ANDERSON & LAW

UNIVERSITY SPINOUTS:
An imperfect ecosystem

An in-depth look at the way in which private and public funding is affecting the success of UK spinouts

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Foreword by Mark Anderson, Managing Partner, Anderson Law LLP

What is this report?

A few months ago, we commissioned independent research into the relationship between the sources of funding for academic research, and successful commercialisation of the research. This report summarises the results of that work. It comprises:

- A short overview of the funding ecosystem and the context for this report
- An executive summary of our report's findings
- An analysis of patterns in research funding and private investment
- Recommendations for future action

Overview of the funding ecosystem, and the context for this report

Since the mid-1980s, UK universities have been allowed to commercialise the results of their research.[1] Over the last 30 years, many universities have gained experience of managing their knowledge transfer activities, either in-house or through a subsidiary company, or in some cases in partnership with external companies. An important part of this activity has been setting up spinout companies and securing initial funding for their activities. Some highly-successful UK and international companies can trace their origins to UK university research.

In 2014, a further boost was given to the commercialization of university research, when the Research Excellence Framework (REF) introduced a requirement that university research should show "impact". Just four years later, research funding is facing a crossroads. Uncertainty over Brexit has left the future of many funding streams far from secure. At the same time, the seven research councils, Innovate UK and Research England are merging into UK Research and Innovation (UKRI). With this, UK universities' ability to turn research into innovation is once again under the spotlight.

The UK's universities are among some of the best in the world, with Oxford, Cambridge, UCL and Imperial all regularly making it into the QS top ten rankings, including for their standards of research.[2] But are UK universities capitalising on this research excellence by creating businesses which could boost the UK economy, shape the future of British industry and solve global challenges? The REF 2014 asked academics to prove that their research had impact beyond academia and one way for academics to show this impact was to create a business based on their research, that is, a spinout company.

[1] In 1985, the UK government announced that BTG (formerly the National Research and Development Corporation) would no longer have the exclusive right to commercialise inventions made in university research and resulting from Research Council funding.
[2] QS World University Rankings https://www.topuniversities.com/university-rankings/world-university-rankings/2018

The results of the REF 2014 highlighted that the system isn't perfect. While it's clear that there is money going into universities and that some of it ultimately leads to spinout companies, it's difficult to ascertain whether there is a relationship between funding and the creation of a spinout. This issue was highlighted by the National Audit Office: "Government needs a coherent view of the UK's research strengths relative to other nations and an analysis of funding in key areas of research."[3] In response to this, the government's industrial strategy[4] states that the government is "asking UK Research and Innovation to develop a new Knowledge Exchange Framework (KEF). This framework will benchmark how well universities are doing at fostering knowledge sharing and research commercialisation."[5]

The government has recognised that it needs a more comprehensive understanding of how research is funding innovation. Without this understanding of the spinout ecosystem, it's difficult to know whether research funding and private investment is funding the right things and whether the system is working. Ahead of the KEF, this report marks the first real insight into how innovation from UK universities is being funded and how this leads to the creation of spinouts. We examined the current data available from the UK research councils and Innovate UK on public investments and combined this with data from Beauhurst on private investment into spinouts. We also conducted interviews with experts who have worked with spinouts over the last twenty years. We then used this information to create a picture of how the current funding of UK spinouts works and indicate areas where improvements could be made to better commercialise research from the UK's universities.

Overall, it's a positive picture for UK research and innovation. Our findings are proof that spinouts from UK universities are thriving. Nine out of ten spinouts which have received private investment between 2011 and 2015 have survived. This is a high rate of success. When looking at start-ups on the whole, only two in ten survive beyond their fifth year.

We also found that the number of spinouts from UK universities is on the increase and, with this, so is the amount of investment into them from private investors. But we believe more should be done. Based on these findings, this report offers a series of recommendations to UK universities, the government and the newly formed UKRI on how to ensure UK spinouts continue to deliver on the successful commercialisation of university research.

[3] https://www.nao.org.uk/press-release/cross-government-funding-of-research-and-development/
[4] https://www.gov.uk/government/topical-events/the-uks-industrial-strategy
[5] Page 79 of the White Paper on Industrial Strategy, to be found at
https://www.gov.uk/government/publications/industrial-strategy-building-a-britain-fit-for-the-future

Executive summary

This report takes an in-depth look at funding patterns, from 2011 to 2017, from the seven UK research councils and Innovate UK, and measures this against the creation of UK university spinout companies across their corresponding sectors:

- Engineering and physical sciences
- Medical
- Biological sciences
- Particle physics, nuclear energy and astronomy
- Economic and social
- Natural environment
- Arts and humanities

It explores the levels of private investment for spinouts in each of the sectors based on data from Beauhurst on more than 600 privately funded spinouts from UK universities.

Beauhurst Beauhurst is a searchable database of the UK's fastest-growing start-ups and scale-ups. It provides comprehensive data on spinouts from UK universities from 2011 onwards.

Finally, it looks at the success rate of spinouts from across all sectors and how these are affected by the amount of public and private sector funding they receive.

