Institute for Public Policy Research

CHARTING A COURSE FOR THE FUTURE

HOW LONDON'S STARTUP SCENE CAN SURVIVE AND THRIVE IN THE AGE OF BREXIT

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SUMMARY

This report presents the findings of IPPR's research into the tech startup ecosystem in London at a time of deep uncertainty as the prospect of Brexit looms large.

The purpose of this research was to listen to the views of the London tech startup community about the impact of Brexit on the ecosystem and the role of government at the current time, particularly in relation to the government's Digital Charter.

Drawing upon the tech startup community's concerns and ideas for change, the report makes a series of recommendations for the future and conveys five key messages for policy and decision makers as to the challenges and opportunities of startups for London and the wider UK economy.

1. **Stronger signalling from government on Brexit and regulation to provide certainty and stability for startups.** One reason for London's success in generating tech startups is the quality and stability of the UK legal framework which is now in question as a result of Brexit. The majority of startups that we spoke to in this study were deeply concerned by the prospect of Brexit for three reasons: first, the uncertainty it has generated around the retention and recruitment of people; second, the possibility of regulatory divergence; and third, future access to finance. Government has an important role to play in continuing to signal its support for startups in the UK, particularly those using new forms of technology and AI to diversify the economy. The focus must be on helping to manage the risks of Brexit, both real and perceived, for startups. In return, the startup community should engage collectively and constructively with government to make their voice heard.
2. **Strengthen the digital charter as basis of new relationship with startups.** The Digital Charter is an important signal of the government's support for the startup ecosystem and its ambition for the UK to be the "best place to start and grow a digital business". There are, however, three important ways in which it could be strengthened.
    - *Be a bridge across government from charter priorities to departmental responsibilities.* Tech and its future influence on the economy particularly through AI and machine learning will have a profound impact on the economic and social infrastructure of the UK's future economy. Consequently, the government's approach to managing the tech transition must go beyond the traditional parameters of government policy.
    - *Embed within the Digital Charter a commitment to the industrial strategy*. In response, the industrial strategy should help promote 'pollination' of tech throughout the economy, particularly the development of startups through the local industrial strategies which are beginning to emerge. We propose the development of 'tech pollination centres' to support LEPs in helping to encourage the formation of new startups that apply tech to traditional industries.
    - *Embrace proportionate regulation*. The principle of proportionality should be included within the Digital Charter to ensure that any future regulatory requirements do not run the risk of stifling innovation and ideas generation within the startup community.

3. **Strengthen the UK's startup community through greater autonomy and freedom for people and place.** London's success as a supportive ecosystem for tech startup tells the story of the way in which positive synergies of culture, institutions, governance and infrastructure combine to create an ecosystem which provides entrepreneurs with the capability or freedom to experiment, exchange ideas and innovate. However, there are questions about the extent to which this freedom is limited by geography, gender and income. Devolution offers a way to extend freedoms and powers to other parts of the UK to ensure that all people – no matter where they live – can be part of the tech startup community. This not only reduces the opportunity costs of lost ideas and skills, but can also support the creation of other successful and potentially more diverse ecosystems for startups in the future. To this end, we propose the creation of devolution deals that build on established regional strengths in tech, akin to what has been agreed in the North of the Tyne.
4. **Leverage tech startups as the basis of a new 'innovation commons' for the economy.** One of the challenges of tech is that it is all encompassing with challenges and opportunities for all industries and sectors. As a result, it does not neatly fit into traditional sectoral definitions, making analysis difficult for both government and for those working in startups. While frustrating for economic analysts, the role of startups in identifying opportunities for innovation in new and existing industries as well as within the public sector could be seen as the basis of a collective shared resource. This could be understood as supporting the 'common good' of society, a new 'innovation commons' which can inspire new ways of thinking across the economy. To this end, we propose a series of recommendations including 'tech audits' to identify opportunities for employers to pursue opportunities to boost productivity through tech as part of their continuous professional development.
5. **Explore how government can support startups by de-risking the 'first customer'.** Government policy has traditionally focused on reducing the financial risk for investors in tech companies. Too little attention has been paid to the delivery risk taken on by the first customer of a startup. The first customer takes on a significant operational risk by working with a supplier with no proven track record. Yet securing the first customer is often a transformative moment for startups – it focuses their businesses and puts pressure on to deliver. That's why to substantially accelerate the uptake of tech, there is a role for government to de-risk the decision to become the first customer, especially for B2B startups. Similarly, we argue that to drive innovation and support the UK's competitive advantage, the government may be able to adopt a similar approach in their work, for example, through pioneering new technology, working with startups to address 'wicked' policy challenges and by taking an equity share in startup investments where the market is failing to deliver, for example, in relation to diversity and tech for good.

SUMMARY OF RECOMMENDATIONS

Recommendation 1: Locate the Digital Charter within the Cabinet Office to enable buy in for the charter's priorities across government.
Recommendation 2: Include in the industrial strategy a 'tech pollination centre' body, private sector or non-profit, that operates on a 'hub and spoke' model to support LEPs in embedding tech innovation in all their business advice.
Recommendation 3: Use devolution deals to support tech startups by building on established regional strengths.
Recommendation 4: Devolve a greater proportion of funding and powers for adult skills development.
Recommendation 5: Using the model of TfLs 'innovation portal', explore how this could be rolled out in other areas of government to help develop linkages between tech startup and public sector.
Recommendation 6: Encourage public sector procurement strategies to consider how tender briefs for goods and services can build in opportunities for utilising tech startups to develop new ideas to address key public service challenges, eg housing and planning and health services.
Recommendation 7: Provide a clear steer on intended direction of travel in relation to talent-related visas for tech post-Brexit, and extend the current Tech Nation 'exceptional Talent' visa to make it easier for startups to access high quality staff.
Recommendation 8: Develop a specific mid-career education programme as part of the Industrial Strategy to support cross sectoral innovation by exploiting the potential of tech across the economy.
Recommendation 9: Facilitate and incentivise 'best practice sharing' and peer learning to increase the gender, ethnic and social diversity of tech startups; create a voluntary scheme for incubators, accelerators, shared workspaces and others to monitor and publish data on the diversity of the founders and companies they support.
Recommendation 10: Use the Digital Charter as the basis of a 'roadmap' which tech and government can start to use to plot through the challenges of Brexit.
Recommendation 11: Explore how government can support startups by de-risking the 'first customer'.
Recommendation 12: Strengthen the role of the British Business Bank in regard to support for tech startups.

1. CHARTING A COURSE FOR TECH STARTUPS POST-BREXIT

1.1 INTRODUCTION

This report investigates the current state of the London tech startup ecosystem in the context of Brexit, as articulated by a cross section of the tech startup community. We consider how government policy can support the future resilience of this ecosystem, offering recommendations in the context of the UK's withdrawal from the EU and government proposals on a Digital Charter. The research also explores how tech startups can be a force for economic development and prosperity in areas beyond London.

We argue that government has an important role to play in supporting and enabling tech startups now and post-Brexit. Some of our recommendations are addressed to government, for ways in which it can help to strengthen London's resilience and also seize opportunities to develop tech startup capability in other key centres around the UK.

The report also considers how tech *itself* can do much to build its capacity to work alongside government to address the present challenges. However, while tech startup faces many political and economic constraints, the industry's ability to adapt and evolve may also be limited by entrenched ways of thinking and operating - which arguably have become **established misconceptions**. These misconceptions define and characterise tech both internally and – perhaps more seriously – from an external perspective. We suggest that at a time when tech is under greater scrutiny than ever before, the tech world has an opportunity to step outside these misconceptions. By doing so, it can become more open to new ideas and perspectives which will help it to adapt to a changing context.

Our work has been informed by interviews and discussion groups with leading investors, public policy specialists and government agencies, as well as company founders, tech startups themselves and representatives of accelerators and co-working spaces. Qualitative data from these discussions has been collated and analysed to identify recurring themes.

Our focus was largely on London but we also spoke to key stakeholders in the north east of England, and experts on local ecosystems in France, Germany and Portugal. A full list of consultees can be found in appendix 1.

1.2 A CHALLENGING TIME FOR UK TECH STARTUP

This report considers the state of UK tech startup in the context of the 2016 referendum result which resulted in the decision to leave the EU ('Brexit'). Brexit has created great uncertainty across the economy, but this is especially acute for tech startups. There are serious concerns about its impact on staff

recruitment and access to current and new markets, as well as questions about how it may enable or restrict data flows (Tech UK 2017). At the heart of this is the continuing ambiguity over how the regulatory environment may change in the post-Brexit policy landscape, with has significant implications for how tech startups operate in the UK longer-term (DCMS Committee 2018).

The questions around Brexit are especially problematic because they come at a time when the speed of technological change, particularly in relation to artificial intelligence (AI), is accelerating. Not only must government grapple with questions about further regulation and safeguards for the UK tech industry in a post-Brexit context, but it must do so at the same time as trying to anticipate what the future regulatory challenges of AI might be for the UK.

AI's advance has also created debate around the impact of automation, particularly on the UK labour market. While this is still some way off, concern is rising over how the productivity gains from automation can be reconciled with the human cost of unemployment (explored elsewhere by IPPR as part of our Commission on Economic Justice, Lawrence 2017). This presents difficult trade-offs for the government, which on the one hand is keen to promote AI as a driver of economic growth, while on the other it must manage the consequences of automation for citizens. In addition, the use of algorithms in public services (such as criminal justice and health) is growing.

From a UK PLC perspective, London's strengths in tech startup must be maintained to safeguard the UK's economic competitiveness. Technology, across the board, is a dominant theme in the 2017 industrial strategy (BEIS 2017a). This identifies AI and the data economy as one of four 'grand challenges' which, if met, can 'put the United Kingdom at the forefront of the industries of the future (BEIS 2017a, 10). But the desire to boost economic development through tech – including startup and enterprise - goes beyond London. The government have restated their desire for rebalancing of economic productivity across the UK and the role that tech startup can play in helping to achieve this rebalancing in the longer term. To this end, many Local Enterprise Partnerships (LEPs)[1] across the UK are gearing up to include tech startup as a driver of growth in their forthcoming Local Industrial Strategies. The government have also announced additional funding to encourage the development of new ideas, incentivised by the Industrial Strategy Challenge Fund (BEIS 2017b).

Our conversations with the tech startup community in London confirmed that it is impossible, and – we believe – misguided, to discuss the economic impact of tech in isolation from the wider moral and ethical questions which are increasingly pertinent. The high-profile furore over Cambridge Analytica's activities has reignited debate on the ethics of how data is used and protected online, prompting ministers to suggest that the government may be willing to take a harder line on the regulation of online platforms in the long-term (de Quetteville 2018). It also raises wider questions about the implications of data use and abuse for democracy in the UK.[2]

1.3 THE MISCONCEPTIONS THAT MISLEAD US

Over the course of our research we began to recognise some recurrent ways of thinking about the challenges that the tech startup community faces, which are applied both inside and outside the tech scene itself. Here we use the term

1 There are 39 Local Enterprise Partnerships (LEPs) across the UK established by the Coalition government in the 2010 Local Growth White Paper.

2 While at the same time – democracy may be supported through more innovative uses of technology as outlined by NESTA (Simon et al 2017).

'misconception' to refer to a 'taken for granted' assumption or unquestioned orthodoxy which has come to be discussed as if it were the objective truth (Chopra 2013). Such misconceptions emerge in many areas of society and demonstrate that, contrary to the rational choice framework of market economics, those involved in particular industries may often share convergent mental models and ideologies which in turn inform how they interpret and respond to the environment around them (Denzau and North 1994). Hodgson (2003) explains how reliance on a shared and convergent mindset can have the effect of limiting people's ability to make choices.

We see evidence of this in the tech world and argue that some misconceptions of tech have become so widespread that it can be difficult to see past these 'truths' to unlock new ideas and perspectives which could help the industry longer term. Failure to face up to these misconceptions risks a stagnation of new policy ideas for tech startup, as well as increasing the likelihood of 'techlash' as resentment grows within wider civil and civic society.

The key misconceptions that we have identified from our research are as follows.

1. **The exceptionalism of tech:** Tech is sometimes described – by both insiders and outsiders – as if it's inherently different from other kinds of work ('tech is different', or 'tech people are different'). This 'exceptionalism' has some basis in fact but is also highly problematic. In reality tech experiences many of the same issues as other fields of enterprise, although it may experience them rather differently (eg its timescales are often swifter). Policy makers and more traditional businesses sometimes lack awareness and understanding of tech – partly because they assume that it is too remote from their work – and as a result may not fully appreciate its ramifications for business and the wider economy. 'Tech exceptionalism' may make it harder to get key tech messages across; for example, it may inhibit open dialogue on issues such as the ethics of tech, applications of AI, and the proper role of government.
2. **The centrality of London:** Much economic policy in the UK is predicated upon the idea of London as the main driver of the UK economy, or that other areas must emulate London in order to succeed. Long term support for London's role is important but it relies to some extent on the rest of England – and the regions themselves have distinctive strengths and potential. The partial devolution of powers to the English regions and devolved nations brings an opportunity to explore how tech can be nurtured and harnessed to help rebalance the UK's economy, and to foster a fair and inclusive prosperity.
3. **The public sector cannot drive innovation in tech:** The public sector is sometimes assumed to be the antithesis of innovation, potentially stifling tech's potential. This way of thinking sees the role of the state as limited to freeing up the regulatory framework and addressing market failures. While it is true that the public sector's ability to 'think big' (Mazzucato 2013) has been severely constrained recently in the context of austerity, extensive UK and international evidence demonstrates the success of state actors in supporting tech in general and tech startups in particular. For example, public sector intervention in Cambridge led to the creation of the so called 'Silicon Fen' phenomenon, and 'civic tech' in the UK has meant that policymakers play an active role in innovation (eg through initiatives such as Citizen Beta and Public).
4. **The UK doesn't have the right people (or enough of the right people)**: Brexit has put additional pressure on the UK labour market (see below), leading to increasingly vocal calls for freer legislation on immigration. Confusion

over the state of the UK migration system post-Brexit is a real concern. However, we must *also* consider how to grow the tech skills base right across our domestic education system. This means both 'upskilling' the current workforce and preparing the future one. It also goes beyond coding – people need the skills to solve problems using tech, to articulate tech solutions effectively, and to make sense of the world and see how tech can make it a better place.

5. **Brexit is a disaster for the London tech startup ecosystem**: There is no doubt that Brexit is having an effect on morale across the London tech startup scene, and it isn't hard to find stories of companies choosing to locate or expand elsewhere, or tech experts leaving the UK. But as Britain's withdrawal from the EU approaches, the tech startup community needs to work together to identify opportunities, think creatively, and collaborate with government to deal with this challenge. After all, a community whose *raison d'être* is innovation and change is exactly where optimism and a tolerance of ambiguity are found. In chapter 4 we examine the Digital Charter and consider its potential as an effective framework to steer and support the transition.

An awareness of these misconceptions helps to frame our discussion of the London tech startup ecosystem and how the government and tech can work together. We will explore how challenging the misconceptions can help to unlock new ideas to support this rapidly changing and evolving industry, in an uncertain political and economic landscape.

1.4 ABOUT THIS REPORT

This report has six chapters. Chapter 2 provides an analysis of the quantitative data showing the state of the startup scene in London and the wider UK. Chapter 3 draws on qualitative data gathered from interviews with key stakeholders and discussion groups to explore the lived experience of the startup community in London. Chapter 4 draws on the qualitative data to examine the challenge of Brexit and to analyse the government's approach to the digital charter as a way to manage the challenge of Brexit longer term. Chapter 5 explores what we can learn from case studies of ecosystems in other parts of Europe and the UK. Chapter 6 concludes by challenging the misconceptions and outlining a series of recommendations for the future.

2.
LONDON IN ITS CONTEXT

2.1 HOW THE ECOSYSTEM FUNCTIONS

What do we mean by 'tech startups'?	What do we mean by 'startup ecosystem'?
Tech In this report, 'tech' refers to the digital tech industries and to digital activities in the non-tech industry. A key characteristic of tech is that it cuts across the economy, impacting on both new and traditional business activities. For this reason, we avoid talking about the tech 'sector' and instead use 'tech' or 'tech industry'.	A self-sustaining network or ecosystem can be understood as a geographical clustering of industries which, depending on size and density, can deliver significant competitive advantage to an area. Tech Nation defines a tech cluster as: "a critical mass of digital technology businesses within an urban location, which interact formally (eg by trading or forming partnerships) and informally (eg networking, socialising)". The analogy of a natural ecosystem is useful for understanding business growth. Like plants and animals, startup businesses need a supportive and nurturing environment in which to develop and grow, in: "a society of founders with ideas and skills, young companies at early stages with talent, incubators with mentors and capital, early adopters and the media. These elements or entities link, interact and assist each other, strengthening the ecosystem while increasing their own value. The goal for any startup ecosystem is to develop a self-sustaining network of talent and resources that seek to solve issues affecting the wider community" (Aleisa 2012, 6). An effective ecosystem actively nurtures individuals' capability and freedom to try out new ideas, develop companies and become successful entrepreneurs. People are encouraged and supported to be their 'own masters'. Successful tech startup ecosystems are as much about how they support the exercise of human freedom and creativity as the absence of economic and political barriers.
Startup The term 'startup' refers to a company which is partly or fully owned by an individual or group of individuals who founded it, who are also involved in its day-to-day activities in any capacity. It may also still be at the stage of seeking external investment to develop its products and services. This covers a large range of companies, and in particular blurs the distinction between 'startup' and 'scaleup'. Such blurring was advocated by several of our interviewees, who pointed out that various different definitions of the borderline between startup and scaleup businesses are used, and that in practice the two groups have much in common. Where the term 'scaleup' is used separately, it refers specifically to recently founded companies which have received at least one round of funding and are expanding their activities, staff base, geographical scope or all of these. However such companies may still retain much of the culture and outlook of startups.	

2.2 THE RISE OF LONDON'S TECH STARTUP ECOSYSTEM

London's tech startup ecosystem emerged during the 1990s, when the full potential of the internet was first appreciated by developers and investors. A wave of entrepreneurs developed internet applications, and although many disappeared following the so-called 'dot-com bubble', the increase in tech business helped to establish the industry's profile with investors. It also helped to mainstream the idea of technology and the internet as an ongoing opportunity for entrepreneurship and future prosperity.

Whilst London is consistently highlighted as a centre for tech startup in Europe, within London the tech startup ecosystem has become associated with the specific geography of Inner East London including areas such as Clerkenwell and Shoreditch. This was a popular location for enterprising tech startups because of the availability – at that time – of relatively cheap accommodation and workspace. The area around the Old Street roundabout became popularly known as the 'magic' or 'Silicon' Roundabout' (Nathan et al 2013), a nickname which is now falling out of usage as more, and more diverse, spaces in the capital become home to tech startups (for example, Rocketspace in Islington and Here East at the Queen Elizabeth Olympic Park).

The tech presence in London has expanded well beyond Inner East London, but tech startup is still strongly associated with this area, and many leading accelerators and co-working spaces are still located there.

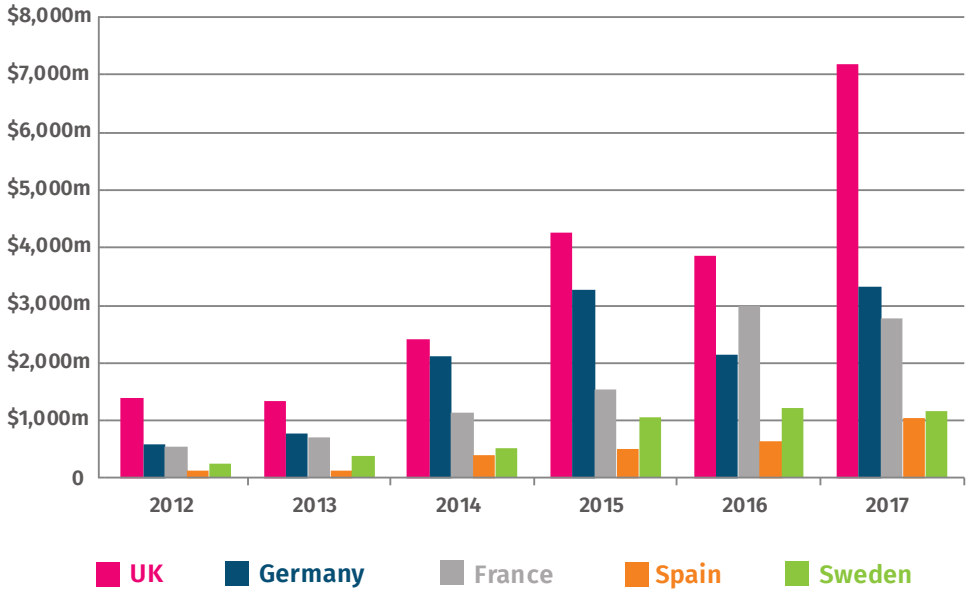
2.3 OVERVIEW: LONDON AS A DIGITAL POWERHOUSE

London is an 'international digital powerhouse' and Europe's leading city for capital investment by a large margin.

- A total of £6.7 billion was invested in UK tech firms in 2016, **more than any other European country**.
- London attracted £2.2 billion of investment in digital tech in 2016, **almost £1 billion more than its two closest competitors**, Paris and Amsterdam (Tech UK 2017) and more than Paris, Berlin and Amsterdam combined.
- Over the past five years the UK has attracted £28 billion in digital tech investment, **more than any other European country** between 2012 and 2016.
- Capital investment in tech in the UK and London was $7,177 million in 2017, well ahead of any other European country.
- **Growth in capital investment was also the highest in Europe** between 2016 and 2017, at 86 per cent; Germany had the second highest rate, at 53 per cent (see figure 2.1).

