestic emissions
- 43% consumption emissions

Supply chain

- visibility, symbiosis, circularity
- disruption as the new normal

Technology

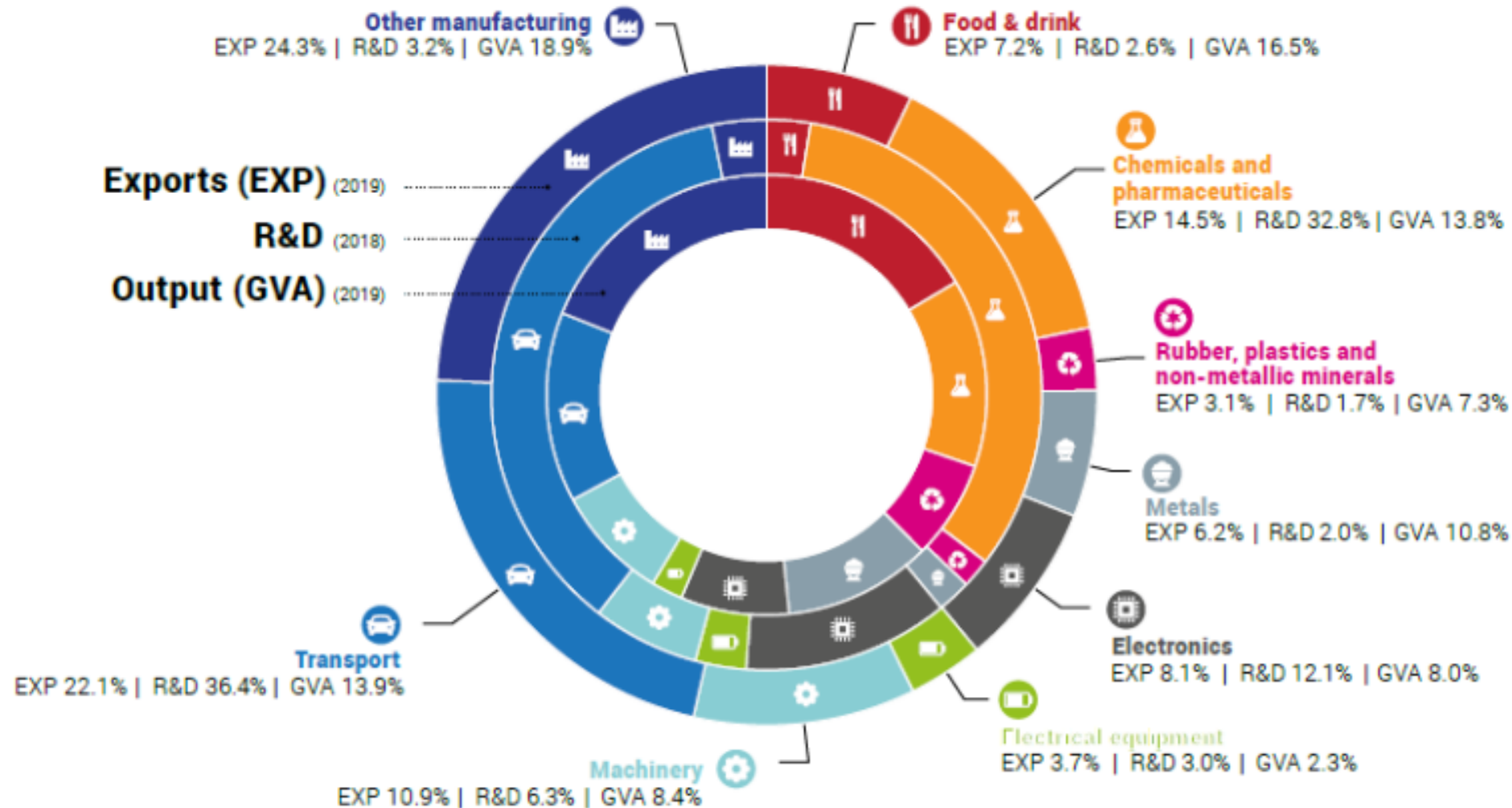
- bio tech, digital, productivity
- AI, novel business models