Findings

- Innovative businesses are an important part of the UK economy, and spinouts from UK universities are making a significant contribution to this sector.
- Investment in UK spinouts from both public and private sources across all research areas, except economic and social research, has increased over the past six years by a total of £1 billion.
- Nine in ten UK spinouts survive beyond five years. This is a higher rate than the overall success rate of UK start-ups.
- Over the six-year period we considered, there did not appear to be any relationship between the level of public investment into research and the level of private investment into UK spinouts. We believe this needs to change to encourage innovation and secure more private investment for UK universities and fulfil the goals of the UK's new industrial strategy.
- The spinout system is working but currently it's unclear to what extent. This report offers a partial view of how the system is working, but there is still a long way to go before the picture is complete.

Based on these research findings, we have come up with the following recommendations to the UK government, the newly formed UKRI and UK universities with a view to ensuring that spinouts continue to contribute to the UK economy and the future of UK innovation. Below is a snapshot of the recommendations from our report.

Government

- Commit to a clear strategy for the commercialisation of research from UK universities beyond the commitments made in the industrial strategy.
- Provide a framework for tracking investments into UK university research and map this against how university spinouts are performing.

UKRI

- Create an intermediate funding mechanism for early stage spinouts.
- Provide clear guidance to universities on what help is available to help them transform research into spinouts.

Universities

- Set up business engagement programmes to bolster links between academics and local businesses.
- Provide investment-readiness training to academics.
- Make it easier for academics to take time away from teaching commitments to pursue commercial projects.

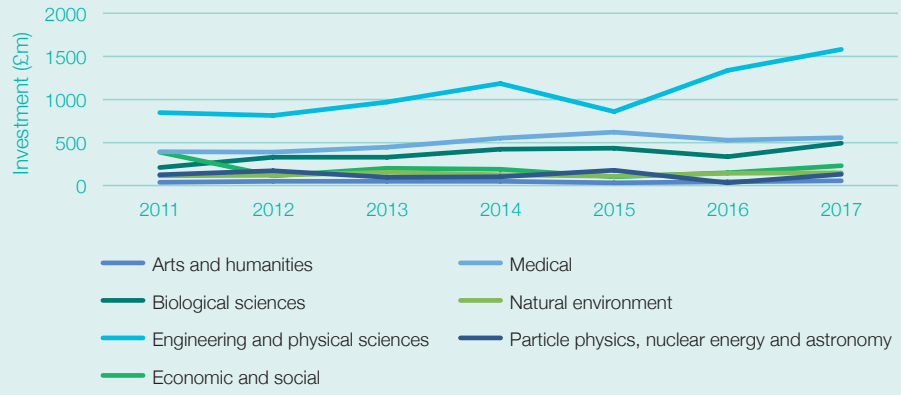
Overall picture

Having examined the publicly available data on research council and Innovate UK funding and Beauhurst data on private investment into spinouts in each case over the six-year period from 2011 to 2017, the overall funding picture for spinout companies from UK universities is positive.

> Private investment in spinouts is defined as private equity or venture capital investment into a spinout company from a UK university

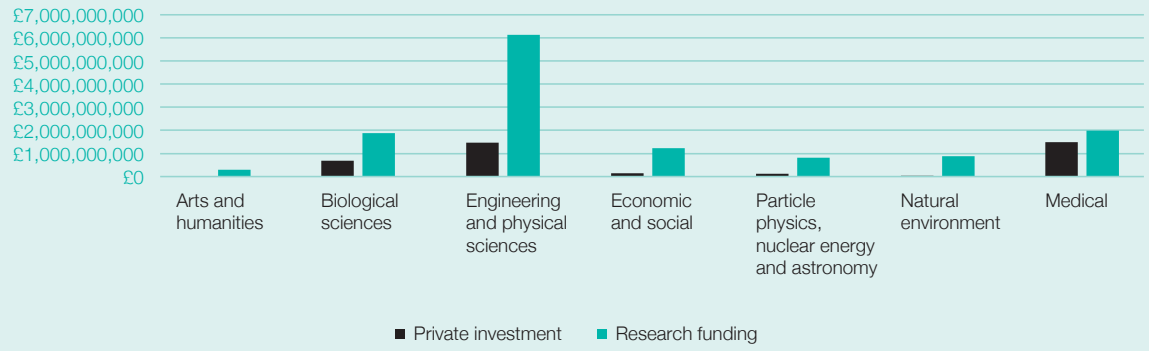
Over the past six years, from 2011 to 2017, investment from public and private sources has risen by £1.1 bn (Chart 1). All sectors have experienced a rise in funding, apart from the economic and social sector. £860m of the overall £1.1bn increase in funding took place between 2015 and 2017.

Chart 1 : Public and private investment by year, by sector



The best funded sector is engineering and physical sciences, which has attracted £7.6bn worth of private and public funding over the past six years (Chart 2). This sector includes mathematics, artificial intelligence and computer science. The second and third best funded sectors are medical research at £3.5bn and biological sciences at £2.6bn. Arts and humanities receives the least funding overall at just over £300m, followed by particle physics, nuclear energy and astronomy at just over £800m and natural environment at around £900m. Economic and social sits in the middle of all sectors with £1.4bn in funding between 2011 and 2017.

