REVIEW OF UK PROOF OF CONCEPT SUPPORT

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This review of Proof of Concept funding was
commissioned by Innovate UK, the UK's innovation agency.

Innovate UK

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CONTENTS

1 EXECUTIVE SUMMARY

Innovate UK commissioned IP Pragmatics to undertake a review of Proof of Concept (PoC) funding for businesses and academia in the UK. Innovate UK's definition of PoC (which is discussed further in the report) identifies a list of eligible activities to define what is considered as PoC:

- Initial feasibility studies
- Basic prototyping
- Specialist testing and/or demonstration to provide basic proof of technical feasibility
- IP protection
- Investigation of production and assembly options
- Pre-clinical research studies for healthcare technologies and medicines including target identification and validation

The information gathered through this project may help to inform thinking for future plans for government support of Proof of Concept funds. The report will also be a valuable resource for the communities to understand the PoC funding landscape.

IP Pragmatics has carried out an assessment of the availability, management and use of Proof of Concept funding in the UK. This information has been used to give a picture of the general landscape for how academic and commercial organisations access, manage and use this type of innovation funding (referred to in this report as "the Proof of Concept or PoC funding landscape"). In this analysis, we have gathered evidence from a wide range of Proof of Concept fund applicants, their advisors and Proof of Concept Fund managers. We have used a combination of approaches and sources of information including web-based searches, funding databases, an online survey of over 400 Proof of Concept participants (users, funders and administrators) and 16 directed interviews.

KEY FINDINGS

- Generally we have found a reasonable degree of satisfaction with the present Proof of Concept funding landscape in terms of the ability of organisations to access and use this type of funding. Key differences have been identified between different types of organisation reflecting mainly their ability to access funding (internal or external) and/or meet external funding requirements such as the need to have matched-funding. These differences are seen both amongst different academic organisations and different sizes of commercial company.
- The Proof of Concept funding landscape has changed significantly over the past 5 years with respect to where and how organisations access this type of funding and the landscape continues to change reflecting the short term availability of many funding sources. For some organisations these changes have been positive; for others the changes have been more negative by making it harder for them to access Proof of Concept funding.
- Across the UK we identified 25 national Proof of Concept fund sources and 14 regional Proof of Concept fund sources that are actively investing in new projects. We also identified a large number of funds, which only individual academic organisations or groups of organisation can access. This latter group of funds is mostly internally managed by the eligible organisation(s). Their prominence particularly reflects a change over the past 5 years with the rise in the number of universities managing their own internal Proof of Concept funds which are

- supported through part of their Higher Education Innovation Fund (HEIF) allocation and/or Research Council accelerator-type funding, and in a very few cases through their own or private funds.

- The regional sources of Proof of Concept funding have seen the biggest changes in the past 5 years and many of the funds that remain are in a state of flux, either awaiting new funding and/or with limited funds still to invest. It is too early to analyse how the Local Enterprise Partnership (LEP) funding landscape may impact on regional Proof of Concept funding since most LEPs are yet to finalise their plans for this type of innovation funding.

- Much of the funding for Proof of Concept is fragmented and available through multiple different sources. These sources are also not always consistently available with many only funding one-off rounds or having limited funding which when committed means the fund then stops. For some organisations, particularly SMEs, this can lead to a higher management cost to keep up to date with what funding is available and what the application requirements are. For universities, this fragmentation may be less of an issue given they already have resources deployed to help academics access diverse funding sources and keep track of funding availability. The fragmentation of funding sources can be a positive as it gives organisations more than one route to accessing funding for a given project.

- Innovate UK funding is a very significant part of the total Proof of Concept funding accessed externally by organisations each year across the UK. This is particularly true for companies for whom Innovate UK funding is the major source of external Proof of Concept funding that they are eligible to apply for. Larger companies have said that they generally use internal funds for undertaking Proof of Concept development in their core areas but rely on external funding for Proof of Concept where the area is more innovative or higher risk. For smaller companies, Proof of Concept funding sources such as Innovate UK are often the only external funding sources they can access for early stage development of their core business concepts. Securing external Proof of Concept funding then facilitates these companies leveraging further seed or other angel or venture investment funding.

- Innovate UK's definition of Proof of Concept chimes well with what the vast majority of respondents also consider as the activities that constitute Proof of Concept. We have identified some differences between universities and companies in the activities that they fund with Proof of Concept funding, particularly with respect to the use of this funding for intellectual property protection. Most organisations favour a broad, inclusive definition of Proof of Concept and try not to be too prescriptive with their own internal definitions. In this respect, we have found no evidence to suggest that changing the present Innovate UK definition for Proof of Concept would be beneficial or helpful.

- The changing and fragmented nature of the Proof of Concept funding landscape means that organisations seeking funding have identified the lack of awareness of available schemes as an issue. Keeping up to date with what sources of funding are available is a problem particularly for non-university associated SMEs. SMEs associated with universities often can benefit from support within the university in respect of knowledge of funding schemes and support with applications. Focussing government funding for Proof of Concept in fewer, longer term funding sources would significantly reduce the funding landscape complexity, particularly for SMEs.

- Respondents have reported very varying success rates with applying for Proof of Concept funding. Successful companies have often learnt how to increase their success rates by working with other companies with more experience of applying for external funding and/or by becoming scheme assessors and being exposed to other ways of approaching the funding applications. Finding new ways to support and signpost new applicants (e.g. through access to more comprehensive online guides) who have no prior experience would be important. Overall success rates for Innovate Smart Proof of Concept funding are around 22%, which compares favourably with success rates reported by applicants more generally.

- The links between public sources of Proof of Concept funding and next stage private sector seed/VC funding are important. Activities such as networking events and access to online data on funded projects are helping to strengthen these links and this is supported by private sector funders.

- We have identified differences in the perception of the present landscape for Proof of Concept funding depending on the nature of the organisations sampled. Generally these differences relate to their perceptions on the availability of Proof of Concept funding:
  - For research-intensive universities the landscape is generally positive. They currently have access to a broad range of internal and external Proof of Concept funds through HEIF and Research Council funding. Issues they encounter relate more to effective application and use of these funds rather than access to funds per se.
  - The positive landscape also extends to SMEs associated with universities (e.g. spin-outs) that are able to tap in to and use university funds and/or university support for Proof of Concept applications.
  - In contrast for the low research-intensive universities the landscape is generally negative and has become worse over the past few years with the demise of many of the regional funds that they used to be able to access. These universities do not generally have access to internal Proof of Concept funds.
  - For SMEs that are not linked to universities the Proof of Concept landscape is also generally neutral or negative. This group particularly identified issues with understanding what funds are available and how to apply/win these funds. For them Innovate UK (particularly Smart funding) is the go-to and often only available funding source. Matched funding requirements can be an issue for some very early stage SMEs.

- Within the Higher Education Institute (HEI) sector some of the difference in perception of the Proof of Concept landscape highlighted in the previous bullet is due to choices they have made in respect of whether to use a proportion of their HEIF allocation to fund an internal Proof of Concept fund. For the less research intensive universities they report that it would be difficult to prioritise this use of their HEIF allocation over other knowledge exchange activities.

- The average size of funding accessed for Proof of Concept is reported as £25,000-£50,000 per project, with less than 10% of projects reported to be funded at greater than £100,000.

- Matched funding is a requirement when accessing most Proof of Concept funds. Most respondents support this and note that this is an important requirement as it demonstrates commitment from the funding recipient. For some very early stage companies, a matched funding requirement is a significant barrier and restricts their ability to apply to many of the

funding sources. This could be addressed through greater flexibility in allowing successful applicants a period of time to raise the matched funding from private sources in the knowledge that the grant funding has been approved subject to the matched funding being secured.

- Both companies and universities identified pre-award project management, including particularly for companies bid writing and application support, as an important success factor in winning Proof of Concept funding. Access to external commercial advisors/champions and post-award project management are also seen as important to ensuring the success of a Proof of Concept project.

- In terms of overall availability of Proof of Concept funding, for both universities and companies the highest percentage of respondents indicated that the number of applications for Proof of Concept funding made by their organisation had remained the same over the past 5 years. For those organisations reporting a decrease in the number of applications, the two factors given for this were decreased availability of internal funding for Proof of Concept and decreased availability of external funding for Proof of Concept. In contrast those organisations reporting an increase in the number of Proof of Concept applications attributed this to a wider combination of factors, of which greater awareness from recipients was the most important factor driving the change.

2 BACKGROUND

In response to the House of Commons Science and Technology Select Committee inquiry 'Bridging the Valley of Death: Improving the Commercialisation of Research', Innovate UK commissioned IP Pragmatics to undertake a review of Proof of Concept funding for businesses and academia in the UK. In performing this review, it was necessary to establish a baseline for how different organisations and different sectors view what constitutes Proof of Concept, to understand what sources of Proof of Concept ("PoC") funding are available and to collect supporting data to understand how academia and businesses are using these funding sources. The information gathered through this project may help to inform thinking for future plans for government support of Proof of Concept funds.

To meet its objectives Innovate UK is seeking to:

- Understand different definitions of Proof of Concept funding across both the business and academic communities
- Provide an understanding of the perceived needs of universities and businesses for 'Proof of Concept' funding and the challenges that it is used to address
- Clarify and describe any differences in the needs for Proof of Concept support between businesses and universities
- Describe the current sources and levels of Proof of Concept support
- Assess what existing Proof of Concept funding is used for and how it is applied
- Identify any perceived gaps in the current support landscape for Proof of Concept

IP Pragmatics was commissioned by Innovate UK to collect and analyse information to help address the areas listed above.

In this analysis, we have gathered evidence from a wide range of Proof of Concept fund applicants, their advisors and Proof of Concept Fund managers. We have used a combination of approaches and sources of information:

- An online survey which was widely distributed by organisations such as Innovate UK, the UK Intellectual Property Office (UKIPO), PraxisUnico and AURIL, as well as by IP Pragmatics through our networks and social media
- Internet searches
- The Beauhurst funders database (http://about.beauhurst.com/);
- Selected interviews
- Networking events such as the annual PraxisUnico Conference (June 2015)

The results of our findings are summarised in this report.

2.1   ONLINE SURVEY

An important part of the data for this study was collected through an online survey which was widely distributed by organisations such as Innovate UK, the UK Intellectual Property Office (UKIPO), PraxisUnico and AURIL, as well as by IP Pragmatics through our networks and social media. The survey remained open for 4 weeks and during this time 426 participants took part. Of this number 242 individuals completed the full survey and answered every relevant question. A significant number of the remaining 184 participants answered the majority of the survey and either skipped some questions and/or failed to fully complete and submit the final pages.

Appendix 1 gives an overview of the survey respondents. A broad cross section of participants answered the online survey with 41% being from within companies and 46.7% from universities/Public Sector Research Establishments (PSREs). Across both of these major groupings there is a good distribution of respondents from the major regions with the exception of Wales and Northern Ireland, which are under-represented.

2.2   ACKNOWLEDGEMENTS

IP Pragmatics would like to thank all the individuals and organisations who responded to the survey with information and data which has allowed us to build up this initial analysis of the use of PoC funds across the UK.

We would also like to thank the steering committee for their valuable input into the design and interpretation of the research.

Any errors or omissions remain the responsibility of the authors.

3   DEFINITION OF PROOF OF CONCEPT

In dictionary terms "Proof of Concept" (PoC) is a noun defined as "the stage during the development of a product when it is established that the product will function as intended". Whilst the principle of PoC is simple to convey, the question of how different organisations in different sectors define Proof of Concept in practice is more complex.

Through the secondary market research we have identified two dimensions to how organisations that are providing funding define PoC. The first dimension is via defining activities which are included and/or excluded. For example, Innovate UK's funding for Smart PoC uses a list of eligible activities to define what they consider is PoC:

- Initial feasibility studies
- Basic prototyping
- Specialist testing and/or demonstration to provide basic proof of technical feasibility
- IP protection
- Investigation of production and assembly options
- Pre-clinical research studies for healthcare technologies and medicines including target identification and validation

The second dimension is to define PoC via the stage of development within a particular industry sector using accepted industry scales such as Technology Readiness Levels (TRLs) or Manufacturing Readiness Levels (MRLs). We have noticed a growing use of these scales within the UK particularly in industries such as automotive, transport and wider manufacturing. Funds using these scales will indicate eligible projects as being those at TRL 2 (technology concept formulated) and wanting to progress through TRL 3 – experimental Proof of Concept to TRL 4 – technology validated in lab. This approach is also recognised and used in Horizon 2020[1]. However, a drawback to this approach if the aim is to provide a universal PoC definition is the need to reconcile the different scales that have been adopted by different industry sectors[2,3].

IP Pragmatics is not aware of any published reviews that focus on comparing how different organisations define Proof of Concept. The importance of Proof of Concept funding in the broader translational research funding in the UK and Europe has often been highlighted[4]. Reviews have been

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[1] http://ec.europa.eu/research/participants/data/ref/h2020/wp/2014_2015/annexes/h2020-wp1415-annex-g-trl_en.pdf

[2] http://www.apcuk.co.uk/wp-content/uploads/2014/09/Automotive-Technology-and-Manufacturing-Readiness-Levels.pdf

[3] http://prod.sandia.gov/techlib/access-control.cgi/2010/107595.pdf

[4] http://www.scienceeurope.org/uploads/PublicDocumentsAndSpeeches/LEGS_Opinion_Paper_dec2014_WEB_FINAL.PDF

published on the impact of specific PoC funds or schemes. These reviews focus mainly on the economic aspects of the funds and the subsequent impact of funded projects[5,6].

3.1   USE OF DEFINITIONS

In undertaking this review we have identified that many organisations are deliberately broad in how they approach what they consider is Proof of Concept when providing funding and/or using internal funding. This extends further for many organisations which do not even use a specific definition. For example, in the online survey we asked respondents whether their organisation uses or has its own understanding of what it considers to be Proof of Concept. Over 50% of respondents stated that their organisation does not use or have a specific understanding of PoC (see Figure 1, which shows the responses by respondent count from a total of 329 respondents).

Figure 1. Use/Understanding of PoC
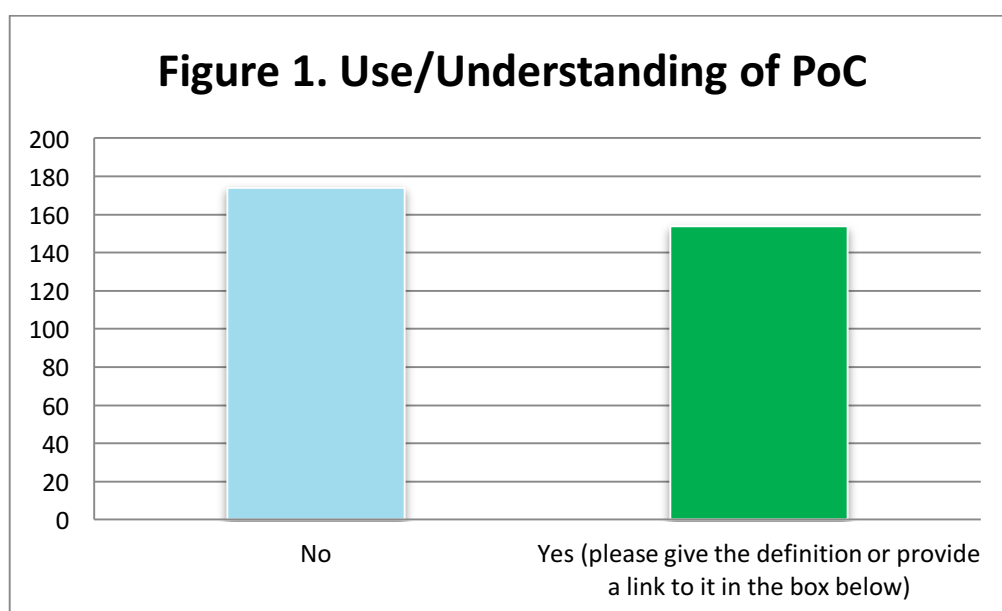
A slightly higher percentage of companies (55.5%) stated that they have no PoC definition than public sector organisations (52%). Even amongst those who manage a PoC funding scheme and are therefore more likely to have a published statement of scope, 43% report they have no PoC definition.

3.2   ACTIVITIES WITHIN SCOPE

154 organisations that stated they had - and used - a specific understanding of PoC provided information on what this constitutes. For many of the university respondents there was good agreement with the activities specifically listed in the survey – these being the same as Innovate UK's list of activities that constitute PoC:

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[5] https://secure.investni.com/static/library/invest-ni/documents/proof-of-concept-interim-evaluation-report-april-2014.pdf

[6] http://www.bbsrc.ac.uk/documents/1407-fof-evaluation-report-pdf/

- Technical feasibility studies
- Prototyping
- Specialist testing and/or demonstration testing
- Market research
- Market testing and competitor analysis
- Intellectual property protection
- Intellectual property position assessment
- Investigation of production and assembly options

For the companies, the definitions listed put most emphasis on prototyping or other proof that the product or service is technically viable, and on market testing to prove commercial viability.

Respondents were also asked which of the activities listed above their organisation considers as being within the scope of the definition of Proof of Concept (respondents asked to tick all that apply).
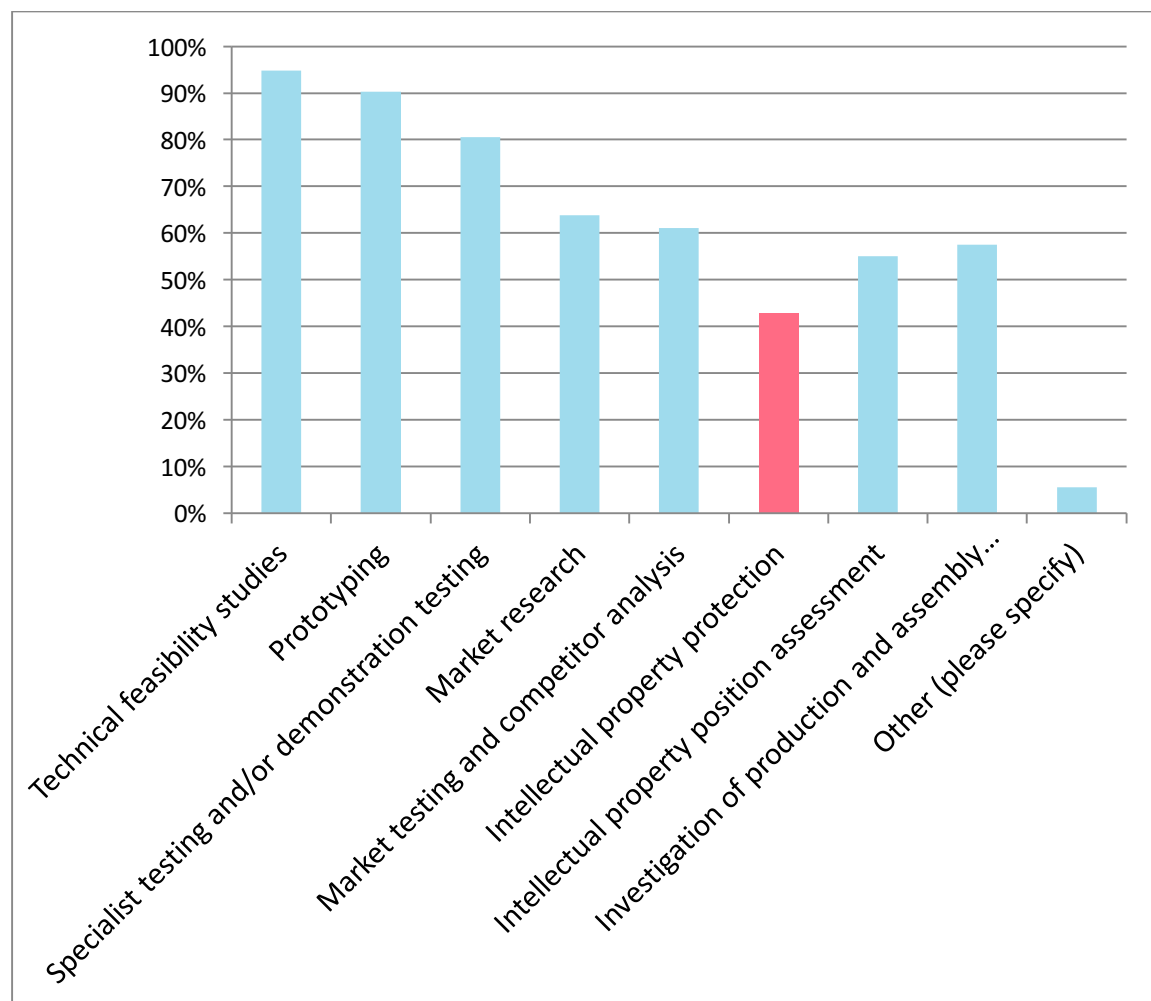

Figure 2. Percentage of 330 respondents who consider each activity as being within scope of Proof of Concept in their organisation

In general there was a good correlation between the answers given by universities and companies. This is illustrated in the comparative figure below.
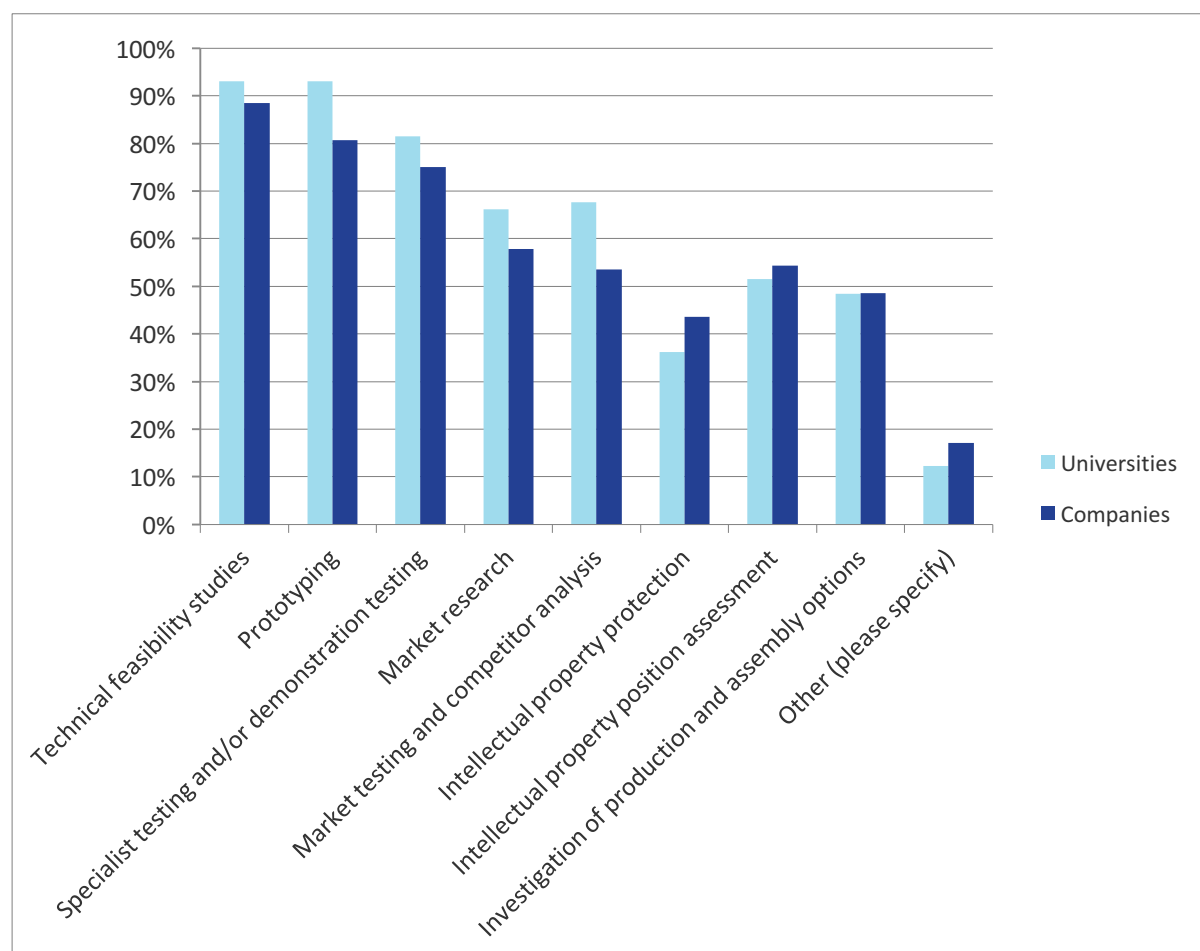

Figure 3.   Percentage of 130 university respondents and 140 company respondents who consider each activity as being within scope of Proof of Concept in their organisation

Very few respondents listed other activities as being within scope. Those that did specify additional activities to the ones listed mentioned the following:

- Co-design, design development
- Community benefit feasibility studies
- Purchase of equipment to support the above
- Consultation with key opinion leaders; testing investor appetite (if spinning out seems more appropriate than licensing to existing companies)
- Early engagement with established market operators with a view to potential partnership
- Certification requirements and compliance
- Commissioning and trials

- Testing of advanced materials against ISO standards for medical devices (costs are generally greater than Proof of Concept project funding)
- Putting together a project team to deliver the Proof of Concept activity
- Initial business case development
- Determining the most effective routes to market
- Testing in a clinical setting - this is a MUST for medical devices
- Costs analysis
- Test trading
- Produce trade-off curves indicating the impact of various technology alternatives on business outcomes (profit, inventory turns, etc.)
- Usability- if appropriate. Over and above market research - issues that impact delivery or quality of service delivered to users/consumers
- Sizing - the issues of scalability
- Early stage customer development - beyond just market research
- Professional memberships
- Business plan creation and modelling
- Cash flow needs, profitability, return on investment, breakeven position alignment with business strategy resources - money, time and skills required - indication of what won't be done if staff allocated to new project
- Financial feasibility, which is only really possible when various information is gathered form this stage
- Work might involve producing concepts for clients, customers from whom contracts are sought. It might be that concepts need to be thoroughly investigated for the purposes of support funding to produce a full working prototype or pilot plant or key components or systems.
- Cost analysis, route to market
- Regulatory planning and early tests horizon scanning beyond the obvious market (have all markets been considered?) Preparatory work to be investment ready - creating a business plan and detailed route to market
- Public communications Process training materials

ACTIVITIES OUT OF SCOPE

Respondents were also asked whether their organisation specifically excluded activities from Proof of Concept. Overall 45% (of 325 respondents) stated that their organisation did exclude specific activities. Within this number a lower percentage of companies (39%) exclude specific activities from what they consider is PoC (versus 51% of universities that do). Exclusions for universities mainly include basic research and IP protection. For companies, exclusions include core research, market research and market testing, existing product improvements, and production scale-up.

