

THE STATE OF THE

musculoskeletal health innovation ecosystem

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Orthopaedic
Research UK



joint
venture



MSK
Innovation
Network

Introduction



The musculoskeletal (MSK) health crisis impacting our health system, society and the lives of tens of millions of people demands innovative thinking and entrepreneurial solutions. We need our clinicians, engineers and scientists to apply their brilliant minds to solving MSK health challenges.

At the same time, we must create a safer, more supportive pathway that allows innovators to reach clinical testing and validation faster – helping entrepreneurs bring high quality, evidence based solutions to market with confidence.

This is why we support MSK entrepreneurs by offering mentoring, training and access to expert networks. We also work with partners, primarily through the Joint Venture MSK Innovation Network that we host, to help create a positive environment for innovation in the UK. We need more people doing MSK research. We need more MSK spinouts from our universities. We need more innovative MSK companies bringing their products and services to the market to support the work of clinicians and transform the lives of patients. And we need to do this with a sense of urgency.

To ensure that we are focusing our support on the right areas and on addressing the most significant barriers to innovation and entrepreneurship it is important that we understand the MSK health innovation ecosystem in the UK. We therefore commissioned research studies examining two core areas of this ecosystem:

1. **Business data analysts** *Beauhurst* was tasked with identifying innovative companies operating within the MSK sector tracking levels of funding secured by these companies.
2. **Specialist academic researchers** *Businessable* was tasked with identifying those working on MSK research and related areas within UK academic institutions.

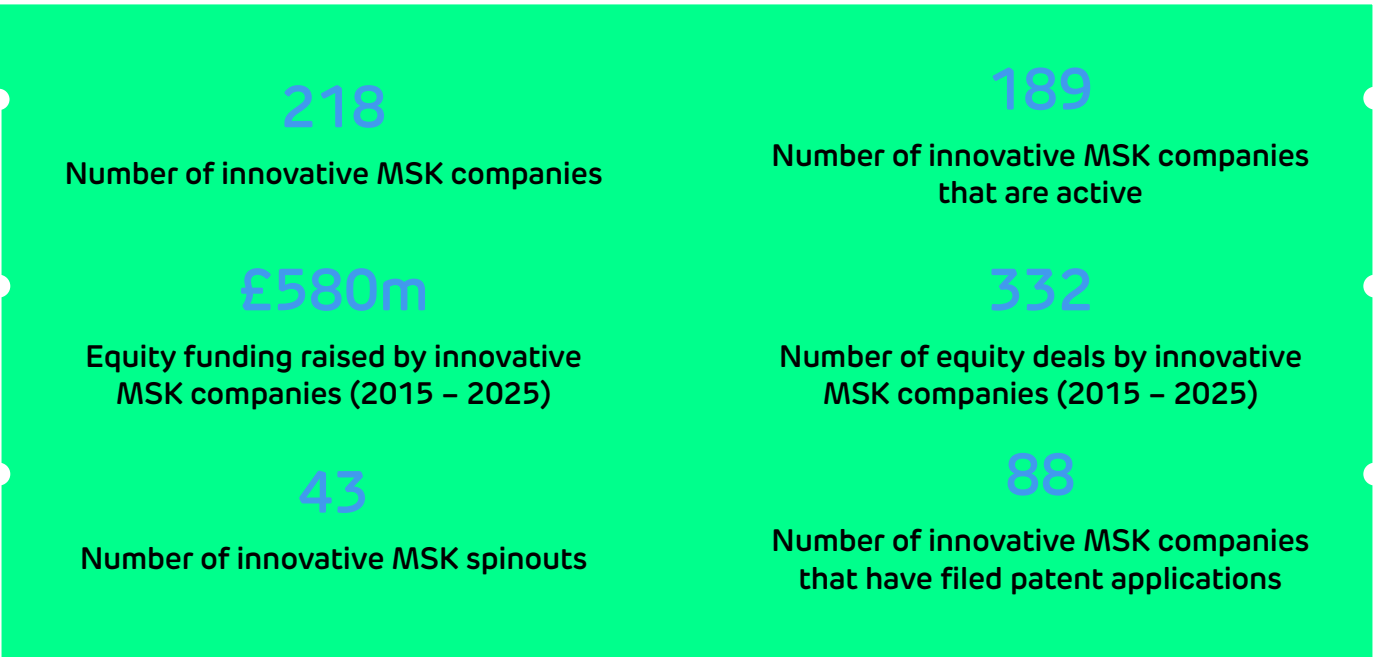
This report provides a synthesis of these research studies. We hope it provides food for thought for everyone working within MSK health. We will be using it to shape the ways in which we support MSK researcher and entrepreneurs.