Materials and Manufacturing

Sector overview

as % of total manufacturing



Materials & Manufacturing

Advanced Manufacturing Plan

Priorities

- Investing in the long-term future of manufacturing
- Cooperating internationally and building supply chain resilience
- Reducing costs and removing barriers to boost competitiveness



Materials & Manufacturing Vision 2050

Built on 3 premises

Imperatives



Net zero,
resource efficient



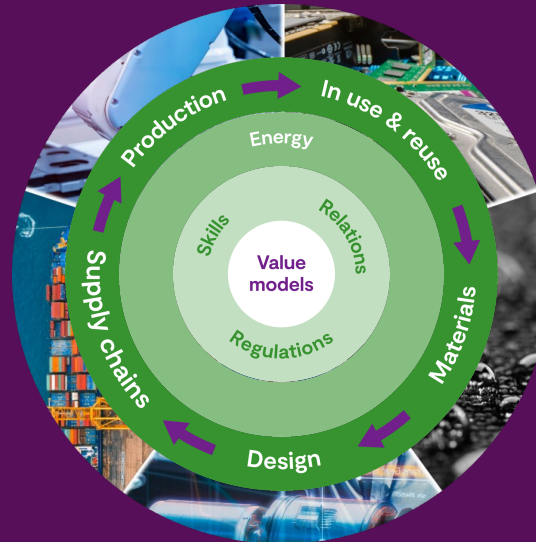
Resilient,
responsive



Technologically
advanced, digital

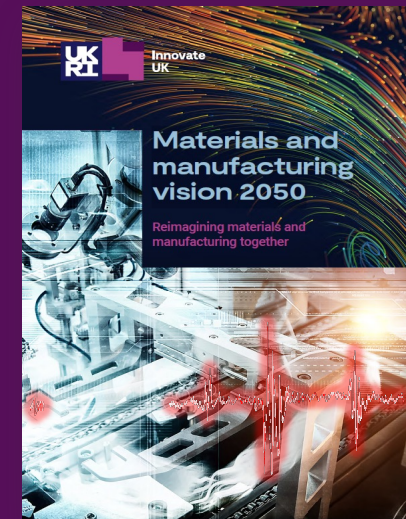
No longer a
zero-sum game !