FIGURE 2.1

Capital invested ($m) by country, 2012-2017, European nations

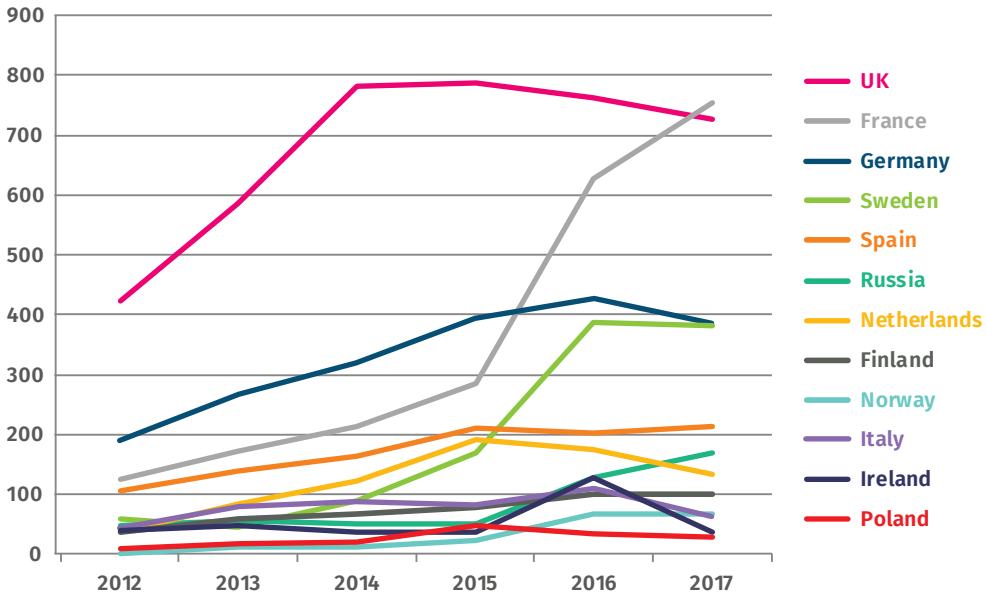


Source: Atomico 2017

The UK has consistently outperformed all other European nations in the **number of deals closed;** only France is beginning to rival its dominance, and the increase in deals in countries such as Finland, Russia and Norway has not been accompanied by any notable falling off in the UK's success (see figure 2.2).

FIGURE 2.2

Number of deals signed, selected EU countries, 2012-2017



Source: Atomico 2017

Digital tech is an important contributor to the UK economy and employment.

- The UK's digital tech economy is **growing 50 per cent faster** than the wider economy.
- There are **1.64 million jobs** in the digital tech economy, of which more than 300,000 are based in London (Mayoral Tech Manifesto and Tech City UK).
- 30 per cent of London's job growth since 2009 has been in the digital tech sector (Mayoral Tech Manifesto 2016).
- Total **contribution to the UK economy of digital tech economy is £97 billion** (GVA) (TechCity 2017).

Digital tech in the UK attracts and rewards talent.

- The average salary advertised in the digital tech sector is **£51k, 44 per cent above the national average** (TechCity 2017).
- **13 per cent of digital tech employees in the UK are from abroad**, rising to 31 per cent in London and the South East.
- Research by Atomico suggests that **London drew in and has a larger population of developers** than any other European city.
- London is rated as **one of the leading places to access capital and 'scale a business'** (Coadec 2017, 57).

London can't take continued dominance for granted.

- There is significant **growth in the value of the tech startup ecosystem** in Paris, Berlin, Amsterdam, and Madrid.
- In 2017 **Germany's population of professional developers overtook the UK's** for the first time, with a total of 837,398 compared with 813,500 in the UK (see table 2.1).

TABLE 2.1

Top ten cities in Europe based on number of developers

2016	2017
London, 300,345	London, 303, 594
Paris, 134,322	Paris, 181,659
Berlin, 81,868	Moscow, 144,488
Madrid, 81,676	Madrid, 104,102
Amsterdam, 66,778	Berlin, 93,517
Warsaw, 63,905	Amsterdam, 90,058
Barcelona, 51,809	Munich, 82,877
Stockholm, 51,547	Warsaw, 77,318
Warsaw, 63,905	Stockholm, 62,594
Dublin, 45,583	Frankfurt, 62,004

Source: Atomico 2017

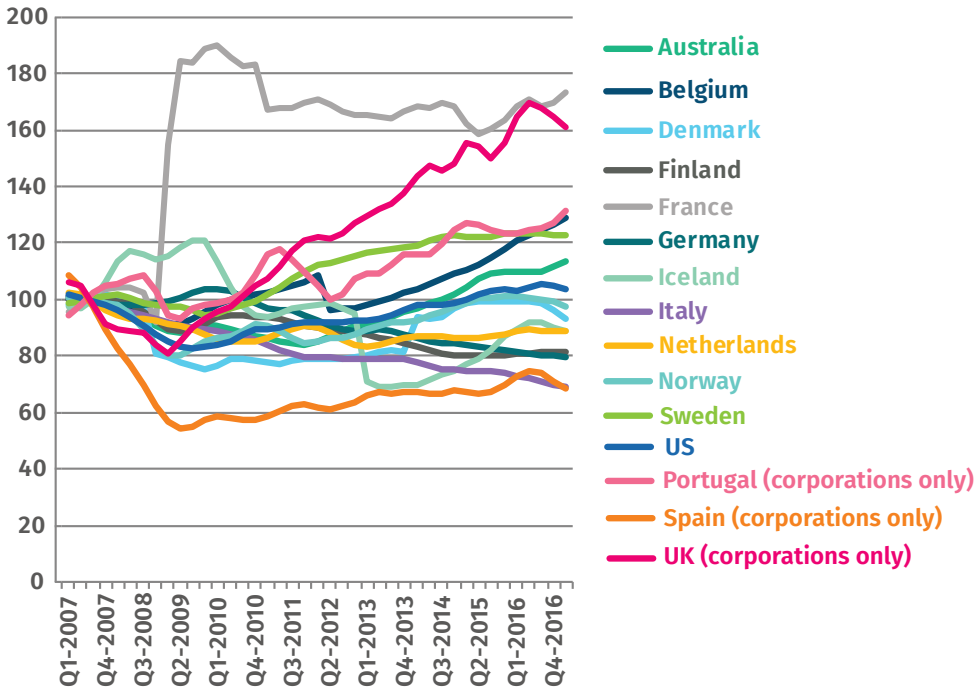
2.4 THE UK AND LONDON IN THEIR INTERNATIONAL CONTEXT

Enterprise entry in the UK is strong, with good performance in tech-related fields

OECD figures suggest that business numbers in the UK have grown relatively strongly by international standards. Since the recession the number of enterprises has increased by about 60 per cent, more than in most other major European countries (see figure 2.3[3]). Despite a slight slow-down since 2015, the rate of enterprise entry remains healthy.

FIGURE 2.3

Enterprise entries, selected OECD nations, 2007-2017. (Indices, 2007=100)



Source: OECD (2018a)[4]

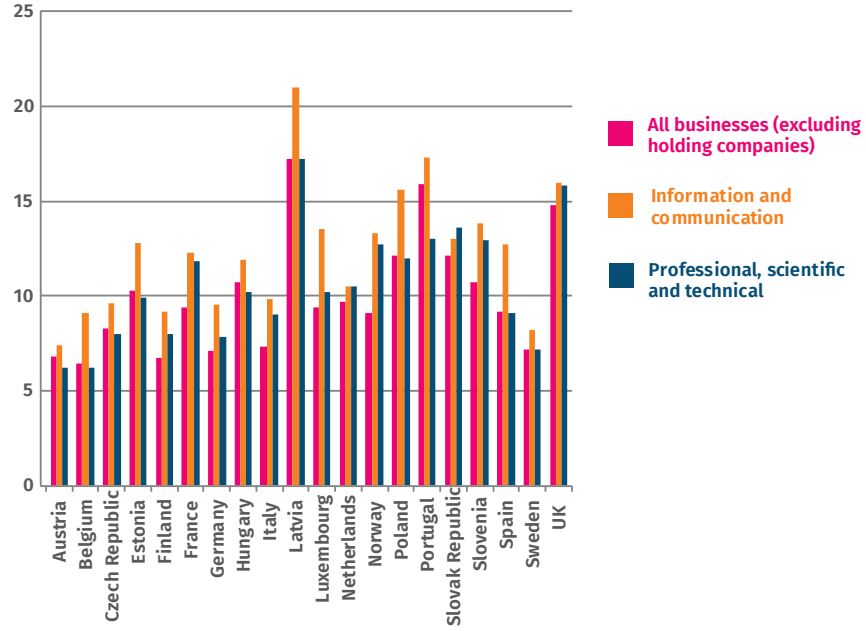
The rate of business creation in the fields most relevant to tech is also among the highest in Europe (see figure 2.4). The business birth rate overall in 2015 was 14.8 per cent, behind only Portugal and Latvia. In the information and communications sector it was 16 per cent and in the professional, scientific and technical field it was 15.8 per cent, again surpassed only in one or two other countries.

3 Note that directly comparable figures for the UK and the USA were not available as USA figures presented by the OECD are for *all enterprises* rather than *corporations only*. However the comparison presented here does suggest that the UK has outperformed its major Anglophone competitor.

4 An exact comparison for the UK and USA is not available from this source; however, the closest available figures for the USA show an index of 103.2 for Q1 of 2017, and figures below 100 for all dates 2007-2014.

FIGURE 2.4

Business birth rate, selected EU nations



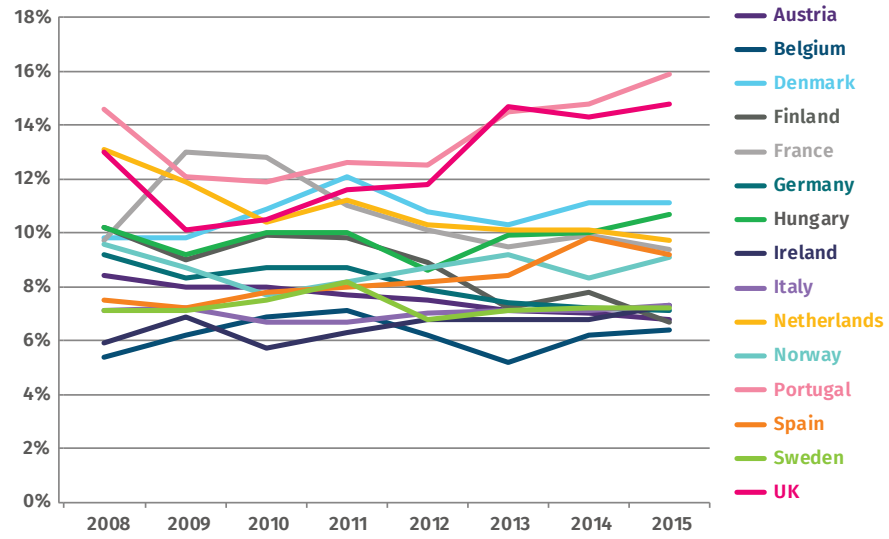
Source: OECD (2018a)

A high proportion of UK businesses are newly-created businesses

Overall, newly created businesses make up a relatively high proportion of the business population in the UK (see figure 2.5). The figure rose relatively sharply between 2012 and 2013, which may reflect the impact *both* of the end of the recession and of policies to encourage enterprise. The increase has been especially marked since 2012, which would correspond with the growth of tech startups in the UK.

FIGURE 2.5

Business births as a percentage of all active enterprises (business birth rate), selected OECD countries



Source: OECD (2018b)

One-year business survival is strong but longer-term survival is middling

OECD figures also suggest that one-year business survival rates in the UK are the third highest in Europe at 92.10 per cent. However, they also highlight the greater challenges of flourishing in the longer term; for five year survival the UK's performance is around the *middle* compared to other European nations.

Tech-related fields do slightly better than other sectors

Survival rates are slightly higher (at around 94 per cent) in information and communications and professional, scientific and technical fields, and again the UK is among the best performers in Europe for one-year survival in these areas. As elsewhere these sectors also perform slightly better after five years than the average for all businesses (OECD 2018b).

Investment in tech innovation and R&D should be a priority

Innovation is a vital source of the ideas, new applications and technologies that underpin many startups. Despite the healthy figures for enterprise creation discussed above, the proportion of businesses in the UK which are engaged in innovation appears relatively *low* by international standards.

Potentially this creates a risk for the UK's ability to maintain a leading role as a startup ecosystem. The country needs to invest in generating ideas, and to signal a commitment to research and creativity. Historically it has been relatively straightforward for entrepreneurs from overseas to move to the UK and become founders. But if they perceive doing so as a risk post-Brexit – or if the process of doing so becomes more difficult in practice – then home-grown innovation will be even more important.

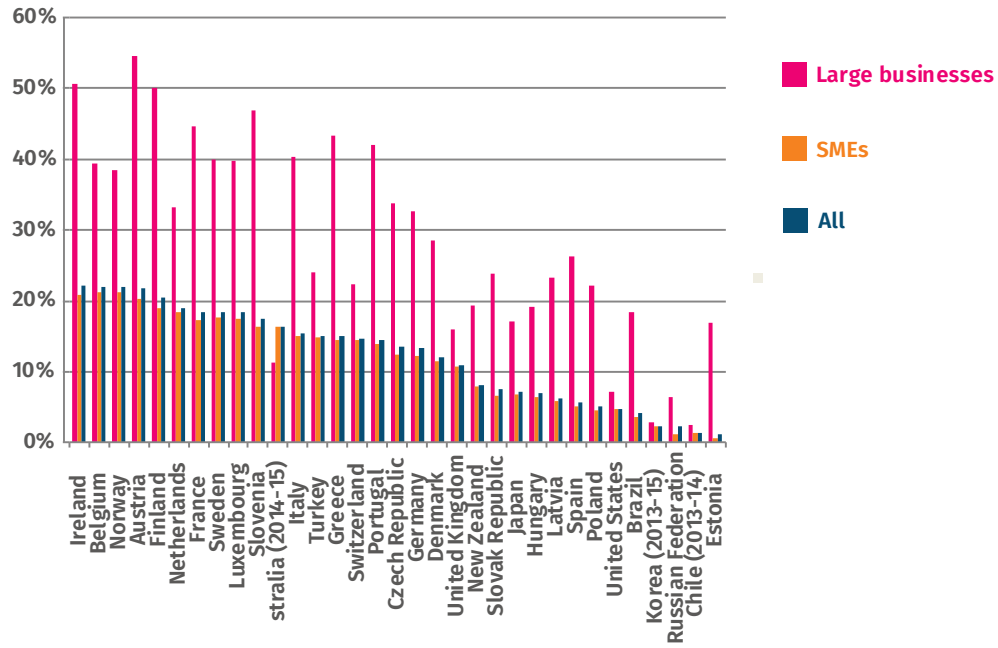
The percentage of companies which are engaged in new-to-market product innovation is lower than in comparable EU countries, at just over 10 per cent compared to around 20 per cent of enterprises in the majority of the Scandinavian countries as well as Ireland, France, Belgium and the Netherlands (see figure 2.6). This is related to wider challenges around R&D investment in the UK (IPPR forthcoming).

The picture is similar for SMEs (and many companies categorised as 'innovative SMEs' may be recent or relatively recent startups). In the highest performing countries around a fifth are product innovators compared to - again - around 10 per cent in the UK. However the contrast is sharpest among large businesses. In Ireland, Austria and Finland over 50 per cent are product innovators, and in many countries between a third and two-fifths fall into this category. In the UK the figure is around 16 per cent.

This is important for the startup ecosystem because large companies that prioritise innovation are more likely to partner with startups to access new ideas and products; this is an important source of customers and clients for startups. And employees from large companies that encourage innovation may themselves become founders. Increasing the density and spread of innovation right across the business community should be a priority for the UK.

FIGURE 2.6

New-to-market product innovators, by size of business (2012-14), as a percentage of all businesses in each size category, within the scope of national innovation surveys

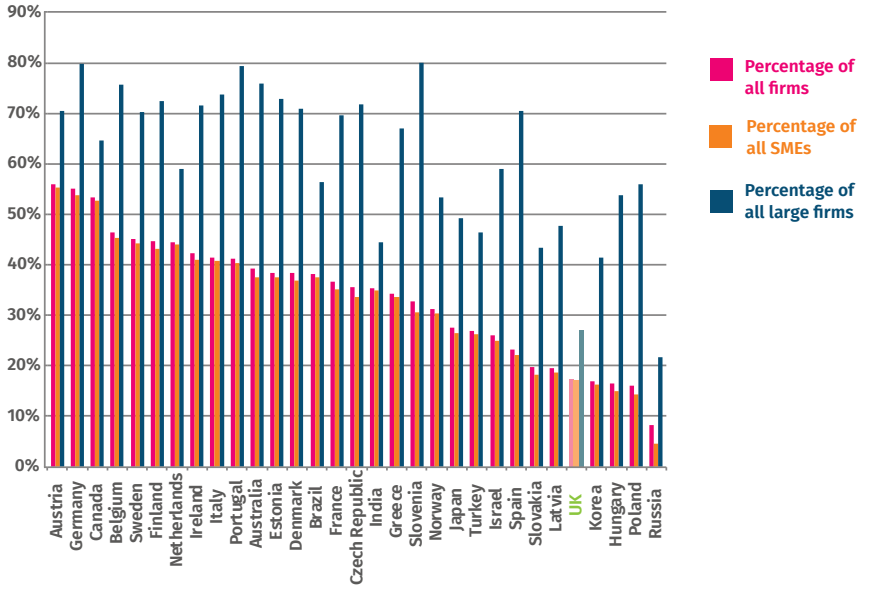


Source: OECD (2017a)

A similar trend emerges from the slightly more detailed data which is available on product and process innovation overall (see figure 2.7). For firms of all sizes, the UK has a relatively limited innovation profile, although this is especially marked for larger firms. Again this data (from 2010-2013) suggests that the UK needs to focus more on embedding innovation right across the economy. The role of large firms in using resources to boost innovation will in turn support SMEs to innovate, fostering a climate where innovation is well-embedded in organisational cultures. The vibrant accelerator community in London illustrates this point.

FIGURE 2.7

Product and/or process innovative firms, including abandoned or ongoing innovation activities (not organisational or marketing innovation)

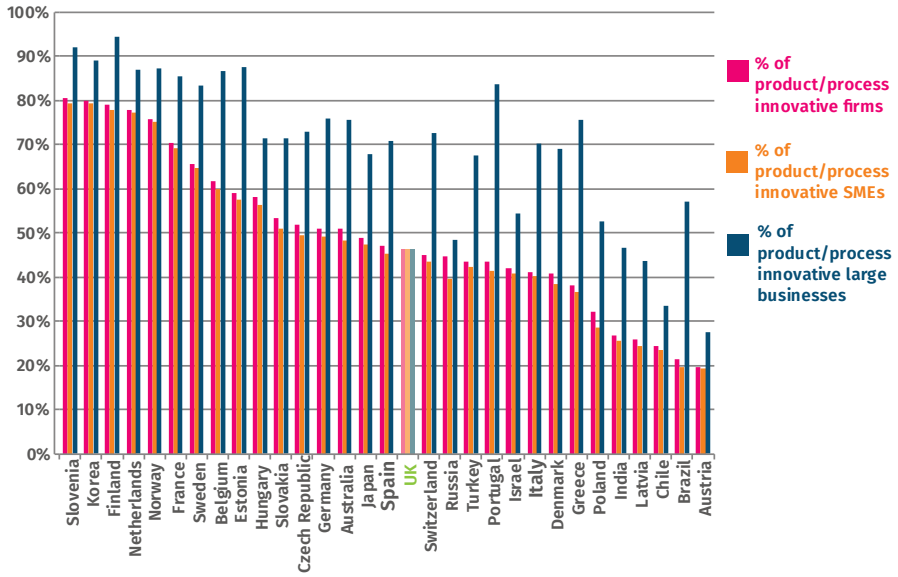


Source: OECD (2017a)

This may reflect the relatively low engagement of UK firms with research and development activities. Again by international standards, this engagement is less widespread *even among firms which are engaged in process and product innovation*, particularly among larger companies (see figure 2.8).