Dr Arash Angadji
CEO, Orthopaedic Research UK

Results: Overview



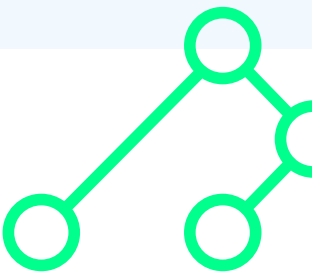
Start-ups



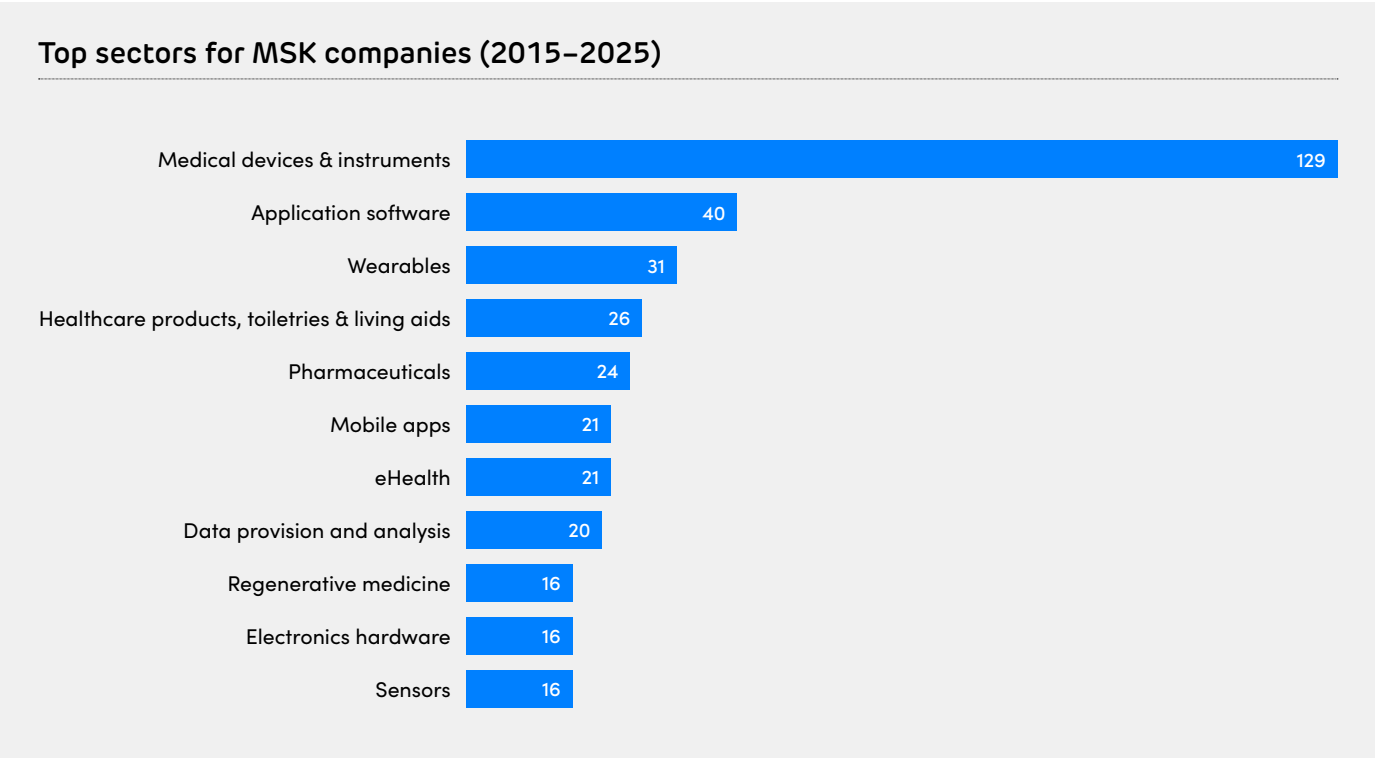
Research



Innovative MSK businesses



Beauhurst identified 218 innovative MSK companies of whom 189 appear to be active.¹