Whole system



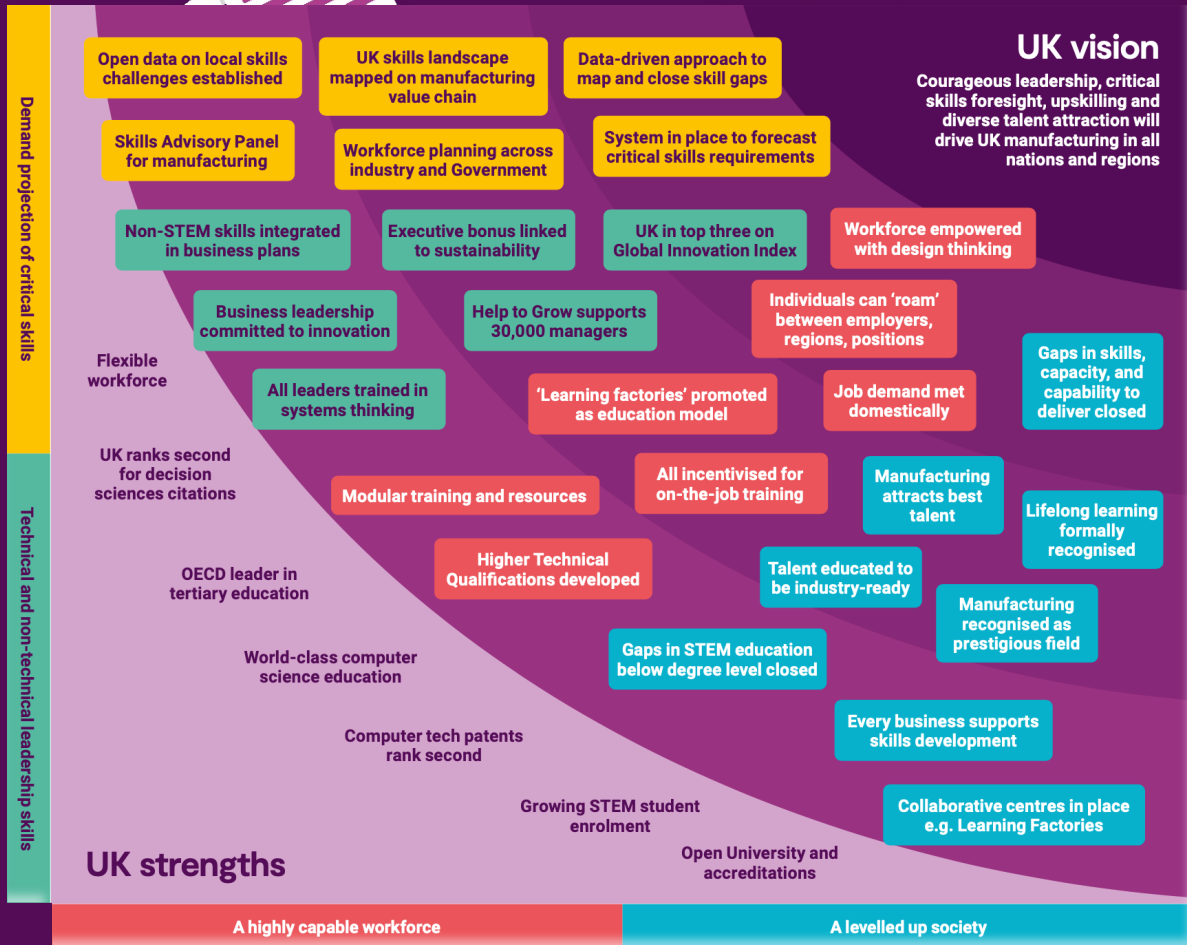
Each area is
equally critical !

Platform for debate

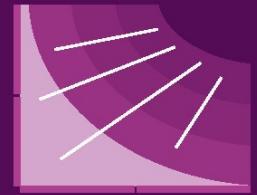
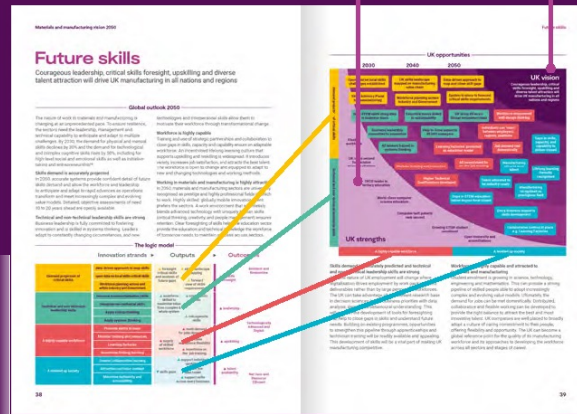


It's a living
document !