3.3 INNOVATE UK DEFINITION OF PROOF OF CONCEPT

Overall, the answers from the survey and the interviews support the validity of the definitions that are currently used by Innovate UK to describe PoC activities. The only possible exception is IP protection, which less than half the respondents viewed as being within scope of PoC funding. Similarly, there was general agreement on the activities (both pre- and post-PoC) which would be seen as out of scope. As would be expected, not all respondents would include all activities, and there is merit in keeping any definitions deliberately wide to allow for flexibility in the face of individual circumstances.

Generally most organisations favour a broad, inclusive definition of Proof of Concept and try not to be too prescriptive with their own internal definitions. In this respect, we have found no evidence to suggest that changing the present Innovate UK definition for Proof of Concept would be beneficial or helpful.

As noted in section 3.1, we have found a growing number of organisations using accepted industry scales such as Technology Readiness Levels (TRLs) or Manufacturing Readiness Levels (MRLs) to help applicants understand the stage of project and type of development work that is within the scope of Proof of Concept. This is particularly within industries such as automotive, transport and wider manufacturing. This approach is also recognised and used in Horizon 2020[7]. However, a drawback to this approach if the aim is to provide a universal PoC definition is the need to reconcile the different scales that have been adopted by different industry sectors[8,9]. Nevertheless these types of industry readiness scale do appear to be helpful for applicants when used alongside a definition that lists the specific types of activity that are eligible for funding (such as in Innovate UK's definition).

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[7] http://ec.europa.eu/research/participants/data/ref/h2020/wp/2014_2015/annexes/h2020-wp1415-annex-g-trl_en.pdf

[8] http://www.apcuk.co.uk/wp-content/uploads/2014/09/Automotive-Technology-and-Manufacturing-Readiness-Levels.pdf

[9] http://prod.sandia.gov/techlib/access-control.cgi/2010/107595.pdf

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4 SOURCES OF PROOF OF CONCEPT FUNDING

4.1 SECONDARY SEARCHES

Innovate UK has previously carried out a survey of Proof of Concept funds in 2009 and compiled a list of around 50 national, regional and individual organisation focussed funds. IP Pragmatics is not aware and has not found any published surveys of available schemes in the UK.

In the US innovosource conducted an assessment in 2011 of 63 technology and start-up gap funding programmes across 40 universities and affiliated organisations. The data is published in their report 'Mind the Gap'[10]. A summary of the source of 34 identified Proof of Concept funds is shown below.

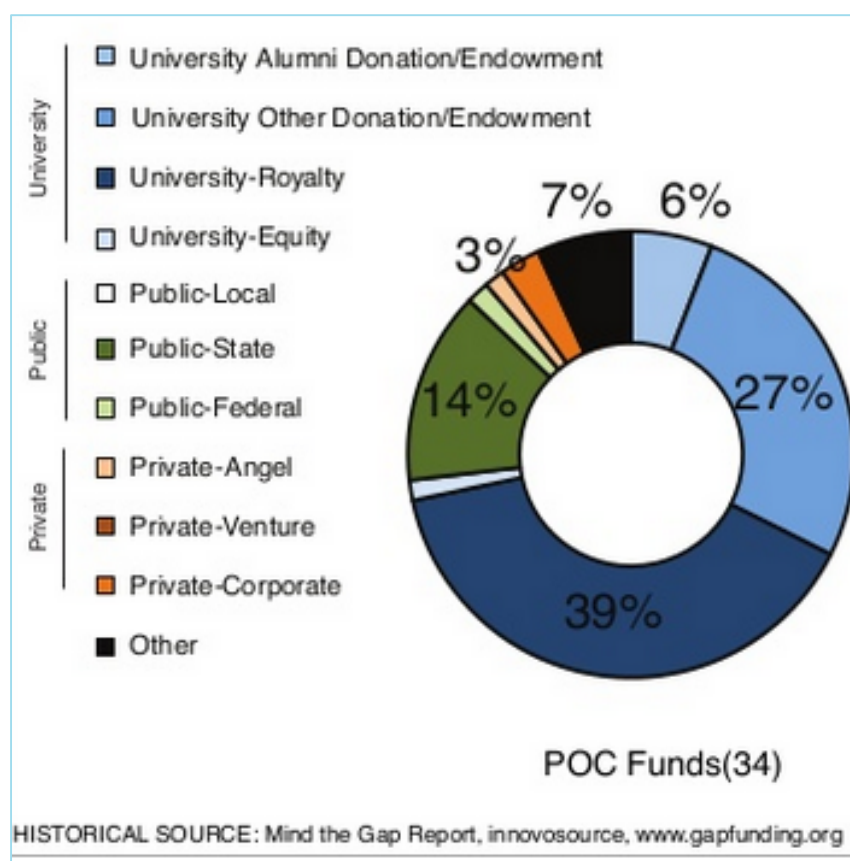HISTORICAL SOURCE: Mind the Gap Report, innovosource, www.gapfunding.org

Figure 4. Sources of Proof of Concept funding in the USA identified in the 2011 innovosource report 'Mind the Gap'.

In contrast to the UK, the university sector in the US appears to mostly fund its Proof of Concept funds through its own revenues from endowments and royalty/licensing income.

For this report we have compiled a list of Proof of Concept funds available to companies and universities across the UK. The data is provided in Appendix 2. Through this work we identified:

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[10] http://www.gapfunding.org/mtgreport/mind-the-gap-report-university-gap-funding/

- 25 national funds
- 14 regional funds
- 23 internal organisation specific funds

The internal fund list is not exhaustive since much of the information on these funds is not in the public domain. This latter group of funds particularly reflects a change over the past 5 years with the rise in the number of universities managing their own internal Proof of Concept funds which are supported by their HEIF allocation and/or Research Council accelerator-type funding, and in few cases through their own or private funds.

The vast majority of Proof of Concept funds are made available on the basis of a grant, with no pay back requirements. Some seed funds indicated that where they do provide initial small sums for Proof of Concept funding (as opposed to seed investment) this can sometimes be as a convertible loan and/or in return for equity. The Oxford Invention Fund[11] (OIF) is unusual in being supported by private donations (see later in this section) and if a spin-out company results from work financed by the OIF, the award will be rolled into an equity investment with the Fund being issued shares in the spin-out company at the same price as the first round cash investors. If rather than a new company, results from the PoC work financed by the Invention Fund generate licensing income, then a portion of the net revenue will be allocated to the Fund.

Comparing the list we have compiled with Innovate UK's previous list and through information gathered in the interviews, it can be seen that there has been considerable change and flux over the past 5 years. The reasons for these changes to the Proof of Concept funding landscape include:

- Regional funding changes
- Initiation of multiple new translational funding schemes and networks which have an element of PoC
- Many schemes have been pilot runs and/or only run for short periods

The regional sources of Proof of Concept funding have seen the biggest changes in the past 5 years and many of the funds that remain are in a state of flux, either awaiting new funding and/or with limited funds still to invest. It is too early to analyse how the LEP funding landscape may impact on regional Proof of Concept funding since most LEPs are yet to finalise their plans for this type of innovation funding. Some of the feedback we received also questioned the wisdom of LEPs setting up regional early stage Proof of Concept funds which may be less effective at reviewing and selecting suitable projects for these types of early stage, technically/sector diverse funds than national schemes such as Smart.

A consequence of this changing and inconsistent landscape is that many companies in our interviews noted the difficulty keeping up with the changes and identifying what publically funded PoC schemes are available to them and from which sources. Much of the funding for Proof of Concept is fragmented and available through multiple different sources. These sources are also not always consistently available with many only funding one-off rounds or having limited funding which when

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[11] http://isis-innovation.com/wp-content/uploads/2014/04/OxfordInventionFund.pdf

committed means the fund then stops. This echoes two of the findings in the July 2015 Dowling Review of Business-University Research Collaborations[12], namely that public support for the innovation system is too complex and that the government strategy on innovation needs to be better coordinated and have greater visibility.

For some organisations, particularly SMEs, this fragmentation and changing landscape of availability can lead to a higher management cost to keep up to date with what funding is available and when, and what the application requirements are (which will likely vary between funds). For universities, this fragmentation may be less of an issue given they already have extensive resources deployed to help academics access diverse funding sources and keep track of funding availability.

On the other side, we also received feedback that the fragmentation of funding sources can be a positive as it gives organisations more than one route to accessing funding for a given project. This is particularly so in certain sectors, such as healthcare, where multiple overlapping sources can potentially be accessed.

Against this changing landscape, Innovate UK Smart funding for Proof of Concept has been a relatively stable and consistent source of funds for organisations wanting to undertake Proof of Concept. Its importance has been widely acknowledged by all of the companies we have spoken with and this likely reflects both its consistency/longevity as a funding source and the overall scale of the fund.

It is not possible from the publically available data to accurately estimate the overall amount of external funding available for Proof of Concept in the UK. Many of the funds do not indicate how much funding they allocate per year, nor their overall fund level. Many funds also cover activities other than Proof of Concept. Additionally many private investors in early stage technology (angels, high net worth individuals and private investment funds) are also providing Proof of Concept funding as part of their overall investment activities and the scale of this is not publically visible[13]. However, despite this background complexity what is clear is that Innovate UK's Smart scheme must be a very significant proportion of the total funding landscape. By comparing total funds available per year from the database we have compiled (see Appendix 2), we estimate that funding under the Smart scheme is >50% of the total externally accessed PoC funding available in the UK each year. This conclusion also chimes with the high number of organisations in the survey that referred to Innovate UK funding as their major source of Proof of Concept funding.

4.2   SURVEY RESPONSES

To supplement the information on Proof of Concept funds sourced through public domain searches we also sought information from the online survey respondents as to sources of Proof of Concept

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[12] https://www.gov.uk/government/publications/business-university-research-collaborations-dowling-review-final-report

[13] Feedback from our interviews suggests that this private investment element in Proof of Concept funding is becoming more prevalent

funding that they accessed. Respondents who had indicated that they had applied for or received PoC funding in the past 3 years were asked to list what the sources of funding were.
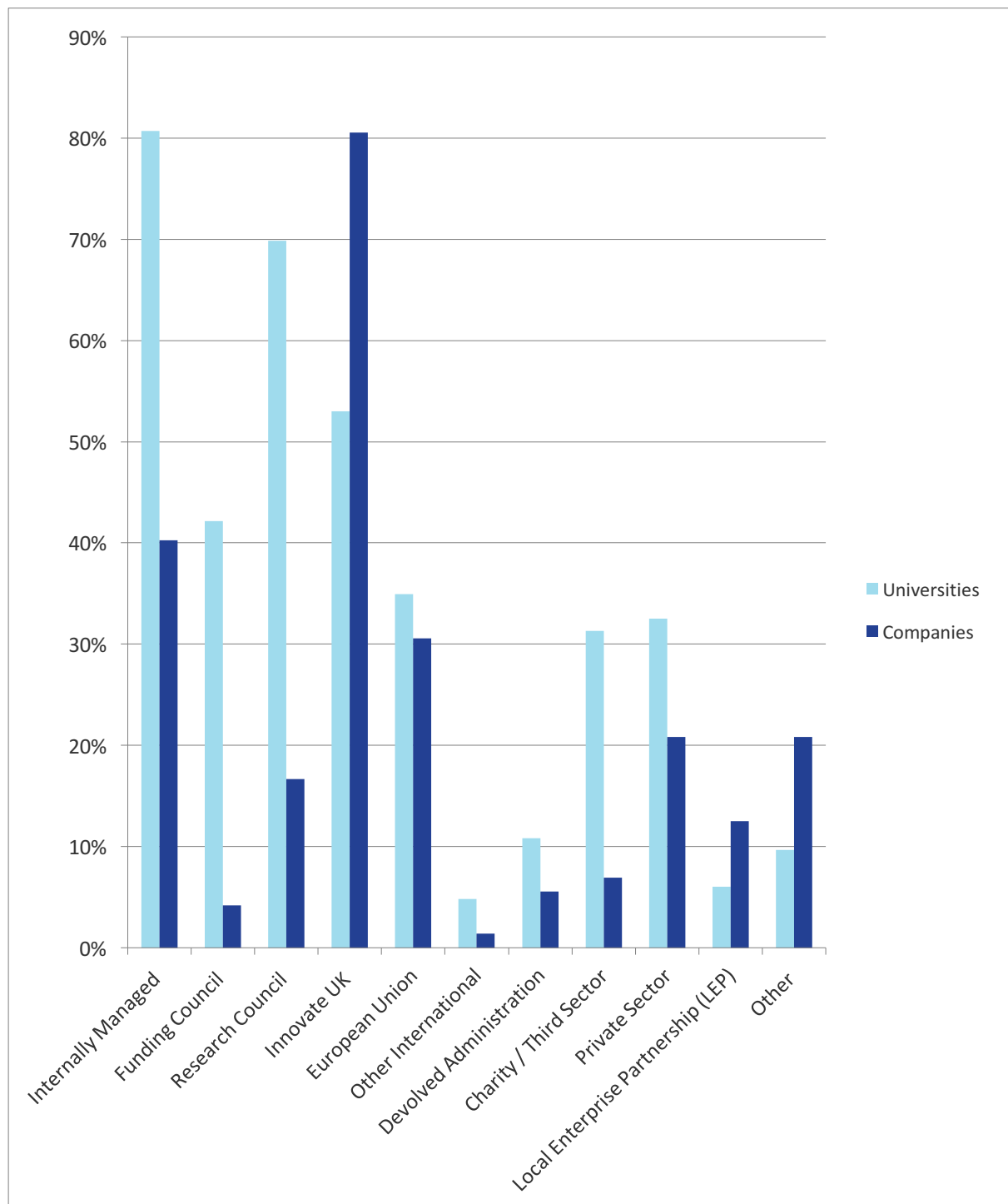

Figure 5. Sources of Proof of Concept funding applied for or accessed in the past 3 years (shown as a percentage of 72 company respondents and 83 university respondents who ticked each source)

Amongst the university cohort, the Russell Group respondents sourced a wider range of PoC funding sources. Non-Russell group universities were higher users of LEP and EU funding as a percentage of total schemes accessed/used, and lower users of Research Council funding.

Amongst the company cohort, as would be expected significantly fewer micro SMEs indicated that they used internally managed sources of funding for Proof of Concept than the larger SMEs and large companies. Micro SMEs also were not users of Funding Council or Research Council funds. Large companies were the heaviest company users of European or other international funding. For all companies, the use of Innovate UK funds dominated – ranging from 78% to 88% across the company categories.

For companies the feedback we received indicated that they will generally use internal Proof of Concept funding for projects that are in their core business areas of expertise and technical competency. In contrast they will look to access external public, or sometimes other private funding for projects which are more innovative (i.e. on the periphery or outside of their core areas) and/or more technically risky. This is true even for the larger companies we surveyed. For the smaller, earlier stage companies who have limited internal funds, they will use external Proof of Concept more broadly for core projects as well.

For the university cohort, the largest percentage indicated they used internally managed Proof of Concept funds. In virtually all cases, these funds originate from external public sources, which are then managed internally. Examples include: using HEIF funding, the Engineering and Physical Sciences Research Council (EPSRC) Impact Accelerator Accounts and the Biotechnology and Biological Sciences Research Council (BBSRC) Sparking Impact Awards. Over the past 5 years the availability of this type of public funding has allowed many of the more research-intensive universities to set up and manage internal Proof of Concept funds. The longer term availability of these external funding awards will dictate whether and to what extent these internally managed funds can continue. There are few examples we have found where internally managed Proof of Concept funds at universities do not rely solely on public sources of funding. One example is Oxford University's Invention fund which has sought private funding through routes including donation[14]. This contrasts with data from the US that indicates a very high proportion of funds used for Proof of Concept come from private sources (e.g. endowments)(see section 4.1).

Sources of Proof of Concept funding indicated through the 'Other' box in the survey included mainly other government department sources, e.g. Department for Transport. Industry consortia were also mentioned by large companies as a source of Proof of Concept funding that they accessed.

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[14] https://www.campaign.ox.ac.uk/oxford_invention_fund

5   USE OF PROOF OF CONCEPT FUNDS

The online survey respondents were asked if their organisation applied for or received Proof of Concept funding. Nearly 60% (179 respondents) of the 322 respondents who answered the question said they had applied for or received PoC funding in the past 3 years.
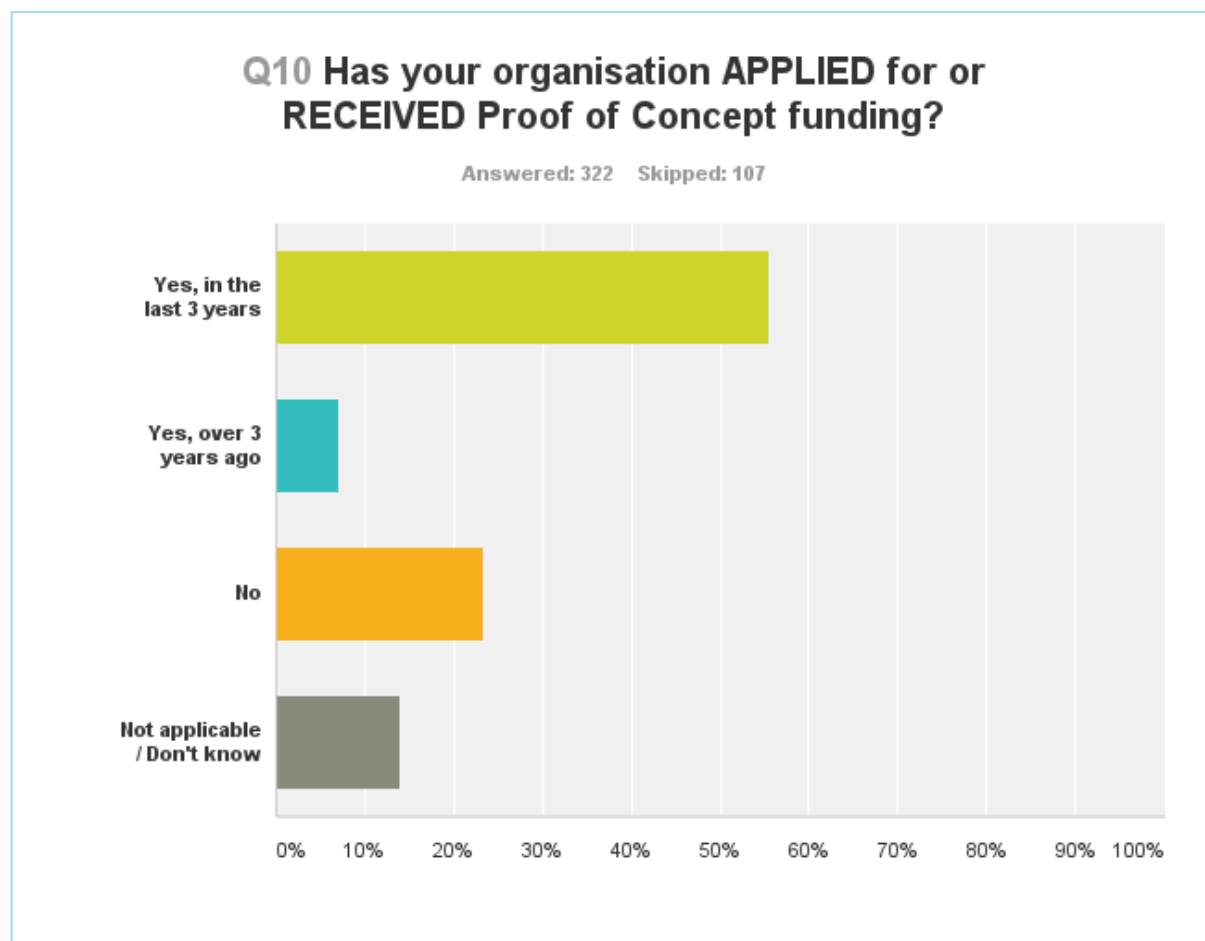
Those ticking the 'yes' in last three years' box included 88 university respondents and 76 company respondents. This combined cohort was used for the subsequent questions investigating further this use as summarised below.

Regionally there was little variation across the combined cohort, except for the South West where a significantly lower percentage of respondents in that region had applied for or received Proof of Concept funding in the past 3 years – 38% compared to the average of nearly 60%. This may reflect a lower availability in recent years of Proof of Concept funds in this region, which is also supported by the data we have compiled on funding sources (see Appendix 2).