Chart 2 : Total public and private funding (2011-2017)



Impact of the withdrawl of EU funding

The likely impact of Brexit could be one reason why research funding rose so dramatically between 2015 and 2017. In response to the UK's decision to withdraw from the EU, the then Universities Minister Jo Johnson MP stated that the UK government would underwrite all successful bids for the EU's Horizon 2020 funding made before the UK leaves the EU.[6] As a result, funding from both public and private sources increased. Dr Carol Daniel, from City, University of London, comments: "It [the UK government] could feel it needs to gear up in preparation for funding cuts from EU sources, such as Horizon 2020." As the UK continues its withdrawal from the EU, the UK government will need to consider how it ensures the levels of research funding for UK universities remain unchanged or increase, to secure the UK's place as a centre of innovation within Europe.

Impact of REF

Another reason for the dramatic increase in research funding going into UK universities between 2015 and 2017 could be the REF 2014. The REF was designed to provide accountability for public investment in research and to produce evidence of the benefits of this research. One way for academics to produce this evidence was to create a spinout company. Stuart Wilkinson, from the University of Oxford, comments: "Universities are realising their role as an economic engine and recognising the imperative to set up scalable commercial ventures through REF."

[6] Science Minister Jo Johnson reaffirms UK Government's underwrite of Horizon 2020 funding http://www.ukspace.org/news-item/jo-johnson-reaffirms-h2020-funding/

This was also a view shared by Tony Hickson at Imperial Innovations who believes that the REF has caused academics to think more carefully about the impact of their research and therefore gain a better understanding of the different routes to market. He comments: “The REF focuses the mind of university management and academics who are becoming much more interested in the impact of their research on society.”

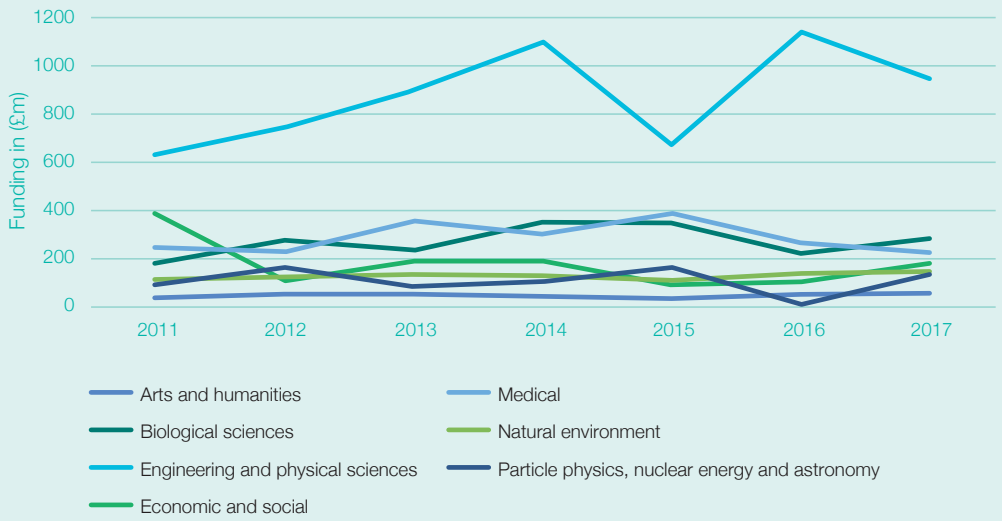
Impact of university improvements

The increase in funding since 2011 could also be a result of improvements within the structures of individual universities, which allow them to better interact with funders and prove that the investment made into research is leading to commercialisation. As the number of spinouts has increased, universities have generally become more sophisticated and improved their ability to commercialise research. Jeff Skinner at the London Business School comments: “The knowledge exchange function is getting better all the time at extracting great intellectual property from the research base and helping academics develop this IP as new ventures. Equally, academics themselves increasingly see spinouts as a viable route to generating impact. With so many more successful spinouts there’s also more peer support, role models and experience to draw on.” If the trend of increased funding and spinout creation continues, the technology transfer functions at UK universities could become even more adept at commercialising research.

Public investment

The overall increase in the funding of spinouts over the six-year period from 2011 to 2017 is a result of an increase in investments from both private and public investment sources. Funding from the seven research councils and Innovate UK has increased across the majority of sectors between 2011 and 2017 by nearly £300 million, except two: economic and social; and medical (Chart 3).

Chart 3 : Research funding by year, by sector



The biggest increases in funding were for biological sciences, which increased by 55%, and engineering and physical sciences, which increased by almost 50%. Particle physics, nuclear energy and astronomy increased by 47%; arts and humanities increased by 41%; and natural environment increased by 29%. This may reflect a move towards funding innovation in technology and artificial intelligence in line with the government's new Industrial Strategy which began to take shape in 2015. Stuart Wilkinson, from the University of Oxford, comments: "There's a growing governmental push into artificial intelligence, robotics, automation and data-based activities, many of which are seen as physical science disciplines."