FIGURE 2.8

Product and/or process innovators which are R&D active, as a percentage of total product and/or process innovative firms within the UK



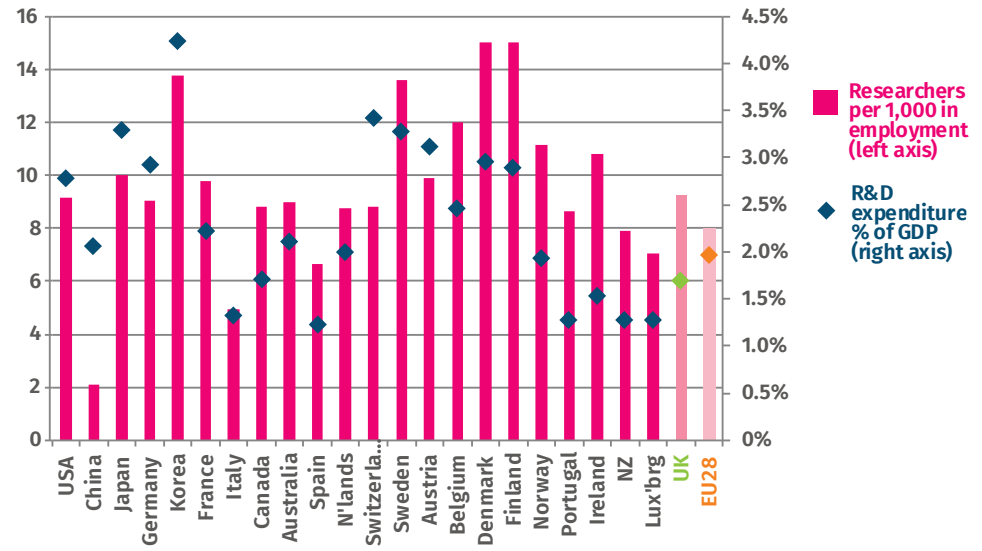
Source: OECD (2017a)

And the skills and workforce base for R&D also needs investment and support

The skills and workforce base for research and development is also relatively low in the UK (see figure 2.9). The proportion of the population employed in research in the UK is higher than the EU28 average but substantially lower than in the Scandinavian countries, Korea, and Ireland. R&D expenditure is *lower* than the EU28 average, and four percentage points lower than in the USA.

FIGURE 2.9

Investment in research: Researchers per 1000 in employment and R&D expenditure as % of GDP, 2015



Source: OECD (2017b)

2.5 THE GROWTH OF THE KNOWLEDGE ECONOMY IN LONDON

London leads the UK in knowledge economy business births[5]

Growth in the number of knowledge economy business births has increased at a higher rate in London than across the UK, with IT services and tech consultancy as the fastest growing areas since 2012. Tech-related fields (software, high tech financial services and computing) led the field between 2009 and 2012.

The knowledge economy makes up a larger proportion of business activity in London than across the UK as a whole. The proportion of business *births* that are in the knowledge economy fell between 2011 and 2012 but has risen since; the proportion of business *deaths* in this sector has stabilised.

5 We use the ONS definition of 'knowledge economy', which includes any company whose primary activity falls into the areas named in table 2.2.

TABLE 2.2

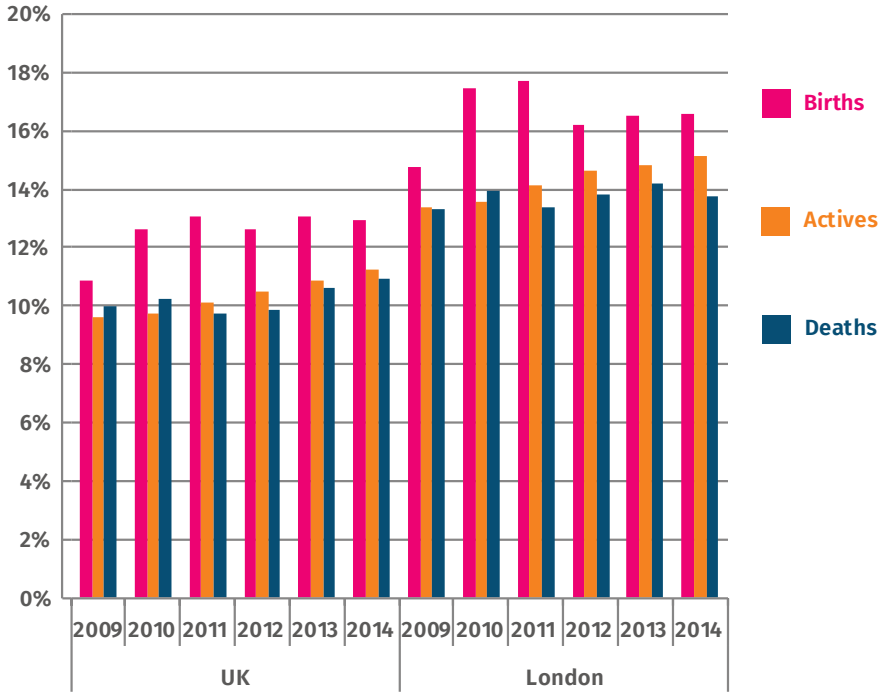
Number of knowledge economy business births by sub-sector, UK and London, 2010-14

	UK					London				
	2010	2011	2012	2013	2014	2010	2011	2012	2013	2014
Aerospace and transport	77	100	119	177	112	67	150	100	200	175
Communications	96	115	100	76	86	89	118	110	84	89
Computing	96	101	94	134	94	64	133	83	140	100
Creative content	95	112	110	137	102	99	111	108	131	104
High-tech financial services	119	114	119	98	101	111	123	132	91	104
IT services	125	104	91	192	108	133	103	87	201	113
Medical devices	95	99	102	162	98	107	100	103	127	95
Other tech consultancy	102	114	109	136	95	107	107	106	146	100
Pharma/biotech	110	118	118	111	100	133	100	113	133	92
Software	137	137	97	71	85	156	151	93	65	94
Total knowledge economy	116	115	100	133	100	124	118	97	131	106

Source: ONS (2017); authors' analysis. Unit=indices, base year=2009

FIGURE 2.10

Knowledge economy enterprises as a proportion of business births, active enterprises, and business deaths, UK and London, 2009-14



Source: ONS (2017)

2.6 THE CHALLENGE OF MEASURING THE STARTUP ECOSYSTEM

This data sets the UK alongside other countries where tech startup is a priority for national policymakers, with conscious efforts to boost enterprise creation in major cities. Figures for innovation investment and business births are clearly relevant to measuring the potential of a place as the setting for a startup ecosystem in this fast-moving field. Yet finding good-quality data[6] to demonstrate the *detail* of an ecosystem is problematic.

Some of this stems from the novelty of many tech startups. Above, both traditional sectoral definitions (eg 'information and communications') and more recent ones ('knowledge economy') are employed, even though they are arguably insufficient to reflect the real range of activity in companies that can be described as 'tech startups'.

The speed of change in tech means that some activities and applications may not yet have a name, or a straightforward definition. And tech's pervasiveness (eg digital platforms, 'big data analytics') means that *all* sectors can be home to companies with a large measure of tech in their activities, to the extent that many may 'struggle… to say whether or not they [are] a "tech" business' (Nathan et al 2013). This presents difficulties in counting companies, as well as quantifying their economic outputs and impact on employment.

The concept of a 'startup ecosystem' is itself novel and evolving,[7] and a proper characterisation demands measurement of factors not captured in standard data gathering. For example, *networks* – formal and informal – are crucial in determining success (Cukier et al 2015a), but a rigorous account of these demands both technological innovation and innovative thinking about data (Motoyama and Watkins 2014, Gloor et al 2013). AI and data mining, to determine characteristics of markets and of firms themselves, may have a role to play (Kakadiya et al 2015). And in this most data- and number-driven field, qualitative as well as quantitative evidence is important in improving understanding (Cukier et al 2015b, Avinmelech 2013).

Efforts to improve the data on startup ecosystems in general and London's in particular should focus on the data that is most useful in shaping and evaluating policy, and on that which is most useful to key players in the ecosystem including entrepreneurs and investors.

6 The new TechNation report will provide an up-to-date overview of the health of the UK tech ecosystem, including detailed analyses of tech clusters in all of the major towns and cities.

7 Although arguably the role of 'ecosystems' of one kind or another in fostering creativity is as old as creativity itself; consider art in renaissance Florence, music in 18th century Vienna, or the production technologies of fabric in the 19th century north and midlands of England.

3.
THE STARTUP EXPERIENCE IN LONDON AND THE UK

3.1 INTRODUCTION

This chapter presents our key findings from interviews with stakeholders in the startup community. Interviewees included founders, investors, and policymakers, and all interviews took place between January and April 2018.

Our interviews focussed on the startup 'lifecycle' and the lived experiences of people involved in founding and supporting new technology and tech startups in London. However, some cross-cutting themes emerged which are relevant to all of the phases and actors discussed in the sections below. These include the following.

- **The role of government in supporting the startup ecosystem**. Government has a key role in creating a healthy startup ecosystem, both through general fiscal, industrial and social policy, and measures specifically developed to support enterprise and technology. As an investor in research, education and business, it is a major supporter of innovation and its regulatory frameworks impact on how innovation is applied in the marketplace. And increasingly the state is a major digital player itself, as digital and e-government grow in importance and AI and algorithms are used in shaping and implementing policy. An effective dialogue between government and people working in tech, in which government engages with and listens to diverse voices, is needed.
- **The role of 'big corporates' in supporting startups (and upstarts)**. Major international companies are important investors in the startup ecosystem and in startups themselves, and are crucial in developing talent and creating demand for innovative products and services. Their presence is vital to London's success. We encountered no suspicion of 'big business', and interviewees were generally positive about these companies. In a field which thrives on innovation and thinking differently, though, it makes sense to question their role and their function as a 'role model'. Should major corporations be a central force in shaping the future digital economy, or are they one element of a complex picture, the part they play changing as innovation progresses?
- **The relationship of tech and digital to other industries.** The 'boundary' of the tech and digital 'sector' is fluid. It is both a distinct field of activity and a crucial enabler right across the economy: in the words of one interviewee, 'pretty much every business with the ambition to grow needs a tech focus'. It also has a huge role to play in boosting productivity for companies of all sizes (Dolphin and Hatfield 2015). A strong dialogue between the tech sector and others is important. At the same time, the 'pure tech' side of the equation also needs investment and support, not least because this will ensure the best possible range of approaches and technologies on which the rest of the economy can draw.
- **The place of support for tech startups within the wider entrepreneurship startup ecosystem.** Tech startups will benefit from 'generic' support for entrepreneurs and new business formation and growth. However the needs and the development lifecycle of startups in tech is different in some

crucial ways from that of other sectors. The balance between these was mentioned by several interviewees; tech startups and scaleups don't need a fully bespoke service but some of their needs are distinctive, as are the ways in which they can take up and benefit from different policies and initiatives.

- **Key strengths of the UK tech sector.** While London was seen as being strong across a range of technologies, the UK's role as a leader in certain areas – especially artificial intelligence (AI) – was discussed in many of these interviews. Alongside a good environment for entrepreneurship and start-ups in general, there was a feeling that policy should recognise and support particular strengths.

3.2 THE LONDON STARTUP ECOSYSTEM, AN OVERVIEW

Like any form of social organisation, a 'startup ecosystem' will change over time, in response to the actions and needs of its citizens, as well as the wider economic, social and policy environment. Cukier et al (2015a) survey the relevant literature, proposing that four phases of startup maturity can be observed:

1. **Nascent**: a place is recognised as a 'hub' with some deals and existing startups, but little or no impact on employment or international markets.
2. **Evolving**: a few startups have grown into successful companies, some regional impact, and a small impact on employment and the local economy.
3. **Mature**: several hundred startups, some scaled businesses achieving 'worldwide impact', and a generation of successful entrepreneurs.
4. **Self-sustainable**: thousands of startups and numerous deals, entrepreneurship mentors to at least a second generation, specialised 'angel' investors, and strong networks of success stories with a commitment to sustaining and growing the ecosystem; high levels of good-quality talent and an 'inclusive environment'.

A measurement of the quantifiable factors included in this 'maturity model' was outside the scope of this study but the overview of data in Tech City UK (2017) presents a picture of a highly networked ecosystem with a significant impact on employment and GVA. For example:

- the turnover of UK digital businesses grew by 22 per cent between 2010 and 2015
- the GVA of a digital tech worker is calculated to be twice that of other sectors
- job creation in 'digital' sectors is growing twice as fast as in non-digital sectors
- London hosted nearly three times as many 'meetups' events as Berlin, Amsterdam or Paris.

Both the data analysis above and our interviews confirm that London's ecosystem has passed beyond the mature stage and into self-sustainability.

London also performs well in terms of the 'pillars' of entrepreneurship identified by the World Economic Forum (Foster et al 2013): accessible markets, talent and human capital, funding and finance, mentors and advisors support system, regulatory framework and infrastructure, education and training, universities as catalysts and cultural support. Evidence for all of these is presented in this chapter.

This was the consensus among our interviewees. They described a large, diverse and well-embedded community of start-ups and support for

start-ups, with multiple examples of success and a growing range of opportunities. The track record and reputation of London as a place to start or grow a tech business mean that it has become 'self-fulfilling', drawing in founders from around the UK and overseas.

Interviewees felt that London's startup ecosystem had its roots in a rich landscape of 'soft infrastructure' for tech startup and entrepreneurship, including fairly unstructured or even unofficial co-working spaces, and informal or self-organised activities for entrepreneurs. It has passed through a number of 'tipping points', which over time have seen these become more recognised and established to the point where the startup community is now a powerful economic movement. This was seen as having been an organic process, which is more likely to foster innovation than any attempt to design an entrepreneurial culture. The challenge for policy is to nurture such 'natural' processes without being over-directive.

3.3 THE LONDON BUSINESS COMMUNITY

Some of the factors which contribute to London's success and demonstrate its high level of maturity are as follows

London as a major corporate hub

London is home to many global businesses. Interviewees felt that it is seen by international companies as "the most exciting place to be in Europe", as well as the home of tech startup on this continent. As such, it is the obvious place for American or other firms to locate their European base, or companies founded elsewhere to set up a second office.

Thus the international market is highly accessible for London startups; they are effectively "... within 30 or 40 minutes of any company in Europe" (in the words of one interviewee) via its London office. It makes the city *attractive* to talented people, by creating a rich range of employment opportunities, and supports the development of talent among employees who may found or work in startups. It also 'leverages in' a large pool of expertise and knowledge. This richness is potentially at risk if London's pre-eminence within Europe is eroded by Brexit. Both uncertainty over the future and actual barriers to entry could create damage.

London is also home to non-tech sectors which work with or buy from tech startups. Finance and insurance are pre-eminent among these; London's FinTech sector is a major success and the city now has a growing presence of 'insuretech'. Some commentators warn that this could be one of the first casualties of Brexit, as the position over passporting and access to the digital single market remain unclear, and regulation issues give rise for concern. A few corporates are said *already* to have moved to Rotterdam or Paris, or decided *not* to move to London or to reduce planned London operations.

Other client sectors with a substantial London presence include medicine and biological sciences, transport, logistics and government. In addition, interviewees named sectors with a strong London or UK presence which have become associated with vibrant and growing community of specialised tech startups. These industries include film and television, fashion and visual art.

This not only provides market access, but – because of the 'talent draw' of London – means that talented people in tech have access to *equally* talented people with an entirely different set of experiences and expertise. This in turn leads to more innovation.

London offers an excellent infrastructure for tech startups

At this stage in its development, London offers a range of support and development opportunities to start-ups which is large and diverse enough to meet the needs of very different businesses. There are multiple accelerator and incubator programmes for founders who seek relatively structured programmes and input, as well as co-working spaces and learning opportunities for those pursuing more informal and self-directed routes. The concentration of startups and scaleups means that mentoring and shared learning are relatively easily available, and startups have a wealth of role models in their immediate environment, so that the journey from 'seed to success' is highly visible. This is an example of how the system has become self-sustaining over time.

Professional support services are also plentiful and of a high quality, and once again the ecosystem is sufficiently large for diversity to thrive. For example, it is relatively easy for startups to find legal and accountancy services which meet their needs. Our interviewees suggested that the system is generally seen as 'fair and open'.

Corporate and social culture are 'startup friendly'

Both the culture of London as a startup ecosystem and more widely as a place to live play a part in its success. Interviewees suggested that the ecosystem *itself* is unusually diverse, with founders who are interested in a range of different ways of doing things and have a relatively independent outlook. This in itself fosters innovation: 'you can have a bash at stuff', and people 'are willing to try it out'. London was contrasted with Silicon Valley by some, who felt that the latter attracts a fairly homogenous group of founders.

This observation (like some of those on informal learning networks, discussed below) creates a paradox for policy. Government and other stakeholders need to support the conditions, material and psychosocial, for innovation and firm growth, but in the best case these are by their nature 'untidy', unlike government policies and company balance sheets. Short-term policy evaluations or calculations of return on investment could miss the factors which create some of the most successful innovations over the long term.

More broadly, London as a city has an extraordinary cultural diversity that makes it an attractive location. World-class cultural institutions, a vast range of social facilities and a huge diversity of neighbourhoods and communities contribute to this. Its vibrancy was - again - contrasted explicitly with Silicon Valley. London offers many different ways of life, and is also seen as a good place to raise children. Socially and culturally, it is sufficiently 'sticky' to make people who have global choices about where to live make it their home.

However there are some challenges. London is expensive both as a place to live and to start a business, which makes it challenging for any founder and inaccessible for many people who cannot draw on a substantial 'safety net' of personal or family resource. Effectively the cost of housing (and, for founders looking to employ others, the knock-on impact of this on salaries) and premises adds an additional layer of risk for entrepreneurs. Anecdotal evidence suggests that the cost of living is beginning to erode some of the cultural attractions of the city as well, as creative businesses find it harder to stay in the city and some communities start to change.

Of course this is a problem for the city as a whole and not just for its tech scene. Initiatives such as the 'New London Plan' (Office of the Mayor of London 2017) seek to address the issues and make the city sustainable economically and socially. The Plan recognises that "London's global economy is the envy of other world cities ... it is the engine of the national economy", but raises the

question of what this prosperity achieves for London's communities. In particular:

- **housing** is expensive, with rents and purchase prices rising rapidly and 'pric[ing] many Londoners out of the market'
- **imbalances** within the city have arisen, with the hotspot of large multinationals at the centre sitting alongside poverty and a lack of development in other areas
- **congestion, poor air quality and other environmental problems** making it a less attractive place to live and work.

The plan aims to shape growth in ways that improve the health and quality of life for all Londoners, reduce inequalities and retain (or reawaken) the attractive characteristics that draw people to the city as a place to live and work.

3.4 GROWING THE IDEAS OF THE FUTURE: KEY QUESTIONS FOR THE ECOSYSTEM

The research with stakeholders also highlighted a number of key questions for the future of London's startup ecosystem.

Is the London startup ecosystem producing enough startups?

The figures presented here suggest that by international standards, the London startup ecosystem is performing well; the number of enterprise entries is high and enterprise survival is relatively good. Our interviewees were broadly in agreement that the fertile soil described in the first part of this chapter is bringing forth a healthy crop of startups.

Some felt that the best course to ensure that this continues would be to leave it in its current state, albeit with the continuation of established policies and initiatives, allowing the market to operate as an effective 'filter' and focussing new initiatives instead on 'scaleup'. Given the success of London to date this is an understandable view – but it is potentially highly risky in the context of Brexit.

Others, while sharing this generally optimistic view, suggested that there is room for policy intervention. One view was that while startups are *plentiful*, their distribution between different parts of the market could be better balanced to ensure that tech startup makes the best possible contribution to the wider economy. This would involve continued and strengthened concentration of investment and other support on the 'deep tech' end of the market, including various applications of artificial intelligence.

Applications to fields such as genomics, synthetic biology and other STEM areas would also fall into this category of areas where additional encouragement for startup could bear fruit. Investment in R&D in business (as discussed above) and most vitally in universities will be key to this. In addition, the new Institutes of Technology proposed in the industrial strategy will play a role.

But this isn't just a STEM issue. Innovations that can transform consumer and user experience are an important, and growing, area with a track record of successful startups and scaleups. For example, healthcare delivery increasingly benefits from tech applications, and perhaps the area where public awareness of tech is highest is among the well-known consumer apps, from behemoths such as Über and AirBnB to a range of smaller 'niche' and local products. However, the easy appeal of the latter should not allow them to become the only 'face' of tech innovation. Slow-burn but potentially

transformative work is also important not least because of their potential as 'underpinning' technologies.

This discussion raises questions – once again – about how ecosystem success is measured. A mature system should be monitored to identify the breadth as well as the quantity of innovation.

How are tech startups influencing innovation within the wider business environment?

Technology is not the only sector with a vibrant entrepreneurial presence in London, but its role can be seen as unique within the city's startup landscape. Our interviewees described it as vital to work for entrepreneurs in *all* sectors: "pretty much every business with ambition to grow has a tech focus". Tech is important in developing problem-solving applications across practically all sectors in the modern world.

For fields such as medicine, engineering and pharmaceuticals, there is a clear connection within the scientific world. Applications elsewhere may need expert facilitation of conversations and 'brokerage' to help non-tech innovators connect with people in the tech startup world who have the expertise to develop solutions. The concentration of tech businesses alongside a wide range of other sectors within London means that it's relatively easy to bring together these diverse interests, but it takes skill to 'translate' both the specific issues and context.

Articulation is also a challenge for companies bringing innovative products to market, especially in sectors where tech engagement is relatively novel. 'Defining the category of what you do if you're doing something very innovative' (as one interviewee put it) is hard work, but worthwhile – especially when initially isolated startups begin to change the conversation and become part of a 'movement'.

This opportunity for cross-sectoral innovation was seen as a distinctive strength of London. Unlike Silicon Valley, which has a relatively 'pure' focus on tech, London's diversity and cosmopolitan outlook facilitate collaboration, practically and culturally. The highly successful fintech movement has its roots in relationships between London's centuries-old banking industry and the upstart digital world, and now new relationships are following the same path (for example, with the film and TV industry, with pharmaceuticals and with the delivery of personal services).

The industrial strategy was seen as a potential driver and enabler for work of this kind. Different technologies can support productivity gains, both in 'advanced' sectors and in the 'everyday economy' of retail and services. Strategic investment and the creation of opportunities to apply tech across sectors could speed up processes of the kind which have grown organically in the ecosystem to date. In particular, as noted above tech will be vital in improving the performance of the long 'tail' of small and medium-sized businesses which account for over 99 per cent of enterprises and 60 per cent of employment in the UK (Rhodes 2017).