5.1   FUNDED ACTIVITIES

Respondents were asked to indicate which of the activities that were previously asked as being in the scope of Proof of Concept funding (see Figures 2 and 3) that they have applied for or received over the past 3 years. The results are shown in Figure 6 below, comparing the university cohort with the company cohort.
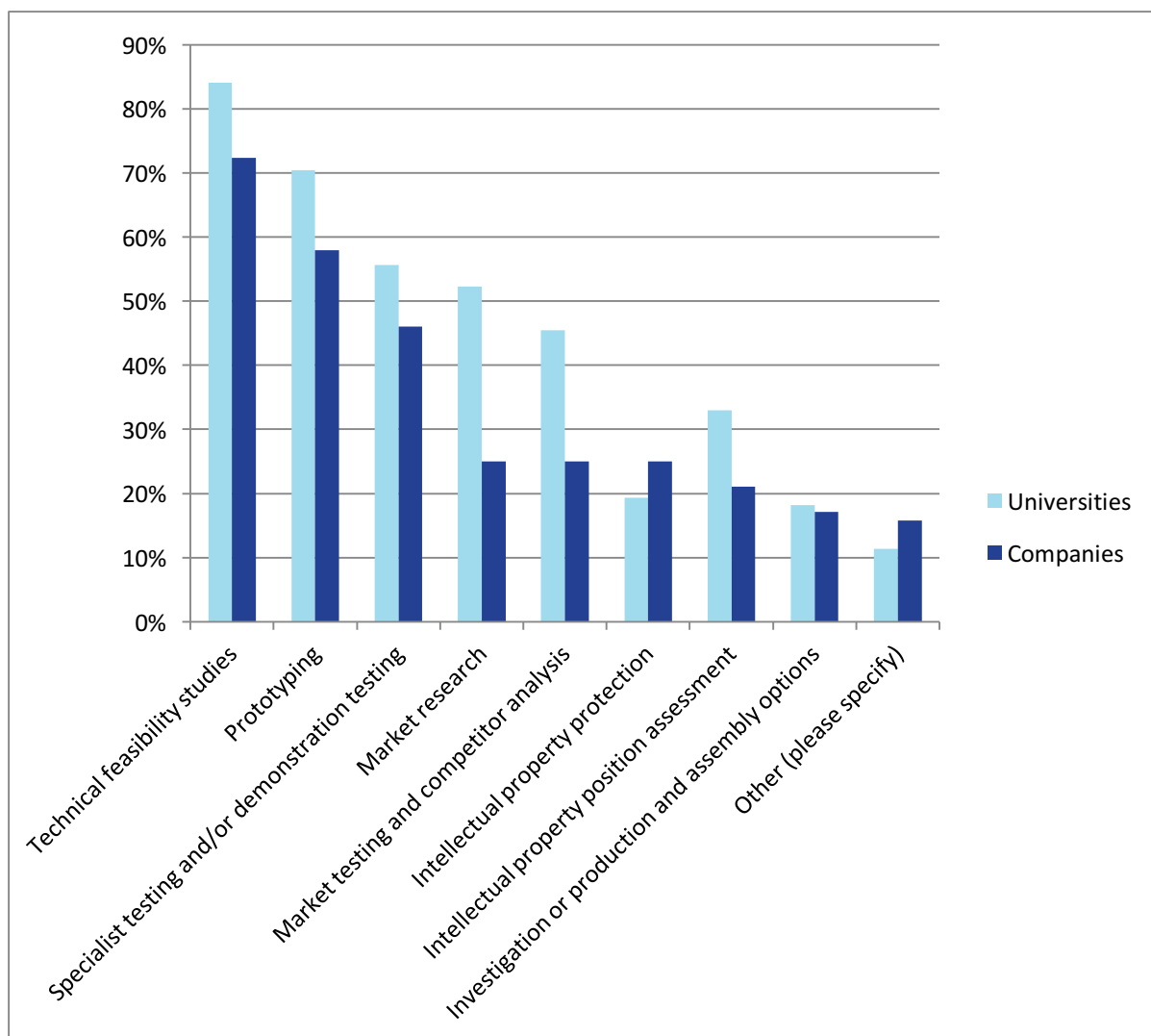
Figure 6. Percentage of 88 university respondents and 76 company respondents who indicated that they had applied for and/or received PoC funding in the past 3 years for each activity

In general there is a reasonable correlation between the activities funded as Proof of Concept by universities and companies. The areas that stand out as differing are:

1. Companies use PoC funding much less for market research and marketing testing/competitor analysis than universities; and
2. Companies use PoC funding relatively more frequently for intellectual property protection than universities.

We do not consider these differences are surprising given that companies generally already understand the markets they operate in or want to expand into. Their study of the market generally, therefore precedes their interest in looking to fund a Proof of Concept project. Similarly for universities they tend to have protected an invention (e.g. through priority patent filing) prior to considering its development through seeking translational funding. For the university cohort, one might have expected a higher percentage than the 45-55% reported would be using Proof of

Concept funding for market research and market testing, given that they generally lack this knowledge internally for many new technology opportunities. It is also an area where universities are sometimes criticised in not understanding the market enough prior to embarking on practical work to further develop a concept.

The overall findings summarised in Figure 6 mirror closely the responses in the survey when the full cohort of respondents was asked about the activities that their organisations define as being within the scope of Proof of Concept (see Figures 2 and 3). This is illustrated in Figure 7.
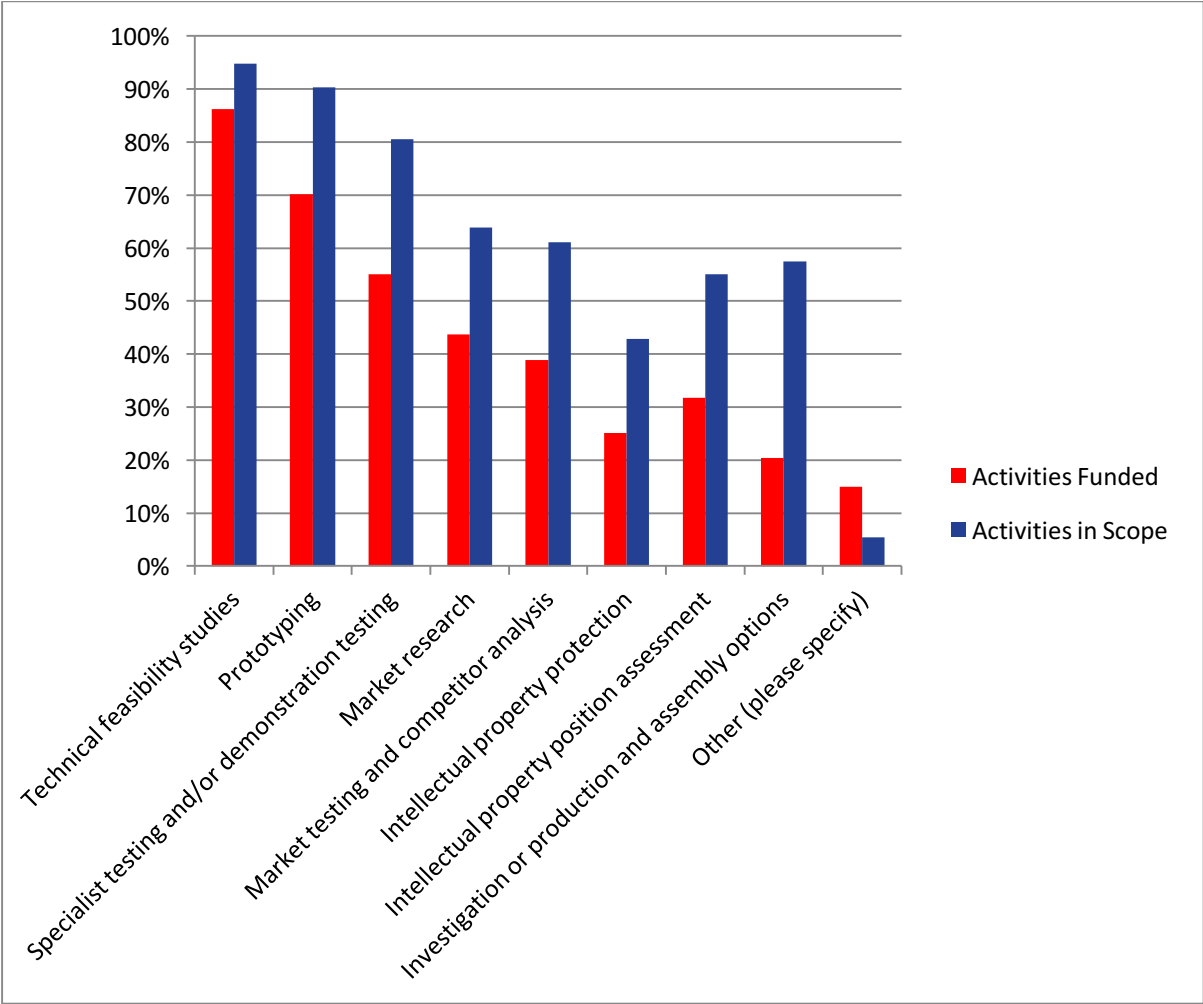

Figure 7. Comparison between the percentage of respondents (n=329) who indicated an activity was in scope of their PoC definition and the activities undertaken by those respondents (n=167) that had applied for and/or received PoC funding in the past 3 years

The one activity that stands out as being less prevalent in the funded activities than within the scope of Proof of Concept is the investigation of production and assembly options. This, however, may just reflect the high response from universities which may be less likely to be directly involved with this stage, or the higher percentage of respondents from industries that do not require this step (e.g. software), or a feeling from some that this activity is the next step beyond PoC.

Other activities not listed in the question that universities or companies stated as being activities for which they have applied for and/or received Proof of Concept funding over the past 3 years included:

- Trade-off curve development (company)
- Training and strategy support (company)
- New studies for new ideas (company)
- Formulation trials process/systems modelling & simulation (university)
- Proof of scientific feasibility in advance of technical feasibility (university)
- Industry expert expertise and door opening (university)
- Progressing work from in vitro to in vivo studies (university)

The percentage of respondents listing 'Other' was very small for both activities funded and activities in scope suggesting that there are no major areas of activity that are not already covered in the list of activities that constitute the Innovate UK Proof of Concept definition.

In general, the survey responses suggest that the list of activities which Innovate UK uses for defining Proof of Concept are comprehensive and correlate well with what both universities and industry not only consider as being in scope but also those activities that they carry out within their Proof of Concept projects. Therefore, we have found no evidence to suggest that this definition should be changed by taking activities out, nor by adding missing activities in.

5.2 LEVELS OF FUNDING

One aspect of Proof of Concept is the varying levels of funding that can be obtained. This can be seen in the range of funding available in the various public funding schemes identified in the secondary research discussed in section 4.1. Respondents were asked about the average funding per project that they applied for and/or received for Proof of Concept over the past 3 years.
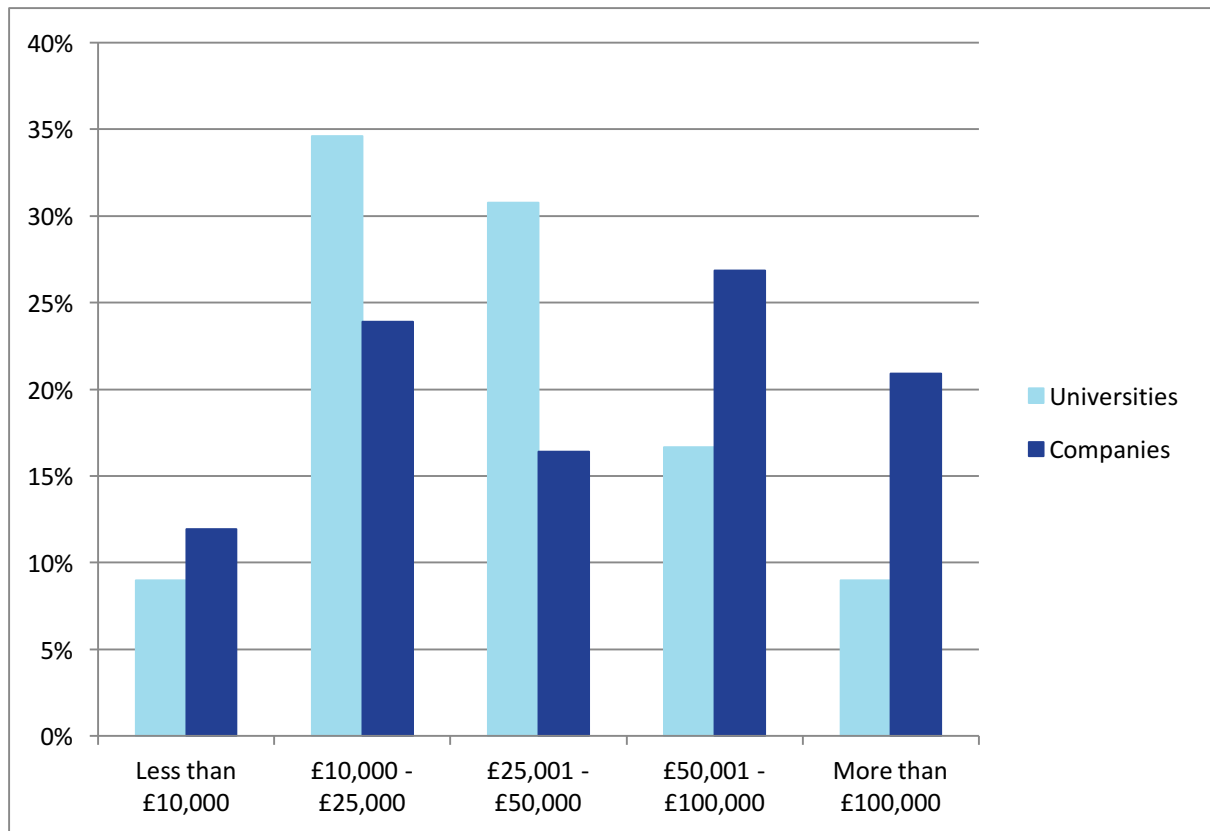
Figure 8.   Average funding per PoC project by percentage of respondents (n=78 for universities and n=67 for companies) that had applied for and/or received PoC funding in the past 3 years

Across the university cohort for most respondents (65%) their averaged Proof of Concept funding was in the range of £10,000 - £50,000 per project, with noticeably fewer respondents having an average project funding size of over £50,000. For the companies the distribution was more bi-modal with a peak at £10,000-£25,000 and a second peak above £50,000.

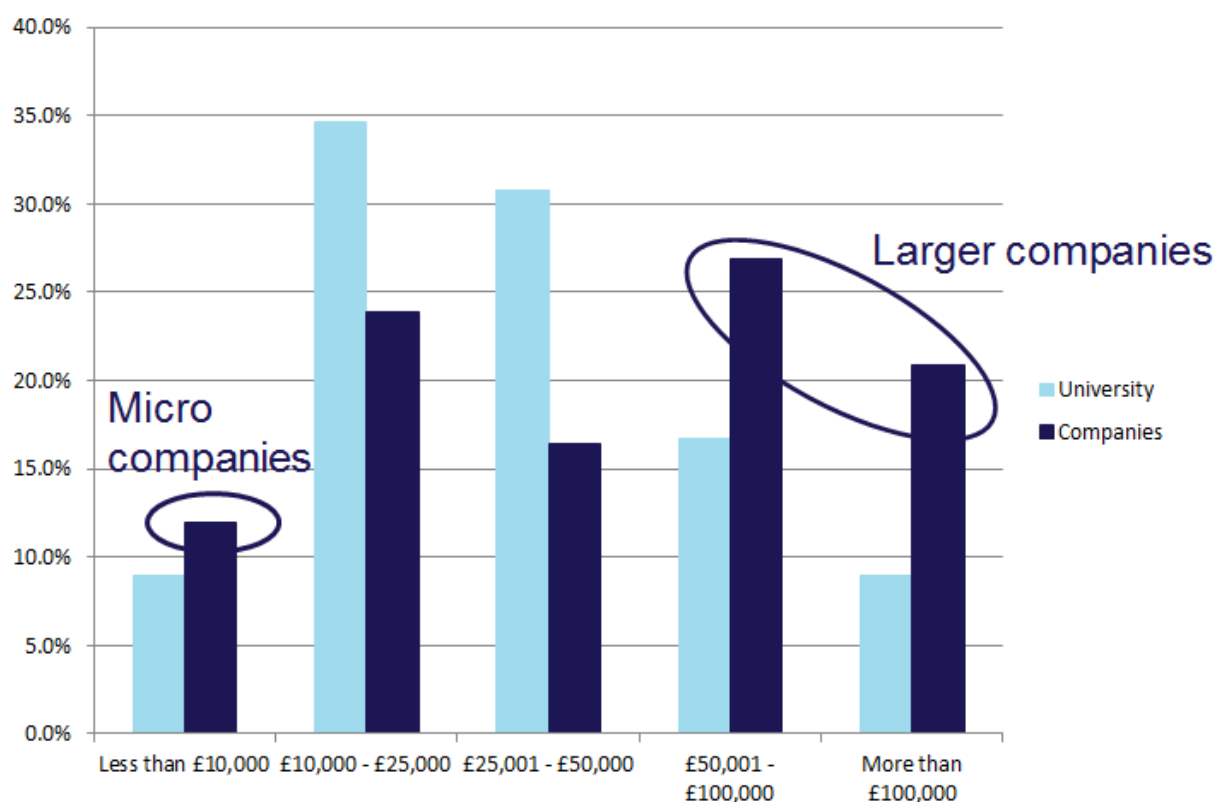**Figure 9. Average funding per PoC project as shown in figure 8 identified by company size or respondents.**
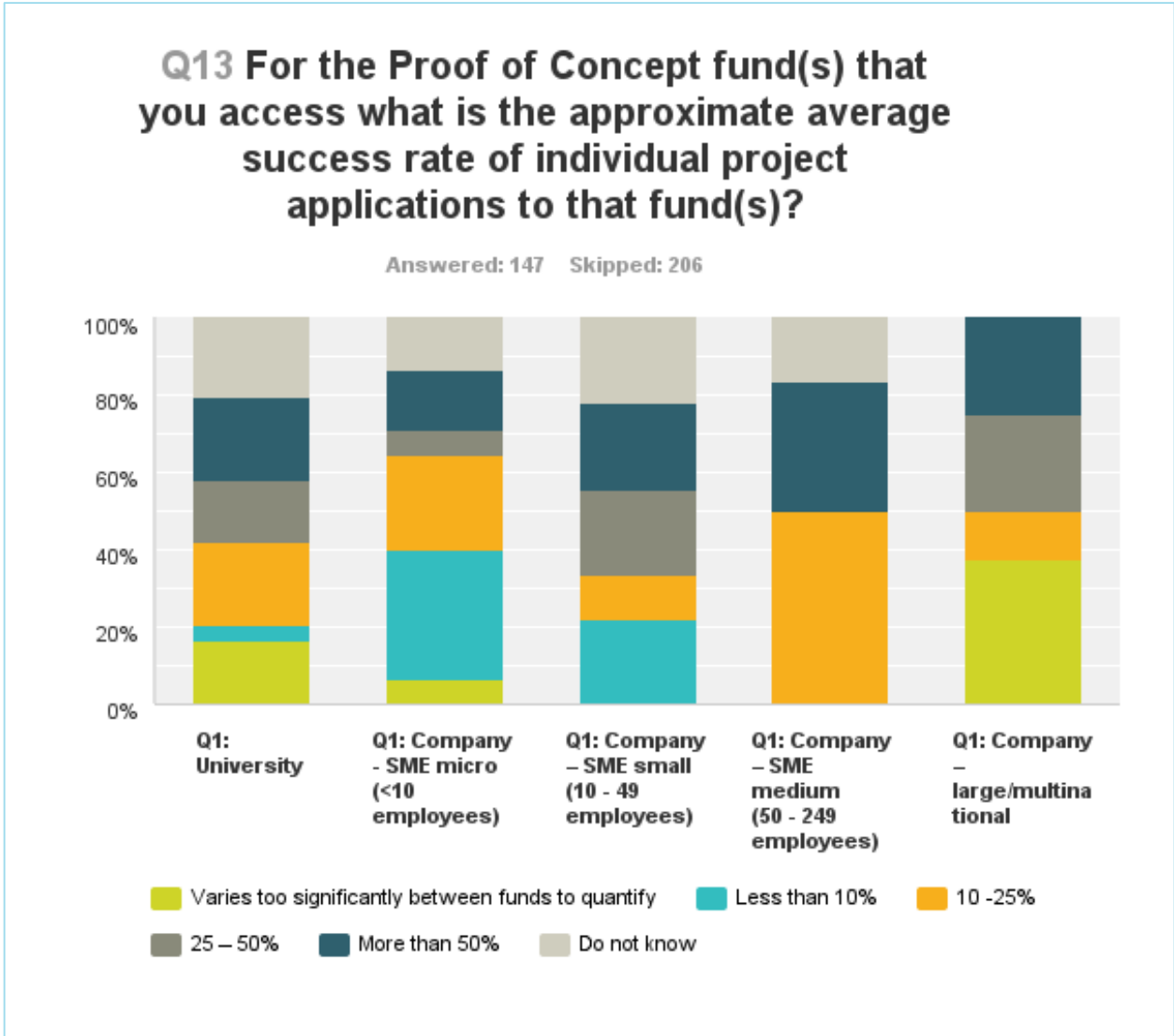
Analysing the distribution of project size by company size identified that most of the micro-SMEs were reporting projects at the lower end and in contrast it was the larger SMEs and large companies that were identifying their average project size as being greater than £50,000. This would not be unexpected given the need for the recipient to find matched funding in most cases, which would preclude smaller companies from accessing larger Proof of Concept funds for individual projects.

5.3   SUCCESS RATES

One of the areas of concern expressed in the individual interviews is the low success rates some organisations, particularly small companies face when applying for external Proof of Concept funding. In contrast, other interviewees demonstrated much higher success rates, which reflected either a history of applications to similar funds and/or experience of working with partners who had previously been successful with obtaining similar funds.

Interviewees also made reference to varying degrees of support available in different organisations to help with Proof of Concept applications and the impact that this can have on success rates. The determining factor for this support level we found was a combination of size of company and how closely associated the company was to a university. In contrast support within the university sector was generally very high reflecting their internal systems for assisting staff to apply for grants. This support also extended to companies closely associated with the university i.e. spin outs.

Differences in success rates when applying for Proof of Concept funding by organisation type can be seen in the figure below.

Q13 For the Proof of Concept fund(s) that you access what is the approximate average success rate of individual project applications to that fund(s)?

Answered: 147   Skipped: 206

In general universities reported success rates per project at 10-25% or above, which is closer in distribution to the medium-sized SMEs and large companies. A much higher percentage of micro-SMEs in particular reported very low success rates (less than 10%). The numbers of medium SMEs and large companies answering the question was much lower than the university and micro-SME groups so this needs to be taken into consideration. However, comparisons between the university cohort and the micro-SME cohort are more valid given the much larger numbers of respondents for both categories. Within the university cohort, the Russell Group universities reported a slightly lower overall success rate than the university group as a whole.

For comparative purposes the success rate for Innovate UK's Smart scheme is around 22%[15].

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[15] Source – Innovate UK

Drawing too many conclusions from success rates is difficult as they will reflect not only the difficulty and availability of getting funding once an application is made, but also the amount of pre-filtering and support that is given prior to making the application. In many universities and also larger companies there is an active pre-sifting of applications to ensure only those with a higher chance of success are progressed to the full application side. As a consequence these organisations have a much higher success rate in terms of funded projects as a percentage of applications made. Particularly amongst the larger companies, interviewees noted that there was a reputational risk both for the individual and the company if a project applied to public funds and was turned down. As a consequence these companies will only apply for projects where they consider there is a very high chance of success that the funding will be approved[16].

In the interviews a number of respondents remarked on the importance of experience in learning how to approach applying for Proof of Concept funding and in particular from Innovate UK funding. Companies have gained experience and increased their success rates through a combination of approaches:

- Working on joint projects with organisations that had already been successful
- Learning through becoming reviewers/assessors of schemes
- Working through intermediary organisations such as KTNs as well as private sector companies who specialise in helping companies seek grant funding

Smaller SMEs and those new to applying for Proof of Concept funding could benefit from adopting these approaches.

5.4   MATCHED FUNDING

The majority of Proof of Concept schemes, particularly public-funded schemes require matched funding[17]. This is an aspect of the overall funding requirement where we have identified differences of opinions. The majority of respondents we spoke with consider the requirement to find a level of matched funding as a positive as it demonstrates a level of commitment by the applicant. In contrast a number of micro-SMEs indicated that this was a considerable constraint to them applying for Proof of Concept funding.

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[16] A consequence of this pre-sifting can be a greater level of disquiet and frustration with the grant system if these projects are not funded

[17] Only a few of the charity funds will provide 100% funding

Q16 For the Proof of Concept fund(s) that you access, is there a requirement for matched funding (from your own or from a partner's resources)?