In summary



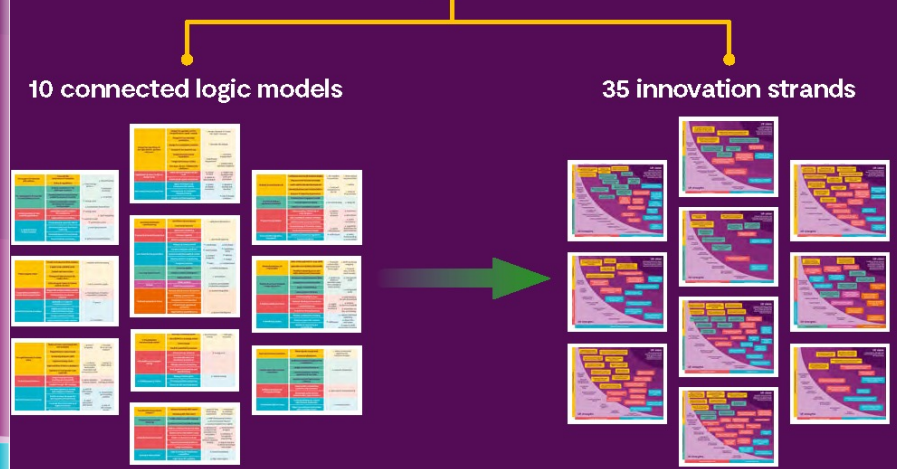
Innovation strands UK strengths Vision statements



35 Innovation strands identified



Sector agnostic vision

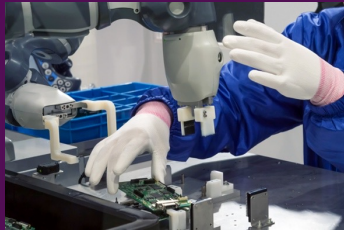


Reimagining materials and manufacturing together

UK Materials and Manufacturing Vision 2050



Aspirational



Realistic



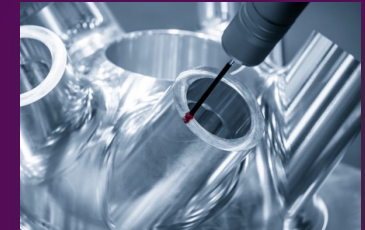
Comprehensive



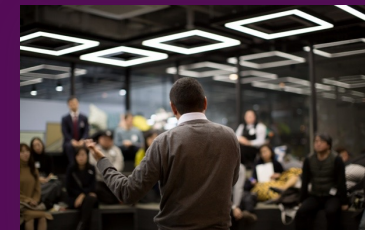
**To inform
strategy**



**To guide
investment**



**To stimulate
debate**



Strategic Delivery Plan 2022-2025

We will focus new programmes on key Net Zero themes:

Power: Develop new energy vectors to fuel vehicles, heat buildings and power industry.

Mobility: Move to electrified and net zero powertrain and reduce carbon through digitisation of transport.

Heat: Move away from gas heating space and water in all buildings.

Net Zero Living: Develop new products and services that transform where we live and work into net zero places.

Make and Use: Transform industry into an advanced, resilient and responsible system.

Green Finance: Increase private investment into green businesses and support their scale-up.

Circular Critical Materials: Develop supply chain resilience in a variety of mineral raw materials.

