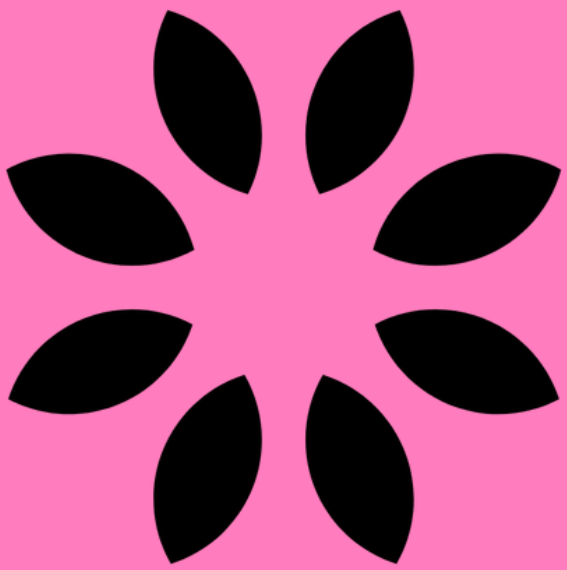
BIO-BASED SOLUTIONS:

FINANCING THE FUTURE

Edition 1



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BBIA
CHAMPIONING THE INDUSTRIAL BIOECONOMY

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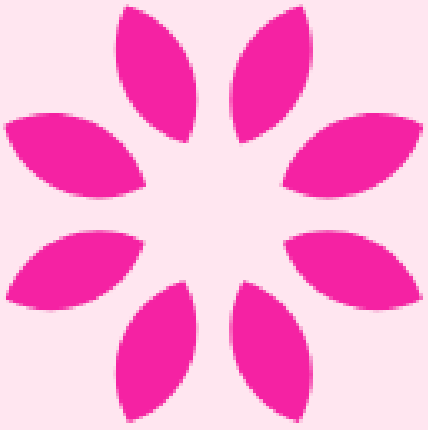
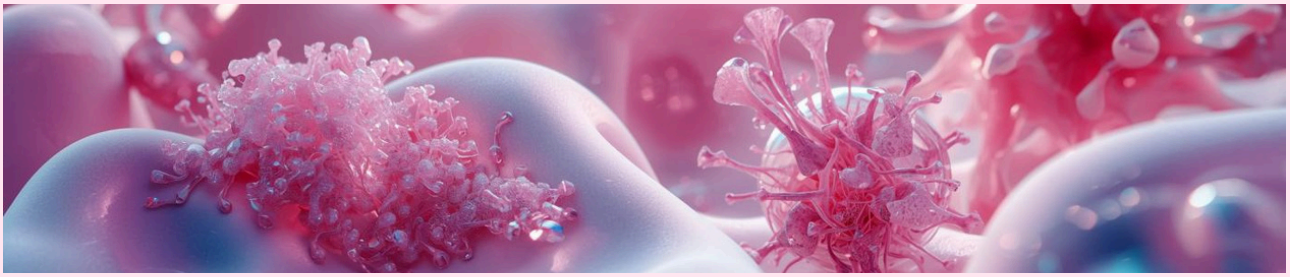


01 INTRODUCTION



INTRODUCTION

The transition to a low-carbon, resource-efficient economy is no longer theoretical — it is reshaping the UK's industrial landscape. Legally binding net-zero commitments, evolving industrial strategy, and growing investor scrutiny of environmental, social and governance performance are accelerating structural change across energy, manufacturing and materials.

Within this transformation, non-human health applications, such as chemicals, materials, food and feed are emerging as a strategic industrial priority. Derived from renewable biological resources — including crops, forestry residues, algae and waste biomass — these technologies provide viable alternatives to fossil-based feedstocks. They offer the potential to reduce lifecycle greenhouse gas emissions, strengthen domestic supply chains, improve resource security, and stimulate high-value regional economic growth.

The UK is well positioned to capture this opportunity. A globally recognised research base, world-class universities and established chemical clusters provide a strong foundation for sector growth. However, structural barriers remain. High capital intensity, technology scale-up risk, feedstock constraints, market price volatility, and regulatory complexity create significant financing challenges. Access to appropriate capital — spanning early-stage R&D, demonstration facilities, and commercial deployment — is therefore decisive in determining whether innovation translates into industrial scale.

This report examines the flow of finance into UK non-human health bio-based solutions (collectively called the bio-based sector in this report) between 2008 and 2025. Drawing on investment data from 353 companies, it analyses more than £3 billion of public and private capital deployed across the sector.

The analysis explores:

- Growth trends in private fundraising
- The catalytic role of public grant support
- Differences in capital intensity across industry segments
- Regional investment distribution
- The balance between early-stage innovation funding and later-stage scale-up finance

By assessing funding sources the report evaluates how effectively the current financial ecosystem supports long-term competitiveness. The findings provide an evidence-based view of how the UK bio-based ecosystem has evolved over nearly two decades — and what this trajectory implies for future growth, resilience and global competitiveness.