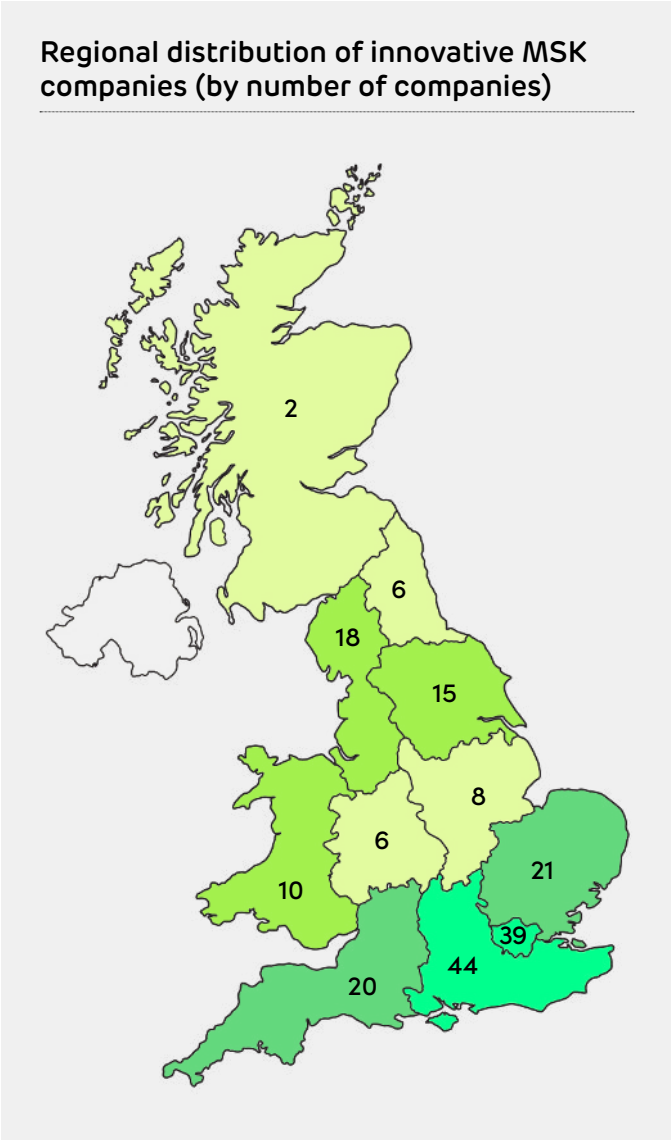


The prevalence of companies in the Medical devices and instruments category underlines the historic focus on surgical treatment for poor MSK health. For example, the category includes Axis Spine Technologies, a Leeds-based company developing spinal implant technology. Since its launch in 2016, the company has raised £23.2m in equity via 11 deals.

There is a significant number of companies (78) providing wearables, apps and healthcare products (including living aids) and eHealth that are likely to help with prevention, pain management and post-operative rehabilitation.

¹ According to the UK government's Bioscience and Health Technology Sector Statistics (BaHTSS) report, published by the Office for Life Sciences, there were approximately 7,320 life sciences companies operating in the UK in 2023/24 of which 4,360 were categorised as Medical Technology companies. There is no single official UK government dataset that provides counts of companies by specific disease area so it is difficult to benchmark whether 189 active MSK companies represents a healthy sector.

A map of the regional distribution of innovative MSK companies shows a typical concentration in London and the Southeast, reflecting the prevalence of universities, investors and healthcare institutions in these regions.



When compared to the distribution of all innovative businesses in the UK, there is an over-representation in the South East and a significant under-representation in the East and West Midlands and Scotland (see table on the right).

Region	Share of all innovative businesses ²	Share of innovative MSK businesses
London	20.3%	20.6%
South East	15.3%	23.3%
North West	10.0%	9.5%
East of England	10.2%	11.1%
West Midlands	8.1%	3.2%
South West	8.9%	10.6%
Yorkshire & Humber	7.2%	7.9%
East Midlands	6.8%	4.2%
Scotland	6.5%	1.1%
Wales	4.0%	5.3%
North East	2.8%	3.2%

These under-represented regions are home to leading universities involved in MSK-related research, such as Nottingham, Leicester, Keele, Loughborough and Aberdeen (all of whom also have a successful track record in supporting spinouts), so a lack of local talent or expertise is unlikely to be the issue.