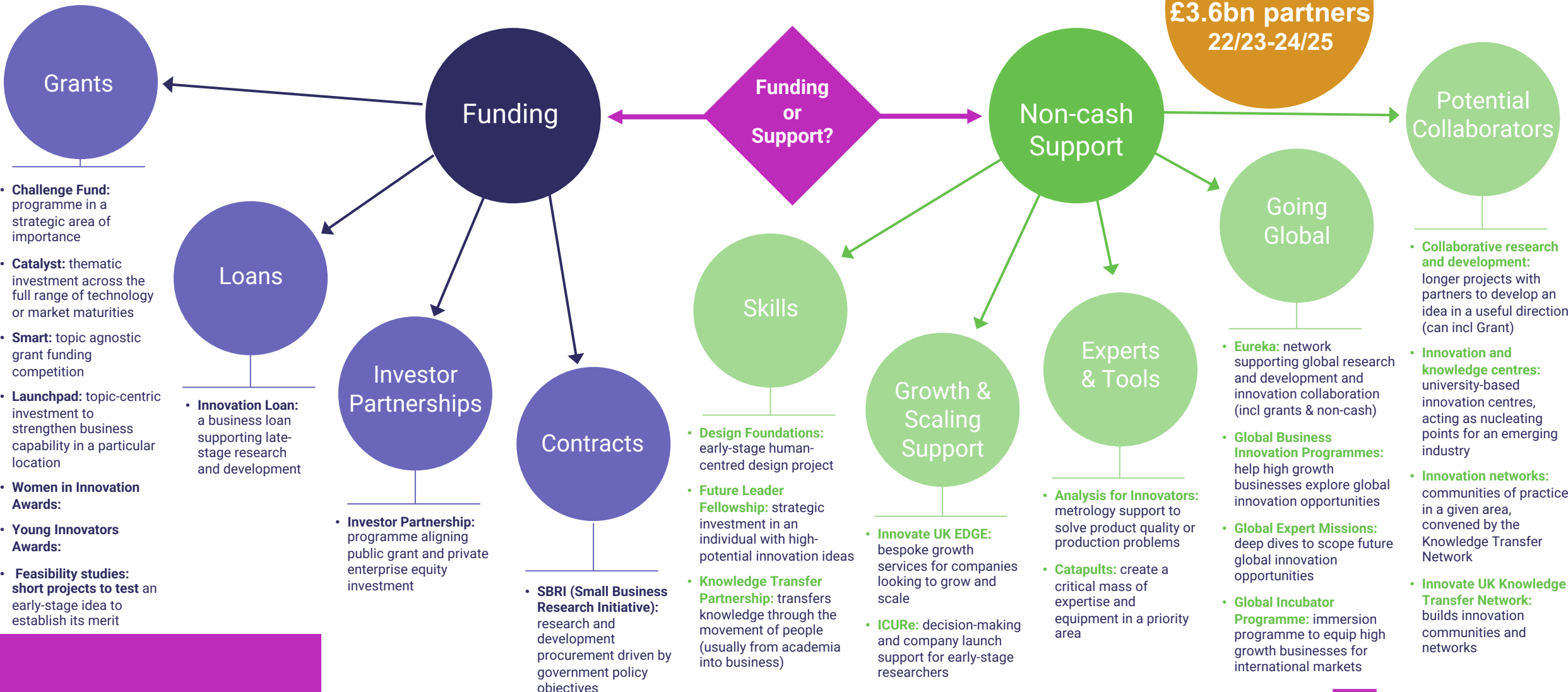


Principles

- Adaptation
- Environmental Sustainability
- Circular Economy
- Just Transition
- Energy Security
- Resilient Supply Chains

Products & Services

£2.6bn core +
£3.6bn partners
22/23-24/25



- **Challenge Fund:** programme in a strategic area of importance
- **Catalyst:** thematic investment across the full range of technology or market maturities
- **Smart:** topic agnostic grant funding competition
- **Launchpad:** topic-centric investment to strengthen business capability in a particular location
- **Women in Innovation Awards:**
- **Young Innovators Awards:**
- **Feasibility studies:** short projects to test an early-stage idea to establish its merit

- **Innovation Loan:** a business loan supporting late-stage research and development

- **Investor Partnership:** programme aligning public grant and private enterprise equity investment

- **SBRI (Small Business Research Initiative):** research and development procurement driven by government policy objectives

- **Design Foundations:** early-stage human-centred design project
- **Future Leader Fellowship:** strategic investment in an individual with high-potential innovation ideas
- **Knowledge Transfer Partnership:** transfers knowledge through the movement of people (usually from academia into business)

- **Innovate UK EDGE:** bespoke growth services for companies looking to grow and scale
- **ICURe:** decision-making and company launch support for early-stage researchers

- **Analysis for Innovators:** metrology support to solve product quality or production problems
- **Catapults:** create a critical mass of expertise and equipment in a priority area

- **Eureka:** network supporting global research and development and innovation collaboration (incl grants & non-cash)
- **Global Business Innovation Programmes:** help high growth businesses explore global innovation opportunities
- **Global Expert Missions:** deep dives to scope future global innovation opportunities
- **Global Incubator Programme:** immersion programme to equip high growth businesses for international markets

- **Collaborative research and development:** longer projects with partners to develop an idea in a useful direction (can incl Grant)
- **Innovation and knowledge centres:** university-based innovation centres, acting as nucleating points for an emerging industry
- **Innovation networks:** communities of practice in a given area, convened by the Knowledge Transfer Network
- **Innovate UK Knowledge Transfer Network:** builds innovation communities and networks

Inspire. Involve. Invest.