Strengthening financial pathways into bio-based chemicals and materials is not only an environmental necessity; it is a strategic economic opportunity. Targeted capital allocation can accelerate innovation, anchor manufacturing capacity domestically, enhance chemical, energy and material security, and position the UK as a global leader in sustainable chemistry and advanced materials.

KEY STATISTICS

£3.1 billion

total public and private investment into UK bio-based companies (2008–2025).

2/3

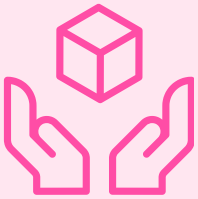
total sector investment from Private Capital.

£10.8 million

average total private funding per company.

£2.9million

average total public funding per company.

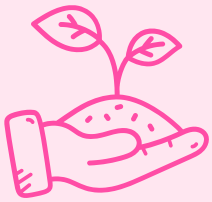


15 x

Biomaterials segment grant-to-fundraising ratio.

London

accounts for just under 50% of total historic bio-based investment.



Seed stage

investment dominates UK, with later-stage Series B and C rounds frequently secured overseas.

Scaling-up

remains a significant barrier for growth of UK bio-based companies

4,230

new jobs if scale-up barriers overcome.

£500 million

annual GVA uplift from solving scale-up constraints.

02

PUBLIC & PRIVATE INVESTMENT

PUBLIC & PRIVATE INVESTMENT

Overall Investment Landscape
The bio-based sector in the UK has secured over £3bn in public investment and private fundraising over the past (nearly) two decades (2008–2025). Private fundraising has been marked by relatively small numbers of high-value raises, alongside a broader base of smaller amounts. A total of 353 companies received grants, private fundraising, or both. Across this group, the average total funding per company was £8.7 million, reflecting meaningful capital inflows, though funding remains unevenly distributed.

Private Fundraising
Private capital accounts for roughly two-thirds of the £3.1bn total investment. However, fundraising is highly concentrated. The data shows private investment has been driven by a small number of large funding rounds, while most companies raised significantly smaller amounts. This suggests a scale-up dynamic where a limited group attracts substantial growth capital, while a broader base of early-stage or niche firms secure modest sums.

Public Grant Funding
Grant funding is more widely distributed, supporting more companies at lower average values. This reflects the role of public funding in early-stage R&D, feasibility studies, pilot development, and innovation support—particularly where commercial risk remains high.

Key Observations
- Strong public foundation: A large majority of companies (330 of 353) accessed grant support, highlighting public funding's role in de-risking innovation.
- Private capital concentration: Fewer companies secure private investment (197), but private funding represents the larger share of total capital.
- Scale gap dynamics: The disparity between average grant funding (£2.9m) and private fundraising (£10.8m) suggests major capital injections occur at later stages.

Table 1. – Total Public & Private Investment

Metric	Value
Companies with Grants or Fundraising	353
Total Grants & Fundraising (2008 – 2025)	£3.1bn
Average Grants & Fundraising (2008 – 2025)	£8.7m
Private	Value
Companies with Fundraising	197
Total Fundraising	£2.1bn
Average Fundraising	£10.8m
Public	Value
Companies with Grants	330
Total Grant Funding	£946m
Average Grant Funding	£2.9m