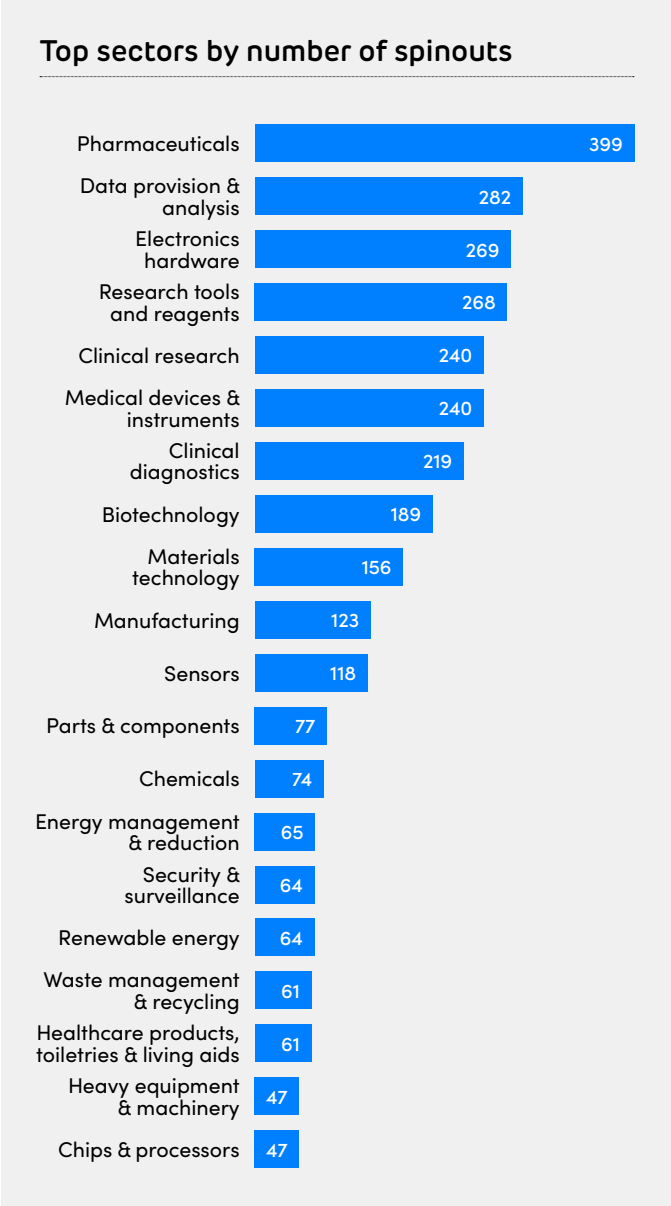


² 2025 ONS Business Population Estimates and 2025 Beauhurst Innovation Signal. Based on the latest business population data and identified “innovative” subsets (companies with patents, university spinouts, or innovation grants)

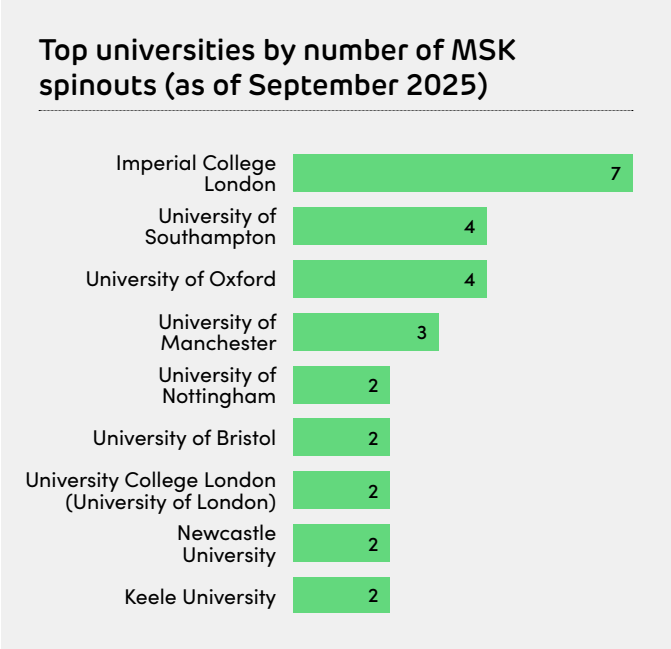
Spinouts

Of the 218 innovative MSK companies, approximately 20% (43) are categorised as spinouts. This is likely to be an under-estimate of the role of UK universities in incubating innovative businesses: many of companies not identified as spinouts are staffed by former academic staff, or part-time academic staff.

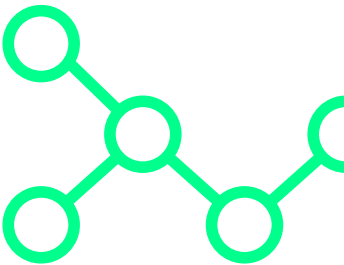
This figure of 43 MSK spinouts can be compared to volume of spinouts in other sectors:³



The leading university incubators of MSK spinout business are:



Among Imperial’s spinouts is Watford-based Additive Instruments, which develops a range of orthopaedic products using additive manufacturing techniques (the company was subsequently sold to a major orthopaedic manufacturer in 2023). Within Oxford’s spinout portfolio is Orthox, which develops tissue regenerative implants to enable patients who have suffered injuries to their knee cartilage to return to a fully active, pain-free lifestyle. Among Southampton’s spinouts is Radii Devices, which received seed funding from ORUK: the company uses state-of-the-art AI and biomechanical modelling to help clinicians design better fitting prosthetic sockets for people with limb loss or limb difference.