Answered: 162   Skipped: 267
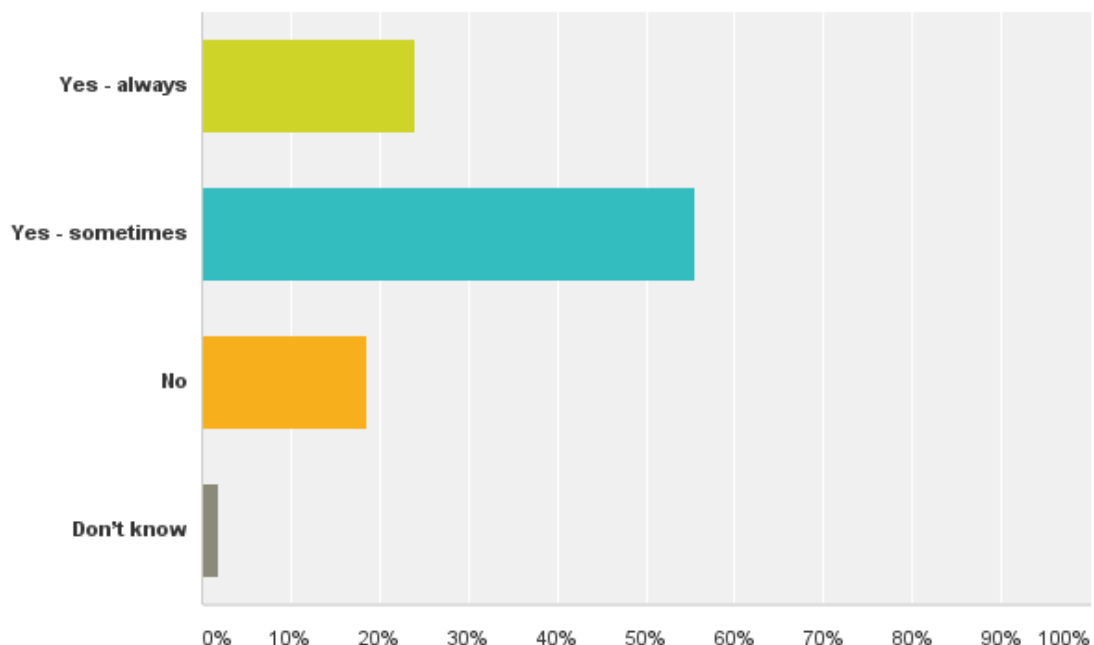
The respondents to the online survey that had accessed PoC funding in the past 3 years were asked if there was a requirement for matched funding. Nearly 80% of the 162 respondents who answered the question said there was, either sometimes (55%) or all of the time (25%) (see figure above). Less than 20% of the respondents indicated that there was no requirement for matched funding from the Proof of Concept funds that they access.

The percentage requiring matched funding is likely to be higher than the above figures suggest. This is because for some of the schemes which do not provide full economic costs for projects, recipients largely consider this as meaning that they are not being required to provide matched funding. From a financial perspective their host organisation is likely to view this differently and they would consider that the lower overhead contribution is a form of matched funding.
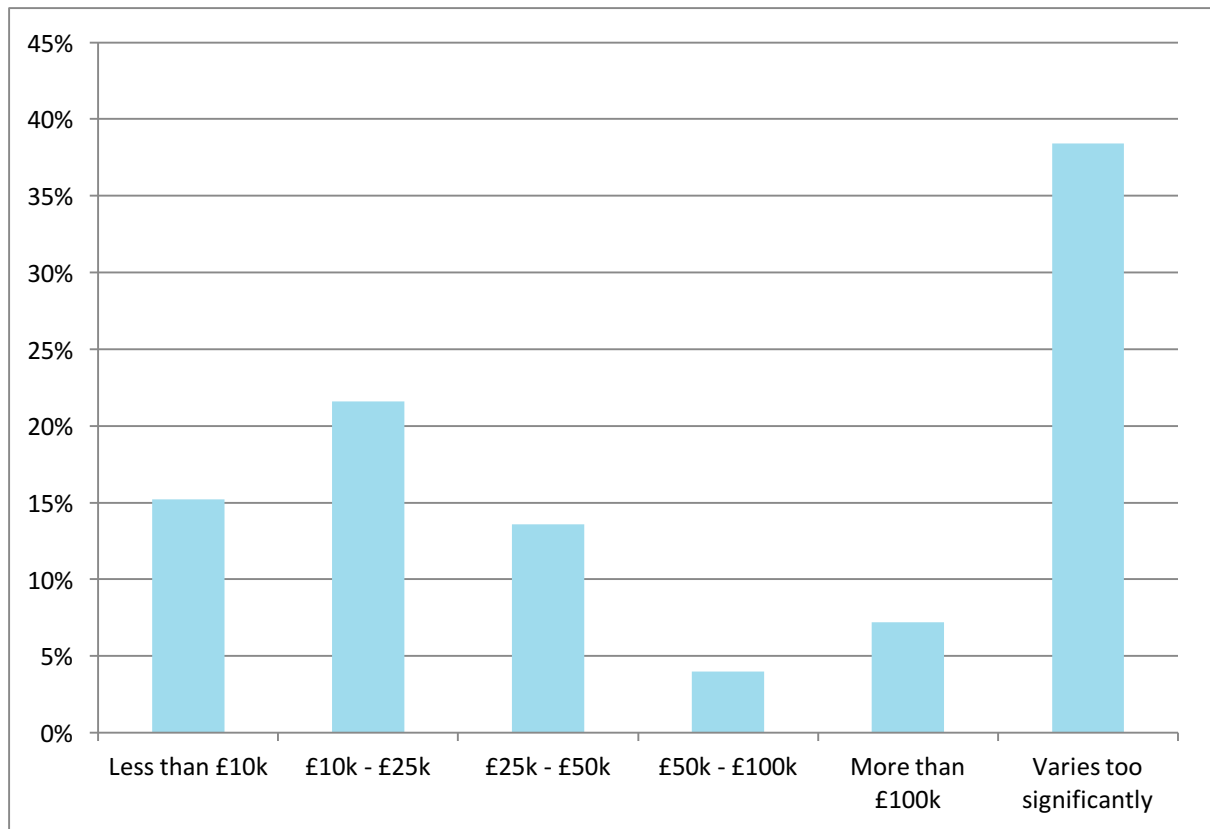
Figure 10.   Average matched funding per PoC project by percentage of respondents answering the question (n=125).

For a significant number of the respondents the level of matched funding varies too significantly between funds for them to quantify an average. For those respondents that were able to estimate an averaged matched funding level, the distribution not unexpectedly was similar to that of the total funding (see Figure 8).

Overall, we have found that most respondents support the need for matched funding and note that this is an important requirement as it demonstrates commitment from the funding recipient. For some very early stage companies, a matched funding requirement is a significant barrier and restricts their ability to apply for many of the funding sources. This could be addressed through greater flexibility in allowing successful applicants a period of time to raise the matched funding from private sources in the knowledge that the grant funding has been approved subject to the matched funding being secured. Respondents noted that securing funding from sources such as Innovate UK was an important endorsement that a business idea had merit, as well as direct financial leverage that helped secure parallel or subsequent seed or angel investment.

5.5   FURTHER FUNDING

In addition to Proof of Concept Funding respondents were asked to identify which of the following sources of funding does their organisation use to develop ideas (tick all that apply):

- Research Council
- Funding Council
- Charity / Third Sector
- Devolved Administration
- Funding from industry (if in academia)
- Your own internal funds (if in a business)
- Innovate UK (Technology Strategy Board)
- European Union
- Angel investment
- VC investment
- Crowd funding

The results are summarised in Figure 11.
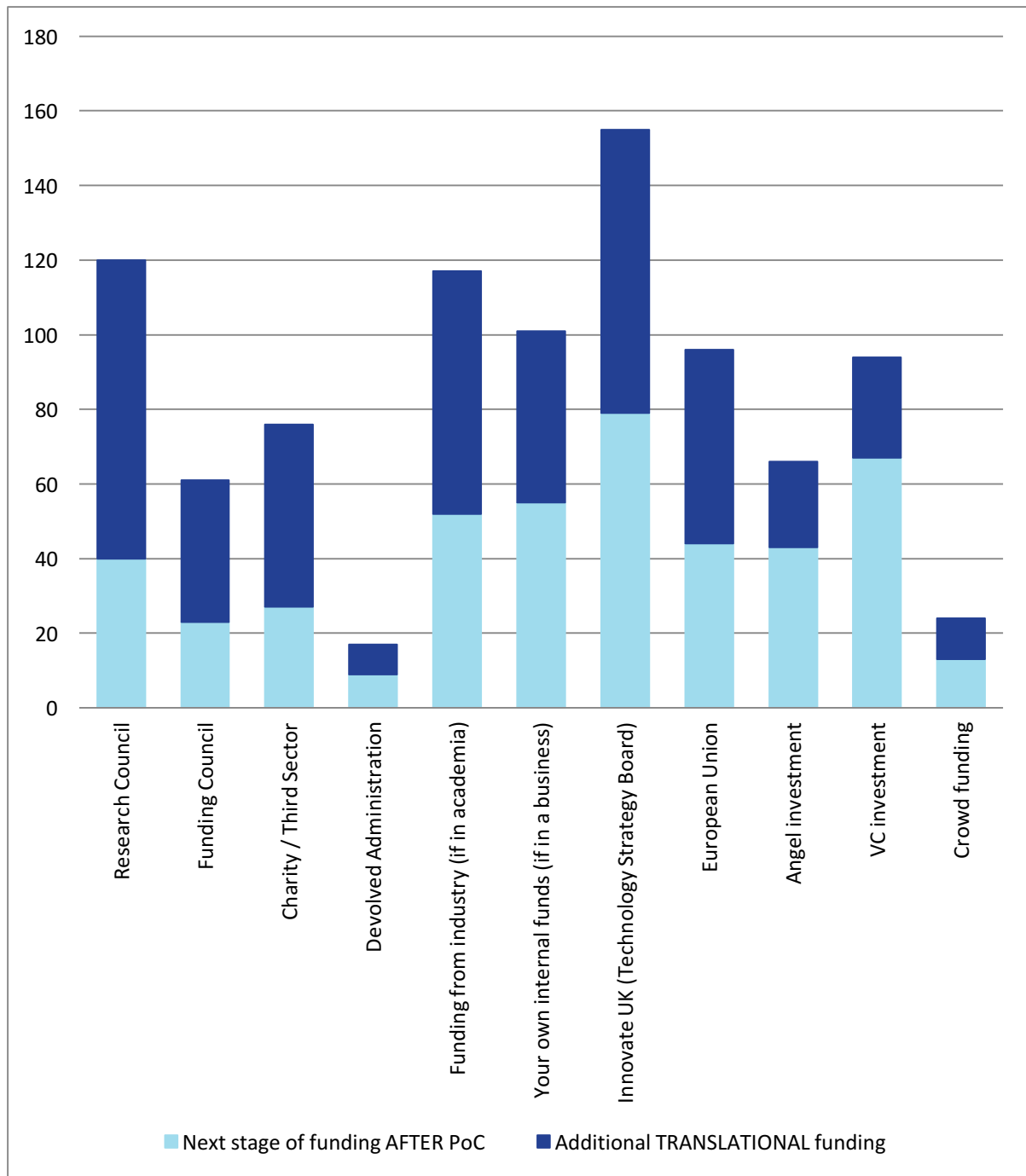
Figure 11. Sources of funding in addition to PoC funding by respondent number (n=152).

Across the respondents, a wide range of funds is used both for additional translational funding and for the next stage after Proof of Concept funding.

Comparing the university respondents to company respondents identified that universities more often access a much wider source of translational funding whereas companies predominantly will use either their own internal funds or Innovate UK funds (see Figure 12).
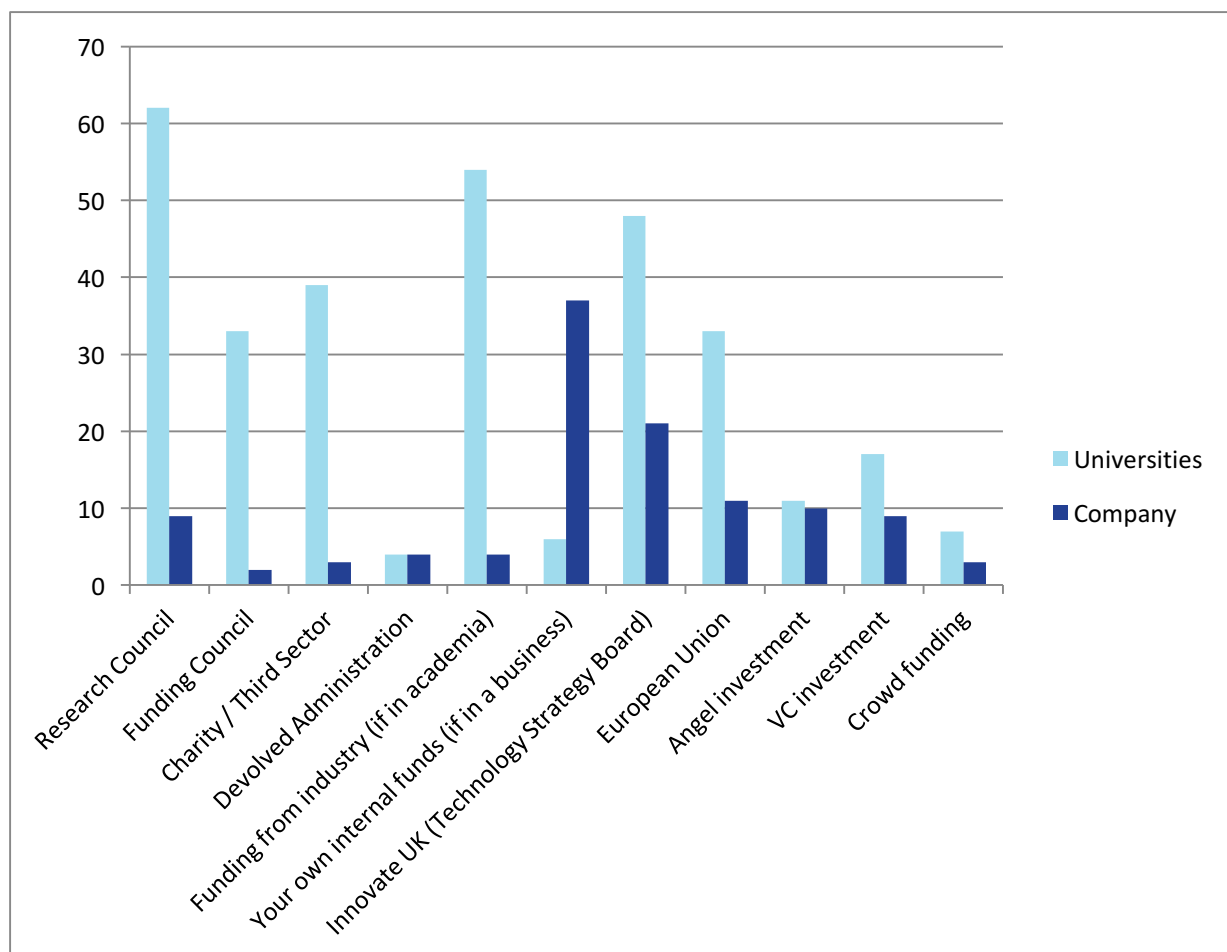
Figure 12. Sources of funding for ADDITIONAL TRANSLATIONAL FUNDING by respondent number comparing universities (n=85) to companies (n=62).

The wider range of translational funds accessed by universities compared to companies likely reflects a combination of their eligibility for a wider range of funding sources and their greater level of internal support resources to help identify and win funding from different diverse funding sources.

The answers given by the university and company respondents were also compared with respect to the sources of funding each uses for further development of projects after Proof of Concept (see Figure 13). For both universities and companies there is a marked increase in the use of angel and venture capital funding after Proof of Concept (as would be expected). Funding from Innovate UK remains an important source for both universities and companies after Proof of Concept.
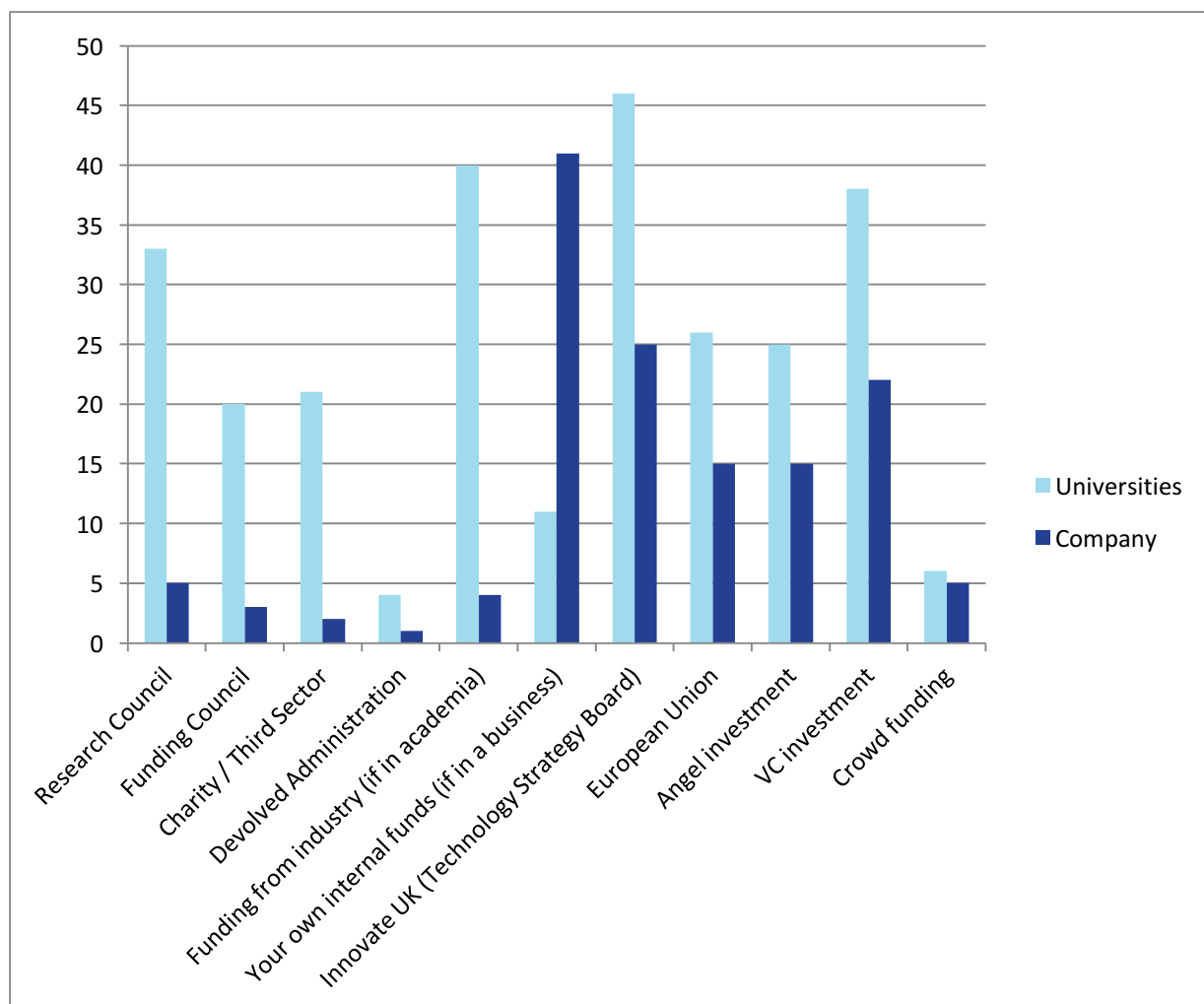
Figure 13. Sources of funding for the next stage development AFTER POC by respondent number comparing universities (n=85) to companies (n=62).

The importance of the link between Proof of Concept funding and downstream private investment from angels, seed and other investment funds was highlighted by a number of the respondents and the interviews we conducted with fund managers. Greater visibility and involvement of private sector funders working alongside grant funding for Proof of Concept would add value and give further commercial rigour to decisions on initial funding. Plus these links would help to ensure successful Proof of Concept projects progress through to the next stage of funding as efficiently as possible. For Innovate UK funding at present these links are being improved through online means such as the _Connect database[18] of funded Innovate UK projects and the GrowthShowcase[19], as well as through Innovate UK's Investor Network.

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[18] https://connect.innovateuk.org/publicdata/

[19] http://www.growthshowcase.com/

6 MANAGEMENT OF PROOF OF CONCEPT FUNDS

Alongside an understanding of how organisations use Proof of Concept funding, we also sought feedback from organisations managing and/or administering Proof of Concept funds.

Of the 294 respondents who answered the question on managing/administering funds 126 had managed or administered a Proof of Concept project in the past 3 years (see below).
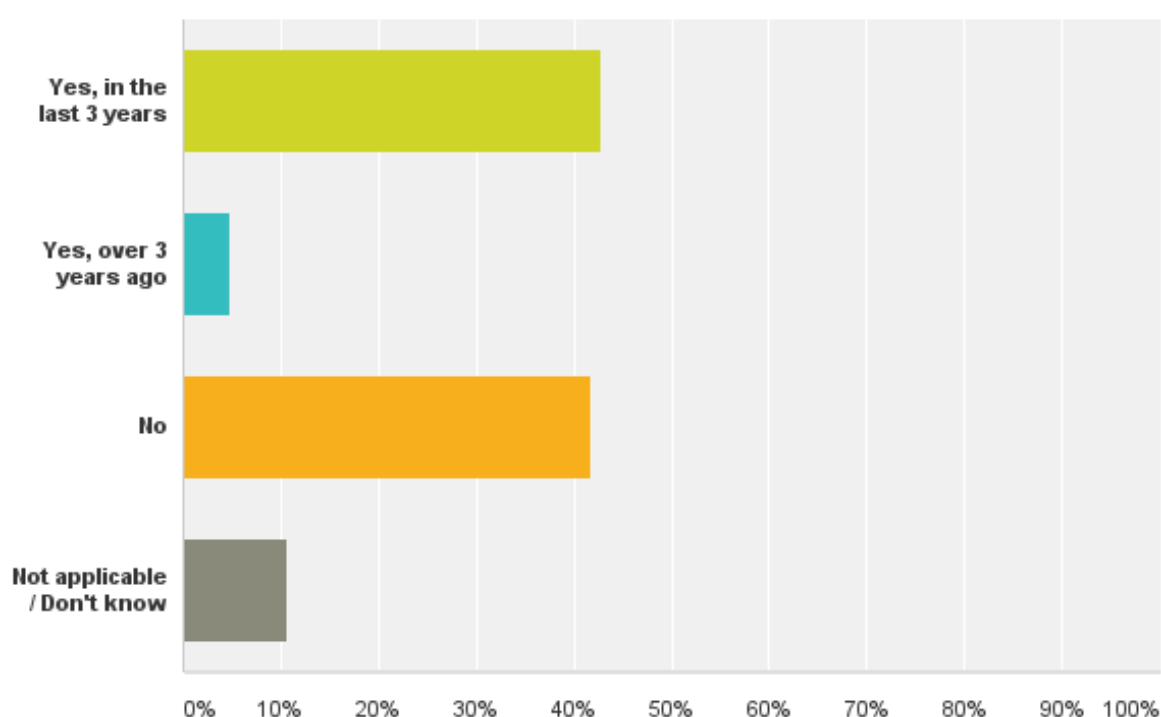
The majority of the funds being managed / administered by respondents are for internal employees and/or students.

	Response Percent	Response Count
Internal employees and/or students	82.8%	101
External public or third sector organisations	30.3%	37
External private sector organisations	27.9%	34
Individual innovators	22.1%	27
	answered question	122

Table 1. Who can access your Proof of Concept funding (tick all that apply)?

Of the 126 respondents who had managed/administered a PoC fund in the past 3 years, 76 were from the university cohort.