Public investment in medical fell from a high of £385m in 2015 to £222m in 2017. Medical research is sometimes seen as a high-risk sector – e.g. given that pharmaceutical development is expensive and has a high failure rate, and there may be other organisations working to develop a cure for the same thing. But, despite these risks, it has remained relatively well-funded. Tamsin Mann at Praxis Auril comments: "I think the story here is all about the risk associated with medical research and a much higher requirement in terms of pre-commercialisation testing of regulations. There is a much longer time-scale between the research breakthrough and taking something to market."

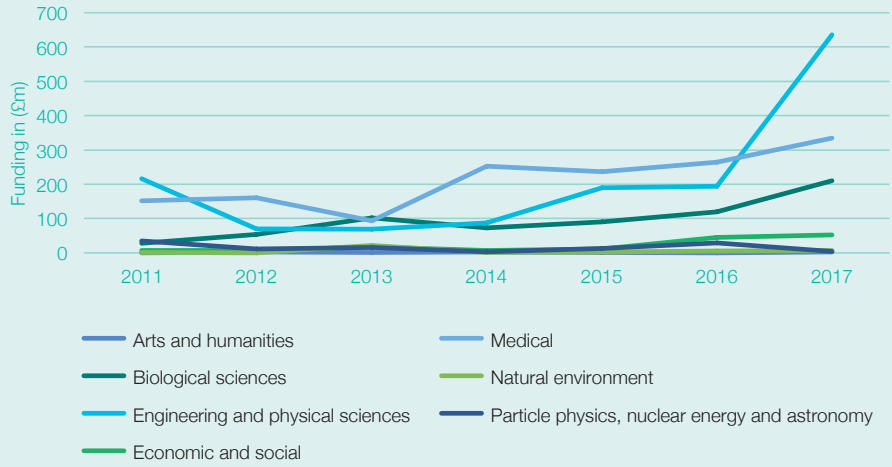
In general, those we spoke to believe that the right sectors are receiving the right amount of funding. However, there is some disagreement on whether public funding is going to the right institutions. At the moment, a few select universities receive the majority of research funding. The University of Oxford, which received the most public funding between 2015 and 2016, was awarded £90m. King's College London, which placed tenth, received less than half that amount.[7]

[7] University of Oxford tops grant funding list
https://www.timeshighereducation.com/news/university-oxford-tops-grant-funding-list

Private investment

As well as an increase in funding from the seven research councils and Innovate UK, our data reveals an uptick in private investment for all sectors between 2011 and2017 by £800 million, except the particle physics, nuclear energy and astronomy sector (Chart 4). This reflects an increasing level of interest in funding the output of research by UK universities from private investors.

Chart 4 : Private investment by year, by sector



In the biggest area for funding overall, engineering and physical sciences, private investment more than tripled between 2016, when investment was at £194m, and 2017, when it rose to £635m. This reflects an overall trend for increasing private investment in the UK technology sector as the UK becomes recognised as a leading centre for technology in Europe.[8] Jeff Skinner comments: “Spinout successes are self-contained and sexy and generally have a coherent and compelling storyline. This creates a feedback loop, because exciting stories energise people and open their eyes to what’s possible.” Chris Case, at Oxford Photovoltaics, adds: “The increase in investments in engineering and physical sciences follows a global trend. The companies that earn most media coverage today are social media companies or big technology companies like Google, Apple and Amazon, and this is having an impact on where private investors put their money.”

The increase in private sector funding was particularly noticeable in the economic and social sector in 2017 when it hit £52m, nearly nine times the level in 2011 (£6m). This could be due to the inclusion of the development of apps in the sector and a growing interest in the applications of big data.

[8] The State of European Tech https://2017.stateofeuropeantech.com/

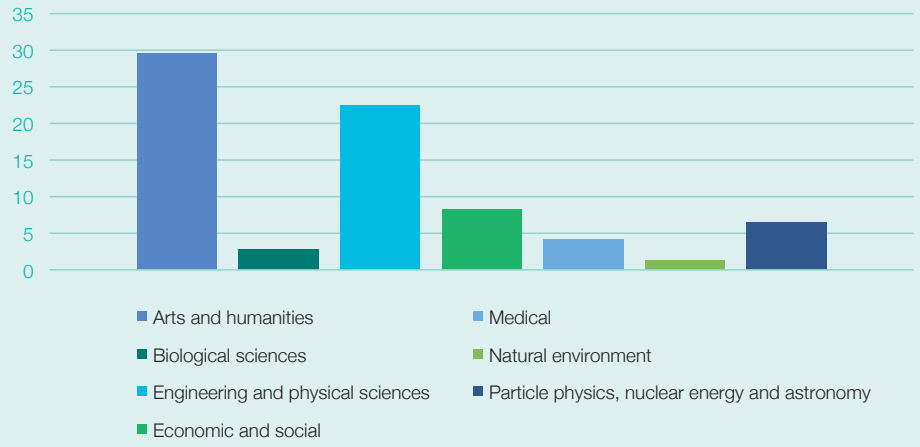
However, Tamsin Mann comments: “Spinouts in economic and social are starting from a low base, so the levels of growth might not be what they seem. Spinouts in this sector may be more attractive to smaller funds or funds that want to find something a bit different, too.”