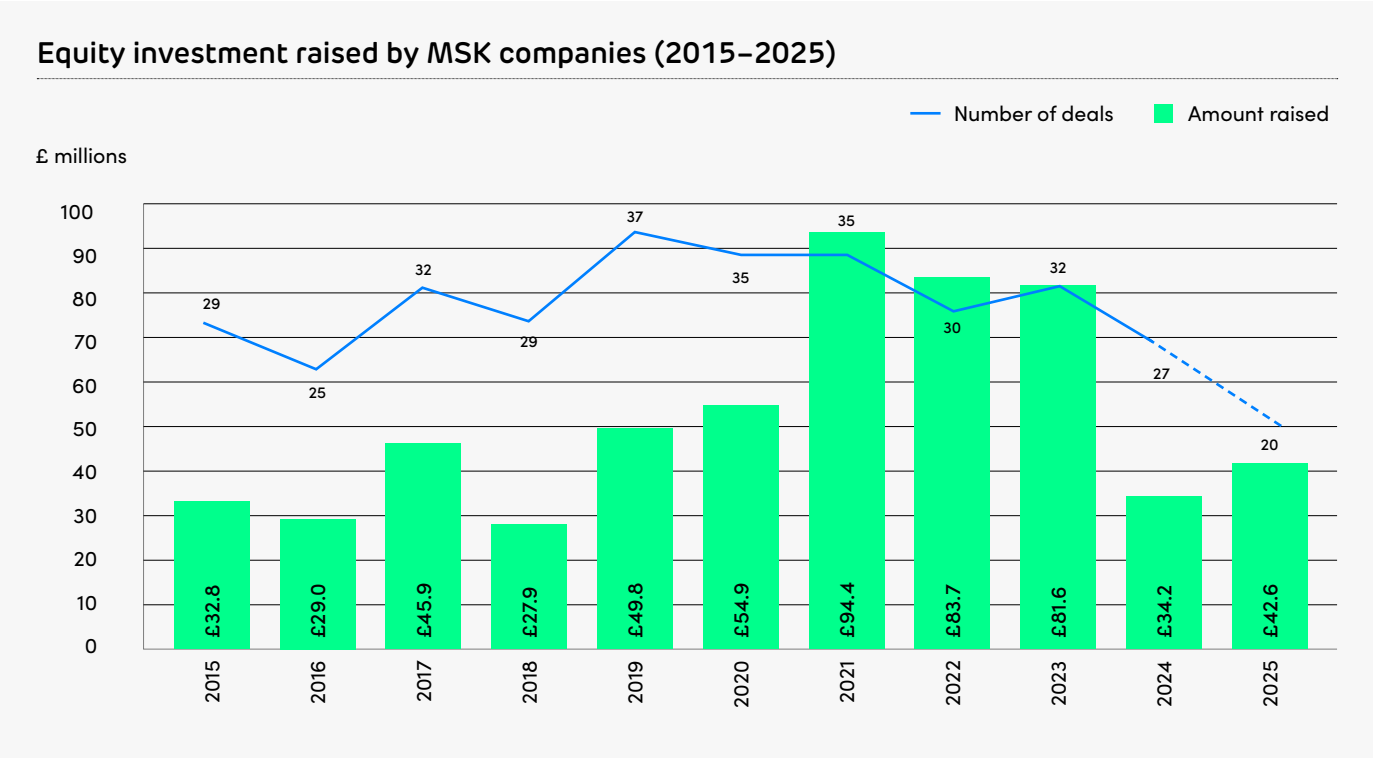
3 Spotlight on Spinouts, February 2025 UK academic spinout trends, Royal Academy of Engineering + Beauhurst

Equity Investment

Equity investment into MSK companies rose sharply to £94.4m in 2021. Among the top deals that year was a £35.0m raise by Levicapt which is developing a biological therapy for the treatment of chronic pain. The level of equity received by MSK companies remained relatively high between 2021 and 2023, before dropping to £34.2m in 2024.