The activities supported by the managed or administered funds are shown below.
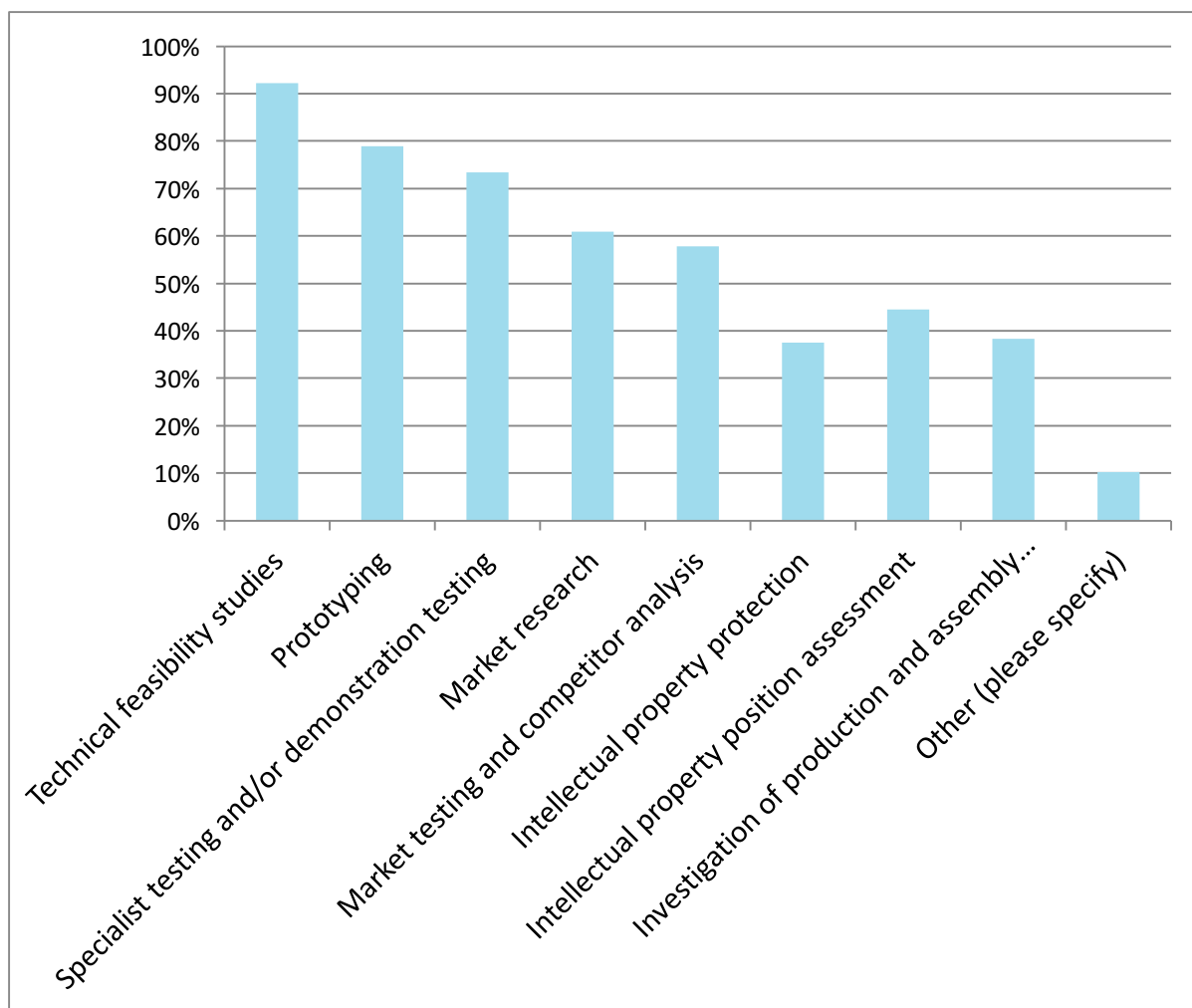
Figure 14. Activities supported by managed/administered funds (n=128).

There is a good correlation between the activities listed here and those identified by recipients of Proof of Concept funding (see figure 6).
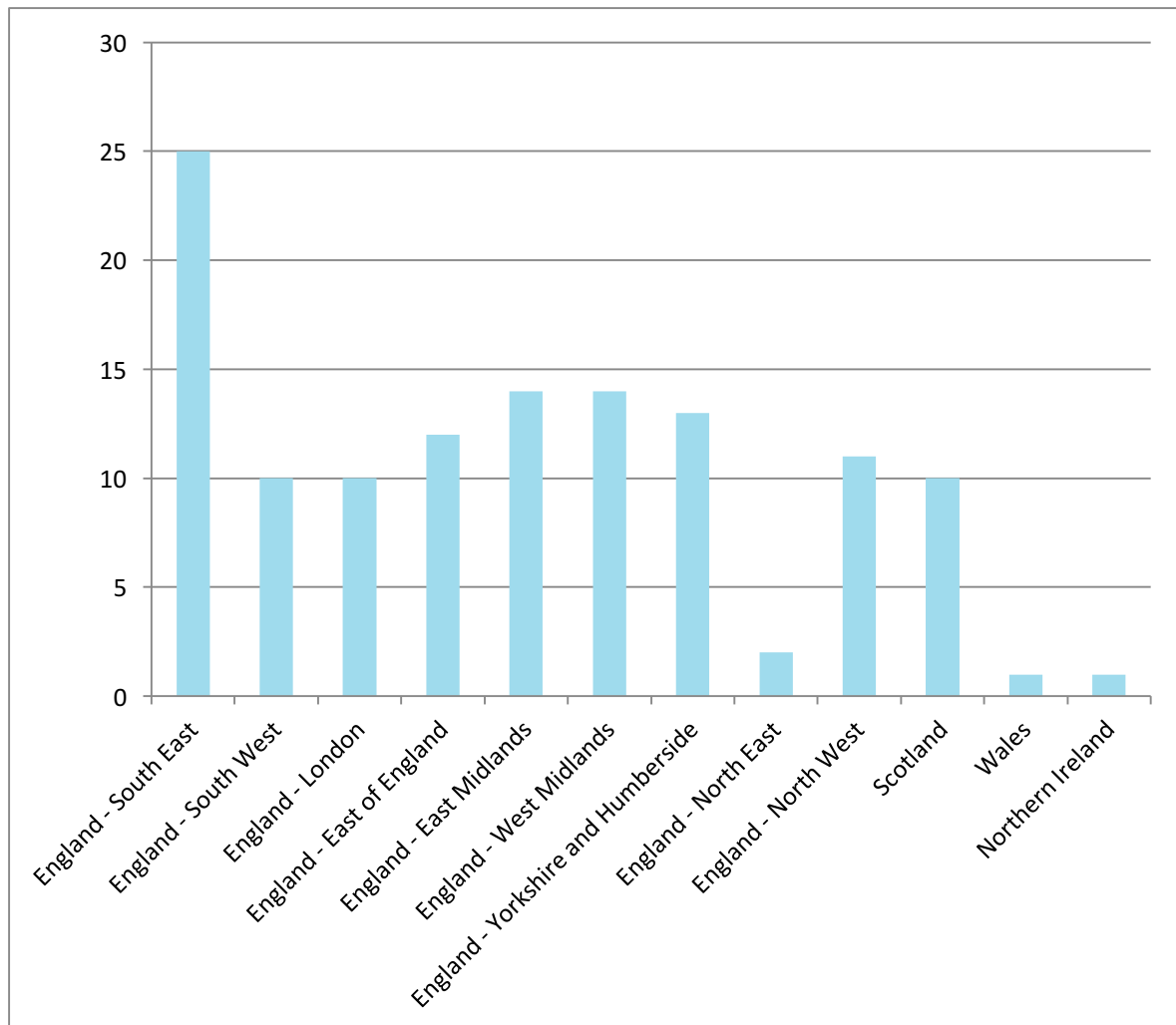
Figure 15. Regional distribution of respondents who have managed/administered a Proof of Concept fund in the past 3 years (n=128).

From a regional perspective, comparing the total respondents by region (see Appendix 1) to the regional distribution of respondents who have managed a Proof of Concept fund in the past 3 years (see Figure 15 above) suggests a lower prevalence in the North East (16% of respondents), Wales (11%) and Northern Ireland (11%), and a higher prevalence in the South East (35%) than average across the regions as a whole (30%). One needs to be careful in drawing too many conclusions about this distribution in terms of whether it correlates to the availability of funds by region. The distribution of regional and individual organisation funds highlighted in the database in Appendix 2 needs to be considered alongside the data presented above before any definitive conclusions can be drawn. Certainly the regional funds have seen the biggest changes over the past 5 years and many whilst still active are no longer investing in new projects.

6.1 FUND SIZE

For those respondents managing or administering funds in the past 3 years, the average level of funding awarded per project is shown in Figure 16.
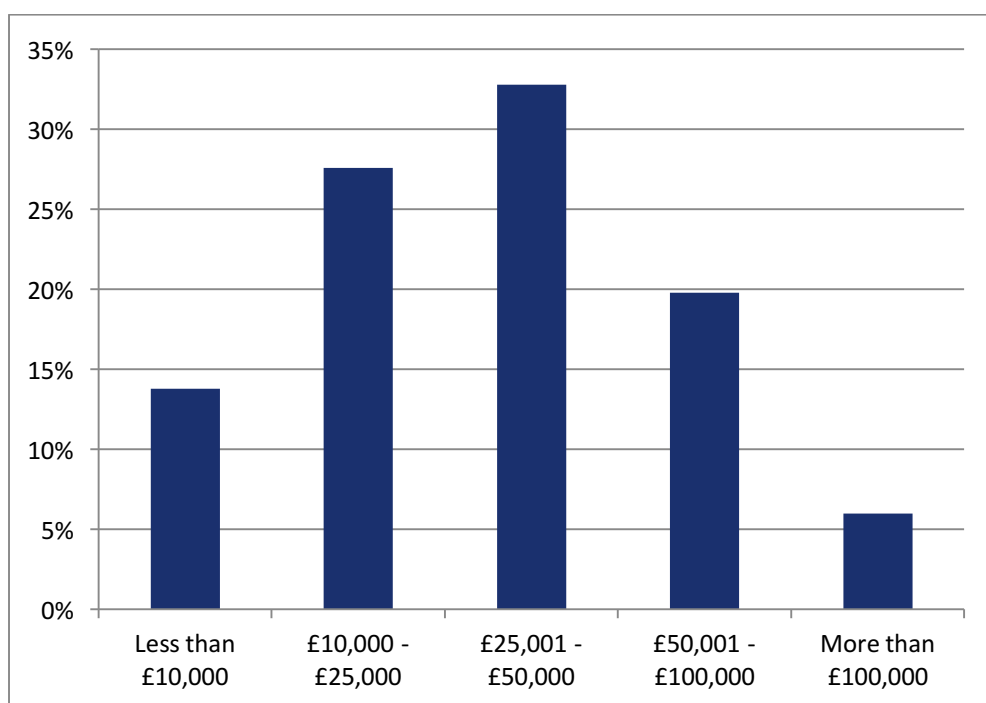
Figure 16. Average size of Proof of Concept funded project (n=116).

Respondents were also asked to estimate the total amount of Proof of Concept funding they award each year. This is shown in Figure 17 below.
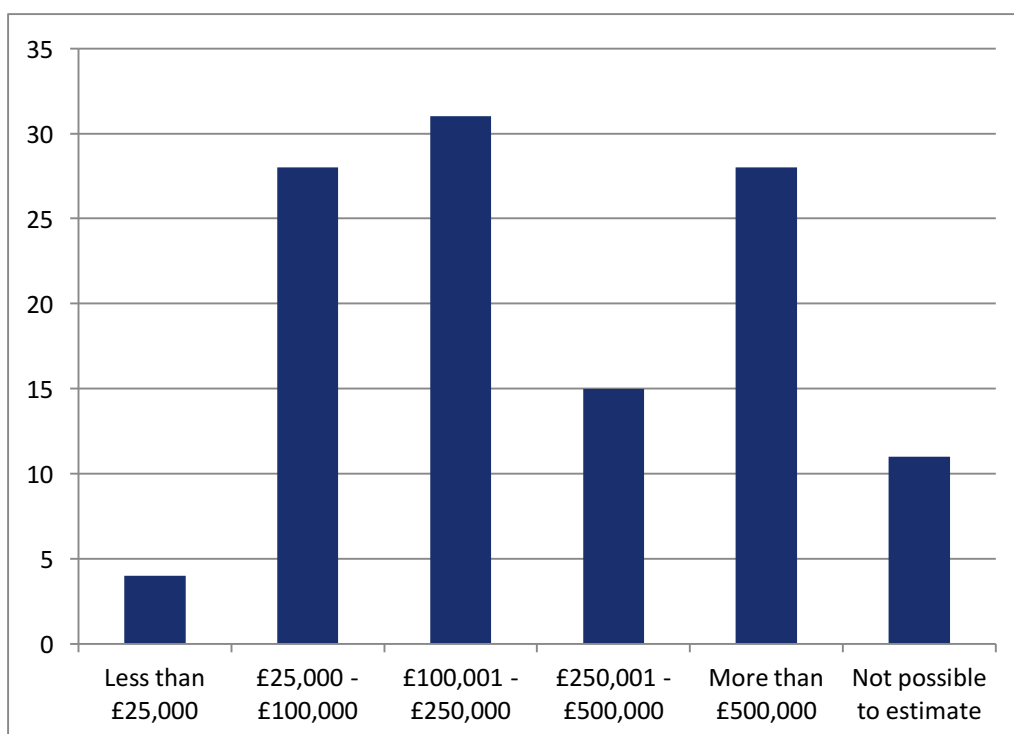
Figure 17. Total amount of Proof of Concept funding allocated per year (n=117).

28 respondents managed or administered Proof of Concept funds that allocated more than £500,000 per year. Of these 16 (57%) were universities. The majority of schemes allocate less than £250,000 per year. These figures are supported by the information in the fund database that we compiled from secondary market sources (see Appendix 2). Some schemes state how much funding they provide each year but most do not. In the latter examples, the total fund size is usually available and an estimate for annual investment can be made based on the expected longevity of the fund.

6.2   SUCCESS RATES

Those managing or administering Proof of Concept funds in the past 3 years were asked about the success rates of applicants to their fund. Figure 18 shows the success rates by percentage of respondents comparing the university Proof of Concept manager/administrator cohort with the private sector manager/administrator cohort.
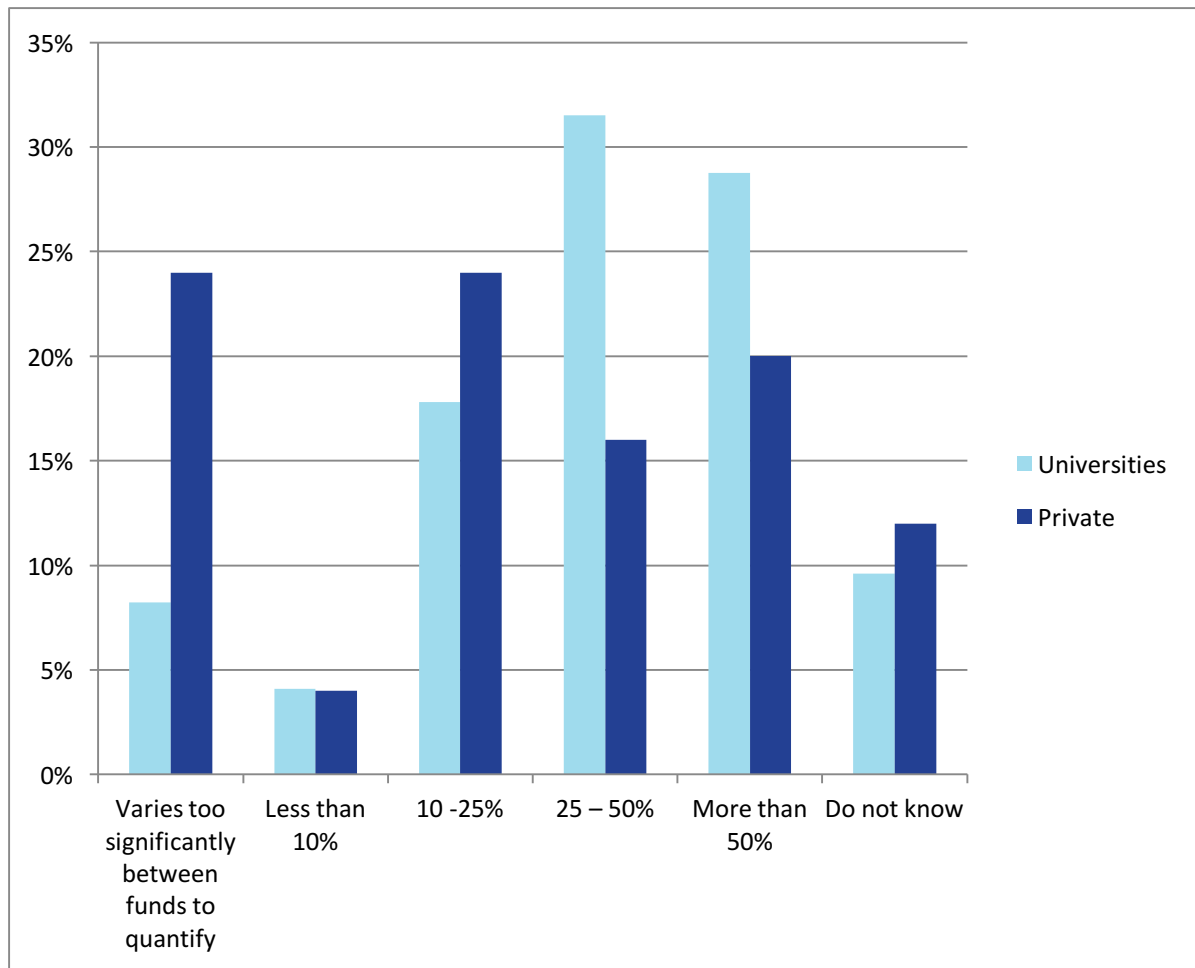
Figure 18. Success rates of applications to managed Proof of Concept funds by percentage of respondents comparing those managed/administered within universities to those managed privately (N = 73 & N =25)

The higher success rate seen in university-managed funds most likely reflects internal processes in which potential applicants for the funding are coached as their plans develop, so that unsuitable projects which are unlikely to be successful do not actually apply to the fund. In this aspect, universities run their Proof of Concept funds more like the commercial seed or angle funds whereby there is close contact between the fund managers and potential applicants before an application or funding pitch is made. This sort of hands on help and assessment is not possible for larger publicly funded schemes such as Innovate UK's Smart funding without significantly increasing the cost of managing the scheme and lengthening the application process. Speed of assessment and time to make a decision can be critical for Proof of Concept projects and the hands-off approach with the Smart scheme allows this to happen.

6.3 MATCHED FUNDING

55% of respondents managing or administering a Proof of Concept fund in the past 3 years said their funding required to be matched either always or sometimes. The percentage that indicated that the funding did not require matched funding is much higher than the equivalent percentage from users of Proof of Concept funds (see section 5.4). This difference may reflect a difference in perception between fund managers and fund users as to what constitutes matched funding – for example funding at less than Full Economic Costing (FEC) may appear to the fund recipient as a requirement for matched funding whilst not being registered as such by the fund manager.

Q25 **For the Proof of Concept fund(s) that you manage, is there a requirement for matched funding?**

Answered: 118   Skipped: 311
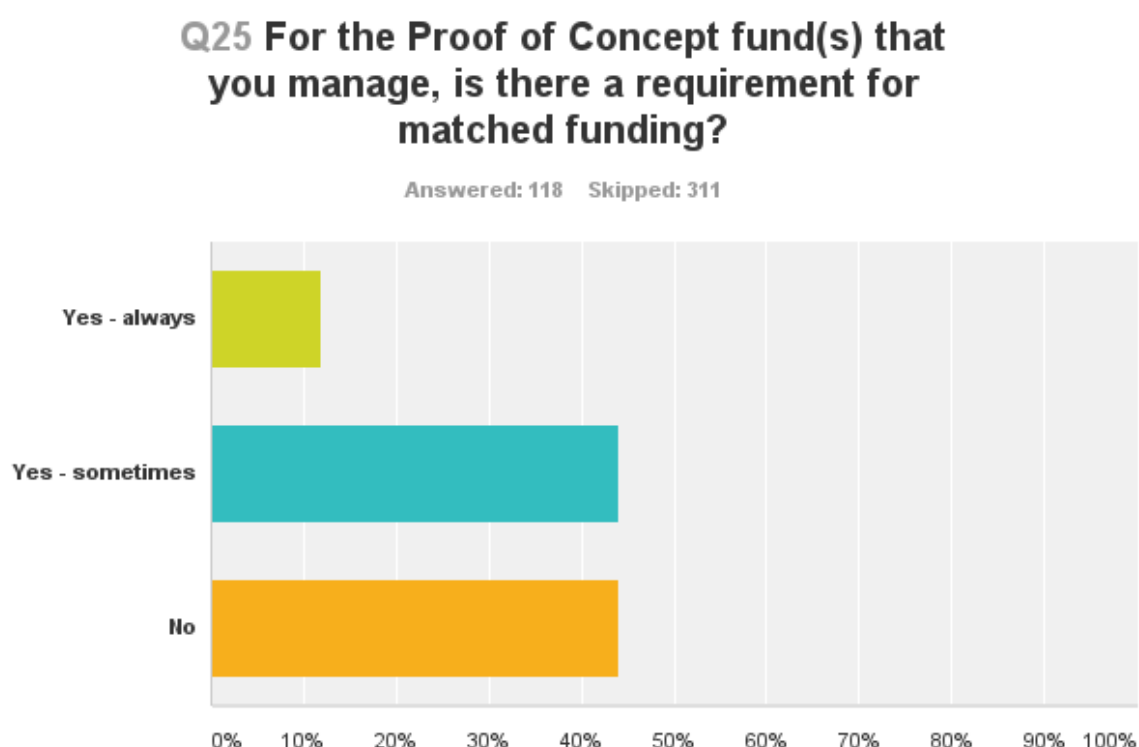
The level of matched funding when it is required was found to be similar between fund manager and fund users/applicants.

Figure 19. Level of matched funding required per project comparing answers given by PoC fund managers versus users/applicants of PoC funds (N = 67 & N =125)
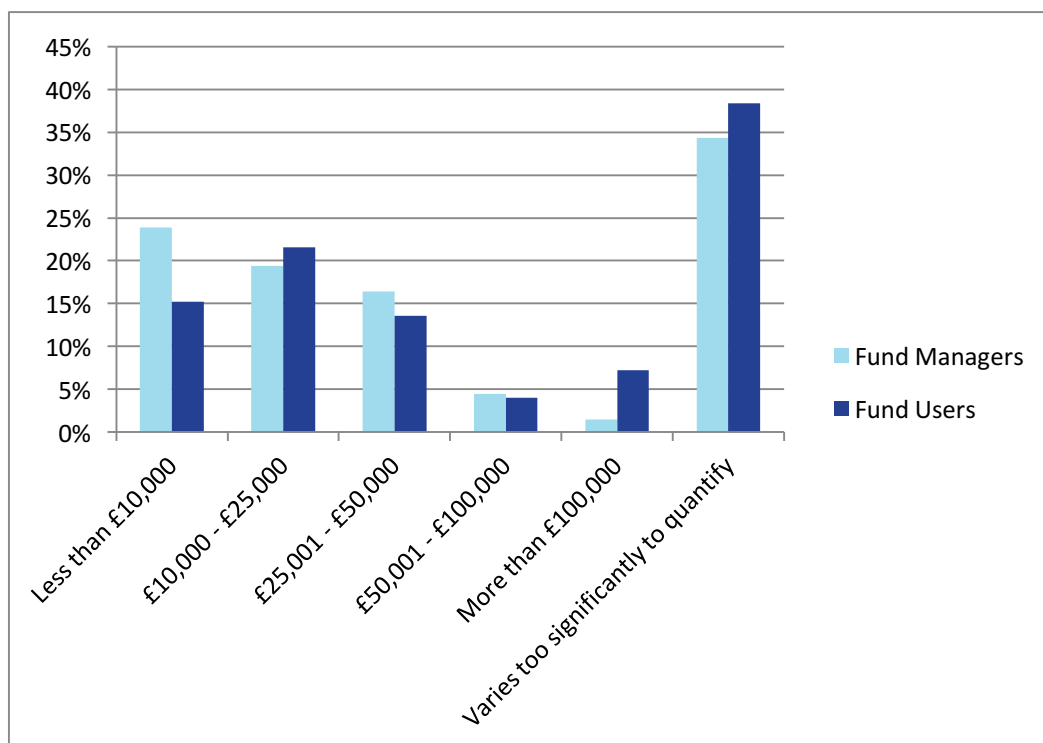
7 BARRIERS, SUCCESS FACTORS AND SUPPORT

7.1 BARRIERS

We have found a wide range of differing opinions from respondents and interviewees with respect to their perception of barriers to Proof of Concept funding. Using the online survey respondents were asked to indicate their views on whether a number of factors are barriers to access to Proof of Concept funding (see Table 2, answers from 274 respondents).

Answer Options	Strongly agree	Agree	Disagree	Strongly disagree
Accessing Proof of Concept funding is not a problem	16	51	117	79
Lack of availability of suitable schemes	75	124	54	13
Eligibility criteria	46	113	88	14
Complexity of the application process	66	100	89	6
Lack of awareness of suitable schemes even when available	78	113	66	9
Funding terms and conditions	52	114	92	4
Funding amounts per project are too low and/or too variable	67	116	74	8
Success rates are too low and this puts people off applying	72	101	75	12
Project durations are too short	23	88	140	11
Matched funding requirements	70	110	71	12
Decision timescales are too long	54	104	96	7
Reporting requirements	26	73	152	8
Recruitment issues	35	83	120	10

Table 2. Do you think that any of the following factors are barriers to access to Proof of Concept funding at present (n =274)?