Figure 1 – Bio-Based Fundraising Timeseries

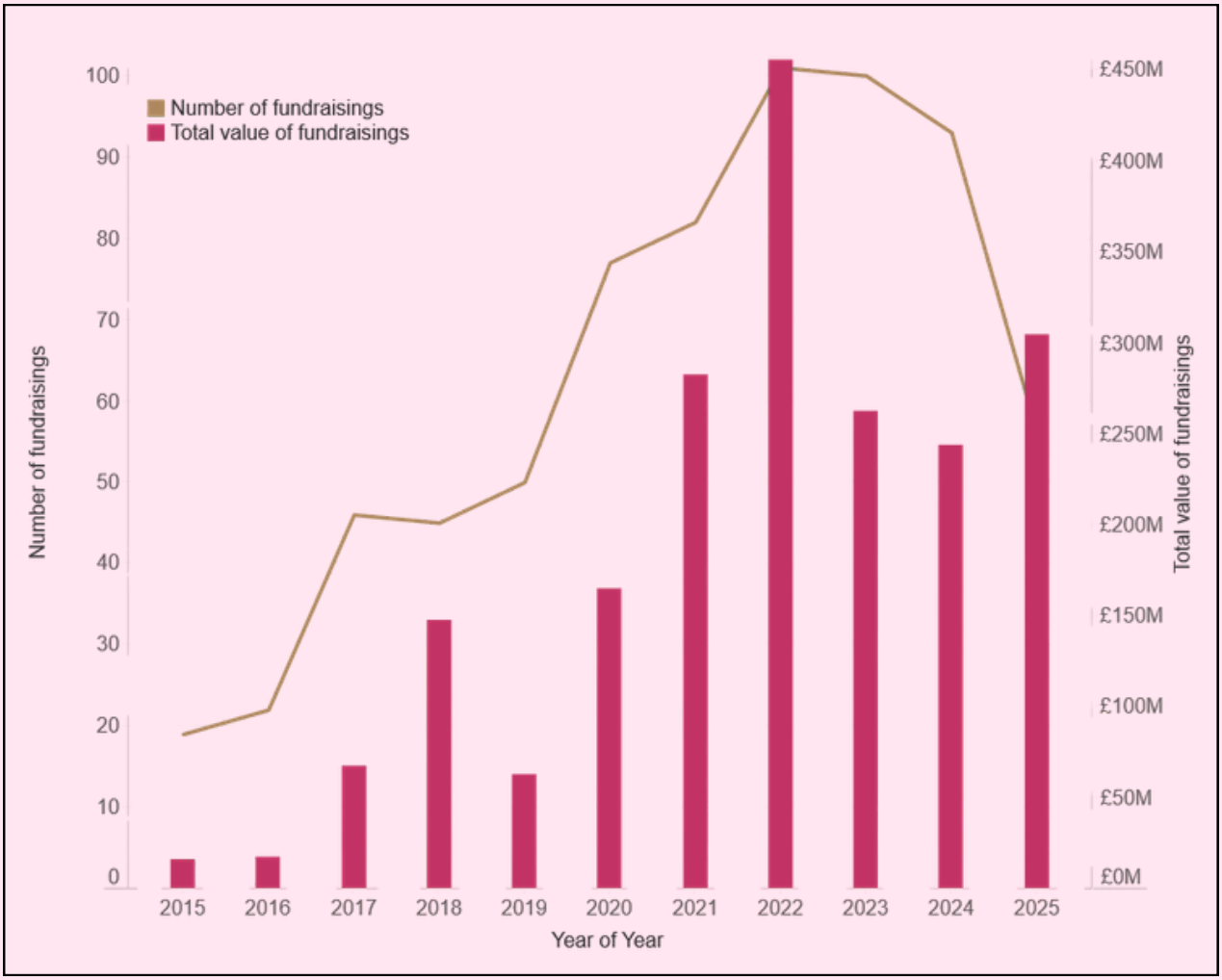
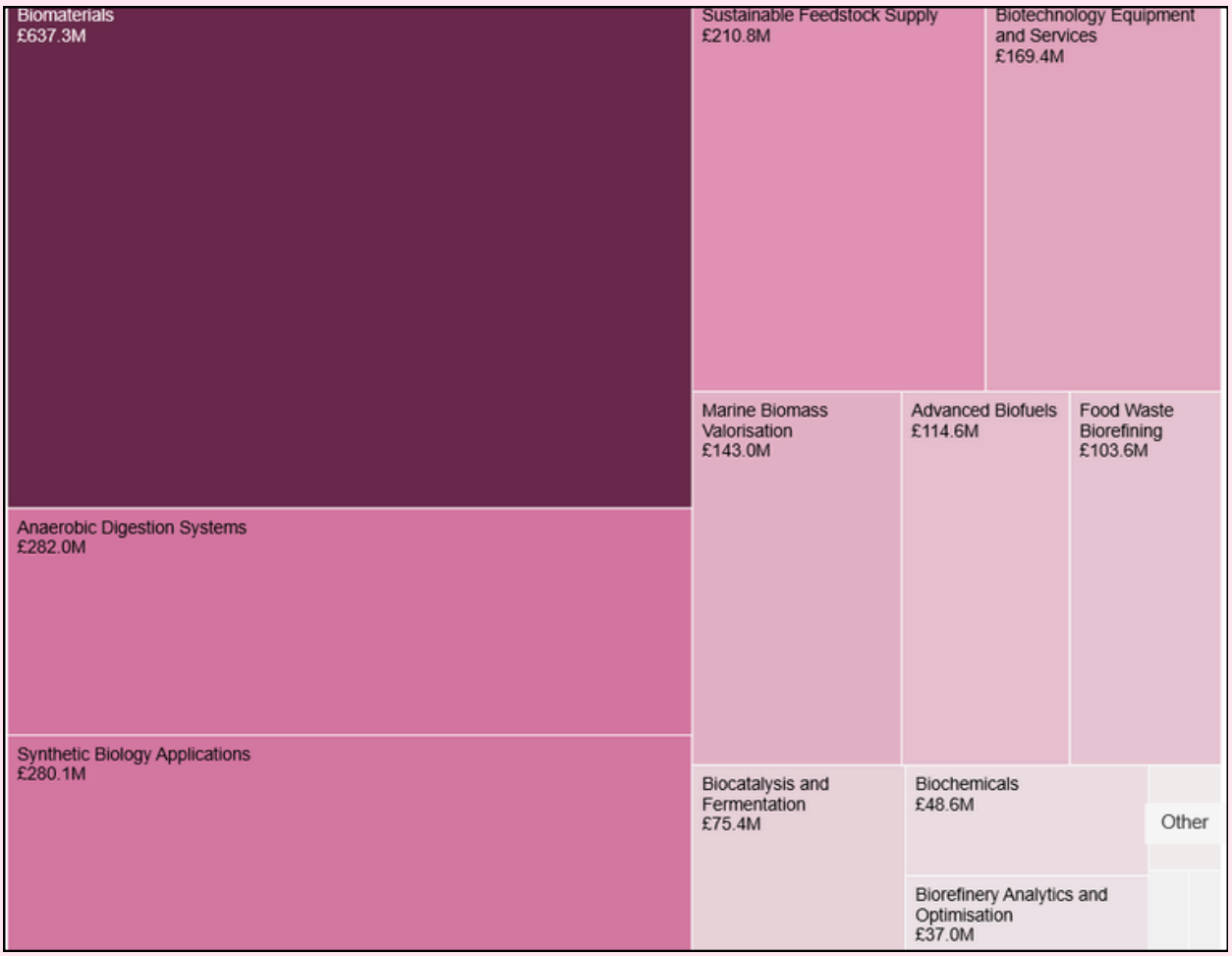