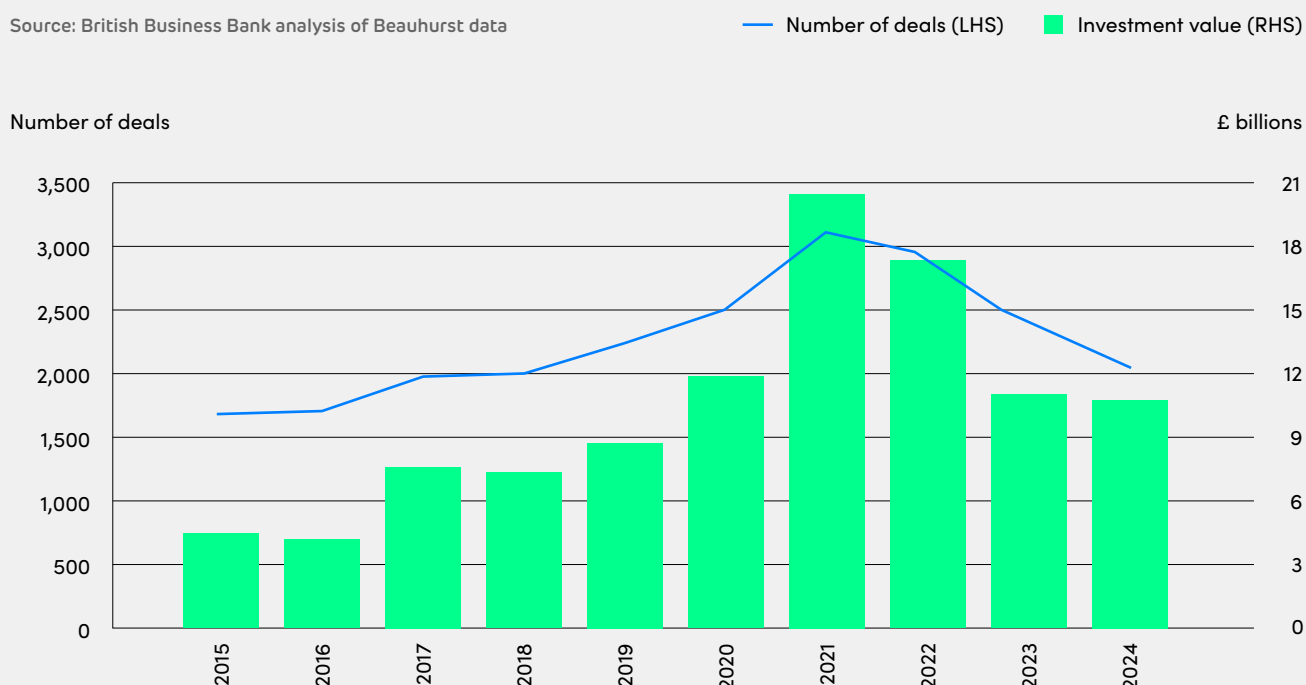
As of September 2025, funding surpassed the levels observed in 2024, with companies raising a collective £42.6m via 20 deals. Notable deals include a £10.4m round by Stroll. The Stafford-based company develops a range of assistive products and gamified physiotherapy exercises for people with Parkinson’s disease, which aim to help mitigate mobility impairment.

The pattern of equity investment in MSK companies mirrors investment trends within the UK market with 2021 and 2022 considered (post Pandemic) ‘outlier years.’

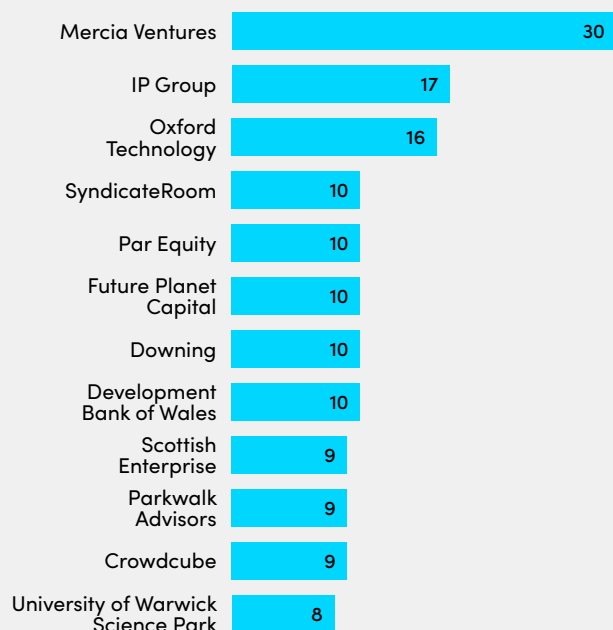


Number and value of equity deals over time

Source: British Business Bank analysis of Beauhurst data



Top investors in MSK companies by number of deal participations (2015–2025)



The MSK space is supported by a diverse mix of private VC, crowdfunding platforms, public and devolved funds, and university-linked investors. The top investor in MSK companies is Mercia Ventures, which has participated in around the same number of deals as the next two investors combined.

Regional and devolved government funding bodies such as the Development Bank of Wales and Scottish Enterprise play a major role in supporting MSK innovation outside the South East cluster.

University-affiliated or commercialisation-linked investors such as IP Group, Oxford Technology and Parkwalk Advisors highlight the academic origins of much MSK innovation.

Orthopaedic Research UK provides seed funding for eight early stage MSK businesses.

MSK Researchers

The analysts identified 880+ people working on MSK and related research projects across 79 UK based academic institutions.

Leading MSK research universities by number of researchers

- 1 University of Oxford
- 2 University College London
- 3 University of Manchester
- 4 Imperial College London
- 5 University of Leeds
- 6 Newcastle University
- 7 University of Sheffield
- 8 University of Southampton
- 9 Queen Mary, University of London
- 10 University of Nottingham

Seven of these universities with a high volume of researchers also appear in a list of the leading incubators of MSK spinouts.



Dr Joshua Steer, Founder & CEO, Ralii Devices

Leading universities by MSK spinouts

- 1 Imperial College London
- 2 University of Southampton
- 3 University of Oxford
- 4 University of Manchester
- 5 University of Nottingham
- 6 University of Bristol
- 7 University College London
- 8 Newcastle University
- 9 Keele University

The location of MSK researchers mirrors the size of the student population in different regions. MSK research 'hotspots' in the North West, Yorkshire & Humber, North East and Scotland are not reflected in the number of innovative MSK businesses in those regions.