Not all sectors experienced an uptick in private funding over the period. Private investment in the particle physics, nuclear energy and astronomy sector fell from 2011 to 2017. However, a number of interviewees suggested this could be due to the nature of the sector. The research funded in this sector is likely to be around the fundamentals of science and therefore unlikely to have a direct commercial application. However, it may lead to innovation in other areas such as the medical or biological science sector.

Relationship between research funding & private investment

In this report, it's been established that funding from the seven research councils, Innovate UK and private investors has increased over the last six years. But is there a relationship between private and public investment? Our research would suggest not. There's an average ratio of private investment funding to research council funding and Innovate UK funding of 1:10, but there are great degrees of variation across the sectors (Chart 5). There also isn't a clear correlation between funding increases in one year between different sectors (Charts 3 and 4).

Chart 5 : Ratio of private investment to research council funding

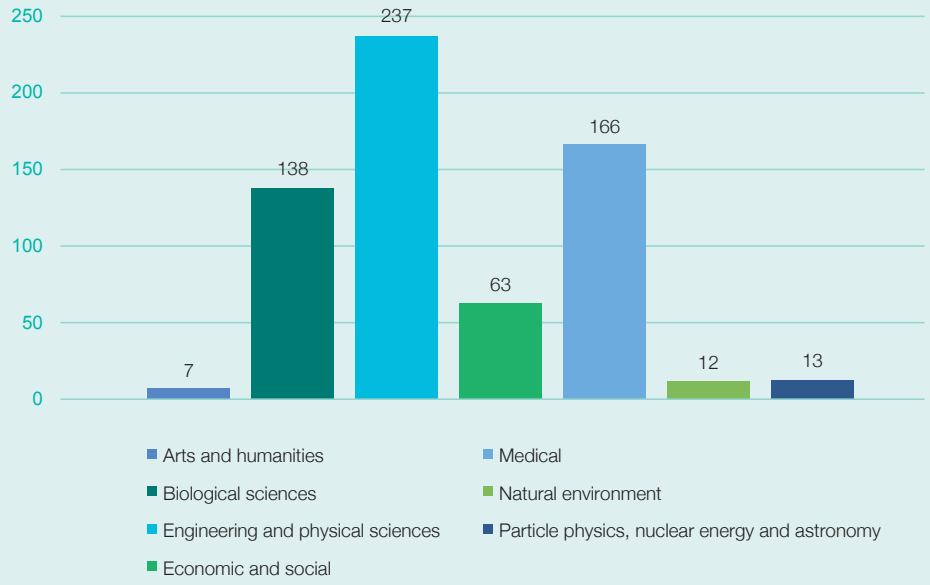


The lower ratios for medical and biological science show that where there are more established routes to market and where investors know that there is a great deal of research funding going into a sector, public and private funding are closely linked. Liz Flint, Compound Semiconductor Applications Catapult, comments that medical research is "a well-travelled path and a well-understood process."

However, in less established sectors for commercialisation, public and private don't match up. There is perhaps a less obvious route to market in sectors such as arts and humanities and, relatively speaking, there doesn't seem to be a lot of previous experience of spinouts in these sectors. Liz Flint adds "You're unlikely to have the next unicorn company from pure arts and humanities research. It's very hard to see rapid expansion employing lots of people, other than when coupled with digital and/or social sciences."

There are also some intriguing trends among the best performing sectors for spinouts. Despite the high number of spinouts in engineering and physical sciences (237 between 2011 and 2017) the ratio of private to public funding is lower than that of medical (Charts 5 and 6). As with any new technology, there can be a high level of risk associated with investing in spinouts in this sector particularly if the spinouts are building expensive products which haven't been proven to work. Carol Daniel comments: "A great deal of research into the physical sciences doesn't lead to a proof of concept that could form the basis of an early stage business. What nature throws at you is unpredictable and we're constantly battling to make the machinery work in a real-world environment."

Chart 6 : Number of spinouts per sector from 2011-2017



This apparent lack of an overall relationship between public and private investment is clear evidence that there is not enough data being produced on how public and private investments into different sectors result in successful spinouts. It appears that private investors are sticking to the areas which have been successful at commercialising research in the past, such as medical and biological, instead of focusing on the areas which are producing the most spinouts and therefore might be the most commercially viable in today's economy. The areas which receive the highest ratio of private funding are those which have traditionally produced the research which has a clear commercial application, such as biological sciences and medical.

Innovate UK funding and private investment

Table 1 : Comparison of private investment funding and Innovate UK investment by year, by subject area

Innovate UK funding and private investment

The data on funding from the seven research councils and private investment shows no clear pattern for the six-year period we considered. But perhaps this is because the research councils tend to fund earlier stage research projects and so we went on to consider whether a pattern between Innovate UK funding, which tends to fund later stage projects, and private investment is more likely.