Most aspects of 'pure' tech have potential applications to other sectors, but artificial intelligence was mentioned especially often in this context. Bringing together the world-leading but relatively small centres of excellence in AI with innovators across a range of industries should be a priority for the strategy, and should be included in the 'detail' of sector deals and key collaborations, such as those between higher education and business. This in turn will demand an examination of the implications of the changes which AI will bring, and their

impacts both on businesses and on the everyday lives of consumers, citizens and employees.

How is the ecosystem generating future talent and addressing needs?

Talent is a key ingredient of innovation. Universities are perhaps the most important pipeline for this, although the employees of established businesses may also become founders, and our interviewees generally felt that universities in London and the wider UK are excellent, and attract students, researchers and academic staff who generate the ideas for a new generation of businesses. This is true both in tech and across the range of sectors with which tech can collaborate, including the sciences, marketing, sales and the arts. The density of tech is matched by the richness of its context.

However, the extent to which Britain's most promising students consider themselves as potential entrepreneurs raised some concerns. The situation in Britain was contrasted with that in the USA, where starting a company is seen as a relatively 'normal' option for graduates from major HEIs; here, it is often viewed as exceptional or risky. 'Universities need to change the way they think', and communicate with their students about entrepreneurial options post-graduation.

There was relatively little consensus on how this might be achieved (and partly it depends on wider representations of entrepreneurship in the UK). Effective approaches, already in place in initiatives such as the 'campuses' founded by or in collaboration with universities, include direct access for students and recent graduates to business in an atmosphere where working together is *expected*.

Universities themselves can help to broker relationships, through established mechanisms such as KTPs, grants to encourage participation in events and conferences, and programmes that link potential founders with networks of employers, investors, etc. Crucially institutions must not set themselves, or their staff, up as 'gatekeepers' or fundholders who control their students' access. Students should be trusted and encouraged – or pushed – to make independent contacts in the startup ecosystem.

Established employees present rather more questions. Companies may want to keep their employees' ideas 'in house'; alternatively, they may actively encourage innovators to become founders and become investors in new businesses. Who is the best judge of whether an innovation will flourish best as part of the portfolio of a larger corporate, or as the basis for a startup? Potentially, a healthy startup ecosystem will offer the opportunity to seek relatively neutral and disinterested advice.

Opportunities for people with a track record of work to augment their tech skills or to engage with this field for the first time are also important. This will increase the pool of tech workers, and also bring together experience from other sectors with a knowledge of what tech can do. This in turn could spark innovation and entrepreneurship. Initiatives such as 'Google Digital Garage' are important in making tech-related upskilling accessible to a large number of people. Employers and education and training providers need to develop a greater awareness of how this kind of learning could benefit their business.

Some interviewees suggested that, while universities and businesses are engaged in some excellent innovation activities, research and development in the digital sector is relatively poorly understood. This is particularly true in the all-important area of collaboration. Closer examination and a better awareness of what fosters 'deep' innovation could lead to better-targeted support infrastructure and investment, as well as guidance for education initiatives.

For current founders and potential founders, informal learning opportunities such as those provided by organisations such as Google Campus are important. Many shared workspaces and entrepreneurship programmes offer development in small 'bites' from which learners can select according to their needs.

How does the ecosystem keep the money flowing?

Among our interviewees were several investors who felt that *very* early investment is crucial to innovation. This could involve investing in the development of ideas *before* they have been developed into a fully-formed business proposition, or even in individuals who have the potential to become funders but have not yet had the opportunity or the time to innovate, or who '... don't yet know they're entrepreneurs'. Funding of this kind is another response to the relative lack of interest in entrepreneurship among the 'brightest and the best' of the UK.

Early stage investment often comes from founders *themselves,* which is problematic for people who have great ideas but little financial resource. A diverse investment landscape, in which a range of investors apply different models of engagement and timescales for outcomes, can help to increase opportunities. And better information for founders about how to present ideas and get investment that fits their product and their aims for their company is essential. Often this is learned informally through involvement in an incubator, accelerator or shared workspace, but founders need a certain level of knowledge and resources even to get to this point.

Many investment opportunities, not surprisingly, focus very strongly on success – or a particular definition of success. Founders who have a very innovative idea may encounter more difficulties in convincing investors that their company has the potential to grow and deliver a return, simply because the relevant market doesn't exist yet – and won't, until they have had a chance to develop it. Yet greater risk taking will also lead to more investors funding ideas that don't bear fruit, or that take a long time to do so – and possibly to tech investment looking riskier overall.

This may be an area where government investment has a role. The popular EIS and SEIS schemes were widely praised, and have provided a vital pipeline of investment for tech startups including highly innovative and 'deep tech' ones that may be less immediately appealing to investors than highly recognisable consumer apps or fintech products. This is an example of a Government policy which has had a major positive impact on the tech startup ecosystem, and which is relatively unique to the UK; for example, the USA lacks any close equivalent.

The issue of investment post-Brexit is discussed in more detail in chapter 5.

3.5 GROWING – FROM FIRST STEPS TO SCALEUP

Investment for scaleup

Getting investment to start and grow a business in London is seen as being relatively easy. This was not always the case, but the quantity and diversity of investment sources has increased radically over the past few years: "it's like night and day compared to what it was", in the words of one of our interviewees.

The number of venture capitalists and 'angels' has increased, with a range of different funds, 'prolific' investors, and a rise in the presence of investment syndicates and groups. Private equity has also grown in importance. Investors have recognised a major opportunity and a new infrastructure has grown up

to support this. At the same time, finance from the British Business Bank, the European Investment Bank and other EU sources has become more accessible. This is another area where Brexit makes London and the UK vulnerable.

Initiatives to bring together public and private money to maximise the impact of investment were praised. This includes projects such as the London Co-Investment Fund, which aims to support 'best in class investors' and to make the best use of public and private investment for startup and scaleup businesses.

A growing trend is for founders and startup companies which do well to *themselves* become investors in new companies or 'reinvestors' in the ecosystem. This is driven in part by a desire to 'give back' and to replicate – or improve on – the opportunities which they themselves had. The willingness of numbers of ecosystem 'insiders' to invest in this way creates a 'virtuous circle' of capital, coupled with the potential for mentoring, learning, and a different kind of relationship between investor and investee from one in which is primarily about money on the one side, and ownership on the other. Several interviewees noted that more opportunities to work with investors in partnership relationships could be beneficial.

Certain initiatives are especially important.

- 'Patient capital' is a powerful and important opportunity for software industries and software led developments.
- Investment which focusses specifically on *scientific innovation* (rather than just on business growth) bears fruit in the long-term, whether this is offered at the earliest stage or to companies which are up and running but seeking to extend their range. R&D tax breaks are also highly valued.
- Allowances which work within the relatively short time-scales for tech startups and scaleups, eg national insurance 'holidays', tax relief (eg on R&D) which is offered quarterly rather than annually; this fits better with typical tech startup and SME cashflow patterns.
- Employee options and employee equity schemes; these are used extensively in the USA but are less common in Britain, which may represent a missed opportunity to increase investment and investor engagement. The recent change to policy which means these are no longer eligible for tax relief presents a potential barrier.
- Crowdfunding, equity or otherwise, is becoming increasingly popular. This trend is more marked in the UK than elsewhere, partly because of lighter regulation in this country.

While the policies themselves are praised, some interviewees suggested that *information* for potential investors and for companies seeking investment could be better. For example, the convertible notes system is useful in unlocking early stage investment and speeding up fundraising, but information about how to use it, and in particular the tax implications, is not always sufficiently clear.

Opportunities: investment and procurement

In the UK context, there are some sector-specific issues where policy could support increased investment opportunities. For example, one interviewee with knowledge of medical technology startups noted that this could be an area where finding investment is a challenge, partly because by far the biggest purchaser is the NHS. Another described how a major shift in education policy had actually been important in helping to grow an innovative company.

What these stories illustrate is the power of government and the public sector as a buyer of innovative tech products. More open opportunities to sell to government could incentivise both investment and innovation across a wide range of areas related to public services (such as sciences, medicine, education, infrastructure, energy, housing and transport). Devolution could extend this to local government and support specialisations and collaborations within local clusters, including those around institutions such as HEIs, innovation catapults, and established centres of excellence.

A gap at the top?

Investment is one of the elements of the startup ecosystem that interviewees generally felt was in a good place. There was a similar level of agreement over where a gap in the market starts to open up, which is around the point at which companies are looking to 'scale'. This was variously described, in very precise terms ('at Series B and C') or more generally ('when you hit scaleup'), but a relative lack of opportunities for businesses looking to grow beyond the initial stages was a widespread concern. Of course, this problem may have arisen precisely because the startup ecosystem is performing well and creating a lot of companies with the potential to grow fast and far. A report by Lisbon Council/NESTA/Open Evidence (2016) came to a similar conclusion. Some interviewees suggested that this lack of 'higher growth' funding is one of the factors which explains the fairly small number of companies founded in London (or the wider UK) which have become 'globally significant'.

Investment in talent

Talent is just as great an issue for businesses looking to scale up as for those at the very earliest stages, and investment in *people* is an important use of funding at this stage. Growing tech companies need employees with strong STEM skills to work on innovative projects and maintain the strengths which underpinned the initial foundation.

However, tech scaleups also need people who can grow a company and recruit, manage and nurture a highly-skilled and often highly sought-after staff. Some interviewees suggested that talent in *management* (of people and of business processes) is actually *harder* to find than scientific and technical ability. This is partly because of how such talent is formed. Rather than recent graduates from world-class universities, the staff who will bring it have often *already* worked in a growing business and seen it move from five or 10 staff to 50, 100 or more. Thus it may be difficult to encourage them to return to a very different kind of working environment (and potentially to lower pay and more precarious employment).

4.
BEYOND LONDON'S ECOSYSTEM
REBALANCING THE UK AND WHAT WE CAN LEARN FROM EUROPE

> ***"The fact that London is so successful can be attributed in part to the fact that the government refuses to devolve real power to the regions and that is really, really harmful. At what point are we going to trust our fellow northerners?"***
>
> Alex Depledge, founder and CEO

In this chapter we explore tech startup beyond London to gain fresh perspectives on the challenges. We first consider the debate on rebalancing in the UK and look at the state of the tech startup ecosystem in the North East. We then look to Europe to see what can be learned from France and Portugal, particularly in the context of Brexit.

4.1 REBALANCING THE UK'S ECONOMY AND THE ROLE OF DEVOLUTION FOR TECH STARTUP

Within the UK, London's tech startup ecosystem dwarfs those of the devolved nations and English regions. But many of our interviewees – including many who are firmly embedded in the London scene – named a strong *national* hinterland as one of the many advantages that has helped the capital to grow. We also came across many founders who had originally grown up in other parts of the UK but had made their way to London to develop their business. Some of them were keen to 'give something back' to their home towns and cities (interview 4). It is also worth noting that London's startup ecosystem dominates the UK, but it also dominates Europe and is among the major concentrations of tech across the world.

During the course of our research, the question of rebalancing the UK economy came up frequently. This is part of a much larger national debate about decentralisation and the role of devolution to the newly emerging mayoral authorities can help support economic prosperity. Devolution to the English regions is progressing through a series of local 'deals'. How can these help to improve economic performance in the regions, and sustain the vibrant national scene that has helped London to achieve its success?

London leads but potential is strong across the UK

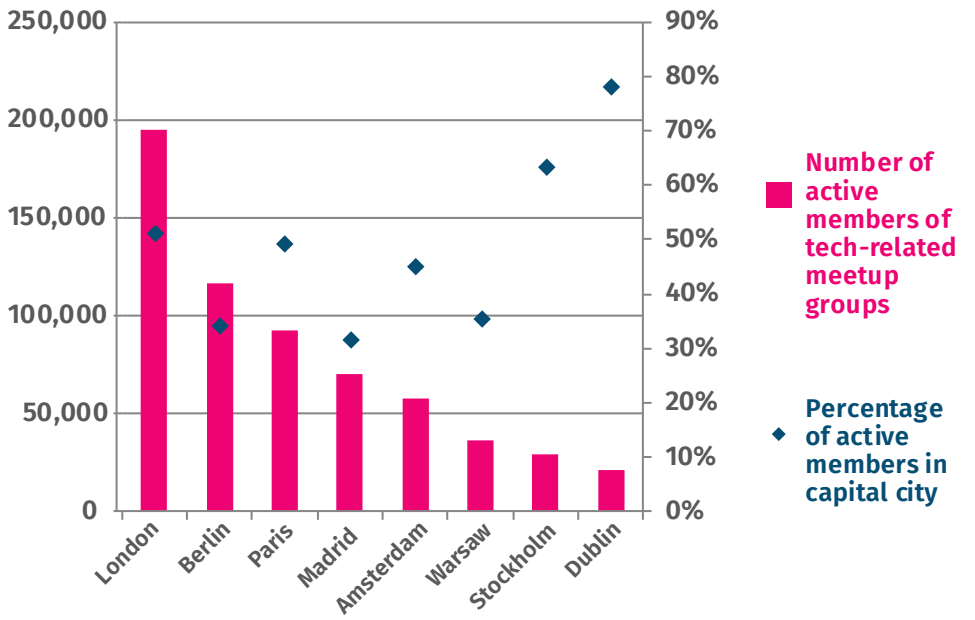
The North East study demonstrates how local entrepreneurship is active but could potentially expand. The available data suggests that *interest* in tech is high across the UK but that at present this is not translating into high rates of tech entrepreneurship in the regions.

For example, the high numbers of active tech-related Meetup members in the UK are in fact quite well distributed across the country. Only just over half (51.4 per cent) are located in London; 3.5 per cent are Manchester-based, but the remainder are, presumably, in other cities and regions. Figure 4.1 shows

the number and distribution of active meetup members in tech areas in several countries.

FIGURE 4.1

Active tech-related meetup group members in each country, and percentage of members who are in the capital city

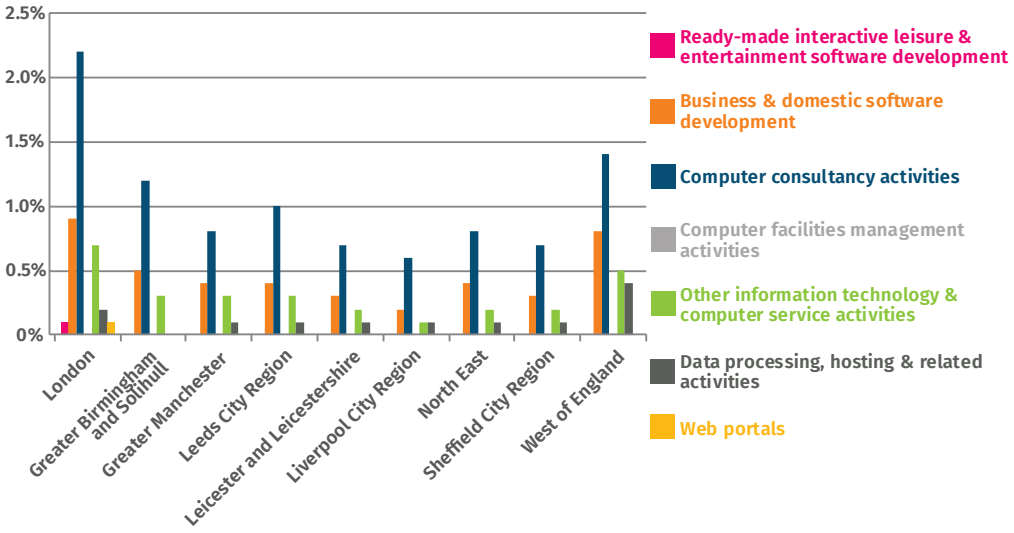


Source: Atomico (2017)

Similarly tech *employment* is higher in London than elsewhere, but city regions outside the capital have reasonably high rates of employment in relevant sectors. For example, computer consultancy businesses employ more than one per cent of the employed population in the West of England and West Yorkshire, and nearly that proportion in the West Midlands. In the North East and Greater Manchester the figure is around 0.75 of one per cent. Business and software development companies employ 0.75 per cent of employees in the west of England, and around 0.5 per cent in west Yorkshire, the West Midlands and the North East. Data roles actually employ a higher proportion in the west of England than in the capital (see figure 4.2).

FIGURE 4.2

Percentage of employed people who work in selected digital occupations[8], LEPs including an English core city



Source: BRES via NomisWeb; authors' analysis

However the tech population in the regions isn't matched by levels of tech GVA

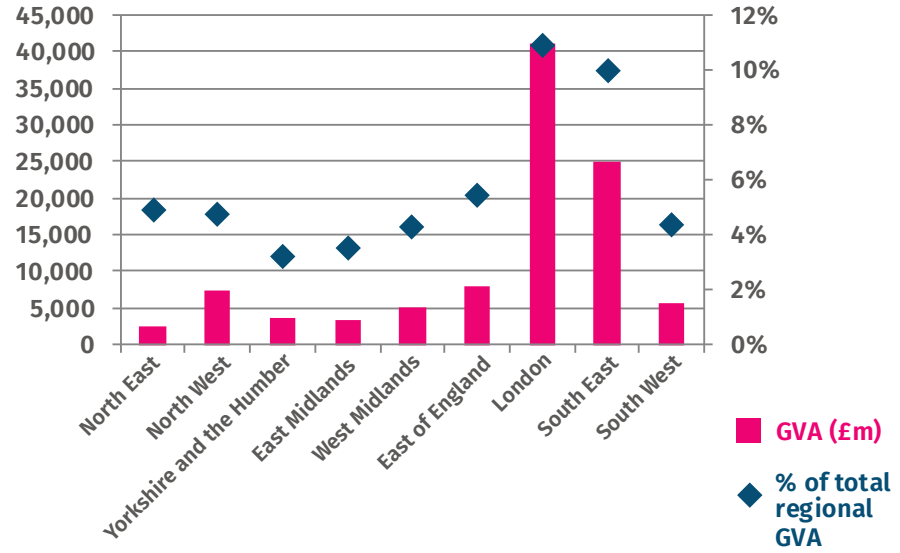
However, although the number of *people* involved in the digital industries in the regions is substantial, their economic weight is smaller. Figure 4.3 shows the total GVA generated by businesses in the 'information and communications' sector (which includes a large proportion of digital industries). Both the absolute sum and the percentage of total regional GVA is considerably lower outside London, and only in the South East does this sector account for more than 10 per cent of the regional economy.[9]

8 This chart and those that follow demonstrate some of the difficulties in using established data sources to discuss the digital and tech economy, and startups within it. Most importantly it will *not* include self-employed people and entrepreneurs. Some of the people employed in the *sectors* listed may not be engaged in tech roles (eg some will be business managers, administrators, etc), and a high number of tech employees may hold relevant roles in other business areas (eg finance, manufacturing, health, academia, etc).

9 The proportions are similar for 'professional, scientific and technical' activities – although these account for a larger proportion of regional GVA in the South East and east of England than in other regions outside London, probably reflecting the presence of the 'golden triangle'.

FIGURE 4.3

GVA generated by 'information and communication' activities, English regions, 2015



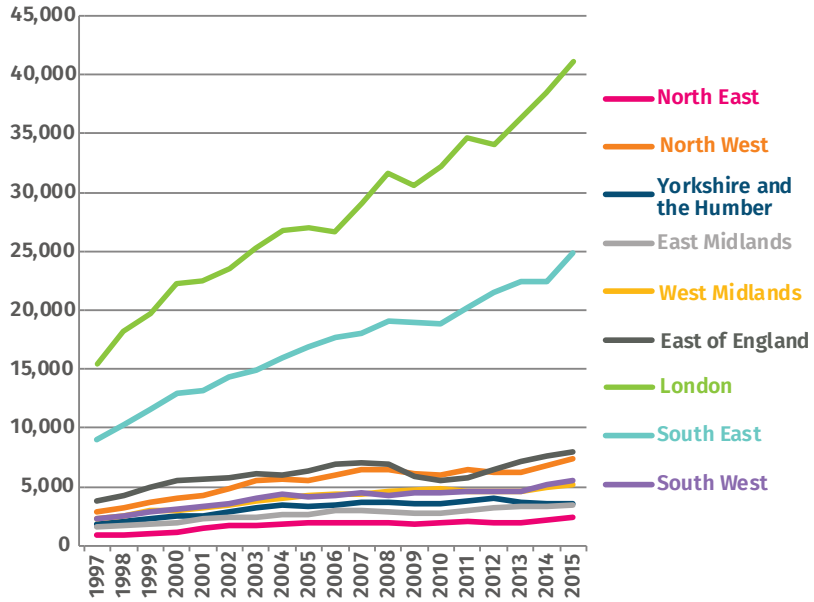
Source: ONS (2018); authors' analysis

The value of GVA generated by this sector has grown substantially in London (see figure 4.4 and table 4.1). The sums involved are far smaller but the rate of growth in the digital economy outside London has outstripped *general* GVA growth both in the capital and elsewhere. Between 1997 and 2015 the north east had the highest rate of growth in GVA generated by the information and communications sector in England. Over the past decade London has indeed outstripped the rest of the country but in all regions this sector has grown by between 80 and 100 per cent, compared to growth of between a quarter and a third[10] for the economy as a whole.