Region	Share of MSK researchers	Share of innovative MSK businesses
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Research topics

The parallel research studies enable us to establish whether the topics being explored by MSK researchers align with the commercial market for MSK health products and services.

Not every clinical researcher wants to become an entrepreneur and not every research project can be translated into the type of product or service innovation that provides the basis for a successful business. However, there is a need for a healthy pipeline of research projects that are capable of driving the creation of the type of innovative businesses that attract commercial funding and deliver significant benefits for clinicians and patients, at scale and at speed.

Academic research is funded primarily by governmental and related (non-commercial) bodies, which means it will tend to be driven by patient, clinician and health system needs, rather than commercial factors. This explains the focus of many research studies on physiotherapy, rheumatology and rehabilitation. In contrast, investors tend to support technology-focused businesses involved in software, wearables, Apps and eHealth. According to Beauhurst, 'Similar to the US, the UK already hosts a strong base of innovative MSK companies in medical devices, wearables, and mobile health applications. These sectors are prominent in terms of equity deal volume, ranking first, third, and fifth, respectively. Yet the landscape is beginning to shift. Investors are increasingly backing companies that develop advanced software and artificial intelligence solutions.'

A follow-up survey from a subset of the MSK researcher list provided further details about the common themes for the participants in MSK research.

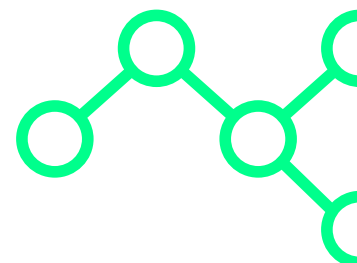


Orthopaedics and Surgical Innovation

Topics in this area that were common in the responses of participants included:

- **Joint replacement & implants:** orthopaedic implants, joint replacement, orthopaedic engineering, orthopaedics – joint replacement and arthritis, orthopaedics hypermobility arthroplasty.
- **Surgical tools & navigation:** surgical navigation for Total Knee Replacement (TKR), surgical navigation, orthopaedic surgical tools.
- **Trauma & injury prevention:** trauma technologies, lower limb injury prevention, ankle sprain, knee ligament injury.
- **Medical devices:** orthopaedic/medical devices, wearables, biofeedback, AI, sensors.

The patterns of results in this section reflect technology-driven improvements in surgery, implants, navigation, and medical devices to restore musculoskeletal function.





Physiotherapy and Rehab

Topics in this area that were common in the responses of participants included:

- **Rehab management:** rehabilitation management (back pain), spinal rehabilitation, rehab in sports people, use of tech to support rehab.
- **Physiotherapy:** orthopaedic physical therapy, physiotherapy (multiple mentions).
- **Wearables & feedback:** wearable sensors, biofeedback, gait analysis, motion capture, musculoskeletal modelling, finite element modelling
- **Pain & function:** pain mechanisms, MSK pain, spinal pain, shoulder pain, low back pain, neck pain.

As in the previous section we can see an integration of rehabilitation science with biomechanics, combined with some interest in technological elements like wearables to improve recovery and manage pain.

Sports: Muscle, Tendon and Connective Tissue Biology

Topics in this area that were common in the responses of participants included:

- **Muscle physiology & disease:** skeletal muscle ageing, sarcopenia, muscle atrophy, muscular dystrophies, muscle coordination, neuromuscular homeostasis, skeletal muscle disease.
- **Tendons & ligaments:** tendon, knee ligaments/tendons.
- **Connective tissue:** connective tissue degeneration, rare metabolic disease with connective tissue disorder.

Sport and exercise science had an emphasis on understanding muscle and connective tissue health, degeneration, and regeneration across ageing and disease contexts.

Bone, Cartilage and Tissue Regeneration

Topics in this area that were common in the responses of participants included:

- **Bone/cartilage biology:** bone and joint biology, bone mechanics, bone and cartilage tissue regeneration.
- **Mechanobiology:** mechanobiology during development, adulthood and ageing.
- **Biomaterials & drug delivery:** biomaterials, drug delivery for tissue repair.
- **Osteoarthritis focus:** osteoarthritis (repeatedly mentioned), knee/hip OA, glenohumeral OA.

Academics involved in bone and tissue studies tended to be interested in fundamental biology and biomaterials research aimed at repair and regeneration of bone, cartilage, and joints, particularly in osteoarthritis (as an overlapping theme).

Rheumatic Diseases and Autoimmune, and Inflammatory issues

Topics in this area that were common in the responses of participants included:

- **Inflammatory arthritis:** osteoarthritis and inflammatory arthritis, rheumatoid arthritis, idiopathic inflammatory myopathies, axial spondylarthritis.
- **Autoimmune conditions:** lupus, paediatric rheumatic conditions (JIA), B cell therapy, autoimmune B cell responses.
- **Systemic sclerosis:** scleroderma, Raynaud's phenomenon, MSK vasculopathy.
- **Cancer-related:** multiple myeloma, induced bone disease.