If we assume that, on average, there is a two-year time lag between development of the technology on which the business is based and the spinout being formed,[9] it is interesting to note there isn't a discernible pattern between spikes in research funding from Innovate UK and private investment. (Table 1) Sue O'Hare, European Space Agency Business Incubation Centre, comments: "With the possible exception of drug development, there isn't a standard pipeline process that spinouts go through – it's not as simple as Research Council funding, followed by Innovate UK funding, and then some private investors come along."

Innovate UK's role in the creation of spinouts, and in driving the UK's economy as a whole, is undefined, and perhaps this could be one of the reasons for this lack of a pattern. Its mission is simply to drive "productivity and growth by supporting businesses to realise the potential of new technologies, develop ideas and make them a commercial success."[10] But perhaps there needs to be clear guidance about what exactly Innovate UK is meant to fund in terms of university spinouts?

There are other players who may operate in this middle ground such as HEIF, HEFCE's Higher Education Innovation Fund, but HEIF doesn't seem to reward universities specifically for producing successful spinouts. Instead, it rewards universities for their overall success. HEIF has consistently awarded around £150 million in knowledge exchange funding to universities, up until 2017-2018 when an additional £35 million was granted as a result of the government's pledge to increase investment in research and innovation. Additionally, institutions like the Wellcome Trust are also putting in early stage funding for spinouts.

Without an overall picture of how all these different players are feeding into the spinout ecosystem, it's difficult to judge where Innovate UK and others need to step in to plug the gaps in funding. We suggest that the newly formed UKRI needs to work out what it wants the role of Innovate UK to be within UKRI and work with other players to ensure each stage of the spinout ecosystem receives the right level of funding.

[9] Profiling UK university spin-outs, Enterprise Research Centre
https://www.enterpriseresearch.ac.uk/wp-content/uploads/2015/07/ERC-ResPap35-M.-Hewitt-Dundas.pdf
[10] About Us, Innovate UK https://www.gov.uk/government/organisations/innovate-uk/about

Connection between volume of public/private funding & spinout formation and success

Table 2 : Comparison of private investment funding and Innovate UK investment by year, by subject area

	Exited	Growth	Venture	Seed	Zombie	Dead
Engineering and physical sciences	26 11%	21 9%	70 30%	93 39%	5 2%	22 9%
Medical	20 12%	11 7%	46 28%	78 47%	4 2%	7 4%
Biological sciences	19 14%	10 7%	35 25%	62 45%	3 2%	9 7%
Economic and social	3 5%	4 6%	10 16%	42 66%	1 2%	3 5%
Particle physics, nuclear energy and astronomy	0 0%	3 23%	2 15%	3 23%	0 0%	5 39%
Natural environment	2 17%	1 8%	2 17%	6 50%	0 0%	1 8%
Arts and humanities	0 0%	0 0%	3 42%	2 29%	0 0%	2 29%

Seed	A youngish company with a small team, low valuation and funding received (low for its sector), uncertain product-market fit or just getting started with the process of getting regulatory approval. Funding likely to come from grant-awarding bodies, equity crowdfunding and business angels.
Venture	A company that has been around for a few years, has either got significant traction, technology or regulatory approval progression and funding received and valuation both in the millions. Funding likely to come from venture capital firms.
Growth	A company that has been around for 5+ years, has multiple offices or branches (often across the world), has either got substantial revenues, some profit, highly valuable technology or secured regulatory approval significant traction, technology or regulatory approval progression, funding received and valuation both in the millions. Funding likely to come from venture capital firms, corporates, asset management firms, mezzanine lenders.
Exited	The company has done an initial public offering or been acquired. (We do not consider management buy-outs to be exits, i.e. reasons to stop tracking companies, but rather a trigger for starting to track a company.)
Zombie	The company's website and/or social media presence show prolonged neglect and/or its Companies House status is somehow troubled – administration, liquidation, dissolution, first notice in the London Gazette, etc. (Merely doing a down-round is not by itself a reason for us to class a company as 'Zombie'. And a company may not be trading, because it is just a holding company, but that doesn't mean we'd classify it as 'Zombie': its subsidiaries may be doing their thing normally.)
Dead	The company has declared it has definitively ceased all activity and/or the ultimate legal entity behind it has been dissolved (according to Companies House).

Failure rate

Our research shows only one in ten university spinout companies, which received private investment between 2011 and 2015 either died or entered zombie state. This is a relatively high survival rate. Fewer than one in two newly born enterprises survive over a five-year period in the wider start-up environment.[11] So can university spinouts teach the wider enterprise economy a thing or two? Tamsin Mann comments that the amount of time and money invested in a university spinout is much greater than that invested in the average start-up, suggesting that taking time to perfect a start-up and investing more money in it improves its survivability rate. University spinouts also undergo stringent testing before they leave the university. Sue O'Hare comments: "A spinout won't make it out of a university unless an awful lot of hoops have been jumped through."