10 Slightly higher in the South East.

FIGURE 4.4

GVA generated by 'information and communication' activities, English regions, 2015



Source: ONS (2018); authors' analysis

TABLE 4.1

GVA growth, information and communication sector and all sectors, English regions

	Information and communication		GVA growth, 1997-2015	
	GVA growth, 1997-2015	Growth, 2005-2015	GVA growth, 1997-2015	GVA growth, 2005-15
North East	186.91	86.36	24.83	26.09
North West	164.31	91.03	34.38	31.17
Yorkshire and the Humber	93.23	82.75	7.15	24.93
East Midlands	116.01	85.4	32.44	32.81
West Midlands	125.86	77.12	20.57	27.96
East of England	109.7	92.96	24.29	32.61
London	165.76	138.2	52.39	52.78
South East	175.38	98.14	47.29	36.69
South West	142.28	93.78	31.52	31.86

Source: ONS (2018); authors' analysis

Startup growth has been even more strongly concentrated in London. Around two-thirds of the capital invested in tech startups and scaleups in the UK between 2012 and 2016 was invested in London, and the most recently available figures suggest that over 90 per cent of 2017 investment was focussed on the capital (Atomico 2017, authors' analysis). 56 per cent of equity investment and 47 per cent of equity deals in 2016 went to the city (ScaleUp Institute 2017).

It is unrealistic to expect the regions to 'catch up' with a world leader, but Devolution Deals can build on the growth in employment and GVA to develop regional startup ecosystems to provide feeder 'clusters' and lifestyle and specialism opportunities that complement those of London.

Devolution approach 1: 'whole system innovation' approaches to local development

Local areas in the UK can learn from examples such as Paris, which was voted European Capital of Innovation ('iCapital') in 2017. This award recognised the following.

- The commitment made by the Paris Local Authority to building a diverse range of incubator spaces for innovation in tech, in tech-enabled businesses across a range of sectors, and in diverse other social and economic fields. Private incubators have also been encouraged and supported. The city gained over 100,000 square metres of incubators in a ten-year period (Eurocities 2017).
- Financial and business support for 'pre-startups' and startups. The City of Paris has created a Public Investment Bank which offers funding at these very early stages (up to €30,000), and the economic development agency Paris&Co offers help with founding a business.
- The development of a deliberate 'place based' approach to planning to make sure that the economic and social benefits of innovation are shared across the city's places and communities. In an initiative known as 'L'Arc', developments are planned to take account of the existing geography, including transport links, established physical and geographical features (such as the Périphérique road), and areas which have been – or are in danger of being – left behind by the city's increasing prosperity. Developments include a range of spaces designed for different kinds of innovation and startup, many of which occupy formerly underused or disused buildings. The project represents a collaboration between the City of Paris and its closest neighbours (ArcInnovation 2017).
- A commitment to innovation in areas such as housing and the ownership of assets, including an increase in the extent of 'sharing'. The 'Réinventer Paris' initiative encourages fresh thinking about how the city can run effectively and sustainably, with tech as a key enabler alongside other forms of transformation.

These developments involve:

- Economically and geographically strategic investment to boost the local economy in a way that best fits with the social and community needs of the city.
- Working with the local built environment and natural assets to embed opportunities for innovation.
- Effective partnerships with geographical neighbours and between stakeholders, eg Local Authorities, private businesses and local and central government.
- Encouraging an innovation and transformation mindset in facing a diverse range of social and economic issues (eg an ageing population is a key issue for Paris).
- 'One stop' opportunities for seed investment at the local level and a clear brand for business support within the city.

Devolution approach 2: devolution deals that build on established regional strengths

The most recent devolution deal signed with a Combined Authority (or putative Combined Authority) in England is the 'North of Tyne' deal, which includes Newcastle, North Tyneside and Northumberland. This includes an explicit offer to the region of additional funding in areas where it has nationally significant innovation assets and research strengths, which include digital (data, 5G, cyber security and information modelling). The deal also empowers the region to 'pioneer a smart-data environment, with improved sharing of data across local and national public services, to deliver more sophisticated, more responsive and more efficient services'. For example, this will include the use of open data and the development of common data standards across the region, as well as data enhanced decision making.

In addition, the deal links this to the distinctive geography of the North of Tyne area. The proximity of urban assets in the core city and its hinterland to England's most sparsely populated county provides an opportunity for innovation in using digital connectivity to develop the rural economy.

This approach demonstrates how devolution can encourage digital innovation and enterprise by:

- recognising and rewarding specific regional achievements to get the best return on targeted investment, strengthen clusters
- creating *de facto* 'sandboxes' for digital innovation in areas such as eGovernment (with associated public/private collaboration, research and innovation, etc)
- encouraging the use of tech as a part of the solution to specific social and economic challenges in local areas, developing scaleable solutions that can become the foundation for new enterprises.

Devolution approach 3: devolve a greater proportion of funding and powers for adult skills development

All of our interviewees stressed the importance of a strong digital skills base to support startups and scaleups – and all of them also identified some level of skill shortage. This is particularly acute outside London, although the capital needs to draw on the regions for skilled workers. This is an issue not only for recent graduates and school leavers. Established employees right across the economy need the skills to become adept and effective tech workers as digital innovation helps to transform the *majority* of sectors. And the combination of appropriate tech skills with experience gained in those sectors which are ripe for innovation and transformation offers a potentially important source of ideas – and even of founders. The startup ecosystem also needs people with the skills in business and supplementary areas to support tech innovation.

Devolving policy for adult skills development has several advantages:

- Skills development policy can be linked closely to business advice for skills utilisation, improving employment and work progression opportunities for workers and productivity for firms (Dromey and McNeill 2017).
- Access to 'target' social and economic groups can be fine-tuned to meet specific social and economic priorities. For example LEPs and other local organisations can use local intelligence to work with employers and others to identify groups where reskilling is especially important for current workers, or where training in specific areas can support improved employment prospects and also help to address skills gaps in the local economy. This can be integrated with other areas of devolved powers, such as transport, eg ensuring that training opportunities are accessible, or

infrastructure development, eg innovating in building design or the use of data (Round 2017).

- Partnerships between local stakeholders, eg schools, colleges and universities, employers and sector bodies, can be formed to design timely and relevant training that meets short- and long-term local priorities (Round 2017).

Devolution approach 4: Planning systems and incentives that support affordable and flexible startup space

London's ecosystem has grown out of formal and informal co-working spaces including Campus which have provided a base and access to networks and infrastructure so that startups could develop and incubate their ideas further. There may be opportunities in the North for combined authorities to take responsibility for planning powers, particularly in relation to derelict or underused buildings to consider how these can become viable spaces for tech startup companies. This could be through the use of compulsory purchase, meanwhile space or pop-up provision.

In London, this is an approach that has been explored by Camden Council who have made available their empty, and due to be demolished, town hall to provide temporary accommodation for startups who have a limited time period to come up with new startup ideas within the health sector.

This seems particularly relevant given the fact that one of the key challenges for some towns and cities in the North is a legacy of industrial buildings that are now difficult, from an economic viability point of view, to convert into modern offices and/or residential properties. One example of this which was highlighted recently in a report by Historic England (Historic England 2017) is the phenomenon of historic mills in the North West and Yorkshire and the Humber. Their report, entitled 'Engines of Prosperity', included examples of how some mills had been refurbished and improved and were now home to digital and creative businesses, including Marshalls Mill in Leeds.

4.2 INTERNATIONAL CASE STUDY 1: PARIS

Introduction

Many accounts of the tech startup scene in Paris start by observing that this is at odds with preconceptions of French culture and society. Stereotypes cast the country as beset by strikes, bureaucracy and a culture that prioritises lifestyle over enterprise, but the recent data tells a different story. The old cliché of 'l'exception Francaise' could be repurposed to refer to a vibrant ecosystem, successful by international measures but with some characteristics rooted in the distinctive context of France.

Some indicators of success include the following.

- Venture capital funding into technology firms in Paris in 2017 was the **second highest** (after London) in Europe, at £564.97m (PitchBook figures, quoted by Donnelly 2018).
- Total venture capital funds raised in France in 2016 were the **second highest** (after London) in Europe, at €1,224m – and for the first quarter of 2017 Paris had overtaken London (Atomico 2017).
- The number of deals in France in 2017 was the **highest in Europe** at 753 (Atomico 2017).
- Optimism about the future of European tech is **highest in Europe**: 70 per cent of French respondents in a survey were more optimistic in 2017 than they had been in 2016 (Atomico 2017).

- Data from a range of sources identifies various indicators of swift growth in the French startup ecosystem, including: a **30 per cent increase in startup creation** per year between 2012 and 2015; a **39 per cent revenue increase** and a **27 per cent rise in staff numbers** between 2014 and 2015; and foreign venture capital investment in **29 per cent of firms**, as well as **six $1 billion startups in the 2010s** (La FrenchTech 2017).

This profile is often associated with the election of the enthusiastically business-friendly Emmanuel Macron in 2017. This has certainly boosted optimism for entrepreneurship, but the shift it has its roots in policies developed under Francois Hollande's government,[11] and its cultural origins are traced back to the aftermath of the 2008 financial crash (Gobry 2017). The effective 'rebranding' of the country has accelerated through a combination of global ambition, and the strong French traditions of collectivism, collaboration, and government intervention.

France also benefits from pride in a strong tradition of STEM achievement and expertise which is explicitly linked to its startup ecosystem. La French Tech brochures boast that the country has more winners of the Fields Medal in mathematics than any other in Europe (13), and a strong tradition of engineering talent is also celebrated.

Government policy and initiatives

Legislation in France is sometimes seen as a barrier to enterprise but its actions under the 'La French Tech' initiative show a strong government commitment to supporting and developing the startup ecosystem. Government backing for tech innovation and a powerful public infrastructure are among the strengths of France as a startup location.

Investment is a significant part of this. Through its public fund, BPIFrance, the French government is now the most active venture capital investor in Europe (Vijngaarde 2018). BPIFrance came about when multiple fragmented government funding schemes were brought together and rebranded to support more strategic investment which could be easily accessed by founders. Funding is available for all phases of business development, from ideas to internationalisation. It also supports international collaboration and international startups within France. BPIFrance invests around €20 billion annually in debt and equity, €1.4 billion of it in innovation; a further €200 million is invested in accelerators. Macron has already announced a further €10 million for future investment.

The fund is described as 'a financial tool serving the collective interest. Its purpose is to become involved in market segments and companies that suffer from a partial or total absence of other financial players' (BPIFrance 2013). It focusses primarily on micro-businesses and SMEs, but also supports larger companies that are strategic to the national economy or to local development and employment. This interventionist philosophy sits alongside impressive commercial performance. Net profit in 2016 was €742 million, an operating ratio of 45.3 per cent, and a low cost of credit risk in the fourth year of high growth across all lines of business (BPIFrance 2017).

Far from the 'crowding out' of private investment which might have been assumed, other sources of money have become increasingly available in Paris, including 'angels', equity and corporate funders. A notable feature of the French landscape is the number of founders who have themselves become investors. This provides some of the 'expert investors' which were seen as

11 In which Macron was an influential member, including a spell as Minister of the Economy, Industry and Digital Affairs between August 2014 and August 2014.

lacking in London. As well as putting money into startups, they will often expand their tech teams in France, rather than overseas.

Other key factors include:

- **Tax credits for innovation:** The French government allocates €6bn in tax credits for research and development, a programme which covers 30 per cent of all research and development expenses (La French Tech 2017). .
- **Innovation as part of a wider social and economic ambition**: Behind this investment lies a broader ambition to put technology and innovation at the heart of modern French economy and society. The Innovation 2030 Commission, launched by Francois Holland in 2013, offers funding via its Worldwide Innovation Challenge to innovators whose work addresses eight critical issues[12] for the 21st century. In total over €300 million will be allocated (via the Public Investment Bank) to co-finance projects. This approach has also been taken at the local level (see the discussion of Paris's 2017 iCapital award in the section on devolution).
- **International engagement and a welcoming environment for entrepreneurs**, through the 'French Tech Ticket' programme which identifies and encourages early stage startups to come to France with an offer including residence permits for entrepreneurs, a 'landing pack', accelerator and incubator opportunities, and investment (in the form of 'prize money'), as well as business support through a help desk. In 2015 this brought 93 foreign startups to France, selected from over 4,000 applications.
- **The French Tech Talent visa** for international startup and scaleup founders and employees, international workers joining a French startup or scaleup that is enrolled in a qualifying programme, and international investors and business 'angels'. This is valid for four years, and does not demand any additional work carried out as an employee. Applications can be fast tracked, and the spouse of the main applicant is offered labour market access.
- **'Joining up' of key initiatives**, eg government support for incubators and co-working spaces to form networks, making it easier to share learning and to create clusters (which can then liaise across sites). The City of Paris has a network of incubators (Paris & Co) which houses and supports new companies, grouped by type of activity.
- **Regulation to support innovation**. The French government is adapting regulation across a range of fields to facilitate business startup and it is claimed that France now offers the best environment in the G20 for people starting a business. For example, online tax accounts allow individuals to gain responses to queries within a day, and business incorporation has been substantially simplified.
- **A unified voice for tech** in the form of La French Tech. This government supported brand promotes France as a location for founders and innovators, and also helps founders to promote and grow their businesses nationally and internationally. Its definition of tech is broad, encompassing both 'pure tech' (from deep to consumer applications) and tech as an enabler of other sectors such as health.

Station F

Paris has numerous shared workspaces, incubators and accelerator programmes. In 2017 it became home to the world's biggest startup campus, 'Station F', which was opened in August by President Macron. Occupying 34,000

12 This includes: 'Big data – improved use of big data and definition of new usages, analytical models and promotion'. Although not explicitly related to digital technology, this field is relevant to all of the other seven goals and ambitions, which are: energy storage, recycling, food security through plant-based protein and other chemical processes, personalised medicine, silver economy (ageing population) and security and protection against threats.

square metres in a former railway termnal, it is occupied by around 1000 startup companies ranging from 'deep tech' through digital services to a vast range of sectors (fashion, food, medicine, finance) in which tech is transforming how people do business.

> ***"There is no company with no tech in their business… every company is in the data space"***
> (Discussion group participant)

The Founders Programme is open to early stage startups which have proof of concept or can demonstrate KPIs. This is designed in collaboration with founders, so that all of its elements are 'recommended and validated' by working entrepreneurs.

Station F's aim is to gather 'a whole ecosystem under one roof'. Founders can effectively choose their own route through diverse learning opportunities and events, as well as learning informally through working in such a huge concentration of like-minded people.

Station F also hosts programmes and accelerators provided by 25 (at the time of writing) partners. These include specialisms such as data, cybersecurity, healthcare, fashion, beauty, various aspects of health, medicine and 'tech for good', construction and finance. Business advice – including thirty different public services – and a 'makerspace' for prototyping hardware are also on site. Investors also make up an important part of the community and the campus website includes a job board where resident startups can post job opportunities.

Station F aims to bring 'a whole ecosystem under one roof'. At present this includes a restaurant with four kitchens and a coffee shop as well as a shop and several leisure facilities. However, from 2018 around 600 members will also be able to live onsite in a dedicated 'co-housing' complex. The provision of on-site housing for founders and startup employees is a feature of several Paris workspaces and incubators. In the case of Station F this both contributes to the holistic nature of the community and makes startup more accessible especially in the context of a big, expensive city: "We know that parents are not there to help them, we know that housing is an issue for them" (Dillet 2017).

Diversity is an important driver for Station F. Its official language is English and it actively recruits international founders through the 'French Tech Ticket' programme. In addition it has a dedicated offer for founders who 'don't have the most traditional background [or are] not from elite groups' and for whom entrepreneurship is a way out of difficulties. This 'Fighters Programme' received 200 applications from 27 countries, of which 13 have been selected to take part in the first year of operation.

4.3 INTERNATIONAL CASE STUDY 2: PORTUGAL

> ***"Lisbon is moving from a start-up phase to a scale-up economy"***
> (Rohan Silva, quoted by Lorenz 2017).

Introduction

Portugal's tech startup scene – particularly in Lisbon – has developed rapidly in recent years. In 2016 Startup Heatmap Europe rated it as one of the top five startup hubs in Europe in 2016 and Atomico (2017) highlights Portugal as one of the top ten fastest growing tech worker locations in Europe. Some indicators of its success are as follows.

- Lisbon has 104,102 professional developers, making it the fourth biggest hub ahead of Berlin and Stockholm.
- Portugal's startup ecosystem is growing at a rate twice that of the EU average (Bozorgzadegh 2017).
- Between February 2016 and 2017, unemployment in Portugal fell to under 10 per cent and 46 per cent of new jobs came from startups (StartUpPortugal 2018).
- 1 million startups which provide 80 per cent of the country's employment excluding non-financial enterprises, and 60 per cent of its gross value added (Linkilaw 2017).

The development of Startup Portugal

Portugal has positioned itself as a competitive choice in Europe, the third safest place in the world, a stable political regime as well as attractive climate, culture and lifestyle options. One of the strategies which the Portuguese government has used to support and encourage the development of the tech scene in Portugal is a programme called 'Startup Portgual', based in Portugal's second city, Porto.

Startup Portgual was first developed in 2015 by João Vasconcelos at the Ministry of the Economy. The ministry's remit was to stimulate the tech startup ecosystem to encourage new startups and investment.

One of its first initiatives was the 'Startup voucher', an offer of funding and mentoring to help companies get started. Over 500 ideas were supported during this first call. Startup Portugal also created the incubation voucher, which aimed to raise the bar for incubator facilities across Portugal and to provide support for initial expenses such as website development. Incubators were invited to become accredited in order to demonstrate their value to startups. These schemes benefitted significantly from European regional funding to the tune of more than €126 million.

However one key lesson from phase one of Startup Portugal was the difficulty experienced in implementing these initiatives through central government departments. Many civil servants were unused to this way of working and had insufficient experience of working with startups. As a result, applicants found themselves with too many 'hoops to jump through' in order to gain the support for which they had applied. Subsequently, the decision was taken to create Startup Portugal as a private, not for profit organisation to run the programme of support for tech startups and investment.

This model has been highly successful and Startup Portugal is now the first point of contact for requests for information, not only from startups but also international investors. This includes large cooperations who want to support startups in Portugal as a way to enhance their own levels of research and innovation.

Startup Portugal has also created a national network of incubators where standards have been raised through training and measures to help promote greater competition between incubator providers which should lead to better outcomes for the startups who use them.

They work closely with business and other thinktanks on questions of regulation, for example, emerging ideas around blockchain are a clear focus at the current time. They also try to work with tech to identify key bottlenecks and constraints on innovation and work to produce solutions. Blockchain has emerged as a key strength in Portgual and there is now a thriving blockchain

business community, exploring the applications of blockchain across the economy.

Startup Portugal is an independent organisation but works closely with government on a day-to-day basis. It has a clear cross departmental mandate for its work to the extent that all government agencies are responsible for promoting tech startups and the country using the same key messages. The ability of Startup Portugal to achieve cross ministry consensus on the importance of tech and the willingness of civil servants to work with them give their commitment has been unexpected but a key element of the programme's success. It has also provided opportunities for civil servants within the ministries to learn about business requirements and the challenge of helping to support and direct new foreign direct investment.

However, as Portugal's ecosystem grows, there are challenges around the capacity of the country's infrastructure to meet demand. This is not just about a steep learning curve for government but for scaling up supporting industries, such as legal services, finance, skills development in universities.

An indicator of Portugal's growing momentum as a startup hub was its successful takeover of the annual Web Summit from 2016-2018 which attracts up to 60,000 people and 2,000 journalists per annum. This has been a massive injection of confidence for the ecosystem and helped to showcase Portugal as a desirable location for startups in Europe.

Blockchain competition to support 'tech for humanity'

The Portuguese government have launched a Govtech competition for 2018 which will award €30,000 to three startups or teams that create a prototype that will help solve the problems of humanity. These problems are defined by the 17 sustainable development goals set by the United Nations for 2030.

The competition itself has been set up using Blockchain technology whereby Anyone who registers to enter, will be able to participate in the contest as if it were a crowdfunding platform. Each user, when registering, will earn 'GovTechs', which are a form of cryptocurrency which can also be used as virtual voting units to be 'invested' in the projects they like best.

Impact of Brexit?

Since Brexit, Startup Portugal has been contacted by many startup companies in the UK. Portugal is an attractive location because it is in the same timezone as the UK, as well as generally good standards of spoken and written English. They have also an initiative which enables tech founders and CEOs who are considering a second base in Europe to come and spend time in the country at no cost. Our interviewees offered examples of UK companies which had set up offices in Portugal as a measure to reassure EU staff who are anxious about their future post-Brexit.

The government have also established 'Portugal In' which is a taskforce designed to identify the key opportunities and implications for Brexit for Portugal and to provide a means with which to attract potential investment from companies considering a move out of the UK, post-Brexit.