The varied views between respondents is illustrated in the distribution of answers between those that agree or disagree with the factors listed above are an issue. At the same time there was a good correlation between those respondents that ticked 'Agree' for barriers such as eligibility, complexity and funding terms and conditions.

Of the 16 respondents who strongly agree that accessing Proof of Concept is not a problem, 44% are universities and 25% micro SMEs. Of the university respondents 57% are Russell Group universities. In contrast of the 79 respondents who strongly disagreed to the same question, 37% are universities

and 45% are micro SMEs. Of the universities strongly disagreeing, only 29% are Russell Group universities.

These data can also be displayed as a rating average, as shown in the chart below:

Rating averages of agreement/disagreement with the potential barrier
on a scale of -2 (strongly disagree) to +2 (strongly agree).

Category	
Access not a problem	
Eligibility criteria	
Lack of awareness	
Funding too low / variable	
Projects too short	
Decisions too long	
Recruitment	

-1   -0.8   -0.6   -0.4   -0.2   0   0.2   0.4   0.6   0.8   1
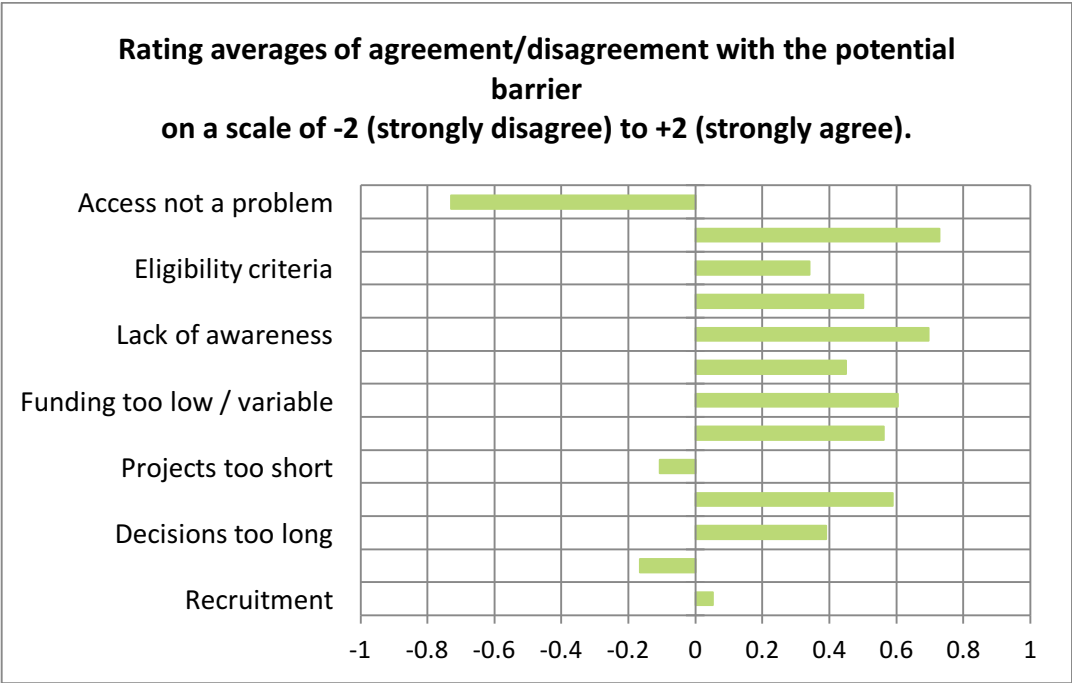
Across the survey as a whole, no specific barriers stand out as being particularly problematic. However, when the data are analysed to compare the responses from universities and companies, some differences appear, as shown below.

Rating averages of agreement/disagreement with the potential barrier
on a scale of -2 (strongly disagree) to +2 (strongly agree).

Category	
Access not a problem	
Eligibility criteria	
Lack of awareness	
Funding too low / variable	
Projects too short	
Decisions too long	
Recruitment	

-1   -0.5   0   0.5   1

■ Companies   ■ Universities
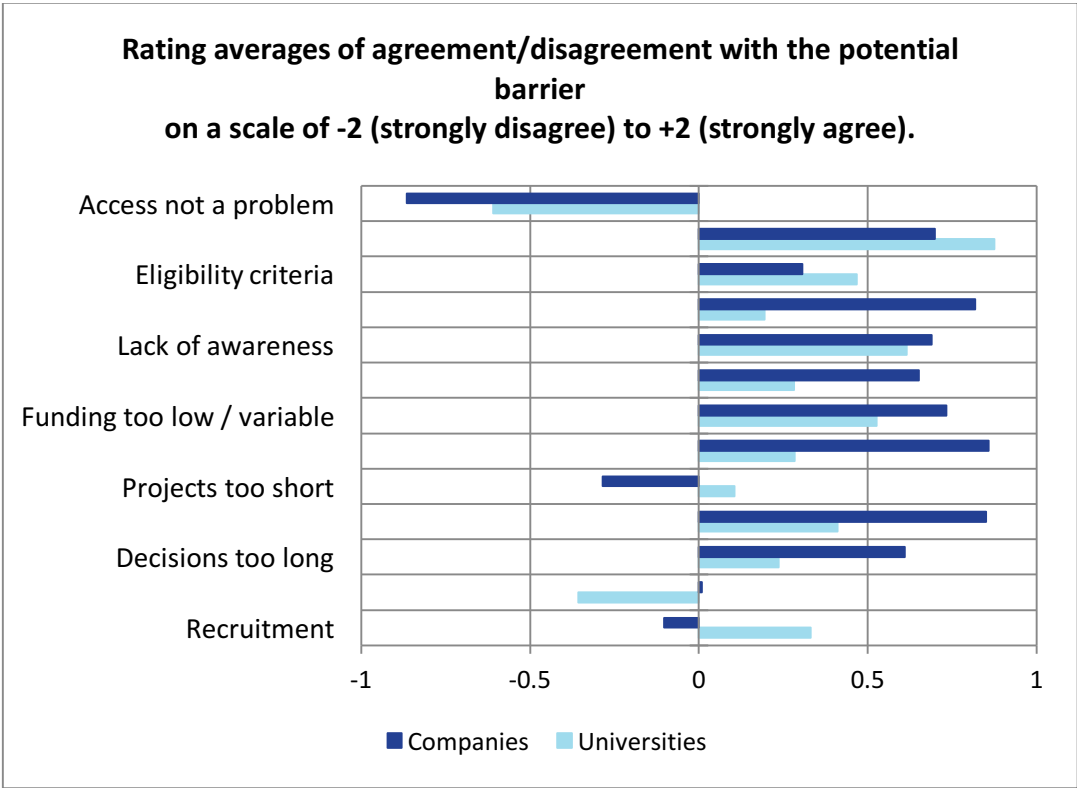
The differing views are also apparent in the interview answers. Overall the impression we have is that the differing views encountered can in part be explained by the different Proof of Concept landscapes presently encountered by the different categories of participants in the landscape (see Table 3).

Category	Proof of Concept Landscape
University – research-intensive	• Access to a broad range of internal and external PoC funds • Issues encountered relate to effective application and use of these funds • Landscape is generally positive
University – low research intensity	• Little or no access to PoC funds (no internal funds and RDA funds have gone) • Landscape is generally negative
Company (SME) – university spin-out; university associated	• Able to tap in to and use university funds and access to support for applications • Landscape is generally positive
Company (SME) – non university linked	• Issues understanding what funds are available and how to apply/win • Innovate UK (Smart) the go-to funding source • Matched funding can be an issue • Landscape is generally neutral / negative

Table 3. Differing Proof of Concept (PoC) landscapes encountered by participants

For some participants, the landscape is generally positive with access to Proof of Concept funding much less of an issue than for other categories of participant. For example, for the research-intensive universities they have benefited from internal funds set up through HEIF and Research Council (accelerator accounts, funding for sector networks etc.) funding as well as through access to external funds (e.g. Innovate UK, charity, private sector etc.).

For the less research-intensive universities whose HEIF allocations are much lower, interviewees noted that it would be difficult for them to justify prioritising investment in a Proof of Concept fund when the monies can be invested in other activities that will generate a more consistent impact and return. This is as opposed to a supporting fund that may only receive a small handful of viable projects and not even on an annual basis. In the past these opportunities would have been taken forward to a Regional Development Fund.

As referred to earlier in this report the landscape for Proof of Concept funding has changed significantly over the past 5 years and continues to change. Many of the funding sources are fragmented and many of the funding calls from these different sources are one-offs or are repeated on a non-regular basis. For the smaller companies this presents an issue in terms of their understanding and awareness of what funding sources are available when and from whom. Keeping

up with the changing landscape is a challenge. For companies associated with universities they are often still benefiting from internal university support, particularly from those parts of the university which are proactively tracking funding sources and making academics/other staff aware of the opportunities. For these companies the awareness of Proof of Concept funding opportunities is much less of a barrier.

7.2 SUCCESS FACTORS

Following the receipt of Proof of Concept funding, respondents to the online survey were asked which of a list of factors are important for determining whether or not the subsequent PoC project will be successful.

Answer Options	Very important	Important	Not that important	Not important at all
The idea	148	103	11	6
Prior experience of the recipient in managing similar projects	47	127	81	13
Level of project management and/or commercialisation support given to the team	96	128	37	7
Prior knowledge of the market	72	140	50	4
Use of clear milestones	96	140	28	4
Involvement of a commercial company	74	99	84	9

Table 4. Importance of success factors for determining if a Proof of Concept project will be successful (n =268)

As before, the data can also be illustrated as a rating average, showing that the idea is seen as the most important factor, followed by good project management factors and market knowledge.

**Rating averages of importance of the factors
on a scale of -2 (not important at all) to +2 (very important)**
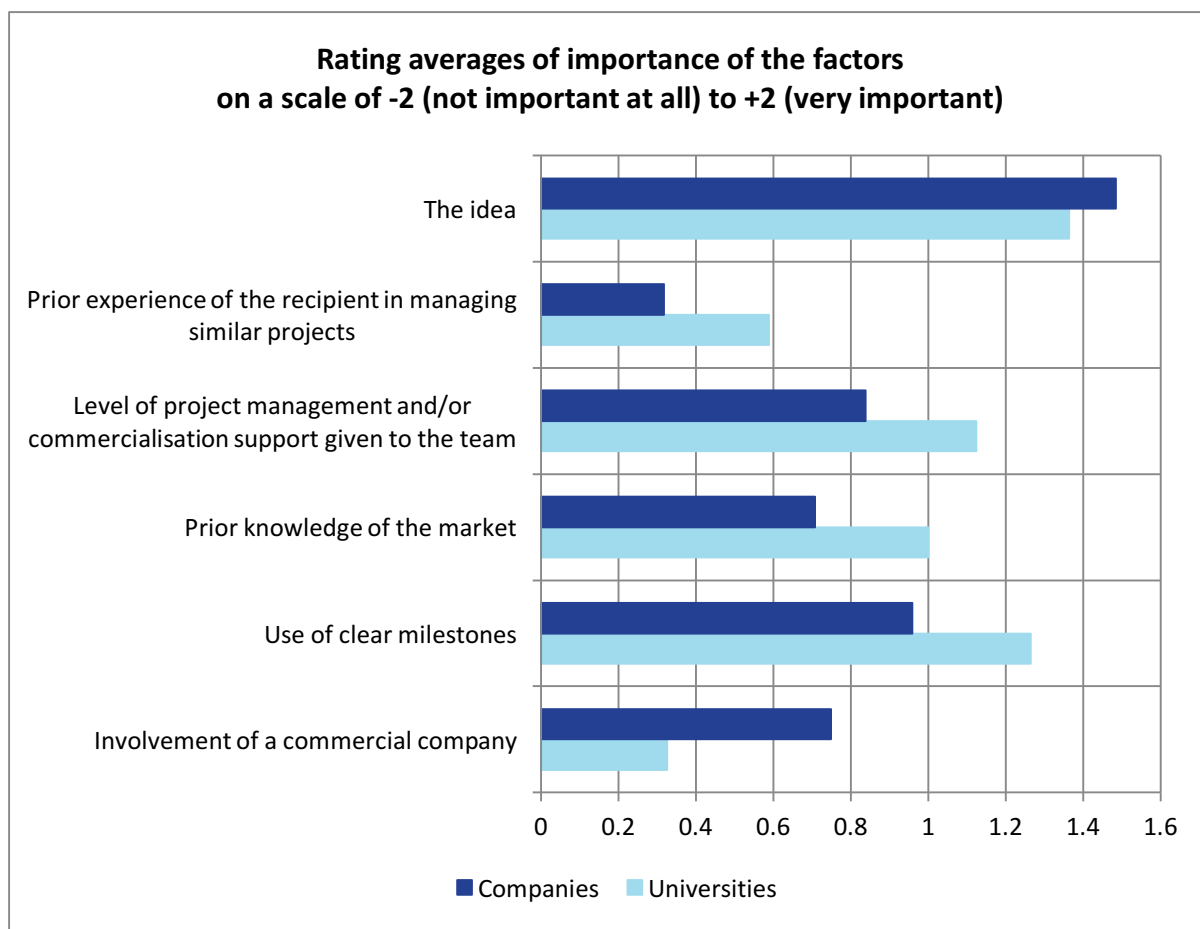
For universities the importance of commercial company involvement was valued much less highly than it was for companies, with 18% of universities (n=105) rating it as very important compared to nearly 40% of companies (n=119).

The funding landscape has changed significantly over the past 5 years and therefore we wanted to understand how this may have impacted on applications for Proof of Concept funding within different organisations. Respondents were asked whether they thought over the past three years that applications for Proof of Concept funding from your organisation had increased or decreased or remained about the same (see Figure 20).

For both universities and companies the highest number of respondents indicated that the number of applications had remained about the same. A higher percentage of universities than companies indicated that applications had increased or increased significantly. In contrast a higher percentage of companies indicated that the number of applications had decreased or decreased significantly than universities.

Differences were also noted between the different company types with generally the smaller companies noting more of a decrease and the larger companies noting more of an increase[20].

Figure 20. Changes in applications for Proof of Concept funding over the past 3 years comparing respondent answers from universities and companies (N = 104 & N =117)

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[20] Although not too much emphasis should be put on the differences since the numbers of the larger SME and large companies in the survey is much lower that the micro SME group

Q29 Over the past three years, do you think that applications for Proof of Concept funding from your organisation have:

Answered: 221 Skipped: 132

Legend: Decreased significantly | Decreased | Remained about the same | Increased | Increased significantly

Amongst the university respondents, significant differences in the trends were seen comparing Russell Group respondents to non-Russell Group respondents (see Figure 20). Nearly 60% of Russell Group respondents noted that applications from Proof of Concept funding had increased or increased significantly over the past 3 years compared with only 23% of non-Russell Group universities. We believe this difference reflects the increase in availability of internally-managed funds at many Russell Group institutions over this time period funded through part of their HEIF allocation and/or Research Council schemes (e.g. Impact Accelerator accounts).
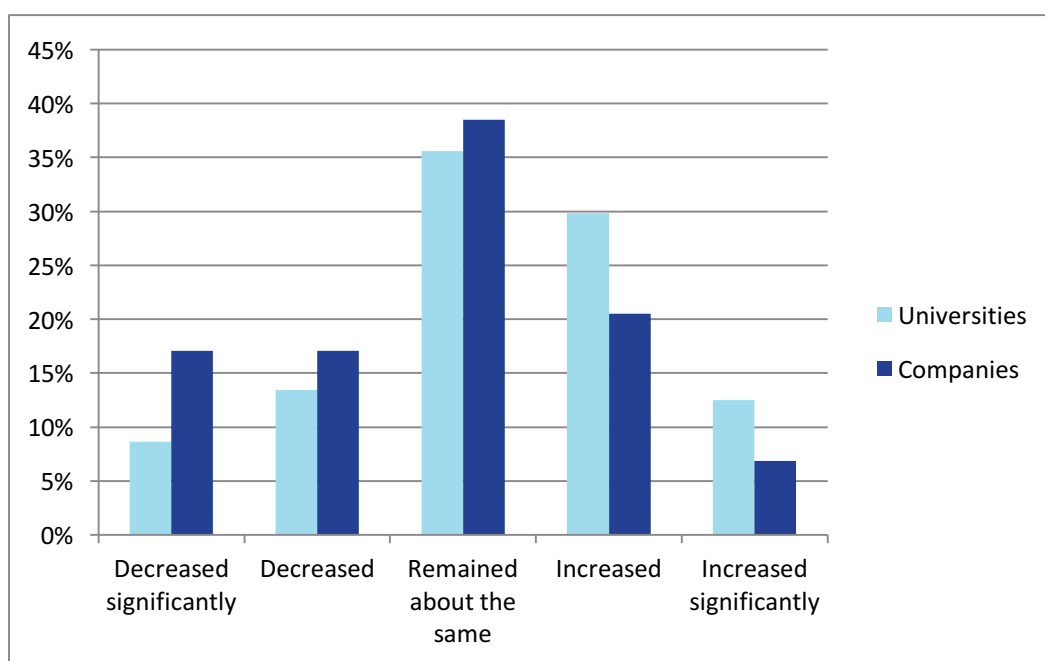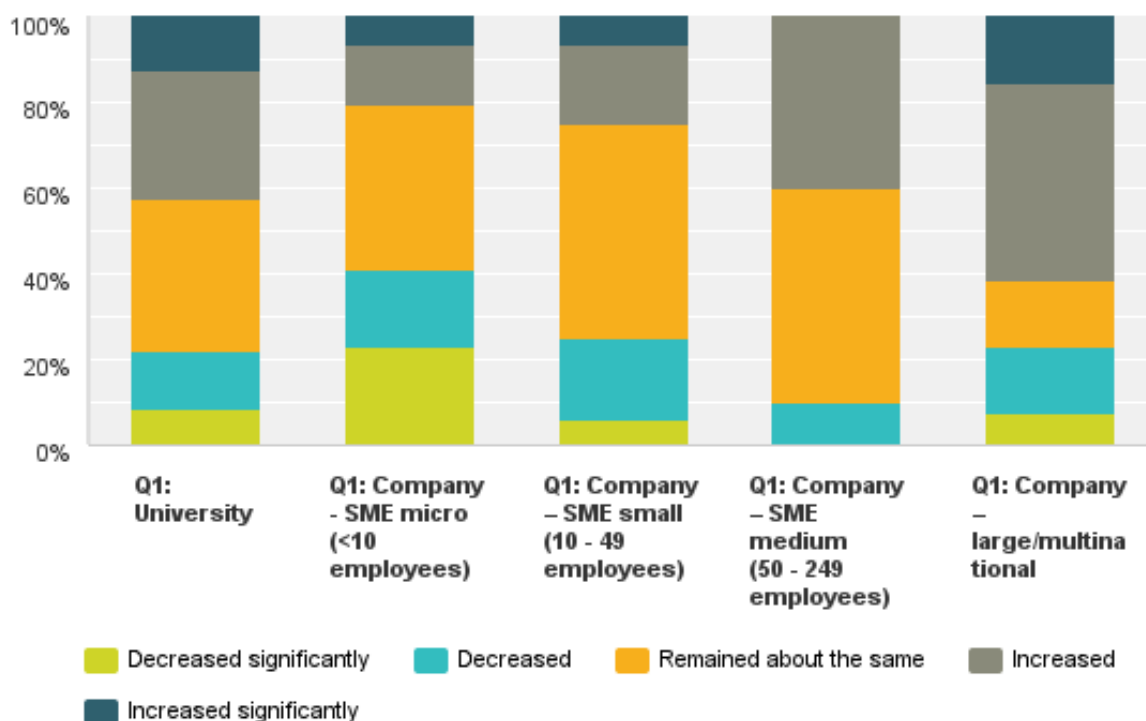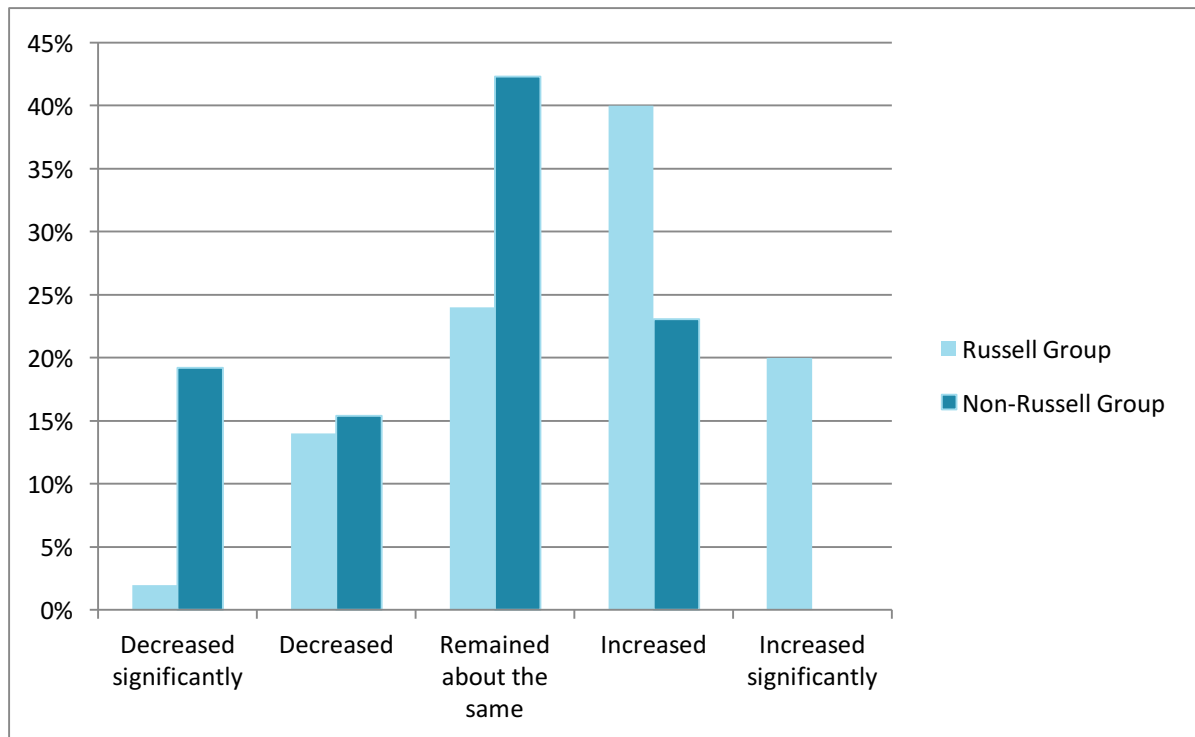
Figure 20. Changes in applications for Proof of Concept funding over the past 3 years comparing respondent answers from Russell Group and non-Russell Group universities (N = 50 & N =26)

Regionally the distribution of answers was similar with a number of exceptions:

- Wales and the North East showed a much higher variation in the spread of answers (this may however just reflect the lower numbers of respondents)
- The East of England and Yorkshire both had a higher percentage of respondents indicating that applications had increased or increased significantly (around 52% combined compared to the regional average of around 35%)

As discussed further below, the reasons for an increase in applications include a range to factors and not necessarily reflects an increase in the availability of funds (either internal or external), although this is a factor. In contrast, for respondents noting a decrease, changes in availability of funds was the most significant factor. Regional differences in those reporting a greater decrease (as in Wales and the North East) is likely, therefore, to reflect a decrease in availability of Proof of Concept funds in these regions.

For the cohort of respondents (n=67) that noted a decrease in Proof of Concept applications they were asked to indicate which of the listed factors are the most important in driving this decrease (with respondents asked to tick all that apply). The most important factors driving the decrease are a combination of decreased availability of funding (both internal and external) and lack of awareness from recipients (see Figure 21).

Figure 21. Factors that respondents noting a decrease in Proof of Concept applications over the past 3 years indicated as being most important in driving the decrease (N = 67)

Similarly for the cohort of respondents (n=88) that noted an increase in Proof of Concept applications they were asked to indicate which of the listed factors are the most important in driving this increase (with respondents asked to tick all that apply).