Figure 2 – Investment in Bio-Based Sector by Industry Segment



Grants vs Fundraising by Industry Segment

Comparing the value of grants vs fundraising across industry segments gives an indication of the commercial traction gained by businesses in different segments.

The median grant-to-funding ratio (value of fundraising secured for each £ of grant funding) across industry segments is 4x, with the middle 50% of sectors falling between roughly 2x and 6x.

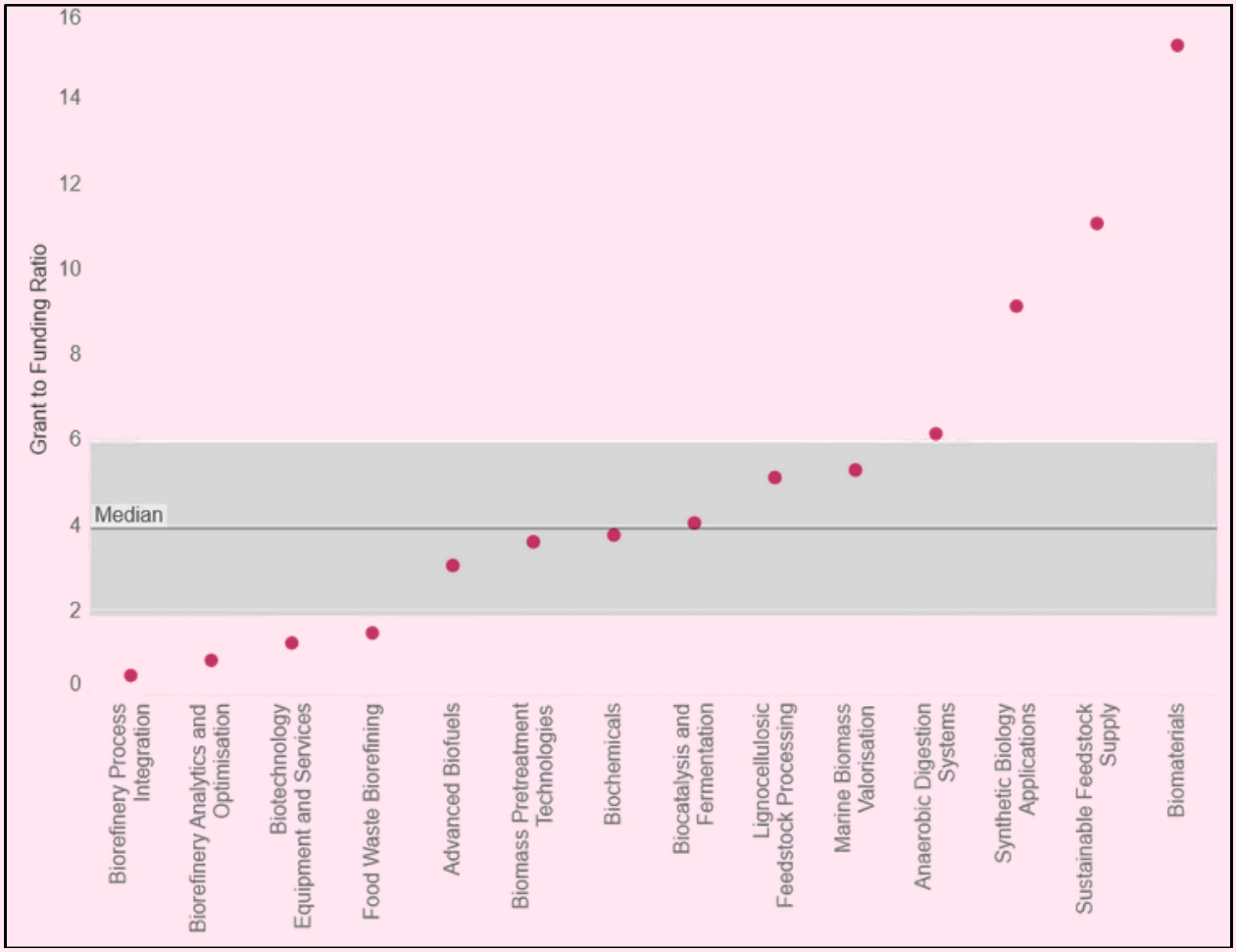
Three categories – Biomaterials (15x), Sustainable Feedstock Supply (11x), and Synthetic Biology/Engineering Biology Applications (9x) – sit notably higher, indicating strong commercial traction.