4.4 REGIONAL CASE STUDY – THE NORTH EAST OF ENGLAND

Introduction

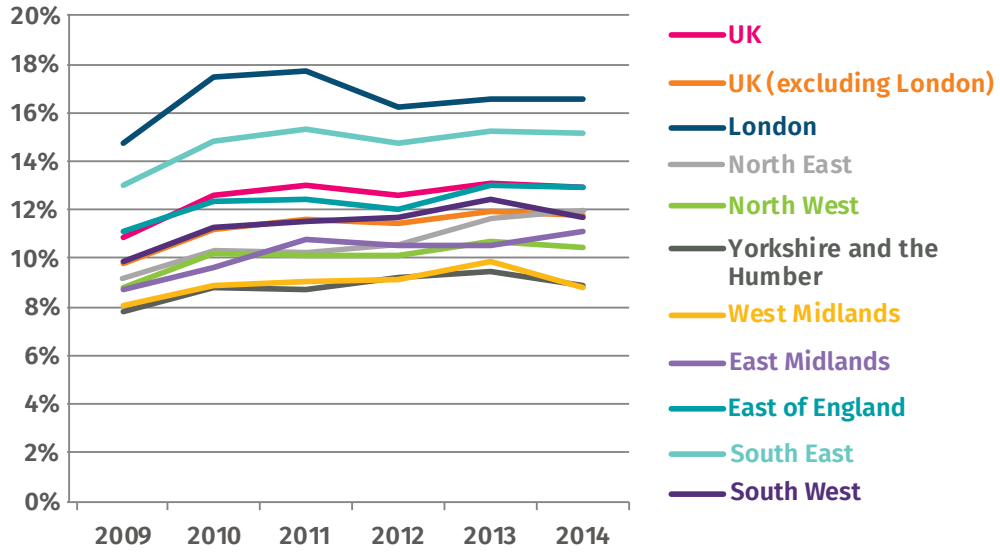
The north east of England is sometimes criticised for lacking entrepreneurship, and for looking back to its history of heavy industry rather than forward to the digital age. It is true that rates of self-employment are low compared to the rest of the UK, as are qualification levels (despite improvements in recent years and among young people).

Yet the region also has an active and well-established tech startup community, sustained by a strong commitment to the region among creative individuals, effective institutions, and a community of experts with a powerful culture of innovation and mutual learning. Organic growth and well-managed small-scale initiatives, coupled with enthusiasm for building a distinctive ecosystem within the region, mean that it can justifiably claim to 'punch above its weight' as a startup ecosystem.

Some recent data support this view. For example, despite a relatively low *number* of start-ups, entrepreneurship is concentrated in the 'knowledge economy'. In 2014, 12 per cent of new businesses in the North East operated in the 'knowledge economy', slightly above the rate for the UK outside London (11.7 per cent) and higher than any other region in the North or the midlands.

FIGURE 4.5

Percentage of business births that fall within the 'knowledge economy', UK regions



Source: ONS (2016a)

Business survival rates are also healthy by national standards. 92 per cent of enterprises formed in 2015 were still operating a year later, the second highest rate for any region and above the national figure of 89.7 per cent. Similarly four-year survival rates for enterprises formed in 2012 was 51.2 per cent, again bettered only by one other region and better than the national average of 50.4 per cent (ONS 2016b).

And business growth in the North East is improving. In the period 2009-12 the North East LEP area was ranked 25th in England for its incidence of high-growth firms; between 2012-15 its rank was 15th (ERC 2016). The region has a relatively

low incidence of high-growth firms overall, but it is in the highest quartile for *small* high-growth firms (Anyadike-Danes and Hart 2017). And it had the seventh highest number of scaleups in the country in 2017 (Beauhurst 2018).

Our interviews with practitioners in the region's tech sector exemplified the passion, both for the North East and for digital innovation, which has been fundamental in building and sustaining the region's ecosystem. Its distinctive history and context mean that it provides some useful learning for other parts of the UK.

Characteristics of the North East's startup ecosystem

Technology and startup support have a long history in the North East, originating in responses to the decline in manufacturing. Project North East (PNE) is an independent non-profit organisation specialising in enterprise development, which first offered digital skills training to unemployed school leavers and dedicated premises for startup businesses in 1981. It has since become a model for the provision of startup premises and business support. By the late 1990s the cluster of new media businesses which sprang up around its enterprise hub and science-based incubator in Newcastle's Pink Lane won the diminutive street the moniker 'Silicon Alley'. Companies also gained a ccess to the region's first high speed internet network, affectionately known as 'Big Netty'.

From these early shoots, the region has gained a diverse range of flexible workspaces and support initiatives for tech entrepreneurs and innovators. Creative businesses in particular have flourished. This startup ecosystem is characterised by a collaborative networking culture and by specialisation in particular areas of tech and entrepreneurship.

Informal and self-establishing networks and groups are plentiful. One interviewee, who had researched this issue, described an 'overabundance' of these, meeting in cafes, pubs and bars as well as university rooms and shared workspaces. Most originated around a specific area of technical expertise or technological application, and new ones are still springing up. These unofficial groups are a recognised (and reliable) source of learning and collaboration, and have now become a focus for investors and for larger companies seeking innovative input.

Some of the region's institutions for the digital sector build on this culture. For example the Dynamo network unites tech companies which are active in the North East, from individual entrepreneurs to international corporations. The Digital Union, part of Generator North East, represents creative enterprises.

Digital creativity is an important area of specialisation, dating back to the early PNE support for new media startups. As well as 'organic' networks, in which maturing companies support new startups and one another, collaboration has helped to bring important institutions and assets to the region. For example, the Tees Valley gaming and animation cluster hosts the UK's largest computer games and animation festival, and a major facility for virtual and augmented reality will soon be built in Gateshead. This latter project is the result of a relatively informal partnership including local authorities, the LEP, universities and colleges, Dynamo and Digital Union, and regional investors.

Other North East specialisms include those related to the region's historical and modern manufacturing strengths, such as energy generation, transport manufacturing, and pharmaceuticals and health. 'Anchor' institutions, notably the region's universities, help to sustain prominence in these areas and provide a pipeline of skills and ideas. North East universities graduate more students per institution from taught postgraduate degrees in computing and IT

than any those in any other region, as well as the second highest number per institution of first degree graduates in these fields (Round 2016).

The North East is home to Ignite, a 'distributed' startup support and investment network. Building on an earlier accelerator programme which focussed on the North East, it now offers investment and development provision to companies located anywhere in the UK. Its aim is to offer long-term support; member organisations participate in the programme for at least six months and the emphasis is on sustainable scaling.

Ignite's innovative funding model also reflects the cooperative and collaborative culture of the North East startup world. Companies contribute 1 per cent of share equity into a pool called 'The Founders' Cooperative', which effectively means that all Ignite members have a stake in one another's success and in the organisation's mission. The Ignite website encourages applicants to "think of it as a cooperative of startups: sharing knowledge, experience and success".

Strengths of the North East's startup ecosystem

- **A culture of resourcefulness and independence.** This stems, to some extent at least, from the relatively availability of investment and the fact that the region is considered 'off the map' by many people outside it (or not considered at all). These challenges have led to a willingness among stakeholders to innovate in their approaches to building and supporting the ecosystem. Winning funding from multiple (and sometimes collaborative) sources, often in small amounts, has fostered an independent approach, and being frequently ignored means that the pressure to conform is off. Interviewees described how they and their acquaintances had developed approaches to hiring, forms of business support, and financial packages for events or innovations in unconventional ways.
- **Low costs.** The North East is often described as attractive because it offers a low cost of living (and of a good quality of life). Although all our interviewees acknowledged that companies did encounter challenges in recruiting enough skilled staff, they also reported that this is becoming less problematic as people who left to study or work 'boomerang' back, and as others choose the region over London. Relatively low property prices and other costs mean that investors are often surprised at what could be achieved for a relatively small sum: 'people in the North can get things up and running without a lot of money'.
- **Mutual learning for innovation and partnership.** The informal networks described above have fostered a culture in which individuals learn from one another and seek answers to their questions and technical problems from peers. In turn this has fostered innovation and partnerships which have led to startups, or been taken up by larger companies. It has also impacted on major businesses and institutions as network members move into employment or found institutions whose role and prominence increases. Historically these networks have had a far stronger focus on science and technology than on business practice, and this is acknowledged as a gap in the region's startup skills base.
- **Cross-sectoral collaboration.** The opportunities for tech to effect transformation across sectors is recognised by many in the North East as a key driver of innovation, and crucially of the move from ideas and innovation to company formation. Some anchor institutions, such as the Digital Catapult at Sunderland Software City, are developing strategies to facilitate links between companies that can benefit from tech innovation and the region's innovators.

- **Socioeconomic diversity.** In a region with high levels of poverty and social exclusion, stakeholders recognise that tech must reach right across communities. Many learning and development opportunities are offered after standard working hours or through flexible and online frameworks. This reflects a recognition that potential entrepreneurs often need to keep the day job – and that current employees are a rich source of startup founders. Low cost business advice (often supported by EU funding) is readily available and heavily promoted. Several key institutions, including training providers and shared workspaces, are located in relatively deprived parts of the North East. Leaders in the ecosystem note that an increasing number of role models from the region are becoming well known, and some founders have now themselves become investors. The presence of several universities with a strong social mission and history of successful widening participation (see for example Lawrence and Blakeley 2016) has also helped.

And initiatives and projects are often designed for fledgling companies which don't have the luxury of resources to free up a large amount of time courting clients, perhaps investing many hours in developing a potential product or relationship which in the end doesn't lead to a financial reward. A positive outlook on potential failure is far easier to cultivate if you have a strong safety net. Ecosystem actors work as 'brokers' between potential clients (often large corporates or others which can benefit from innovative tech), to get the most out of limited time. In addition, they are piloting approaches to tech recruitment which focus on *actual skills* rather than qualification levels, recognising that many people build valuable tech and creative abilities independently or 'on the job', but don't necessarily have a certificate that recognises these.

Challenges for the North East's startup ecosystem

- **External image as 'parochial and isolated'**. A day spent with the north east's digital entrepreneurs and their champions swiftly dispels any such beliefs. Levels of entrepreneurship are growing and experts stress that the view of North East residents as employees by choice, wedded to the idea of one safe job for life, is outdated. Yet the stereotype of a parochial, isolated and backward-looking region persists – and may stop potential investors or entrepreneurs coming to the region to meet the very people who would explode this myth.
- **Lack of investors and limited investor skills.** Historically the North East has had relatively few investors, particularly in the venture capital or 'angel' categories. Our interviewees reported that interest in the region is growing, partly because of the region's strengths in innovation and in specific technologies ('you can cast your net wider when fewer people are fishing') and partly because costs are low and the skills base is improving. However, interest may not translate into input; the number of equity deals in the North East *fell* by 34 per cent in 2017 (compared to an 8 per cent rise in London). There is also a lack of knowledge among *potential* investors, about what tech is 'out there' to invest in and even about schemes such EIS and SEIS. The opportunity to achieve quite a lot with small sums means that novel forms of investment could be explored, such as collaborative investment and alternatives to property for small investors.
- **A lack of business skills and startup or scaleup infrastructure.** The North East's foundational strengths are in creativity and technical expertise. If London lacks the specialised business skills to grow and promote a company, this region has an even greater need. Working with the North East's larger businesses, and taking advantage of diverse and high quality business advice goes some way towards mitigating this. The stock of

infrastructure specifically for startups, such as legal and financial firms, is also relatively small, especially outside Newcastle.

- **Geographical dispersion**. It only takes two hours and 40 minutes to travel by the East Coast mainline from Newcastle to London, plus an additional 20 minutes to reach Shoreditch. This makes the city a far more viable place for an aspiring tech startup than it was 20 or even 10 years ago. Unfortunately it takes almost an hour and a half to travel the 50 miles from Newcastle to Redcar. The region is vast and geographically dispersed, and its ecosystem relies heavily on its physical and sub-sectoral clusters.
- **Brexit**. Brexit was regarded as a serious risk by interviewees in the region. European funding been crucial to much of the education and training, business support, investment, and workspace development described here. For example it has supported or partially supported the Toffee Factory (a specialised creative shared workspace in Newcastle), Sunderland Software City, and Middlesbrough's Digital City, and the European Investment Fund has been vital for this region (Tighe 2017).

In addition, the potential impact of leaving the EU on the wider economy of the region played on the minds of stakeholders. The North East economy is deeply intertwined with that of mainland Europe, reflecting the proactive approach of businesses and civic leaders in making the most of the easy access afforded by the east coast ports. Both the uncertainty surrounding Brexit and the aftermath of withdrawal pose a threat to prosperity for many firms – including customers for tech startups. The lack of clarity on trading in services was also a source of anxiety.

5. CHARTING A FUTURE DIRECTION FOR TECH STARTUPS IN THE CONTEXT OF CHALLENGE

> ***"Entrepreneurs always find a way through"***
> (Interview 1)

> ***"I know of companies that were going to set up a second European office [in London] and have changed their mind as well as founders choosing not to set up here because of the same reason... There is lots of competition from France which has a lot of momentum and backing from government. Yes, it is years away from the density of London but it is moving in the right direction. Recent announcements like the £1 billion AI investment show that there are ministers who see the need to take steps to ensure the UK stays ahead."***
> Brent Hoberman, Founders' Factory

In this chapter, we explore some of the key challenges cited by participants in the context of Brexit and explore the ability of the Digital Charter in its current form to help steer a way through.

5.1 BREXIT

Unsurprisingly, Brexit loomed large in all of our discussions; all participants were asked to give their views on Brexit and the majority were overwhelmingly negative. Comments in Box 5.1 are typical of the responses received.

This stems from a general, often very emotional, concern from within the community about how Brexit alters the perception of London as a diverse, dynamic, open and welcoming environment in which to set up a tech business. As one interviewee, themselves an international migrant, put it "am I still welcome here?" (discussion group participant). These feelings are compounded as friends and co-workers *do* leave, either to set up elsewhere or to return home to other EU countries. Ram (2018) describes some worrying evidence that despite London's continued success a number of founders, companies and skilled workers have chosen a different location.

There is also anger, particularly among those who feel that the government have, as one person put it, 'pandered' to anti-migration sentiment. Linked to this was a feeling from international startups that their contribution to the UK economy has not been appreciated or properly acknowledged. For many, the vote for went against what was described as the 'tech ethos' of "breaking down borders and having a global mindset" (interview 12).

From a practical perspective, Brexit is also a "deeply annoying thing" (discussion group participant). The uncertainty over regulation post-Brexit in what is still a very young industry (and over how it might change during the transition phase and after withdrawal) is a cause of real inconvenience. In response companies have taken a pragmatic response. Many have registered their businesses overseas, making the most of links that they or their co-founders have (such as non-UK citizenship).

Participants reported that the effects of uncertainty are considerably more disruptive for smaller, younger firms who operate on much faster timescales:

> ***"HSBC can sit on its hands for a year, a new startup can't do this. Startups have much shorter horizons and more uncertainty – it [Brexit] can be far more disruptive"***
>
> (Interview 11)

BOX 5.1: Sample of views of the tech startup community on Brexit

> ***"Brexit is a disaster for tech"***
> (Interview 32)
>
> ***"Initial response from tech community was very negative, but this dissipated in a number of weeks probably because people didn't want to think about it!"***
> (Interview 12)
>
> ***"Brexit is having a 'freezing effect' on Tech and is the uncertainty is particularly difficult for small startups to manage"***
> (Interview 33)
>
> ***"London is different from the rest of the UK because it embraces digital and it has an international profile. Brexit is having a 'souring effect"***
> (Interview 1)
>
> ***"London is no longer the natural location [for startups]. People are already going elsewhere rather than having to deal with London today and a lack of clarity and certainty in the current political environment doesn't help to continue the momentum in the system"***
> (Interview 11)
>
> ***"Generally-speaking, the Brexit vote and Article 50 process today are creating friction in the shape of uncertainty that acts as an unnecessary barrier to the continued growth of the UK tech sector"***
> (Interview 26)
>
> ***"I am more frustrated with the UK government than I am with Brexit"***
> (Discussion group participant).

When the qualitative data was coded and analysed, specific Brexit concerns expressed during the research, tended to fall into three main categories.

Access to people

> ***"Talent is almost more important to us than in any other industry - in terms of the levels of productivity it is probably the top sector at risk [in the UK]"***
>
> (Interview 10)

> ***"I can't take any action at the moment, its so difficult to make plans for the future -are we going to be able to recruit engineers in 12 months time – can we get them here, will they want to work here?"***
>
> (Discussion group participant)

The most frequently voiced concern was the impact on the ability of new and scaling companies to access skilled and talented people. Difficulty in filling vacancies in tech as well as general concerns around a lack of STEM skills has has been well documented in recent years (see for example Coadec (2017) and Tech UK (2017), and Brexit has put further pressure on what is an already limited labour market.

Labour market constraints have in turn raised costs for startups, as salaries rise. Being able to recruit from the EU and further afield has historically provided an alternative supply of labour. Figures from DExEU suggest that out of 1.5 million people in the UK's digital sector in 2016, almost 98,000 (6.7 per cent) were EU nationals and a further 95,000 (9.2 per cent) came from outside the UK (DCMS Committee 2018). The figure may well be higher for startups; for example 51 per cent of Google Campus's London community members were born outside the UK.

But international tech workers do not just plug skills gaps. They also play an active role as founders. Data from the European Startup Monitor 2016 (Kollmann et al 2016) shows that 44 percent of startups in the UK were founded by people from the EU (22 percent) and outside the EU (22 percent). This means that overly restrictive entry requirements after Brexit could not only constrain the labour market but, perhaps more seriously, may limit the rate of startups. One indicator of change came from the discussions with accelerators, many of which reported that whilst applications had remained high there was a shift in people's attitudes to the UK, with more teams choosing to locate elsewhere Europe rather than seeing London as their final destination.

There were also numerous references to migration policy, specifically the difficulty experienced by the tech startup community in accessing Tier 1 and 2 visas. Everyone we spoke to felt that the process of gaining access to the UK from outside the EU was extremely cumbersome and time-consuming, which, whilst presumably deliberate on the part of government, is potentially detrimental the UK's economy. Participants often quoted examples of how other countries are attempting to welcome and support skilled migration from other areas, including investor visas in France and Canada.

In the UK exceptional talent visas were highlighted by some as a positive move, although some interviewees felt that these are too restrictive in tech at present. Participants also talked about the perception of difficulty – ie the danger that, regardless of what system is put in place to manage migration, skilled individuals as well as companies and investors would assume that there would be problems recruiting staff and be dissuaded. "A huge push is needed around that [challenging misconceptions]" (interview 4) and the government

must give greater assurances that "the tap is not going to turn off for talent" because of Brexit (interview 14).

The challenge of recruitment, because of Brexit and existing skills shortages, led many to conclude that greater efforts are needed to improve the existing UK skills system and provide "home grown talent" to enter the industry (interview 6).

Access to finance for startups and to support innovation

As noted above, universities were viewed positively s contributors to talent and innovation. They are also an important source of 'spin out' businesses, (eg ARM in Cambridge and countless smaller startups with the potential to grow). The quality and depth of the UK's university system were consistently highlighted as highly attractive to startups and investors. Unsurprisingly, interviewees expressed considerable concern about how Brexit would hit access to research funding for universities.

The 'drying up' of the European Investment Fund was of real concern because this scheme had an important international focus. This effect was also reported in the FT during 2017 (Shubber 2017). There were also questions about knock on effects of EIF's suspension for venture capital (VC) more generally, particularly companies at the scaleup stage:

> ***"In the VC community the European market is where people are at – where VCs are thinking about to scale up. The problem for entrepreneurs at that scaleup stage is, if there isn't such an accessible European market – where do they go, naturally?"***
>
> (Interview 12)

And the UK could also lose out on benefits from Europe-wide initiatives to encourage venture capital funding into tech business, for example, the announcement in April 2018 (European Commission 2018a) from the European Commission and EIF of €410 million in EU funds to develop investment in Europe's venture capital capacity. It is hoped that this will double the amount of VC currently in Europe to €6.5 billion of new investment in innovative start-up and scale-up companies. This is part of the EU's Investment Plan for Europe (European Commission 2018b). The EU has also announced plans to explore ways to enable more frictionless trade and tax regimes across the single market to support innovative business startups, in order to create a "better ecosystem for our companies to grow" (ibid).

The uncertainty over the future of EIF left questions for the government about how the British Business Bank (BBB) might help 'fill the gap'. The BBB is a convener of funding between private and public sources, helping to bring funding partners together rather than focus on initiatives or funds. Views on the efficacy of the BBB were mixed with many startups arguing that it was not sufficiently international. Others felt that it was an important replacement for EIF but that more could be done to strengthen it – particularly extending its cross-border reach. There were also suggestions that more could be done to use the BBB to engage with investors and support and develop their skills and understanding, for example, around good work, social value and tech for good. From a Brexit perspective, the demise of the EIF has placed the spotlight on the BBB and its ability to respond to the capital challenges in the next few years, particularly for scaleups.

Interviewees were concerned about the demise of European Structural Funds post-Brexit. These have been crucial in helping develop the UK's economy and

infrastructure capacity as well as supporting many of the local and subregional programmes which aim to create the conditions in which startups can thrive. These can be particularly important in the North and the West Midlands, but are also crucial for London.

For example, some of the initiatives developed by London and Partners, the mayor's main promotional agency for London, benefit from the European Regional Development Fund (ERDF), including the Mayor's International Business Programme. The government have proposed the establishment of the Shared Prosperity Fund (SPF) to replace European Structural Funds and support regional development. This is likely to employ some form of competitive bidding scheme but full details of how it will operate are not yet available.

Regulatory conditions for tech startups, post-Brexit

A real concern for tech startups is about how regulatory conditions may change after Brexit. Currently, as in many areas of public policy, tech startup operates within the context of EU legislation. The situation is complex because tech is a "vertical sector and a horizontal enabler" (interview 19). Consequently, it crosses into other regulatory frameworks, for example, finance, health, and advanced manufacturing.

The majority of participants argued that, post-Brexit, the UK should continue to work within the parameters of the General Data Protection Regulation (GDPR). In time there may be the opportunity for the UK government to enable the GDPR to evolve to help support the UK's existing competitiveness, for example, positioning the UK as a regulatory 'bridgehead' between the UK and the US.