However, despite the seemingly high levels of success, there was a feeling among interviewees that there should in fact be a higher rate of failure among spinouts. The high survival rate was seen by some as an indication of a fear of failure and a lack of encouragement for academics to see if their research could lead to commercial success. Chris Case comments: "In the US, the more failed start-ups you have under your belt, the more successful you're viewed."

Whether that is the case or not, it's ultimately a positive story for innovation in the UK that so many spinouts are surviving and indicates that they are worth the time and investment required to get them to market. There may need to be a cultural shift to encourage more academics to see if their research can be commercialised. But, what's clear from this report is that there is a good amount of investment going into spinouts and that, for the most part, they are surviving. The high survival rate shows that UK universities are clearly contributing to the entrepreneurial future of the UK economy.

[11] https://www.ons.gov.uk/businessindustryandtrade/business/activitysizeandlocation/datasets/businessdemographyreferencetable

Failure by sectors

Engineering and physical sciences receives the highest level of public and private funding, but this high level of investment does not result in a particularly high percentage of exits at just 11% (Table 2). Just 9% of spinouts in this sector have died.

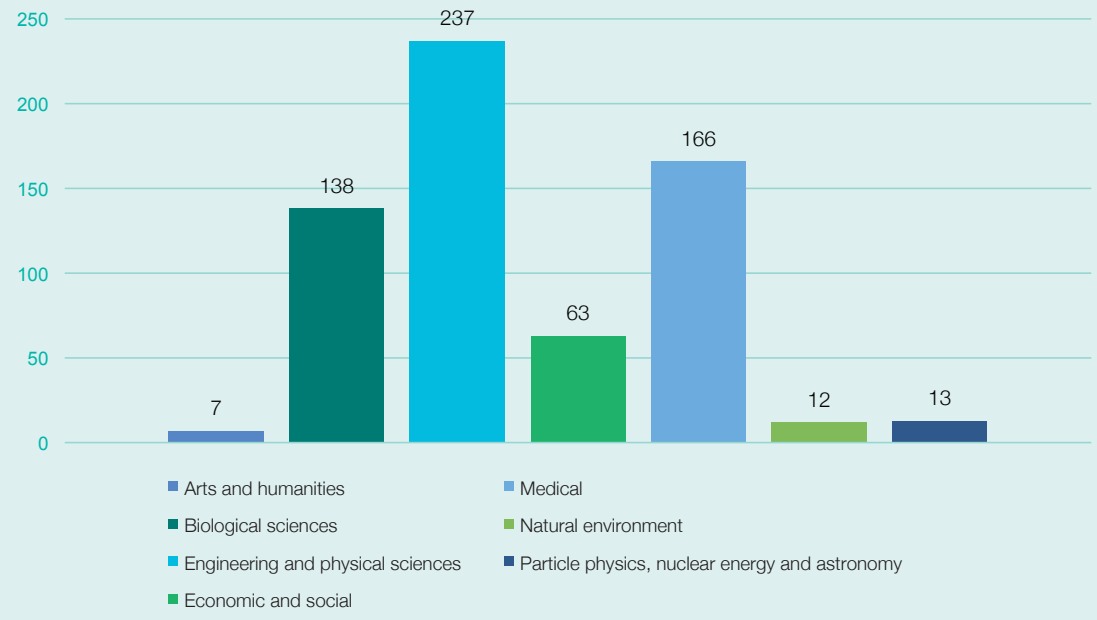
By comparison, the medical sector receives less than half of the funding which engineering and physical sciences receives, but achieves a marginally higher proportion of exits (12%), with proportionately fewer dead spinouts, too, at 4%. And biological sciences spinouts do even better, with 14% achieving exit, although a higher proportion have died (7%).

Tamsin Mann feels that this is due to the nature of investing in these sectors in the first instance: “There’s more risk attached to investment in medical and biological sciences, so there’s more caution around what private companies will invest in. Therefore, although there’s less overall investment going in, once that investment has been secured, there is a more certain route to market.”

But this leads to a wider question about what university spinouts should actually be aiming for in the first place. Sue O’Hare says: “The perennial question is: do we want them to achieve an exit over the short term? Or do we want them to stick around and grow into unicorns, which the UK is always criticised for not doing? But, of course, that goes back to the investors who are driving an exit to get a return within a desired timescale.”

The differences across the sectors show that more investment from both private and public sectors does not necessarily lead to more successful spinouts. However, without a comprehensive view of all spinouts and all funding streams it’s difficult to know whether the success rate is telling the full story. Without a clear strategy for UK spinouts it’s also difficult to know what level of success we should be aiming for.

Chart 7 : Number of spinouts per sector



Funding the future of UK innovation

As we've seen in this report, there are many positives about the current funding situation of UK spinouts and the government's industrial strategy will go some way towards improving the system. We have a good starting point with some of the best universities and best research in the world, but this report shows there is a big opportunity for commercialising research from UK universities, although there is still uncertainty about the most effective way of doing this.