Four categories fall below the lower quartile: Food Waste Biorefining, Biotechnology Equipment and Services, Biorefinery Analytics and Optimisation, and Biorefinery Process Integration – suggesting that these industry segments remain more reliant on public funding.

This indicates that:

- Market-facing, product-driven segments attract faster private scaling.
- Infrastructure-heavy or enabling technologies remain earlier in the commercialisation cycle.

Figure 3 – Public vs Private Investment by Industry Segment



Grants and Fundraising by Region

Companies with registered offices in London have secured the highest value of investment overall, representing just under 50% of total historic investment in bio-based and biotechnology companies.

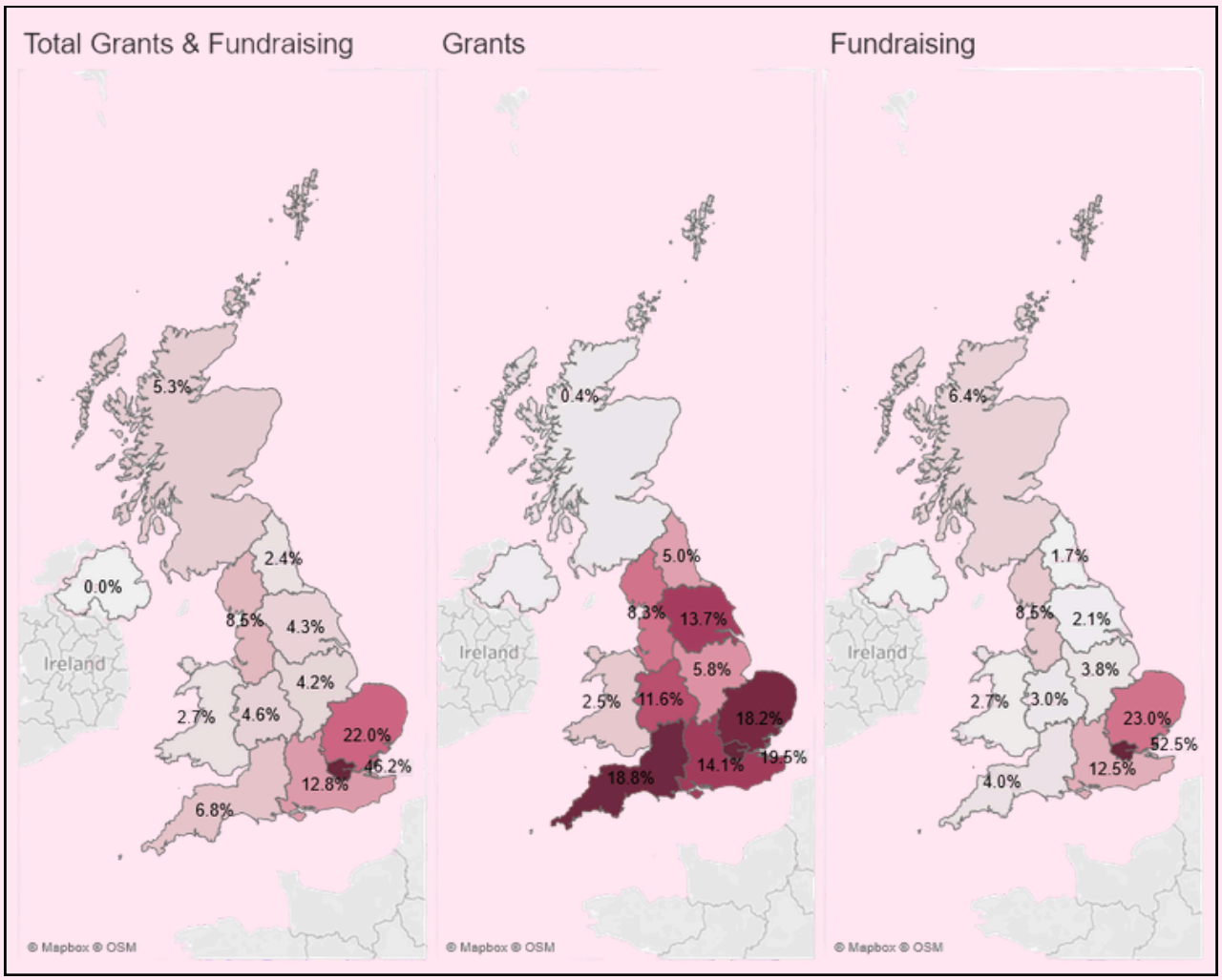
Public investment has been more evenly spread across UK regions, with the South West, the South East and the East of England securing relatively large shares (between 14% and 19%).

Private investment is more heavily concentrated in London and the East of England (accounting for ~75% of total private investment).