There was also a strong sense that the government's ambitions to grow AI would be heavily dependent upon its ability to get the regulatory environment right post-Brexit. Typical comments concerned the need to "mobilise AI" in a similar way to the US and China (interview 5) and that post-Brexit, this could be done by a repositioning of:

> ***"our regulatory frameworks in favour of innovation in AI/deep tech fields in order to accelerate timelines for commercialisation of products and services based on these technologies...at the same time as fully understanding the potential regulatory challenges. Use regulation as a tool to drive the UK's global competitive advantage and position the country as the most attractive destination for AI/deep tech entrepreneurs and companies"***
>
> **(Interview 26)**

Participants felt that the UK's expertise in data ethics was particularly important to capitalise upon in a post-Brexit landscape, for example, academic leaders in this field as well as companies such as Deepmind. However, there was also a sense of frustration that whilst the debate about regulation and Brexit was important, there were wider challenges for tech more generally about how regulation needed to evolve in a digital trading context.

5.2 THE STARTUP CHALLENGE FOR GOVERNMENT

Given tech's wide influence on the economy and wider society of the UK, it is unsurprising that relevant government policy crosses over a number of departmental boundaries. The Department of Culture, Media and Sport (DCMS) take responsibility for much of the regulatory environment for tech startups whilst the Department of Business, Energy and Industrial Strategy focuses on the role of tech in supporting future economic growth. In addition, both DCMS

and BEIS have collaborated to produce policy recommendations for tech, most notably, the review of the artificial intelligence industry in the UK (Hall and Pesenti 2017). Other parts of government are responsible for the role of tech in facilitating progress within their own policy areas, for example, the Cabinet Office's work on the Government Digital Service. And of course the Treasury holds overall responsibility for departmental budgets, and therefore has an interest in ensuring that these prioritise future catalysts for the economy.

How can government support London and UK tech startups?

Government intervention in the economy can be framed in three main ways:

1. **As a market regulator** enacting laws and legislation in the public interest, often designed to manage or minimise the negative externalities of the market. So, for example, employment legislation to ensure that people's basic pay and conditions are protected through the legal process. Similarly, the government's adoption of the European GDPR regulates to ensure that private data is used responsibility. This role also enables the government to intervene though fiscal measures to ensure that the benefits of economic growth can be used to support public goods, such as health and social care as well as ensuring that the benefits of growth are distributed. Well-managed, it also provides stability which is important for startups in their early phases. At present regulatory changes such as the move to GDPR are creating a certain amount of uncertainty for tech startups. And again, this is exacerbated by the shadow of Brexit.
2. **As a 'market actor'** to encourage and incentivise innovation by exploring growth sectors such as tech and by taking steps to encourage and build confidence in new products and ideas (Adams and Tiesdell 2010). One of the advantages of the public sector is that it can potentially 'think big' and take risks to help create new markets and innovation, this is about the public sector acting entrepreneurially (Mazzucato 2013; Adams and Tiesdell 2010). Organisations such as Transport for London have played an important role in helping to create 'mobilisation vehicles' whereby tech products have been pioneered by the public sector and, through this process, have encouraged early adoption by consumers in London, for example, contactless payment as a result of the Oyster card. This is a key priority of London's chief digital officer, Theo Blackwell.
3. **As a 'market fixer'** –where government intervenes to address instances of market failure. This can include intervening spatially to encourage and de-risk new investment in areas which may 'lag' behind other areas in terms of unemployment and productivity. This rationale has been a key part of the government's Green Book approach to economic appraisal, particularly in relation to investment in strategic infrastructure such as transport, superfast broadband and energy.

To fulfil these different roles and to begin to address some of the current challenges for tech, the government has developed the Digital Charter.

5.3 THE DIGITAL CHARTER

In January 2018, DCMS published the government's Digital Charter. Its stated aim is to help ensure that the internet works for everyone by making the UK "the best place to start and grow a digital business and the safest place to be online" (DCMS 2018).

The charter is very brief – just two pages long – non-legislative, and framed very much as a work in progress and a statement of the government's commitment to this agenda. To this end, it has been described as an "umbrella document" (interview 21) and as a part of a "rolling programme of work" which

one government spokesperson described as a "regular drumbeat of initiatives" to help provide greater structure to the tech startup scene in the UK. The charter sets out a number of priorities under its work programme which already include the government's Data Protection Bill, Internet Safety Strategy as well as their work on AI, all of which already progressing under the remit of the charter.

Background to the charter

The concept of a Digital Charter was trailblazed in the 2017 Conservative Party manifesto as a way of tackling the challenge of regulating social media, particularly with the largest tech companies in mind. This suggests that the charter should help the UK become:

1. the best place for digital business
2. the safest place to be online.

Historically, a charter was used to grant privileges, recognise rights or create a new institution, for example a municipal borough or university (New Shorter OED, 1993). However, the term 'charter' has become much more widespread in public policy in recent years to set out a list of principles, guidelines or rights, particularly in relation to public services. This usage was established by John Mayor's government in 1991 when he introduced the idea of a Citizen's Charter in a public services white paper.

The Citizens' Charter set out six key principles of public services to which every citizen was entitled to expect (Castellani 2017), signalling a direct shift towards greater emphasis on customer focus within the civil service.

The language used in the Digital Charter emphasises the government's desire to develop the charter in collaboration with the "tech sector, businesses and civil society" but then presumably, as others have pointed out, the charter would be enforced upon them through regulation (Perrin 2017). The charter is also presented as a living document (DCMS 2018) in recognition of the fact that the speed of change within the technology sector risks any government intervention being out of date as soon as legislation is enacted.

Feedback from the tech startup community: more bucket than charter?

Given that name recognition of the charter was low amongst participants, the interview responses were instead coded against each of the charter priorities to identify common themes. These are shown in table 5.1 below. While nearly everyone referenced some aspect of the Digital Charter's priorities, when asked directly about their views on the Digital Charter very few had a clear understanding of or even awareness of the charter and its purpose. There was also some confusion around the word 'charter' because it does not currently include any particular set of rights and guidelines.

Among those participants familiar with the charter, it was seen as "a good start" (interview 20) but lacking in purpose and definition. There is a danger that the current iteration of the charter could be seen as a "bucket into which you [the government] just put all the digital stuff" (interview 31).

Whilst the two overarching objectives which frame the charter are supported, the priorities need to be much more specific in terms of how the government can directly and indirectly support their realisation.

The lack of understanding, particularly of the charter's purpose, may be linked to how government communicates with tech startup businesses now and in the future. A recurring theme from the interviews was that government tended to rely on the bigger companies to communicate and to represent tech startup

businesses. Similarly, government representatives expressed their frustration at the difficulty they had in being able to get the views of smaller businesses within tech.

Also important are the ways in which the industry understands government and government understands this young and rapidly-changing field. This is especially urgent in relation to the channels they use to communicate and convey key messages. Government is already conscious of this, and indeed the senior civil servants we spoke to expressed frustration at what they saw as their dependence on the big tech corporates to convey messages to smaller companies about government policy. Traditionally, government has tended to engage with business via umbrella organisations such as the FSB or trade bodies, such as the BMA. Tech is different because:

> ***"There is no such thing as the tech sector, tech is just like this thing that flows into every other sector"***
>
> (Discussion group participant)

New ways of communicating are essential. And beyond communication with government, all industries, regardless of whether they are seen as 'tech' or not, need to understand the implications of tech innovation for their business. Part of the answer is for the government to actively attend events aimed at tech companies to provide PR for tech, and "not just those events which are organised by Google" (interview 4). But it is also crucial that the government talks tech to all sections of the economy.

This visibility of government, what one interviewee called its "signalling" in the context of Brexit, was felt to be crucial by most participants in this research, both in terms of offering reassurance in a time of uncertainty but also to champion the UK's strengths in tech startup in order to support and strengthen the ecosystem in a time of change.

Given that name recognition of the charter was low amongst participants, the interview responses were instead coded against each of the charter priorities to identify common themes. These are shown in table 5.1 below.

5.4 HOW WELL DOES THE CHARTER DELIVER ON CREATING THE 'BEST PLACE TO SET UP A TECH BUSINESS?'

> ***"Great founders need great environments and founders are 'agents' of innovation"***
>
> (Interview 1)

Our focus in this research was particularly on how the charter can guide efforts to make the UK the best place to set up a tech business. Table 5.1 below summarises some of the main points raised under this theme.

However this is an extremely broad aim, and the charter's the other priorities also make important contributions to the UK's attractiveness for tech startup. It may be useful to consider how this priority can be made more specific by referring to the specific ways in which government can influence the ecosystem. This must be positioned as a cross departmental priority to ensure that all parts of government are aware. For example:

- government Digital Service, overseen by the Cabinet Office
- government procurement and commissioning, for example the Social Value Act

- local economic development and planning, for example, National Planning Policy Framework (NPPF)
- fiscal Policy, for example, references to SEIS/EIS
- education and skills, for example the apprenticeship levy (skills and education are noticeably absent from the charter which, given the recruitment and retention issues within tech, is problematic).

A more cross-departmental approach to the charter is crucial. The work of DCMS to recruit increased expertise around digital policy – especially in relation to Brexit – is very important. However, it could be argued that DCMS is not necessarily best equipped to lead on creating 'the best place to set up a digital business' whereas this is very much part and parcel of the work of BEIS, particularly through the industrial strategy and its roll out to LEPs. At present, whilst DCMS collaborate closely with other departments on a range of tech questions, it is unclear how the Digital Charter links to the industrial strategy and who 'owns' the priorities of the Digital Charter, many of which DCMS has only limited control over. In addition, there is a lack of clarity about how priorities are defined and about their primary audiences. Some read like outcomes (eg digital economy); others are architectural in terms of their importance for underpinning the future of the ecosystem.

To help address these questions, it may be useful for the government to consider outlining what they see as the key outcomes to be achieved as a result of the charter and where ownership for these outcomes lies.

In addition, in seeking to position the UK as the 'best place' to set up a digital business, the charter makes no reference to the role of local government or the combined authorities, many of which now have devolved powers for policy priorities such as education and skills.

Table 5.1 also shows raises two other important issues for the charter going forward: the importance of AI for the charter and the compliance burden. There was collective agreement and support for the work of the Centre for Data Ethics, although again, even amongst the AI startups we spoke to, most had not heard of it as yet.

However, it was suggested that its effectiveness may be limited by the scope of DCMS as a department, as well as a lack proper resource and statutory powers. Crucially, the charter must not frame the debate on the AI ethics and data as a regulatory burden; instead AI ethics, in and of itself, should be seen as an aspect of is part of the UK's competitive advantage going forward.

Finally, the charter makes little reference to the interaction between tech and the UK labour market, particularly in relation to automation and labour law flexibilities. Many tech companies have used the latter to support innovation, but this has come under scrutiny because of concerns around exploitation, for example widely publicised issues around some companies reliant on the gig economy. Similarly, as referenced by many participants during this research, increasing levels of automation will create both opportunities and challenges and there is a responsibility on the part of government to ensure that citizens are involved in the discussion through the democratic process. In addition, citizens may need support to adopt and reskill as necessary (with projects such as Grow with Google increasing in importance):

> ***"The [tech] revolution is here.....How do we protect citizens and giving them the tools to deal with the agenda?"***
> **(Interview 29)**

TABLE 5.1

Overview of recurring discussion themes against charter priorities

Charter priorities	Commonly recurring themes from interviews
Digital economy – building a thriving ecosystem where technology companies can start and grow.	**Invest in quality of place** - importance of quality of place in providing a supportive context for tech, eg London ecosystem. **Support a good supply of co-working space** both informal and formal because of how it helps to provide opportunities for startups. **Support scaleup as well as startup** SEIS/EIS initiatives attract broad support but unmet need to support 'funding gap' post series A. **Build on UK entrepreneurial strengths,** eg ease of establishing a company in the UK – build on and protect this characteristic of UK attractiveness. **Recognise the threat Brexit presents to the ecosystem –** majority of participants felt that Brexit threatened the UK's attractiveness. **Recognise the importance of government 'signalling'** in support of tech particularly in the context of Brexit. **Consider the development of investor initiatives such as FCA Sandbox–** Considerable support amongst interviewees and a desire to see this rolled out in future.
Digital markets – ensuring digital markets are working well, including through supporting data portability and the better use, control and sharing of data].	**Some evidence of 'regulatory arbitrage'** where tech can take advantage of the fact that there is lower regulation in tech than traditional industries, eg fintech for example is a sector where 'regulatory arbitrage' has been well documented. Uber in London has also been highlighted as an example of the practice. **Access to digital markets is constrained by poor infrastructure** with examples given of how even in London, there are issues with superfast broadband connectivity.
Liability – looking at the legal liability that online platforms have for the content shared on their sites, including considering how we could get more effective action through better use of the existing legal frameworks and definitions.	**Be aware of the compliance burden** – Bigger companies can better absorb the costs of current and future compliance – important that bigger companies set an example, but also important that legal requirements are proportional. **Consider Brand value and protection online**: much of the tech sector is about building a brand, but limited protection online (interview 8). **Consider monopolies of data reach**: the importance of considering the size and depth of data being exchanged in mergers and acquisitions not just monopolies in terms of market size (in monetary terms).
Data and artificial intelligence (AI) ethics and innovation – ensuring data is used in safe and ethical way, and when decisions are made based on data, these are fair and appropriately transparent.	**A real opportunity for the UK:** given our strengths in AI ethics which make us competitive eg Google Deepmind, academic centres of excellence including the Leverhulme Centre for the Future of Intelligence, Cambridge, and the new Alan Turing Institute in London. **Centre for Data Ethics –** strongly supported by the tech startup community as 'key to the UK being an AI Leader' but few details as yet and requires a stronger focus and commitment across government. **Evidence of some confusion of ethics and economics –** government action in relation to AI is important both because of the ethical concerns around AI as well as the potential economic benefits for the economy. Government's purpose for the charter in this context seem somewhat limited. Perhaps a third tranche around helping to coordinate, anticipate and generally prepare the UK for the changes that AI will bring. **Challenges of transparency of decision making –** particularly where algorithms are used in the context of public services, eg criminal justice and health.
Disinformation – limiting the spread and impact of disinformation intended to mislead for political, personal and/or financial gain.	**Few people mentioned this directly** (bearing in mind that most of the research was carried out before the Cambridge Analytica scandal broke) but it was implicit in discussions around the responsible use of online data

Online harms – protecting people from harmful content and behaviour, including building understanding and resilience, and working with industry to encourage the development of technological solutions.	Again, this was implicit in the discussions around data and liability.
Cyber security – supporting businesses and other organisations to take the steps necessary to keep themselves and individuals safe from malicious cyber activity, including by reducing the burden of responsibility on end-users.	**This is only going to get more important for tech** what one company described as "mission critical" and that a failure to address cybersecurity within a company's operation is 'setting itself up to fail'.

BOX 5.2: Sample of views from the community: making the UK the best place to set up a digital business

"Government can only give it a push they can't actually make things happen directly"
(Interview 4)

"The UK has been "very friendly from a policy perspective, financially with tax policy, investment including EIS, SEIS"
(Interview 15)

"EIS and SEIS are greatbut [the government] could do more to promote them to the market, ie investors"
(Interview 19)

"There's a gap around 'series A' investment – a chasm between late seed and testing and developing the business model, and the beginning to scale, where you've already scaled. This needs 'more fuel' as there's not a lot of investment really focussing on that"
(Interview 8)

"It's not a kind of 'less regulation, more regulation' thing but smarter regulation and better processes of dealing with innovation. The sandbox was an excellent model, lots of entrepreneurs liked it a lot – it should be rolled out and it hasn't been"
(Interview 12)

"The government has been forward thinking re regulation – [that] has been good, eg FCA and some of the sandbox initiatives. We're seeing organisations that are opening their doors to startups"
(Interview 14)

6. PRELIMINARY CONCLUSIONS
LOOKING BEYOND THE TECH MISCONCEPTIONS

Based on discussions with founders, CEOs, accelerators and policy makers, this report has explored the challenges being faced by startup tech businesses across the London ecosystem particularly in relation to the impacts of Brexit. It tells the story of a successful and mature ecosystem, which is increasingly self-sufficient but, like many other industries, feels uneasy at the current time. There are widespread concerns around access to people, regulation and access to finance.

At the heart of the future challenge for the London ecosystem, and indeed the wider UK tech economy, is about how tech can adapt and thrive, in the context of uncertainty around issues such as Brexit as well as long-standing concerns around infrastructure and access to skills.

In this final section, we set out a number of key recommendations in supporting the tech startup ecosystem to become more resilient. We suggest that it is being held back by a series of prevailing misconceptions which are prevalent both within and out with the tech startup community. We argue that these misconceptions have become so widespread that it can be often difficult to see past them to unlock new ideas and perspectives which could help tech in the longer term.

Against each of the prevailing misconceptions identified in this research, we provide an alternative perspective and recommendations which highlight how the how the Government and tech can work together to challenge these misconceptions and in doing so, unlock new ideas to help to support what is a rapidly changing and evolving industry to adapt and evolve within an uncertain political and economic landscape.

The underlying theme underpinning all of these ideas is the importance of providing people with the 'freedom' to experiment, exchange ideas and innovate.

6.1 MISCONCEPTION 1: THE EXCEPTIONALISM OF TECH

Because tech is such a *young* industry, it may be inevitable that there remains a lack of information and awareness about its full implications for business and wider society. In addition, there is often a tendency to suggest that tech's challenges are particularly unique, or different to those in other parts of the economy.

Many people within tech have concerns about how it is perceived amongst the general public. There are also concerns about relatively low levels of awareness amongst policy makers; for example, very few MPs have direct

experience of working in tech. One of our interviewees noted, for example, that if a crisis erupts for large manufacturing employers (in a field such as steel or aerospace), the House of Commons is full. Debates relating to digital tech concerns, by contrast, are relatively poorly attended despite the strategic economic importance of tech. This may reflect a lack of understanding or knowledge, but may also demonstrate the complexity that tech presents for policy makers, for example in relation to how regulation should proceed.

The challenge: tech is not a unique 'sector' but should be seen by policy makers as an enabler of the wider economy.

A genuinely unique aspect of tech is that it is not a distinct 'sector' but instead permeates a range of both new and traditional businesses across the UK. As such it should be understood as an enabler of innovation and productivity within existing industries, particularly manufacturing.

Recommendation 1: Responsibility for the Digital Charter is currently located within DCMS. However, the primary objectives of the charter - making the UK the safest place to be online and the best place to start and grow a digital business - are within the remit of *both* BEIS and DCMS. In addition, it is not clear how the charter links directly to other initiatives, most importantly the industrial strategy. Therefore we suggest that it may be appropriate for the Cabinet Office, to jointly own the digital strategy which would then provide a coordinating function for the objectives to be delivered through DCMS and BEIS and throughout government.

Recommendation 2: Include in the industrial strategy a 'tech pollination centre' body, private sector or non-profit, that operates on a 'hub and spoke' model to support LEPs in embedding tech innovation in all their business advice. Following established good practice (eg that of the Digital Catapult at Sunderland Software City), the aim of this should be:

- to identify problems or emerging issues in non-tech sectors that can be addressed effectively through a tech application
- to promote the use of tech to improve productivity, quality of work, business effectiveness, etc
- to broker relationships between businesses benefiting from (a) and (b) and local tech startups and potential founders, creating spaces where they can develop innovative products and services, gain their first clients and build a client base, and start or grow their companies.

These might be funded through industrial strategy investment, for example funds associated with productivity initiatives. Delivery at the local level could be via established business support networks (eg within LEPs themselves, or following a model such as Google's Digital Garage), or through contracted partner organisations (which might include, for example, universities and Chambers of Commerce), or startup businesses.

6.2 MISCONCEPTION 2: THE CENTRALITY OF LONDON FOR TECH'S FUTURE

The challenge: many founders and investors are keen to support tech in cities and towns across the UK. How can the emerging system of regional devolution use the experience of London ecosystem to develop capacity in other areas?

The focus of this research was on the tech startup ecosystem in London and a recurring theme was the way in which devolution of powers and resources to the mayor of London has helped to provide a focus for investment in the city and support for the ecosystem.

Consequently, many participants argued that devolution could help to develop and deepen the tech economy in the regions. Indeed, many combined authorities are already using devolution to explore how they can harness the opportunities of tech for their economy. For example, in the West Midlands the combined authority are exploring proposals to appoint a chief digital officer with a role similar to Theo Blackwell's in London.

To this end, we propose a number of approaches to using devolution to support tech in other parts of the UK.

Recommendation 3: Use devolution deals to support tech startups by building on established regional strengths.

The most recent devolution deal signed with a combined authority in England is the North of Tyne deal, covering Newcastle, North Tyneside and Northumberland. This includes an explicit offer to the region of additional funding in areas where it has nationally significant innovation assets and research strengths, one of which is digital (including data, 5G, cyber security and information modelling). The deal also empowers the region to "pioneer a smart-data environment, with improved sharing of data across local and national public services, to deliver more sophisticated, more responsive and more efficient services". This will include the use of open data and the development of common data standards across the region, as well as data enhanced decision making.

In addition, the deal links this to the distinctive geography of the North of Tyne area. The proximity of urban assets in the core city and its hinterland to England's most sparsely populated county provides an opportunity for innovation in using digital connectivity to develop the rural economy.