Rheumatology often seemed to be combined with an interest in immunology and immune related musculoskeletal disease (in children and adults). We also saw research links to systemic autoimmune and inflammatory pathways.

Ageing, Frailty and Metabolism

Topics in this area that were common in the responses of participants included:

- **Ageing & frailty:** skeletal muscle ageing, sarcopenia, frailty, musculoskeletal ageing, adulthood and ageing.
- **Metabolic links:** metabolic disease, muscle metabolism, rare metabolic disease.
- **Fatigue & occupational stress:** fatigue, occupational MSK stress, musculoskeletal health.

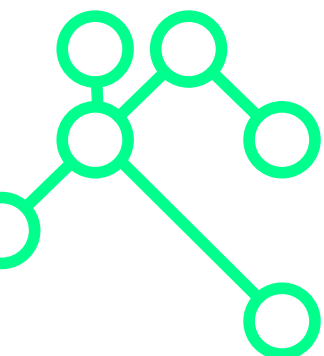
As topics, ageing and frailty often went together, as did the intersection of ageing, metabolic health, and musculoskeletal decline. Here, we also see an emphasis on frailty, sarcopenia, and chronic conditions.

Biomechanics, Modelling and Movement Analysis

Topics in this area that were common in the responses of participants included:

- **Biomechanics & modelling:** MSK biomechanics, musculoskeletal modelling, finite element modelling (knees), joint biomechanics, biomechanics of gait.
- **Movement analysis:** gait analysis, biplane video radiography, motion capture.
- **Comparative anatomy & developmental biology:** craniofacial form, comparative anatomy, developmental biology, early lineage specification.

As with other areas cited above we can see in biomechanics an interest in both the technology (motion capture) and modelling, and imaging to understand MSK loading, function, and pathology.



About Orthopaedic Research UK (ORUK)

ORUK is one of the most significant funders of MSK research and innovation in the UK and a leading provider of MSK learning for clinicians. It partners with research bodies, leading academic institutions, charities and commercial organisations to fund innovative research projects in the UK that expand knowledge, improve patient outcomes and pioneer new forms of prevention, diagnosis, treatment and management. It offers a comprehensive programme of educational courses and events for MSK professionals to develop knowledge, share learning and support clinical career development. It is the first MSK charity in the UK to actively support early-stage start-ups. It invests in entrepreneurs delivering breakthrough innovations within MSK health and help accelerate the translation of research ideas into new products or services by providing Early Career Researchers with education, mentoring, investment and networking support. Its MSK Innovation Accelerator Programme, delivered by the MedTech SuperConnector, has proven to be particularly effective in supporting entrepreneurially minded researchers and identifying start-up businesses meriting investment. It also hosts the Joint Venture MSK Innovation Network to provide a forum for debate and the sharing of ideas across the sector.

Methodological note: Beahurst

To identify the cohort of companies operating within the MSK sector, **Beahurst conducted the following keyword searches across the following sources:** Company descriptions • Grant abstracts • Patent abstracts

These searches were built using a set of keywords, including: Musculoskeletal • Bone(s) • Joint(s) • Knee • Hip • Shoulder • Foot and ankle • Ligament • Connective tissue • Soft tissue • Tendon • Spine / spinal • Back (pain) • Skeletal • Orthopaedic / orthopaedic • Muscle strength

• Osteoarthritis • Osteoporosis • Scoliosis • Sarcoma / Bone cancer • Bunions • Fibromyalgia • Rheumatoid arthritis • Back pain (including lower back pain) • Tendinitis • Carpal tunnel syndrome • Gout • Pain / Pain management

From this broad set, the Beahurst team narrowed the cohort to innovative companies.

These are companies which have: • Presence of technology-related industries or buzzwords • Evidence of funding secured (equity or grants) • At least one patent filing application

Within the innovative cohort, they further categorised companies according to the nature of their technologies, differentiating between traditional and emerging solutions.

Methodological note: Businessable

To identify those actively involved in MSK research and related areas, Businessable undertook desk research and made direct contact with UK academic institutions to capture areas of expertise, experience, location, and appetite for commercialisation. This approach, which is dependent on the availability of publicly accessible information and the willingness of individual schools/departments to respond to surveys, will not capture every researcher working on MSK-related research, but provides an indicative overview of the MSK research landscape.

Attempts to identify people in junior roles were difficult, as there are not many of them. Accessing junior staff to learn more about them often involved going through a professor or associate professor.

In addition to scraping data exercise, the Businessable team collected more survey data from a subset of people in the list. In total it received 55 responses which provided further details on the research being undertaken.



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