Reimagining materials and manufacturing together

International - benchmarking

Identifies international research and innovation collaborations with the potential to unlock opportunities for UK next-generation materials and manufacturing

Includes:

- key motivations and win-win principles for international research and innovation collaboration
- strengths of the UK advanced manufacturing and materials sector
- identification of UK technology priorities, major opportunities for international collaboration and key partner countries
- implications for the selection and funding of future international collaboration



LONGLIST - Opportunities by Country and Technology			
Country/territory	Net zero manufacturing	Industrial digitalisation and supply chain resilience	Other/general
Australia	• Green hydrogen production		
Canada	• Sustainable plastics	• Data science and sensors • End-to-end supply chain integration	• Quantum systems manufacturing
China	• Batteries • Electric vehicles	• Robotics	• Bio-refinery processes • Additive manufacturing
The EU	• Hydrogen – aerospace • Power electronics		
Germany	• Batteries • CCUS • Hydrogen – fuel cells	• Materials informatics • IoT and IIoT • Digital systems integration • Predictive systems	• High-performance computing • Graphene and 2D materials
India		• Digital twins	• Synthetic biology manufacturing
Israel		• Industrial cybersecurity	• Quantum systems manufacturing
Japan	• Sustainable plastics • CCUS • Green hydrogen production	• AI and machine learning • Augmented and virtual reality • Predictive systems	• Bio-derived materials manufacturing
South Korea	• Electric vehicles	• Automation machine-building • Digital twins	• Bio-refinery processes • High-performance computing • Graphene and 2D materials
Singapore		• AI and machine learning • Robotics • End-to-end supply chain integration	• Synthetic biology manufacturing
Switzerland		• Automation machine-building • Augmented and virtual reality	
Taiwan		• Data science and sensors • IoT and IIoT	
The US	• Hydrogen – aerospace • Hydrogen – fuel cells • Power electronics	• Materials informatics • Industrial cybersecurity • Digital systems integration	• Bio-derived materials manufacturing • Additive manufacturing

Materials and manufacturing

Now is the time to reimagine materials and manufacturing



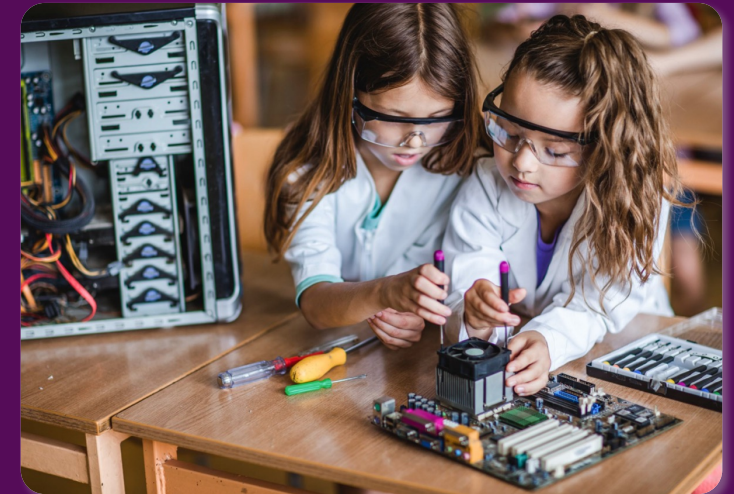
Mission critical for UK and world

Climate | Supply | Economy



Stimulating and exciting

Opportunity to change the world



Difficult but doable

Requires our best talent



www.ukri.org/reimagine-manufacturing

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