This pattern indicates:

- Public funding is acting as a levelling mechanism across regions.
- Private capital is clustering around established venture and research ecosystems (London and Cambridge/East of England).
- A potential regional "scale gap" where strong R&D bases exist outside London but lack equivalent access to growth capital.

Figure 4 – Public & Private Investment by Region



03
INVESTORS

INVESTORS

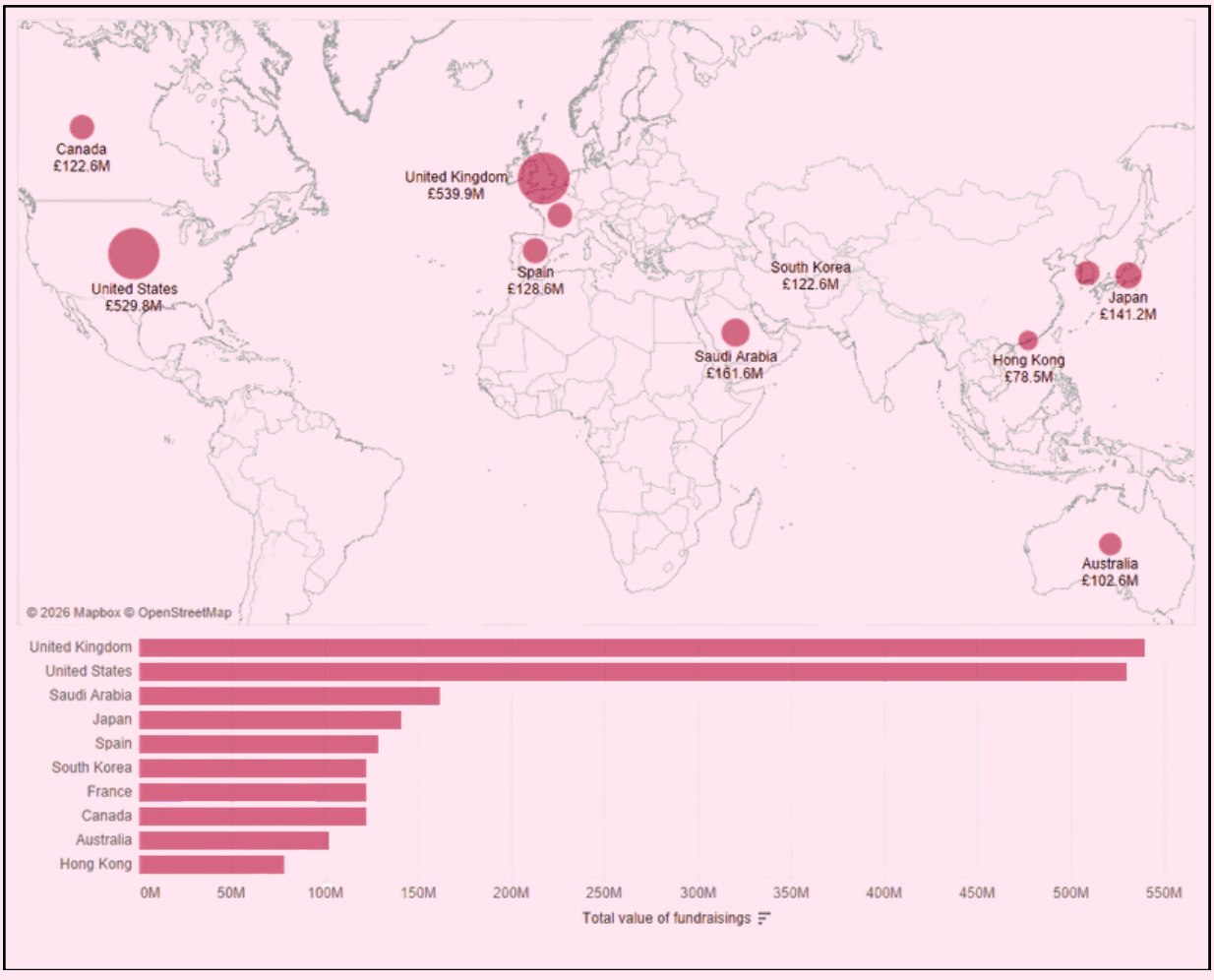
Understanding investor location provides insight into the global networks supporting the UK bio-based sector, the scale of cross-border capital flows, and the extent to which overseas markets view UK innovation as strategically attractive.

While all capital analysed was deployed into businesses operating in the United Kingdom, the funding base is distinctly international. The UK accounts for the largest domestic share, with approximately £539.9 million from UK-based investors. Investors in the United States contributed £529.8 million, nearly matching domestic capital and underscoring strong transatlantic investment ties.

Beyond these two leading sources, substantial funding originated from Saudi Arabia (£161.6 million), reflecting strategic interest in bio-based technologies as part of broader economic diversification. East Asian centres also feature prominently, with investors from Japan (£141.2 million) and South Korea (£122.6 million) showing strong engagement, while participation from Hong Kong (£78.5 million) reinforces the sector's appeal to Asian capital markets. Additional contributions came from Spain (£128.6 million), Canada (£122.6 million), France (£122.6 million) and Australia (£102.6 million).