This may be down to a number of factors. The ability of a project to attract public and private funding is not a clear-cut process and while investment in different sectors is not being tracked comprehensively it is difficult to say why one spinout or sector attracts more investment than another. University structure, capacity, investment trends and policy winds can all impact which sectors receive more investment than others at any given time.

This report has provided some of the first insights into how research funding actually impacts on the commercialisation of research and spinout formation, but as there are many more spinouts which are yet to receive private investment, the view is only a partial one. The government, research councils, Innovate UK and private investors would all benefit from a much more complete view of the spinout ecosystem.

As UKRI begins its work, considering how the commercialisation of research from UK universities is tracked and what measures of success they are aiming for must form a key part of its role. There is a great opportunity for this new research body to define its role in the spinout ecosystem, set clear targets for the spinouts sector and identify a clear pathway to success. With Innovate UK now becoming more integrated with the research councils, we think the time is right for a commitment to funding not just research, but the future of UK innovation.

In response to the findings in this report, we make the following recommendations to the UK government, UKRI and UK universities.

Recommendations

Government

- Commit to a clear strategy for the commercialisation of research from UK universities, building on the commitments made in the government's industrial strategy. There's currently no commitment on a target for the number of spinouts the government thinks universities should create or whether this is the type of commercialisation of research it wants universities to focus on.
- Provide a framework for tracking investments into UK universities and map this against how spinouts are performing. Without a clear overview of how money invested from the research councils and Innovate UK is related to the number, sector and type of spinouts which UK universities are creating it is difficult for the government to prove return on investment for public spending.

UKRI

- Create an intermediate funding mechanism for early stage spinouts. Private investors are often put off investing in spinouts because they see them as a risky investment decision as they are too early stage. A middle ground funder to help spinouts test their research before they go looking for private investment could help overcome this challenge.
- Consider its role in the wider spinout universe and how it is able to assist universities to commercialise their research. Providing the government with a clearer picture of where investment has led to commercialisation will allow the government to make more informed decisions about how funding should be divided and where more is needed.

Universities

- Set up business engagement programmes to bolster links between academics and businesses. Universities are already partnering with businesses and private investors to commercialise research but they should consider whether their academics have the access to the right investors at the right stage of a project.
- Make it easier for academics to take time out from teaching commitments to pursue commercial projects. Most universities already do this but should consider introducing a clause in academic contracts which allows them to take a break from their academic career to see if they are able to commercialise their research.

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Methodology

Linstock Communications analysed data from Research Councils UK regarding all research grants, irrespective of type, given by the seven research councils and Innovate UK to universities in the UK. We have also accessed data on private investment in university spinouts via Beauhurst. Both explore data between 2011 and 2017. We have used the Research Councils' subject domains to assign each Innovate UK grant and university spinout to one of seven sectors. This has allowed us to investigate the relationship between public and private funding.

The seven research councils are:

- Arts and Humanities Research Council
- Biotechnology and Biological Sciences Research Council
- Engineering and Physical Sciences Research Council
- Economic and Social Research Council
- Medical Research Council
- Natural Environment Research Council
- Science and Technology Facilities Council

The seven sector categories are:

- Arts and humanities
- Biological sciences
- Economic and social
- Engineering and physical sciences
- Medical
- Natural environment
- Particle physics, nuclear energy and astronomy

After compiling this data, we analysed the total amount of funding from private and public investments, how these two were related and created a data set which allowed us to see how the two interacted.

The data from Beauhurst also allowed us to analyse the success rates of spinouts across the individual sectors.

The quantitative findings were discussed through a series of qualitative interviews with experts working in technology transfer offices within universities, senior team management within spinouts, private investment companies and a membership body for spinouts.

Beauhurst tracks spinouts according to five triggers:

- Secured equity investment
- Secured venture debt
- Completed management buyout/in
- Participated in selected accelerator programmes
- Has been or is a scale-up

Spinouts that do not meet at least one of these criteria are therefore not included in the numbers for this report.

[12] http://www.rcuk.ac.uk/research/areas/

About us

Who we are: Anderson Law LLP is a niche technology law practice based in Oxfordshire. We have been highly recommended as a leading firm by Chambers & Partners and IAM 1000 for several years and many of our solicitors have also received separate accolades for their work. Our team is led by Mark Anderson, who is currently Chairman of the IP Law Committee of the Law Society of England & Wales, Chairman of BioLaw Europe FmbA, non-executive director of OBN (UK) Ltd, and former Secretary of the IP Committee of the UK BioIndustry Association.

What we do: We specialise in transactional work with an IP focus, particularly in the university, life science, IT, engineering and NHS sectors. Most of our clients are universities (including their technology transfer & research contracts groups), technology-based businesses (including spin-outs, start-ups and SMEs), NHS Trusts, charities and government agencies.

How we work: We place a strong emphasis on high technical and service standards in everything we do. We are a credible and cost-effective alternative to specialist IP law firms in London and other major cities, combining specialist IP and commercial law knowledge with experience of working on complex and international transactions and negotiations. We like to work as part of our client's team, frequently provide secondment services, and have long-standing relationships with our clients (some now running for over 20 years).

Contact us

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