A wider range and more even spread of factors was indicated as being important to driving the increase in applications seen by these respondents (see Figure 22) than those reporting a decrease (see Figure 21).
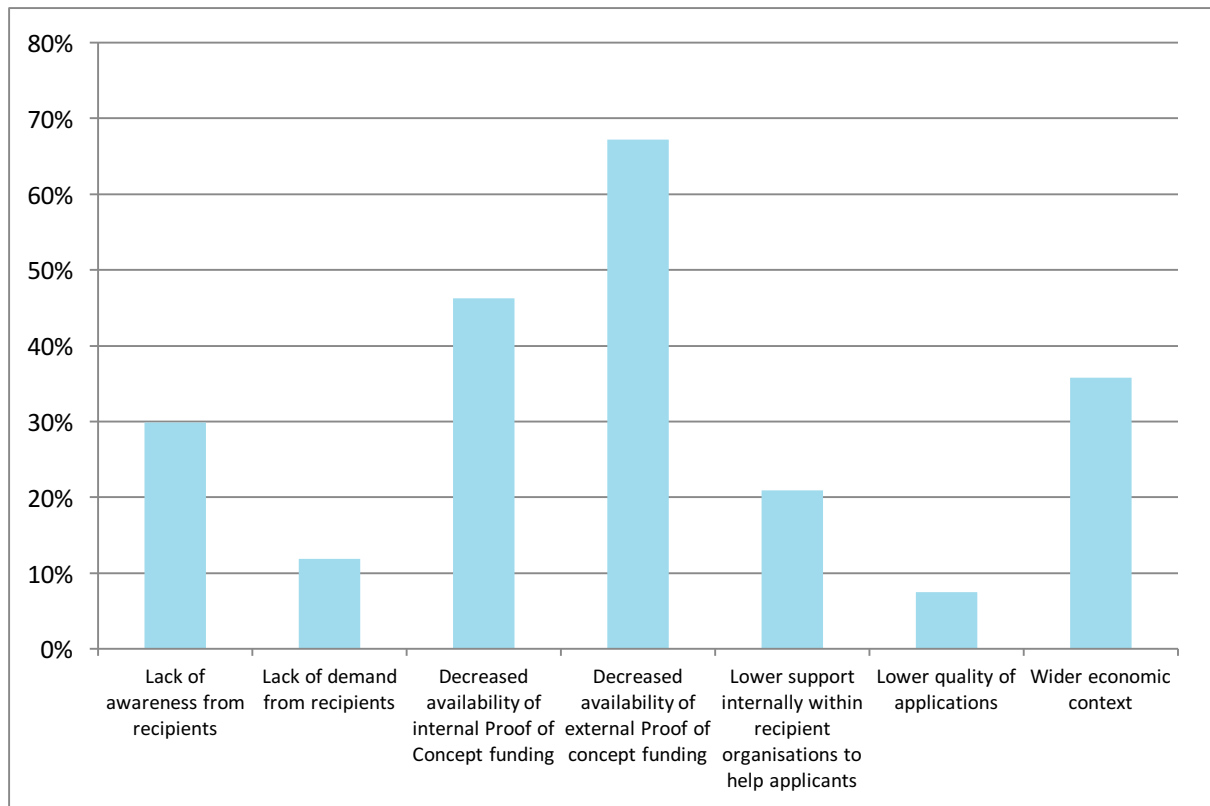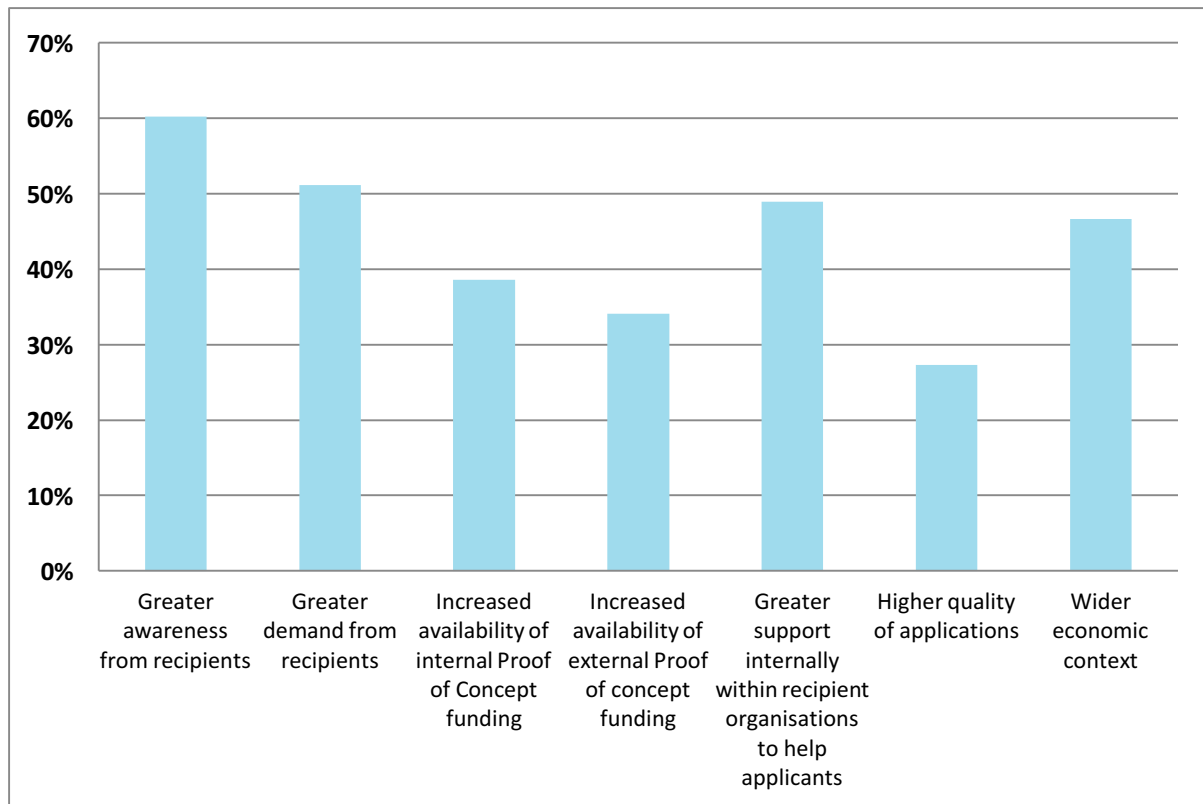
Figure 22. Factors that respondents noting an increase in Proof of Concept applications over the past 3 years indicated as being most important in driving the increase (N = 88)

All respondents were also asked to rank in order of importance which of the following factors are important to further increase the opportunity and the demand for Proof of Concept funding for their organisation (1=most important, 4=least important, N/A=not applicable).

- Eligibility to a greater range of Proof of Concept funds
- More resources to help applicants
- Increasing the maximum funding limit per project
- Simplified application process

Answer Options	1	2	3	4	N/A
Eligibility to a greater range of Proof of Concept funds	113	57	52	32	9
More resources to help applicants	45	55	75	74	12
Increasing the maximum funding limit per project	54	74	63	65	8
Simplified application process	51	75	64	71	7

Table 5. Ranking in importance of factors to increase opportunity and demand for Proof of Concept funding (n =268)

Eligibility to a greater range of Proof of Concept funds stands out as the most important factor. Amongst the other factors, the importance rankings were more evenly scored with "More resources to help applicants" scoring slightly lower in importance than the other two factors – 'Increasing the maximum funding limit per project' and 'Simplified application process'.

The responses and rankings of factors comparing universities with companies were similar. There was also generally a high degree of consistency across the regions.

Other factors that respondents quoted as being important to drive an increase in the opportunity and demand for Proof of Concept were:

- Clearer marketing message if universities are eligible to apply
- Stop the lottery. Discuss applications with applicants, to probe the value of the concept as opposed to the use of buzzwords. Speed up assessment and decision making, e.g. by always-open funding with decisions (including interviews) within a month of applying. Permit in-kind support, especially if British-sourced (maybe a 100% rating of the at-cost value of in-kind support for British- or EU-sourced support, 50% if sourced elsewhere). Permit follow-on funding, decided project by project rather than by competition, for promising projects, especially if large in concept. Permit additional funding if the project is large in concept: Proof of Concept of a new infrastructure technology costs more than of a widget
- Lower matching requirements for start-ups and oriented basic research projects
- Transparency and allocation process detached from universities benefiting from it. It has become a cash till and influence toy for the administrators
- Less academic involvement ergo tripartite universities not aiding competitive PoC technologies
- Travel costs should be 100% funded to undertake meetings with international potential customers (under NDA) to determine feasibility (presenting results of alpha prototype). This is the single most important way to validate a Proof of Concept. If such a study is not done then the concept remains commercially unproven. In a highly technical field this cannot be done by a web-based survey. Face to face contact with potential customers is critical and should be a requirement
- There are often many overlapping initiatives and these can cause problems. Alternatively there may also be long periods when limited funding is on offer
- More relaxed approach to the involvement of non-UK companies
- Strategic agreements with companies willing to fund a project from TRL1 up to TRL5 or 6.
- Better access to Intellectual Property (IP) protection
- Assessors should look to help fund worthy projects not look to refuse most applications. A mind-set change
- Allow risk, be adventurous, cultivate a spirit of the great inventor of the past to the modern US heroes of Microsoft, Apple, Facebook, Skype, Tumblr, and a million others that we are missing out on
- Flexibility of when funds can be accessed
- Easier more flexible administration of grants when awarded
- Make it more attractive to recruit required academic staff - either a more flexible approach to moving existing expertise from existing projects or perhaps longer projects. Or maybe

even a way of supporting a pool of expertise at academic institutions that can be maintained long term so that the expertise remains, but can be quickly channelled to short term projects - this option probably sits outside of this PoC investigation but would be a great way of supporting/ delivering more successful PoC type projects

- A list of specialist advisers to help applicants both complete the application and manage the project
- Quicker and easier access to small funds for rapid prototyping of invention without undue administrative overheads
- Reducing project lead times. For smaller amounts simplify the application process
- Effort must be made to understand applications despite often poor or incomplete presentation. Scrutiny of basic ideas and determination to start and complete projects is equally important
- Remove need for matched funding
- A mix of internal and external funds is necessary. One size or conduit does not fit all
- Effective PoC management experience - it is not junior VC it is different
- The opportunity for multiple awards and PoC projects to cross the "valley of death". Funds for the very earliest stages of exploring potential commercial opportunities e.g. at TRL 3
- Need to demonstrate impact - totally outweighs all of the above
- Reduce requirement for matching funds
- Access to funds which do not require matched funding from SMEs so we can work with a potential end user without putting them at risk

7.4   TRAINING AND SUPPORT

Respondents were asked whether they provided a range of support activities for their applicants for Proof of Concept funding. Specifically the following:

- Training for applicants
- Pre-award project management
- Access to external commercial advisors and/or mentors, champions
- Post-award project management

In general much higher levels of support are provided within universities with a focus on pre-award and post-award project management, along with access to external commercial advisors and/or mentors, champions (see Figure 23).
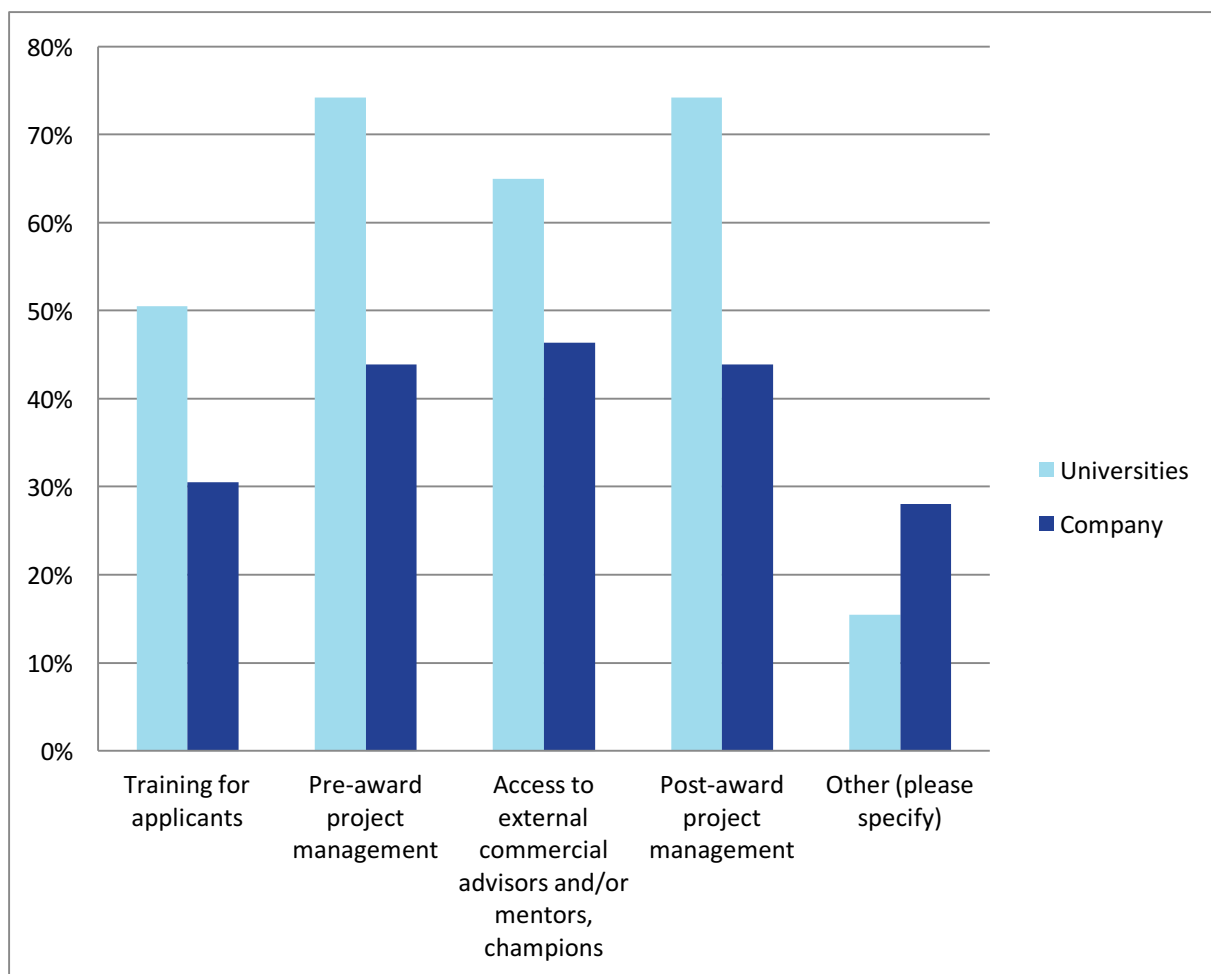
Figure 23. Types of support provided to applicants (N = 219)

Respondents also quoted additional support including:

Universities:

- Support generating application
- IP management
- Development framework for PoC projects, advice from industry specialists
- Typically help academic applicants to identify relevant PoC funds, develop proposals with them, assist in the application process, in particular providing input into the IP protection and exploitation strategy that these applications typically require info on
- Get reviewer/panel feedback from previous application. Allow to resubmit once into next call. Of 3 invited to resubmit last time, 2 were awarded this time
- We provide networking opportunities for our members to come together and build their collaborative projects. We also provide one to one advice on their applications ahead of deadlines as it is requested
- Embedding applicant in Innovation Centre
- Also have internal advisors and business development managers who assist researchers with their PoC projects.
- We are thinking about providing pre-award training.

- Our experience has shown that support from experienced consultants, especially in market analysis/ business planning is beneficial - especially where that person could act as "CEO-designate" or commercial champion working with the Technology Transfer Office (TTO) as part of the project team to deliver the PoC outcome. We also use experienced Technology Transfer (TT) staff who understand the PoC application process and this increases our success rate.
- Timely meetings with advisors throughout the process with relevant advisors/mentors
- Advice on shaping the project to fit translational research rather than a fundamental research application. Ensuring the project outputs are translational etc.
- Access to internal advice on IP and commercial propositions

Companies:
- Bid writing support
- Support with the application process
- Help the candidate build the project and application with realistic funding structures and timescales. Ensure that the project will meet eligibility criteria and be able to meet the requirement. Often a client approaches us with half an idea or a lack of credibility on paper, i.e. as start-up, which makes it unlikely that they would qualify for funding.

As shown in the figure on the next page, there is not a clear picture that this support has affected the success rate of applications to, or quality of projects developed using Proof of Concept funding.

How has this support affected the success rate of applications to, or quality of projects developed using Proof of Concept funding?

Answered: 227   Skipped: 202

Legend:
- Improved success rate for applications
- Improved quality of projects
- Not had any effect
- Don't know or N/A
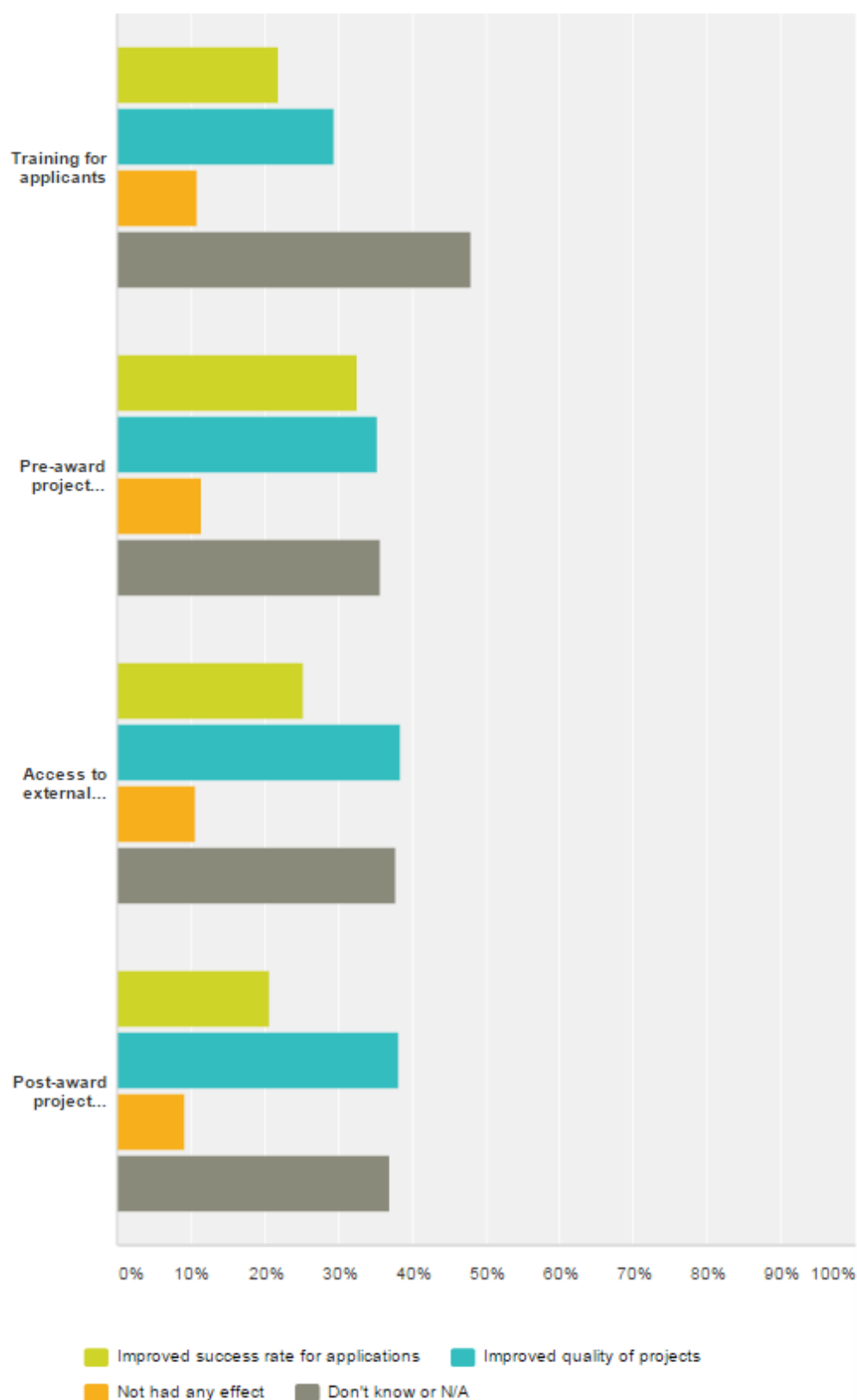
7.5 OTHER COMMENTS & CASE STUDIES

115 respondents left contact details for follow up conversations and further interviews. Those interviewed were selected from this cohort. 70 of these respondents also provided brief information on potential case studies.

Case studies include:

- Haptic interfaces for computer and machine control; Peer based anti smoking programme; New Medical Technology for body strengthening
- Application of design processes to develop a method of collaborative interaction to address complex problems
- Company start up using the SMART award.
- TSB R&D grant to support development of in-situ blade inspection, cleaning and repair techniques for offshore wind turbines using suspended work platforms.
- A work based health intervention that reduces sickness absence and improves employee productivity
- Spinout company which arose from a University in 2013 following proof of concept support. Subsequently raised significant seed funding.
- Seeding the creation of world-leading manufacturing companies in the UK.
- Cyber security software applied to topical, real world issues by two distinct and fully funded spinouts each emerging from SE Proof of Concept funding
- Successful applications for and management of 3 MRC Confidence in Concept awards (total value £1.6M).
- Micro-SME who received PoC funding.
- Protecting commercially important crops across the world from various pest species with a Floral odour - granted patents
- Yorkshire Universities Small Innovation Projects funding leading to commercialisation.
- Evaluation of biogas potential from micro algae using novel BMP equipment
- Energy harvesting for wireless sensors
- Antibody development that gave rise to a spin out and subsequent exit through sale to multinational pharmaceutical company
- 3D Ptychographic Imaging; Electron Ptychography
- Conversion software from legacy AutoCAD, PDF and paper schematic drawings to smart, data driven and knowledge based drawings for the process industries
- Electrical assisted etching for advanced chemical machining; lack of funds
- Application of electrodialysis as a process analysis/development tool for biocatalysis.
- Feasibility study in the automation of a biochemical assay
- One of our P2P (BBSRC) funded PoC applicants has now gone on to apply for further funding via the IB Catalyst to further develop their proof of concept project and take it one step closer to commercial reality.
- Successful spin out of aerosol valve technology into an international manufacturing firm following extensive internal development of the technical concept.

- Brownfield site contamination database inclusive of remediation cost to encourage local and regional growth, social housing and infrastructure
- An innovative, advanced adiabatic Compressed Air Energy Storage system using a novel process but which can be built, with very high efficiencies, using existing off-the-shelf equipment, and which has support from a fantastic group of 8 multinationals, 5 of them UK-based and the others with major UK-based facilities.
- Resource recovery of comingled wastes
- Spin-out was initially supported by our own PoC. Company listed on AIM last year and sells products in 11 countries and employs 23 high-tech staff locally
- Use of injectable fibroblasts to treat skin disorders
- PoC application for a new concept for domestic whole-house ventilation system.
- Local UK proof-of-concept intelligent lighting solution has led to a full review of productisation options within the corporate parent, with significant market impact potential.
- Pilot demonstration of a new rail freight vehicle concept
- Deployment of a 1-10 kW model of a vertical-axis tidal turbine under marine conditions.
- CO_2 reduction of marine Diesel engines via feedback control of piston ring film thickness
- Use of spinouts, project management and POC to deliver investment-ready vehicles for investors.
- Salmon feed from whisky by-products; Microwave Sensor for Food & Drink industry. We also have a number of cases where PoC has "failed" or companies formed through PoC have spunout and then failed.
- Wearable technology for children
- A novel system-on-board technology for robots was developed and licensed using proof of concept fund.
- Zero irradiation medical imaging modality which can be used unsupervised even by patients at home via Internet.
- Voice identity management product launch building on previous Innovate UK (TSB) PoC awards
- Supply Network Optimization (manufacturing supply chains)
- Oilwell topkill idea with a University, no chance from all applications, Innovate UK too narrow
- Use of PoC funding to secure part-time mentor, who helped structure business case and commercial strategy, leading to his joining the resulting spin-out as CEO.
- Invested in developing a number of case studies typically £50/100k which have led to significant programmes in excess. These have leveraged a net investment of £25m public investment with industry match of the same magnitude.

This is useful resource for collating case studies to support further impact assessments of this type of funding

The Proof of Concept funding landscape has changed significantly over the past 5 years with respect to where and how organisations access this type of funding and the landscape continues to change reflecting the short term availability of many funding sources. For some organisations these changes have been positive; for others the changes have been more negative by making it harder for them to access Proof of Concept funding either because of fewer available funding sources and/or higher competition for the available funding.