Overall, the data show that the UK bio-based products sector is embedded in a global investment ecosystem, attracting significant inflows from North America, Europe, the Middle East and Asia. This international backing reflects confidence in UK technological capability and the growing importance of bio-based materials in delivering sustainable growth worldwide.

Figure 5 – Investors geographical location



TOP INVESTORS

Fund name	Country	Total value of fundraisings
Aramco Ventures Sustainability Fund	Saudi Arabia	£161,602,105
WAVE Equity Partners	United States	£147,191,274
Chevron Technology Ventures	United States	£141,217,726
Marubeni Ventures	Japan	£141,217,726
Cemex Ventures	Spain	£128,585,176
AXA Investment Managers	France	£122,611,628
Samsung Venture Investment	South Korea	£122,611,628
TC Energy	Canada	£122,611,628
National Wealth Fund	United Kingdom	£112,000,000
Future Fund	Australia	£102,568,763
Braavos Investment Advisers	United States	£95,990,477
Environmental Technologies Fund (ETF Partners)	United Kingdom	£89,532,009
University of Oxford	United Kingdom	£83,990,477
KBR	United States	£80,102,660
Horizons Ventures	Hong Kong	£78,509,757
Hermes GPE	United Kingdom	£70,000,000
DCVC	United States	£65,276,984
Scottish Venture Fund	United Kingdom	£62,420,891
Scottish National Investment Bank (SNIB)	United Kingdom	£62,000,000
Oxford Science Enterprises	United Kingdom	£60,000,000

CASE STUDIES

TWIG

www.twig.bio

Twig Bio Ltd is a London-based engineering biology company founded in 2022, focused on transforming how key industrial ingredients are produced. Through its proprietary twig:tech platform, which integrates AI-driven automation with advanced microbial engineering, the company designs and ferments high-performance microbial strains capable of producing sustainable, bio-based alternatives to fossil-derived ingredients such as palm oil, isoprene, and acetone.

Twig Bio's mission is to make these next-generation ingredients scalable, cost-competitive, and environmentally sustainable—enabling a transition away from petrochemical and resource-intensive supply chains. To date, Twig Bio has raised more than £5 million from leading UK and European venture capital investors and has been awarded five Innovate UK grants, representing over £1.3 million in UK Government support to accelerate the development and commercialisation of its technology.

PULPEX

www.pulpex.com

Pulpex Ltd, founded in 2020 by Diageo and Pilot Lite, is pioneering a fully recyclable, paper-based bottle made from sustainably sourced forest fibres. The company's mission is bold: to eliminate the 700,000 plastic bottles discarded daily in the UK. Pulpex's technology offers a transformative solution for sustainable packaging, combining innovation with environmental impact at scale.

Between 2020 and 2023, Pulpex secured £43 million in funding to establish its R&D and automation hub in Cambridgeshire, successfully validating its core manufacturing and fibre-processing technologies. In 2025, a further £63 million investment from the UK National Wealth Fund and the Scottish National Investment Bank accelerated industrial-scale deployment, with a new state-of-the-art manufacturing facility now under construction in Glasgow.

KELPI

www.kelpi.net

Founded in 2020, Kelpi is a Bristol-based startup revolutionising sustainable packaging with seaweed-derived bio-based plastic coatings for paper and cardboard. Their proprietary barrier technology delivers exceptional water, oil, and acid resistance, making it a scalable alternative to fossil-based plastics across food, beverage, and cosmetics packaging.

In 2022, Kelpi was awarded a £665,000 Innovate UK grant to advance its bio-based coating to fully functional prototypes. Building on this progress, the company raised £4.35 million in equity seed funding in 2024, enabling pilot-scale production and positioning Kelpi at the forefront of next-generation, eco-friendly packaging solutions.

CASE STUDIES

SHELLWORKS

www.shellworks.com

Shellworks, a London-based materials startup, has raised £11.25 million in Series A funding to scale production of Vivomer, its bio-based alternative to conventional plastic. Moving beyond demonstration-scale manufacturing, Shellworks is now enabling personal care and wellness brands to access sustainable, high-performance packaging.

Produced via fermentation from waste feedstocks, Vivomer performs like traditional plastic but is designed to biodegrade after disposal, significantly reducing environmental impact while supporting a circular, low-waste future.

SOLENA MATERIALS

www.solena-materials.com

Solena Materials, a London-based biomaterials innovator, has secured $6.7 million in seed funding to accelerate the development and commercial scale-up of its next-generation biodegradable protein fibres for high-performance textiles. Spun out of Imperial College London, Solena combines advanced bioengineering with AI-driven design to lead the next wave of sustainable materials innovation.

The seed round attracted a high-profile syndicate of investors, including Sir David Harding, SynBioVen, and Insempra, underscoring strong market confidence in Solena's vision to transform the textiles industry with environmentally responsible, high-performance materials.

NOVA BIOCHEM

Nova Biochem, a UK-based green chemistry startup, has raised an oversubscribed Seed funding round backed by investors including Circulate Capital, Coca-Cola Europacific Partners, Archipelago Ventures, and Circular Plastics Accelerator. The investment complements a €7.5 million EU grant supporting the development of Nova's first pilot plant in Sweden.

Nova Biochem is developing a proprietary supercritical water process that converts black liquor—a lignin-rich waste stream from the pulp and paper industry—into bio-aromatic chemicals such as BTX, essential building blocks used to manufacture plastics, coatings, and resins. These bio-based aromatics can replace fossil-derived inputs used in materials such as Polyethylene Terephthalate.

04

MARKET CHALLENGES

LOST IN TRANSLATION: FROM LAB TO MARKET

Despite significant capital into the bio-based sector, venture investment in the UK remains heavily concentrated at seed stage, with later-stage Series B and C rounds frequently secured overseas. This financing pattern reflects a structural weakness in the domestic scale-up environment: companies are founded and incubated in the United Kingdom, but increasingly look abroad when they reach capital-intensive demonstration and commercialisation phases.

Between 2018 and 2024, more than £450 million of UKRI funding was directed towards research and early-stage innovation. However, this substantial public investment has not translated into proportional economic transformation. As highlighted in the *'Don't fail to scale: seizing the opportunity of engineering biology'* report by the House of Lords, without urgent action to address gaps in scale-up capability, infrastructure and coordination, the UK risks losing its world-leading research base to international competitors.

That risk is now materialising. UK bio-based SMEs are relocating key operations to jurisdictions offering stronger scale-up finance, clearer regulatory pathways and established pilot and demonstration infrastructure. In particular, companies are expanding or redomiciling to the United States and Singapore, where capital markets and regulatory systems are perceived to be more predictable and commercially aligned. This outward movement results in the loss of high-value jobs, intellectual property and taxpayer-supported innovation.

Research consistently shows that internationally active firms employ more staff and generate nearly twice the revenue of domestically focused counterparts. A recent report from BB-REG-NET *'From Research to Revenue: UK Bio-Based Innovation Faces Critical Scale-Up Challenge'* concluded that addressing scale-up barriers in the UK could create 4,230 new jobs and add £300–500 million in annual GVA. Yet the principal constraint remains the "missing middle": insufficient growth capital and limited pilot and demonstration infrastructure capable of bridging laboratory success and commercial production.

The consequences are cumulative. Regulatory uncertainty and prolonged approval timelines increase investor risk, contributing to downscaling, delayed projects or outright company failure. Billions of pounds in public R&D support are therefore placed at risk by a lack of regulatory and infrastructure follow-through. For just three UK-based SMEs, an estimated £35.7 million in annual GVA and more than 473 potential jobs remain unrealised. Extrapolated across the wider ecosystem of bio-based SMEs, the annual economic opportunity cost is substantial. Without decisive intervention, the UK will continue to generate innovation domestically while exporting scale, value creation and long-term economic gains overseas.

05
CONCLUSIONS

CONCLUSIONS

The UK bio-based sector has transitioned from an R&D-led innovation landscape to a scaling commercial ecosystem underpinned by sustained capital inflows exceeding £3bn over 17 years. Several structural conclusions emerge:

Public funding is foundational.

- With 330 of 353 companies accessing grants, government support plays a critical de-risking role, particularly in early-stage science and capital-intensive innovation.
- Private capital is concentrated but deepening.
- Although fewer firms secure private investment, it represents two-thirds of total capital and is increasingly delivered in larger rounds. This signals sector maturation and growing investor conviction.

A scale-up divide persists.

- The gap between average grant funding (£2.9m) and private fundraising (£10.8m) reflects a clear transition threshold. A limited cohort of companies successfully crosses into large-scale growth financing, while many remain in innovation or early-commercial phases.
- Biomaterials and synthetic biology are leading commercial segments.
- High grant-to-funding ratios and absolute capital levels indicate strong market pull, particularly in sustainable materials and advanced applications.

- **Regional imbalance in private capital remains.**
- While public funding is nationally distributed, private capital clusters heavily in London and the East of England. Addressing this imbalance may unlock additional scale-up potential across UK regions.
- International credibility is strengthening.
- The presence of overseas investors and multinational corporate partners signals that UK bio-based innovation is globally competitive.

Overall, the data portrays a sector that is scientifically strong, increasingly commercial, and internationally recognised—but still characterised by capital concentration and regional disparities. Continued public-private alignment, targeted scale-up finance, and regional capital mobilisation will be critical to converting innovation leadership into sustained industrial and economic impact.

The UK bio-based sector has evolved from an R&D-led innovation landscape into a commercially maturing ecosystem attracting over £3 billion in investment, with strong public funding foundations, growing private capital and international credibility - though continued scale-up finance and broader regional investment will be critical to fully realise its industrial potential.

At the BBIA we are focused on accelerating the adoption of bio-based and biodegradable chemicals and materials in the UK, in order to reduce our reliance on fossil resources and create a sustainable circular economy.

www.bbia.org.uk