Across the UK we identified 25 national Proof of Concept fund sources and 14 regional Proof of Concept fund sources. We also identified a large number of funds which are accessible by individual academic organisations or groups of organisation. This latter group of funds particularly reflects a change over the past 5 years with the rise in the number of universities managing their own internal Proof of Concept funds which are supported by part of their HEIF allocation and/or Research Council accelerator-type funding, and in a very few cases through their own or private funds.

The regional sources of Proof of Concept funding have seen the biggest changes in the past 5 years and many of the funds that remain are in a state of flux, either awaiting new funding and/or with limited funds still to invest. It is too early to analyse how the LEP funding landscape may impact on regional Proof of Concept funding since most LEPs are yet to finalise their plans for this type of innovation funding.

Much of the funding for Proof of Concept is fragmented and available through multiple different sources. These sources are also not always consistently available with many only funding one-off rounds or having limited funding which when committed means the fund then stops. For some organisations, particularly SMEs, this can lead to a higher management cost to keep up to date with what funding is available and what the application requirements are. For universities, this fragmentation may be less of an issue given they already have resources deployed to help academics access diverse funding sources and keep track of funding availability. The fragmentation of funding sources can be a positive as it gives organisations more than one route to accessing funding for a given project.

Innovate UK funding is a very significant part of the total Proof of Concept funding accessed externally by organisations each year across the UK. This is particularly true for companies for whom Innovate UK funding is the major source of external Proof of Concept funding that they are eligible to apply for. Larger companies have said that they generally use internal funds for undertaking Proof of Concept development in their core areas but rely on external funding for Proof of Concept where the area is more innovative or higher risk. For smaller companies who lack significant internal funds, Proof of Concept funding from sources such as Innovate UK are often the only external funding sources they can access for early stage development of their core business concepts. This Proof of Concept funding then facilitates these companies leveraging further seed or other investment funding.

The changing and fragmented nature of the Proof of Concept funding landscape means that organisations seeking funding have identified the lack of awareness of available schemes as an issue. Keeping up to date with what sources of funding are available is a problem particularly for non-

university associated SMEs. SMEs associated with universities often can benefit from support within the university in respect of knowledge of funding schemes and support with applications. Focussing government funding for Proof of Concept in fewer, longer term funding sources would significantly reduce the funding landscape complexity, particularly for SMEs.

Generally we have found a reasonable degree of satisfaction with the present Proof of Concept funding landscape in terms of the ability of organisations to access and use this type of funding. Key differences have been identified between different types of organisation reflecting mainly their ability to access funding (both internal and external) and/or meet external funding requirements such as the need to have matched-funding. These differences are seen both amongst different academic organisations and different sizes of commercial company.

For research-intensive universities the landscape is generally viewed as positive. They currently have access to a broad range of internal and external Proof of Concept funds through HEIF and Research Council funding. Issues they encounter relate more to effective application and use of these funds rather than access to funds per se. However, this landscape could change significantly depending on whether these public funding courses remain available to continue create the internal funds. So far in the UK there are very few examples of universities using non-public funds to support Proof of Concept projects. The Oxford Invention Fund is one example. In contrast in the US, published data suggests a much higher percentage of universities are using endowment monies and other university funds (e.g. patent royalties) to support their Proof of Concept Funds.

The positive landscape for accessing Proof of Concept funding also extends to SMEs associated with universities (e.g. spin-outs) that are able to tap in to and use university funds and/or university support for Proof of Concept applications. For these companies, the management burden of applying for such external funding can be significantly reduced through reliance on university support. These companies are often more experienced and comfortable with applying for grant funding per se because of their familiarity with this environment from their university roots and therefore they can be more astute to the application processes and requirements.

In contrast, for the low research-intensive universities the landscape is generally negative and has become worse over the past few years with the demise of many of the regional funds that they used to be able to access. These universities do not generally have access to internal Proof of Concept funds and would struggle to justify on a return on investment ground using part of their limited HEIF allocation for such purposes. Interviewees noted that they would likely only have suitable projects looking for this type of investment on an infrequent basis. Where a good opportunity did arise in the past, these were often funded through a regional development grant. This avenue is generally not now available leaving a gap in funding for these occasional good project opportunities.

For SMEs that are not linked to universities we have found that the Proof of Concept landscape is also generally viewed as neutral or negative. This group particularly identified issues with understanding what funds are available and how to apply/win these funds. For these companies Innovate UK (particularly Smart funding) is the go-to and often only available funding source they can access.

In terms of overall availability of Proof of Concept funding, for both universities and companies the highest percentage of respondents in our survey indicated that the number of applications for Proof

of Concept funding made by their organisation had remained the same over the past 5 years. We think this is the most important factor for why overall we have a found a reasonable degree of satisfaction with the present Proof of Concept funding landscape.

For those organisations reporting a decrease in the number of applications, the two most important factors given for this were decreased availability of both internal and external funding for Proof of Concept. In contrast those organisations reporting an increase in the number of Proof of Concept applications attributed this to a wider combination of factors, of which greater awareness from recipients was the most important.

Another important factor driving the overall levels of satisfaction with the present Proof of Concept funding landscape would be expected to be the success rates respondents noted when applying for external Proof of Concept funding. Respondents reported very varying success rates with applying for Proof of Concept funding. Successful companies have often learnt how to increase their success rates by working with other companies with more experience of applying for external funding and/or by becoming scheme assessors and being exposed to other ways of approaching the funding applications. Finding new ways to support and signpost new applicants (e.g. through access to more comprehensive online guides) who have no prior experience would be important. Overall success rates for Innovate Smart Proof of Concept funding are around 22%, which compares favourably with success rates reported by applicants more generally.

Comparing success rates between organisations and drawing clear conclusions is difficult as the rate can reflect the amount of available funds, the level of competition for these funds as well as the level of internal support given prior to an application being made. It is, therefore, not necessarily correct to assume that differing success rates between different types of organisation is a reflection of the level of access they each have to suitable funds. Nevertheless, success rates for smaller SMEs were reported as being significantly lower than all other organisation types in our survey. Finding new ways to support these types of applicant, particularly in respect of greater sharing of information on available funds and how those funds can be used, as well as advice on improving their applications, would be ways to help address this imbalance.

Both companies and universities identified pre-award project management, including particularly for companies bid writing and application support, as an important success factor in winning Proof of Concept funding. The higher success rate seen in university managed funds likely reflects internal processes in which potential applicants for the funding are coached as their plans develop, so that unsuitable projects which are unlikely to be successful do not actually apply to the fund. In this aspect, universities run their Proof of Concept funds more like the commercial seed or angel funds whereby there is close contact between the fund managers and potential applicants before an application or funding pitch is made. This sort of hands on help and assessment is not possible for larger publicly funded PoC schemes such as Innovate UK's Smart funding without significantly increasing the cost of managing the scheme and lengthening the application process. Speed of assessment and time to make a decision can be critical for Proof of Concept projects and the hands-off approach with the Smart scheme allows this to happen effectively.

More established SMEs and larger companies also indicated that there is an active pre-sifting of applications in their organisations to ensure only those with a higher chance of success are

progressed to the full application side. As a consequence these organisations have a much higher success rate in terms of funded projects as a percentage of applications made. Particularly amongst the larger companies, interviewees noted that there was a reputational risk both for the individual and the company if a project applied to public funds and was turned down. As a consequence these companies will only apply for projects when they consider there is a very high chance of success that the funding will be approved. However, if such projects are then not successful this can result in greater disquiet with the funding system.

It is not possible from the publically available data to accurately estimate the overall amount of external funding available for Proof of Concept in the UK. Many of the funds do not indicate how much funding they allocate per year, nor their overall fund level. Many funds also cover activities other than Proof of Concept. Additionally many private investors in early stage technology (angels, high net worth individuals and private investment funds) are also providing Proof of Concept funding as part of their overall investment activities and the scale of this is not publically visible. However, despite this background complexity what is clear is that Innovate UK's Smart scheme must be a very significant proportion of the total funding landscape. By comparing total funds available per year from the database we have compiled, we estimate that funding under the Smart scheme is >50% of the total externally accessed PoC funding available in the UK each year. This conclusion also chimes with the high number of organisations in the survey that referred to Innovate UK funding as their major source of Proof of Concept funding (as noted above).

From the survey we have conducted the average size of funding accessed for Proof of Concept is £25,000-£50,000 per project, with less than 10% of projects reported to be funded at greater than £100,000. Matched funding is a requirement when accessing the majority of Proof of Concept funds. Most respondents support this and note that this is an important requirement as it demonstrates commitment from the funding recipient. For some very early stage companies, a matched funding requirement is a significant barrier and restricts their ability to apply for many of the funding sources. This could be addressed through greater flexibility in allowing successful applicants a period of time to raise the matched funding from private sources in the knowledge that the grant funding has been approved subject to the matched funding being secured.

The links between public sources of Proof of Concept funding and next stage private sector seed/VC funding are important. Activities such as networking events and access to online data on funded projects are helping to strengthen these links and this is supported by the private sector funders we spoke to. These closer links would also help to support systems whereby there is greater flexibility in allowing successful grant applicants to use the provisional public funding approval to help leverage and secure private matched funding.

As part of this work we also looked into the definition of Proof of Concept and in particular how different organisations view the activities that fall within Proof of Concept, as well as what activities are excluded in their view. We have found that Innovate UK's definition of Proof of Concept chimes well with what the vast majority of respondents also consider as the activities that constitute Proof of Concept in their organisation. We have identified some differences between universities and companies in the activities that they fund with Proof of Concept funding, particularly with respect to the use of this funding for intellectual property protection. Most organisations favour a broad, inclusive definition of Proof of Concept and try not to be too prescriptive with their own internal

definitions. In this respect, we have found no evidence to suggest that changing the present Innovate UK definition for Proof of Concept would be beneficial or helpful.

Alongside a definition of Proof of Concept which references types of activity that are in scope we have also found a growing use of sector-based industry scales and guides to help people understand where Proof of Concept fits in the overall development pipeline. These scales include Technology Readiness Levels (TRLs) and Manufacturing Readiness Levels (MRLs). This is particularly within industries such as automotive, transport and wider manufacturing. This approach is also recognised and used in Horizon 2020[21]. However, a drawback to this approach if the aim is to provide a universal PoC definition is the need to reconcile the different scales that have been adopted by different industry sectors[22,23]. Nevertheless these types of industry readiness scale do appear to be helpful for applicants when used alongside a definition that lists the specific types of activity that are eligible for funding (such as in Innovate UK's definition).

As part of the survey a large number of individuals left contact details and were willing to be contacted for follow up conversations and further interviews. Seventy of these respondents also provided brief information on potential case studies. These case studies provide a useful resource to demonstrate impact and success stories from public Proof of Concept funds.

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[21] http://ec.europa.eu/research/participants/data/ref/h2020/wp/2014_2015/annexes/h2020-wp1415-annex-g-trl_en.pdf

[22] http://www.apcuk.co.uk/wp-content/uploads/2014/09/Automotive-Technology-and-Manufacturing-Readiness-Levels.pdf

[23] http://prod.sandia.gov/techlib/access-control.cgi/2010/107595.pdf

ORGANISATION TYPE

A broad cross section of participants answered the online survey with 41% being from within companies and 46.7% universities/PSREs.

As shown below in Table 6 a high percentage of the respondents were from universities and micro SMEs (<10 employees).

Table 6. Answers to Q1 - Organisation Type	Response Percent	Response Count
University	**42.7%**	**180**
Other Public Sector Research Establishment (PSRE)	4.0%	17
NHS	0.0%	0
Government or Regional Funding Agency	3.8%	16
Professional Services – consultant, accountant, lawyer etc.	5.2%	22
Company - SME micro (<10 employees)	**25.4%**	**107**
Company – SME small (10 - 49 employees)	5.9%	25
Company – SME medium (50 - 249 employees)	2.8%	12
Company – large/multinational	6.9%	29
Private Investment Organisation	1.7%	7
Other (please specify)	1.7%	7
	answered question	422
	skipped question	4
Charity	4	
Other public body	3	

The number of other company respondents was perhaps not surprisingly lower. Ideally the survey would have attracted more of the medium-sized SMEs in particular. However, this is a community that is much less well represented in the UK in terms of total number of companies.

LOCATION

The survey respondents are broadly representative of the different regions across the country as demonstrated in Table 7 below.

Table 7. Answers to Q2 - Where is your headquarters located?		
Answer Options	Response Percent	Response Count
England - South East	16.8%	71
England - South West	8.8%	37
England – London	12.3%	52
England - East of England	8.3%	35
England - East Midlands	8.1%	34
England - West Midlands	8.3%	35
England - Yorkshire and Humberside	10.0%	42
England - North East	2.8%	12
England - North West	10.0%	42
Scotland	7.3%	31
Wales	**2.1%**	**9**
Northern Ireland	**2.1%**	**9**
Other (please specify)	3.1%	13
	answered question	422
	skipped question	4

The number of respondents from Wales and Northern Ireland is lower than might have been expected or hoped, particularly given the numbers from Scotland.

UNIVERSITY GROUPING

Those respondents that ticked the 'university' box in question 1 were asked which university grouping they belonged to. The distribution of the 183 respondents that answered this question is shown in Figure 24.

As expected around 50% of the respondents are from Russell Group universities. Analysis of those ticking the 'Other' box included answers such as the Million+ and the 1992 Group.

Figure 24. University Grouping

Pie chart showing:
- Russell Group 48%
- University Alliance 13%
- Other (please specify below) 9%
- None of the above 20%
- Don't know 10%
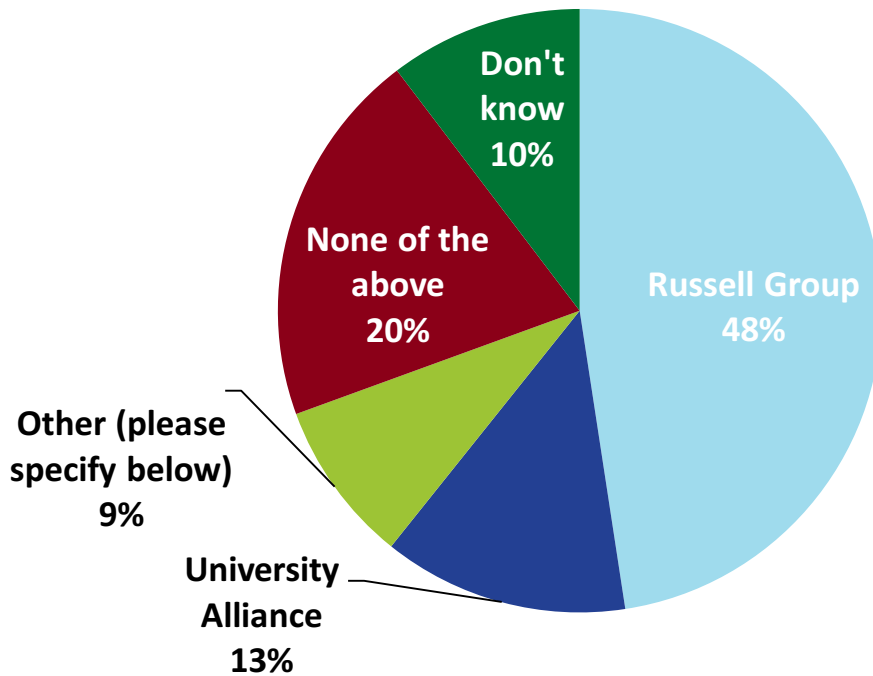
INDUSTRY FIELD

Those respondents who identified themselves as being a company in Question 1 were asked to identify the industry field that their company is associated with. 167 company respondents answered this question and the range of fields is shown in the table 8.

Table 8. Answers to Q4 - Industry Field	Response Percent	Response Count
Aerospace	4.8%	8
Agricultural	1.2%	2
Automotive	5.4%	9
Chemicals and process industries	7.2%	12
Construction	4.8%	8
Food and drink	2.4%	4
Information economy	**24.6%**	**41**
International education	0.0%	0

Life sciences	13.8%	23
Nuclear	1.2%	2
Renewables	7.2%	12
Oil and gas	1.2%	2
Professional and business services	11.4%	19
Other (please specify)	15.0%	25
	answered question	167
	skipped question	260

A high proportion of the company respondents are from the information economy and many of these are also micro SMEs.

CURRENT INVOLVEMENT

All respondents were asked about their current involvement relating to Proof of Concept projects.

Figure 25. Current Involvement
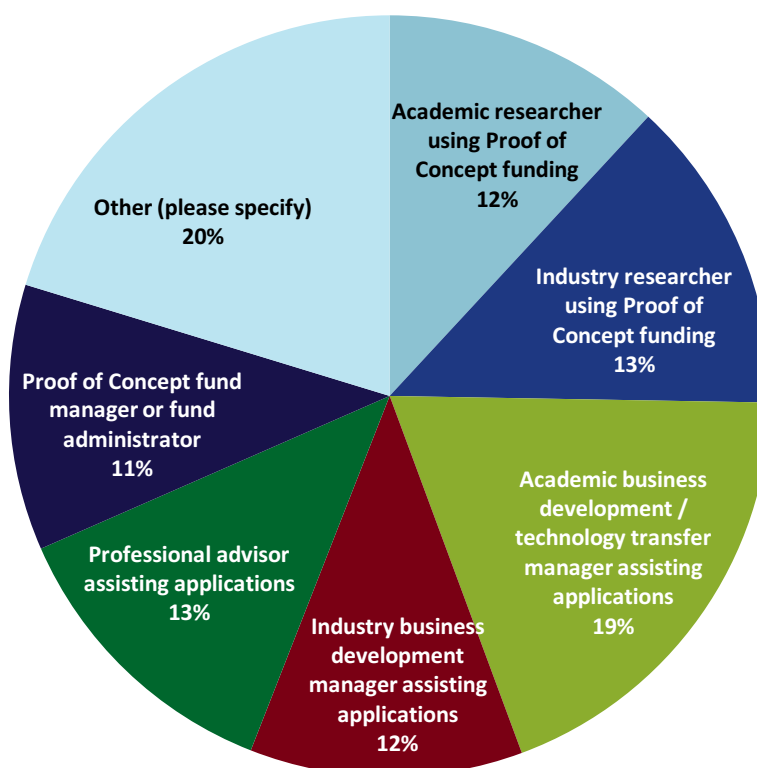
321 respondents answered the question and as can be seen from Figure 25 above there is a good mix of academic/industry researchers as well as academic/industry business development staff and fund managers/administrators.

179 respondents said their organisation had either applied for or received Proof of Concept funding in the past 3 years.

APPENDIX 2: LIST OF AVAILABLE PROOF OF CONCEPT FUNDS IN THE UK

UK NATIONAL SOURCES

Name of POC Fund	Region	Fund Manager	Funding Source	Size of Fund (total unless stated as annual)
European Research Council (ERC)	UK	ERC	International - Public	€20m in 2015
Higher Education Innovation Fund (HEIF)	UK	Multiple universities running their own funds	National - Public	varies from university to university. Largest around £500k per year
EPSRC Impact Accelerator Accounts	UK	31 universities running their on IAA	National - Public	£60m in 2012 followed by £30m in 2015
Translational Proof of Concept Awards to accelerate the fight against musculoskeletal disorders	UK	EPSRC & Arthritis UK	National - Public and charity	
BBSRC Sparking Impact Awards	UK	Multiple (incl. Imperial College, Leeds, UCL, Sussex, N'ham, Sheffield, KCL)	National - Public	Up to £200k given to universities for their own management
BBSRC Networks in Industrial Biotechnology and Bioenergy (BBSRC NIBB)	UK	BBSRC	National - Public	£18m
The SME Instrument	UK	Horizon 2020	International - Public	€3Bn funding for Phase 1 (Feasibility Assessment) and Phase 2 (Innovation Projects) over period 2014-2020

India-UK Collaborative Industrial R&D Programme	UK	Innovate UK	National - Public	
SMART - Proof of Concept	UK	Innovate UK	National - Public	£60m
Seeding Drug Discovery	UK	Wellcome Trust	National - Public	Not defined
Pathfinder Awards	UK	Wellcome Trust	National - Public	Not defined
Translation Funds/Awards	UK	Wellcome Trust	National - Public	Not defined
Brian Mercer Feasibility Awards	UK	Royal Society	National - Public	Approx £200,000
Brian Mercer Innovation Awards	UK	Royal Society	National - Public	£250,000 per year
Arthritis Research Proof of concept	UK	Arthritis Research UK	National - Public	Approx £500k per year
British Heart Foundation Proof of concept	UK	British Heart Foundation	National - public	
Research Council Follow on Funds	UK	Research Councils	National - Public	
MRC Confidence in Concept	UK	MRC	National - Public	
Rainbow Seed Fund	UK	Midven	National - Public/Private	total seed fund is £24m
Health Innovation Challenge Fund	UK	NIHR	Public and Charity	
Transport-Technology	UK	DfT	National -Public	£200k

Research Innovations Grant (T-TRIG)				
The Advanced Propulsion Centre (APC) Technology Developer Accelerator Programme (TDAP)	UK	APC	National - Public	
Future Railway	UK	Innovate UK	National - Public	varies
NIHR i-4-i	UK	The National Institute for Health Research	National-Public	
Centre for Defence Enterprise	UK	dstl	National - Public	Not defined

UK REGIONAL SOURCES

Name of POC Fund	*Region*	*Fund Manager*	*Funding Source*	*Size of Fund (total unless stated as annual)*
ICENI Seedcorn Fund	East Anglia	ICENI	Public and Private	£4m
Worcestershire Proof of Concept Fund	Midlands	Worcestershire County Council	Public	£1.2m
North East Proof-of-Concept Fund	North East	Northstar Ventures	International - Public	£17m
Yorkshire Innovation Fund	North East		Public	
Corridor Growth Fund	North West	Manchester City Council	Regional - Public	Estimated to be £1.5m
Innovus	North West	Innovus	Public - Private	£2.5m

Invest Growth Proof of Concept Fund	Northern Ireland	E-Synergy	Devolved Gov't Funding	£5m
Invest Growth Proof of Concept Fund **& Proof of Concept Programme**	Northern Ireland	Invest NI	Public	
TechStart NI	Northern Ireland	Pentech Ventures	Public	
Scottish Enterprise Proof of Concept Fund	Scotland	Scottish Enterprise	Regional - Public	
iCURE	South East and South West	SETsquared Partnership	National - Public	£3.2m
EASTERN AGRI-TECH GROWTH INITIATIVE	East Anglia	LEP	National - Public	Her is £3.2m
Creative England Interactive Healthcare Fund	West Midlands and North West		National - Public	£1m
Life Sciences Bridging Fund	Wales	Life Sciences Hub Wales	Public	£3m

INTERNAL ORGANISATION SPECIFIC FUNDS

Name of POC Fund	Region	Fund Manager	Funding Source	Size of Fund (total unless stated as annual)
Cambridge University STFC Impact Acceleration Funding	East Anglia	Cambridge Enterprise	National - Public	
Cambridge Enterprise Proof of Concept Funding	East Anglia	Cambridge Enterprise	National - Public	
Cambridge Enterprise Seed Funds (CESF) Pathfinder Fund	East Anglia	Cambridge Enterprise	National - Public	
University of East Anglia Proof of Concept Fund	East Anglia	University of East Anglia	National - Public	
Anglia Ruskin University	East Anglia	Anglia Ruskin University	Public	£500,000
Norwich Research Park Translational Fund	East Anglia		Public	£1.75m
Warwick Impact Fund Proof of Concept Awards	Midlands	Warwick Ventures Ltd	University	Not confirmed
University of Leicester	Midlands	University of Leicester	Public	
Leeds Beckett University	North East	Leeds Beckett University	Public	
University of Hull	North East			
Sheffield University	North West	Sheffield University	National - Public	

University of Manchester	North West	UMIP	Public and private	
Faringdon Fund	South East		National - Public	
UCLB Funds	South East	UCLB	University	
Gateway Fund	South East	Royal Holloway University	Public and Private	
Enterprise Development Fund	South East	University of Sussex	Public	
Southampton Enterprise Development Fund	South East	University of Southampton	Public	£100k annually
QMUL Proof of Concept Fund	South East	Queen Mary University London	Public	
Oxford Invention Fund	South East	ISIS Innovation	Donors	Aiming for £5m
Oxford EPSRC Impact Acceleration Account Funding	South East	Oxford University	National - Public	£3.2m (finishes Sept 2015)
Oxford Brookes University	South East			
Portsmouth University	South East			
Bristol University Enterprise and Impact Development Fund	South West	Bristol University	University	