This approach demonstrates how devolution can encourage digital innovation and enterprise by:

- recognising and rewarding specific regional achievements to get the best return on targeted investment and strengthen clusters
- creating *de facto* 'sandboxes' for digital innovation in areas such as eGovernment (with associated public/private collaboration, research and innovation, etc)
- encouraging the use of tech in solving specific social and economic challenges in local areas, developing scaleable solutions that can become the foundation for new enterprises.

Recommendation 4: Devolve a greater proportion of funding and powers for adult skills development.

All our interviewees stressed the importance of a strong digital skills base to support startups and scaleups – and all of them also identified some level of skill shortage. This is particularly acute outside London, although the capital needs to draw on the regions for skilled workers. And it relates to the whole workforce, not just recent graduates and school leavers. Established employees right across the economy need the skills to become adept and effective tech workers as digital innovation helps to transform the *majority* of sectors. The combination of appropriate tech skills with experience gained in those sectors which are ripe for innovation and change offers a potentially important source of ideas – and even of founders. The startup ecosystem also needs people with the skills in business and supplementary areas to support tech innovation.

Devolving policy for adult skills development has several advantages.

- Skills development policy can be linked closely to business advice for skills utilisation, improving employment and work progression opportunities for workers and productivity for firms (Dromey and McNeill 2017).
- Access to 'target' social and economic groups can be fine-tuned to meet social and economic priorities. For example LEPs and other local organisations can use local intelligence to work with employers and others to identify groups where reskilling is especially important for current workers, or training in specific areas can support improved employment prospects and address skills gaps in the local economy. This can be integrated with other areas of devolved powers, such as transport, eg ensuring that training opportunities are accessible, or infrastructure, eg innovating in building design or the use of data (Round 2017).
- Partnerships between local stakeholders, eg schools, colleges and universities, employers and sector bodies, can be formed to design timely and relevant training that meets short- and long-term local priorities (Round 2017).

6.3 MISCONCEPTION 3: THE PUBLIC SECTOR CAN DO LITTLE TO DRIVE INNOVATION IN TECH

The challenge: the government is an enabler of tech innovation through its significant purchasing power.

The public sector is a significant customer in the UK economy, actively procuring and commissioning goods and services to deliver outcomes which are in the public interest (eg healthcare, education and infrastructure such as transport and energy). The public sector, in all its forms, is also the caretaker of gigantic quantities of data generated through its regular interactions with UK citizens.

Indeed, the UK's dominance of tech startups within Europe owes much to the willingness of the government and the UK pubic to adopt technical change, for example, online banking, retail and customer services. A good example of this is the work of Transport for London. TFL has developed an innovation portal (TfL 2018) which actively encourages tech companies to submit their ideas to address London transport challenges.

This demonstrates the significant potential for the public sector at all levels to use its buying and data power strategically to encourage innovation and in doing so, help to 'make the market' for new tech products and services. The work done to date by the government on digital government and the recently announced GovTech Fund (HMT/BEIS/Clark/Hammond 2017) are examples of how this is already being developed. We suggest two ways in which the government can build upon these initiatives going forward:

Recommendation 5: Using the model of TfLs 'innovation portal', explore how this could be rolled out in other areas of government to help develop linkages between tech startups and the public sector.

London has pioneered the use of public mobilisation vehicles to help de-risk new tech innovations and in doing so, helped to mainstream the utilisation of particular types of tech within the general public and encourage investment in new applications and ideas. Taking inspiration from the model of TfL's innovation portal (TfL 2018), and the Govtech programme to date, the government could consider how to roll out this approach in other parts of the public sector, for example challenges in housing supply and delivery, and health.

Recommendation 6: Encourage public sector procurement strategies to consider how tender briefs for goods and services can build in opportunities for utilising tech startups to develop new ideas to address key public service challenges, eg housing and planning and health services.

Public sector procurement is increasingly seen as a means to support not only efficiency in service delivery, but wider social, environmental and economic value. Interest has increased in the power of procurement and the use of public sector expenditure to secure benefits beyond narrow efficiency savings.[13] In London, this is being progressed by organisations like the South London Procurement Network (South London Procurement Network 2018). The government have also responded to the agenda through measures such as the Social Value Act (UK Government 2016). Subsequently, there may be opportunities to consider how the criteria used to assess and evaluate the 'value' component of service delivery could be adapted to encourage suppliers to explore 'tech' solutions in developing and designing public services.

6.4 MISCONCEPTION 4: THE UK DOESN'T HAVE THE 'RIGHT' PEOPLE

Our interviewees were in almost total agreement that it is too difficult to recruit appropriately skilled people to work startup and scale-up businesses in London. The necessary skillset is substantial and demands continual updating. And the presence of many major tech corporates, or corporates with a large tech department, drives up salaries and means that even though London *attracts* a lot of talent, gaps still occur. For startups which can't match the payscales of a global firm or financial institution, recruiting a good tech team who can work with advanced and innovative products can be very hard indeed.

The demand for talent and skills is one of the most commonly mentioned challenges in reports about tech, both in London and the UK more widely. Contributing factors include a lack of STEM graduates in the UK, the nature of British education, and the complexity of the UK's migration and visa system.

The challenge: the UK cannot rely on the traditional educational pipeline to meet the immediate needs of tech.

No one disputes that we need more people with good tech skills, and the skills pipeline is at further risk because of ongoing uncertainty around the status of international workers post-Brexit. Our interviewees were concerned at the complexity of the current visa system and felt that the government must give a clear signal on its post-Brexit intentions for talent-related visas post-Brexit.

However, framing the debate primarily in terms of the inadequacies of the UK educational and skills system to deliver the 'right' skills misses the most pressing challenge. No matter what is implemented in the national curriculum, it will take too long to deliver the skilled people that tech needs right now to deliver future growth. To arrest the flow of international expertise out of the UK and meet the immediate demand, government and tech stakeholders should focus on both:

Retention of staff within the UK and how this can be incentivised through support provided by government to existing companies, the quality of place 'offer' in London and other parts of the UK, and the investment in human resource management and culture which is provided by the tech sector.

13 For example, see the work of Centre for Local Economic Strategies in Manchester who have written about the use of LM3 modelling to understand the map of expenditure in the most deprived areas of the cities.

Retaining and reskilling of existing UK workforce to enable new people to 'transfer' into the tech sector. This means ensuring ease of transfer into tech for people who may not currently work in tech per se but who have the ambition, underlying talent and tenacity to make the transition.

Tech also has some persistent challenges in relation to diversity. Examples include the following.

- The visibility of high profile **women in tech** is welcome, and industry panels and publications are no longer as relentlessly male as was the case ten or fifteen years ago. The impact of these changes can be seen in the data on *perceptions* of diversity; in 2017 60 per cent of women working in European tech startups and 52 per cent of men agreed that 'gender diversity is positively reflected in [their] company's employee composition and hiring' (Atomico 2017).

  Yet this presentation of gender diversity is still not matched by the actual numbers of women working in tech startup. In fact just 6 per cent of CEOs in startups across the continent, along with 9 per cent of chief operating officers and 2 per cent of chief technology officers. The *only* senior position in which women make up more than 20 per cent of employees is chief marketing officer at 23 per cent (Atomico 2017). Across IT as a whole the proportion of staff who are women has fallen slightly (to just under 20 per cent); just 11 per cent of IT specialists were women, and their median gross weekly pay rate was 16 per cent lower than the comparison figure for men in IT roles (Runciman 2015). Deeper-seated cultural change – in hiring and in life at tech startups – is needed.
- **Ethnic diversity** is greater in the British tech startup scene than in equivalent USA communities such as Silicon Valley (Price 2015), but people from minority ethnic groups are still under-represented. This is both a social injustice and a business risk; research shows that companies with better diversity profiles perform better financially (Recruitment International 2015, Hunt et al 2015).[14] Recommendations to support improvement include better data collection and transparency, explicit aims for achieving diversity and senior management commitment to these, training and initiatives to combat discrimination, and – again – cultural change (Connor 2017).
- **Socioeconomic diversity**: tech is sometimes spoken of as a force to break down old social barriers, a democratic landscape in which everyone can stand on their own merits. Founding a company, with the associated investment and risks, demands a certain kind of individual outlook on life – and money. But inevitably it is a less daunting prospect for individuals whose family circumstances offer a 'safety net' of some sort (eg money for living expenses, accommodation in London), or even actual investment from better-off family and friends.

  Dominant narratives of the startup ecosystem and entrepreneurship often play down the advantages that come with a level of affluence and access to affluent personal networks (Guerreiro et al 2018). When this omission leads to a view that *anyone* can become a founder if they have the right personal qualities (and that money is irrelevant), it could have the impact of shutting out at least some innovators from other backgrounds, especially in the most expensive city in the UK. Approaches to founder support such as those described in the North East case study above can help to increase social diversity.

14 The latter identifies an increase of 0.8 per cent in earnings before incomes and taxes which is associated with every 10 per cent increase in the ethnic diversity of the senior team.

Recommendation 7: Provide a clear steer on intended direction of travel in relation to talent-related visas for tech post-Brexit, and extend the current Tech Nation 'exceptional talent' visa to make it easier for startups to access high quality staff.

Our interviewees noted that Brexit had already exerted an *emotional* impact on their community. They reported that some international startup founders and staff felt less welcome, or anxious that they might become less welcome, than before the referendum. Broader cultural or media discourses had partly contributed to this, but so had the lack of a clear steer from government in the form of a *specific* statement about the value of international migration to key industries (such as tech), along with a commitment to sustain this. Vague, general affirmations that 'migration has been good for our economy' were felt to be of little value.

Interviewees also noted that the visa system can be highly obscure and potentially burdensome for tech startup founders who are 'multitasking' in the early stages of their company. Alongside concrete commitment to policies that will ensure access to a global pool of talent post-Brexit, the government should encourage greater collaboration between BEIS and the Home Office to facilitate a programme that both maintains the rigor of the migration system whilst being sympathetic to the needs of business.

The current Tech Nation Tier 1 Exceptional Talent visa allows exceptionally talented people from around the world to come and work in the tech industry here, including founders and potential founders. However the conditions are extremely stringent and the numbers relatively small (Abbot 2016). Our interviewees suggested that an extended version, maintaining the current system but augmenting it with a further set of conditions and processes *tailored specifically to the needs of startups for talented staff,* would be extremely valuable. For example, the overall stringent conditions could be relaxed somewhat for staff who plan to work *in small, new and innovative companies*. Startups planning to use this new visa would receive support through the 'one stop shop' proposed above.

Another proposal was a graduate entrepreneurship visa, open to graduates of MSc and PhD programmes at UK universities. This would allow a recent graduate with a strong idea which could be used as the basis for a startup, or who has already progressed towards founding a startup, to remain in the UK for two years *without* requiring them to work outside developing their business or innovation. The scheme would need a system of sponsorship and endorsement similar to that for a Tech Nation visa, possibly working through a consortium of universities.

Recommendation 8: Develop a specific mid-career education programme as part of the industrial strategy to support cross sectoral innovation by exploiting the potential of tech across the economy. This should build and complement what is already available, eg the Grow with Google initiative, programmes that are presented in this, and higher level apprenticeships.

It should include opportunities for advanced and deep learning (equivalent to MSc level) for people at a mid-point in their career who have expertise in their original field and the potential to bring this into the tech sector.

The programme would be provided through the network of higher education providers across the UK and would invite applicants from across the advanced sectors named in the industrial strategy as well as within the so called 'every day' economy. It would provide a fully funded model of targeted support to equip participants with the skills needed *either* to transfer into tech (for

example by joining an existing company or starting their own business), or to use the learning gained through the programme to support the adoption of tech solutions in their established sector and/or organisation.

The programme could be supported through co-investment by beneficiaries; for example, employers could be permitted to use part of their apprenticeship levy to offer it as a higher level apprenticeship course (or element of one). Effective provision should be set in the context of devolved powers and budgets for adult skills, to ensure the best match to local economies, economic needs, and community engagement.

Recommendation 9: Facilitate and incentivise 'best practice sharing' and peer learning to increase the gender, ethnic and social diversity of tech startups; create a voluntary scheme for incubators, accelerators, shared workspaces and others to monitor and publish data on the diversity of the founders and companies they support.

Some companies and organisations are doing well on diversity; others less so. In many cases a lack of action – or of effective action – may stem from poor awareness of how to tackle disparities, or even that there is a problem. However there is much excellent work which can be used to drive change (eg the work of Code First Girls). The government or a respected tech organisation could provide a repository of evidenced best practice to inform and encourage positive behaviours among companies, and support peer learning.

Collecting and publishing data provides a welcome level of transparency and an incentive to examine and change practice. The holders of the practice repository should also curate a voluntary initiative for tech startup ecosystem stakeholders to collect and share data on key aspects of diversity in their organisations. This could be done at an aggregate level - eg for workspaces, incubators, accelerators or groups of startups - to avoid disclosive figures where tech startups themselves are very small.

Data could be compared with other relevant figures, for example, the demographics of communities close to a tech startup hub or institution, or of relevant university courses. As this practice becomes established it might be possible to track relationships between startup performance and the diversity of the people who generate this, and between deliberate measures to tackle diversity and change in the profile – and experiences – of the workforce.

6.5 MISCONCEPTION 5: BREXIT IS A DISASTER FOR TECH

As we found in this project, there is no doubt that Brexit is challenging for tech and is already causing widespread disruption and uncertainty. However, now that details about the UK's approach to Brexit are beginning to emerge, it is important that tech works constructively with government to explore solutions and greater clarity, particularly in relation to the three challenges raised in this report: access to people, access to finance, and regulation.

Recommendation 10: Use the Digital Charter as the basis of a 'roadmap' which tech and government can start to use to plot through the challenges of Brexit and in doing so, strengthen the digital charter in three main ways.

- Tech and its influence, particularly through AI and machine learning, will have a profound impact on the economic and social infrastructure of the UK's future economy. Therefore the government's approach to managing the tech transition must go beyond the traditional parameters of government policy. **The charter must represent a bridge across government which joins charter priorities to departmental responsibilities**.

- **Embed within the Digital Charter a commitment to the industrial strategy. In response, the industrial strategy should help promote 'pollination' of tech throughout the economy**, particularly the development of startups through the local industrial strategies which are beginning to emerge. We propose the development of 'tech pollination centres' (see recommendation 2 above) to support LEPs in encouraging the formation of new startups whose clients come from traditional sectors that can benefit from tech.
- **Include the principle of proportionality within the Digital Charter** to ensure that any future regulatory requirements do not run the risk of stifling innovation and ideas generation within the startup community.

Sufficient levels of capital and revenue funding are essential to maintaining and supporting a healthy startup ecosystem in London and throughout the UK, now and in the future. Keeping the money flowing becomes even more important in the context of Brexit and particularly the demise of European Investment Finance which places greater emphasis upon mechanisms such as the British Business Bank and the EIS/SEIS investment programmes.

Recommendation 11: Explore how government can support startups by de-risking the 'first customer'.

Government policy has traditionally focused on reducing the financial risk for investors in tech companies. Too little attention has been paid to the delivery risk taken on by the first customer of a startup. The first customer takes on a significant operational risk by working with a supplier with no proven track record. Yet securing the first customer is often a transformative moment for startups—it focuses their businesses and puts pressure on to deliver. That's why to really get the uptake of tech to accelerate, there is a role for government to de-risk the decision to become the first customer, especially for B2B startups.

Government could play a crucial role by insuring the delivery risk for the first customers of B2B startups. Government would insure up to the full contract value for the first customer in return for receiving an equity stake in the startup. If the startup failed to deliver, the scheme would pay the first customer the contract value. This would de-risk the decision of existing businesses to become the first customers of startups. Government would, of course, need to undertake due diligence to determine which companies should be accepted into the scheme. Moreover, government could open such an arrangement to particular sectors or regions of the country.

The equity stakes could be held by a Citizens' Wealth Fund (Roberts and Lawrence 2018) which in turn could be used to support skills and training for people who work in low skilled sectors which may be at particular risk of automation.

Recommendation 12: Strengthen the role of the British Business Bank as regards support for tech startups.

In the context of Brexit, the role of the BBB is set to become increasingly important. Whilst there was a lot of positivity shown towards the bank during the course of this research, there was also some confusion about the extent to which it would fill the gap left by European Investment Funds. It is vital that the BBB, working with government provides clear signals to the market about how the BBB will operate in the future to give confidence to startups and scaleups as well as other venture capital funds. This could include using the BBB venture capital community to strengthen the UK's advantage in terms of data ethics. The

UK has an opportunity in the context of Brexit to use its competitive advantage in relation to data ethics to help establish the UK as a global lead. One way of incentivising this to the market might be for the Centre of Data Ethics to work with the BBB to encourage venture capital investors to support high ethical standards in the businesses that they support. This could be in relation to specific ethical standards around data use and privacy but it might also relate to ethical working practices, diversity in recruitment policy and deploying their technical expertise to tackle long standing social and economic challenges.

6.6 CONCLUSION

It's unlikely that there is ever a dull moment at which to interview nearly 50 diverse stakeholders in the tech startup ecosystem. Even so, a period which falls one year before Britain's withdrawal – after nearly half a century – from the EU, in the early days of two key pieces of legislation, and in the midst of a major public conversation about the place of digital tech and data in our everyday lives makes for even more interest than usual.

We found a mature ecosystem whose roots and branches go deep and reach high – deeper and higher than any other in Europe, and distinctive from the equivalent in Silicon Valley. We found boundless enthusiasm, countless ideas, general agreement on some points and passionate disagreement on others. We found optimism on a number of fronts, but also much uncertainty and – related to that – anxiety as well.

The bulk of this was associated with Brexit. It is tempting to present a report that frames Brexit as an opportunity, but that would not reflect the views of majority of our interviewees. Nor would it be wise to discount their caution. These people are intimately acquainted with the London startup ecosystem and with tech more broadly. If anyone can recognise a threat to it, it's them – and it makes sense to take the threats they described seriously.

But the mood was by no means universally gloomy. These ecosystem stakeholders identified the strengths of tech and the startup ecosystem which mean it *can* be resilient and *will*, with support, make the most of the new political and trading conditions.

A policy environment that matches the tech ecosystem in its innovative approach is a vital part of that support. Tech presents challenges for industrial and economic policy because of its pervasiveness across the economy. Our recommendations address ways to make the most of our strong tech startup ecosystem to address persistent problems such as productivity and work quality – as well as to boost Britain's opportunities in post-Brexit trade and growth. By 'tech-proofing' – or 'tech-enabling' – key policies such as the industrial strategy and Digital Charter, this can become powerful rather than piecemeal for startups and their potential clients.

What tech (and it is not alone in this) needs most in the short term, however, is clarity from government, both on the direction of key policies post-Brexit and on its relationship with tech. The latter must include a strong commitment to work with the sector for the national economic and social good. The former should address policy areas which are at the heart of tech's success in this country, notably migration and regulation.

Another risk of Brexit is that it could become the 'only game in town' and obscure other issues and opportunities for the tech startup ecosystem. So both the sector and government must nurture the ecosystem and make sure that it remains a place where positive synergies of culture, institutions, governance and infrastructure allow creativity and innovation to flourish. In the UK context that

means giving places *outside* London the powers and funding to make the most of their strengths and assets, as the capital has done. And it means growing the skills that people need to enjoy a whole career in a world where tech plays a bigger and bigger part, as empowered workers, creators, users and citizens.

Throughout the report we found ourselves moving towards a position which cast government not as a bureaucratic stifler of freedoms nor a 'hands off' body that steps in only where strictly necessary. Rather its role should be as a partner to the sector, with a well-defined, positive and evolving role to support this rapidly changing (and change-driving) industry.

If government wants to accelerate the pace of change, then it has a crucial role to play in de-risking investment in tech for customers rather than investors. One of the defining stages of any tech startup is securing the first customer—but the first customer has to take on the *delivery* risk of working with a supplier without a proven track record. We therefore believe there is a role for government in diminishing this risk—and so enabling tech and the sectors it serves the chance to flourish.

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APPENDIX 1
RESEARCH CONSULTEES AND ORGANISATIONS

- Alex Depledge
- Amali De Alwis, Code First Girls
- Atomica
- Baroness Martha Lane Fox
- Bethany Koby, Tech will save us
- Bim Afolami, MP
- Brent Hoberman, Founders Factory
- British Business Bank
- Chris Bush, DCMS
- Darren Jones, MP
- David Dunn, Sunderland Software City
- David Prior
- Dia Thanki, Thank Intelligence
- Dom Hallas, Coadec
- Eileen Burbidge, Passion Capital
- Eric Van Der Kleij
- Gavin Poole, Here East
- George Windsor, Tech Nation
- Gila Sachs, DCMS
- Huss El Sheikh, 9fin
- James Wise, Balderton Capital Management
- Jeremy Silver, Digital Catapult
- John Corner, The Platform, Media City, Salford
- Jon Bradford
- Julian David, Tech UK
- Laura Citron, London and Partners
- Maria Miguel, Startup Portugal
- Matt Clifford, Entrepreneur First
- Matt Wichrowski, Entrepreneur First
- Max Kelly, Techstars
- Natalie Black, No 10 Policy Unit
- Nick Bowes, Office of the Mayor of London
- Nigel Huddleston, MP
- Normal Lamb, MP
- Paul Lancaster, Google
- Paul Lancaster, Plan Digital
- Philip Alexander, People Platform
- Philip Salter, Entrepreneurs Network
- Rachel Peacock, Generator North East
- Rachel Reeves, MP
- Rachel Wolf, Public First
- Rannia Leontaridi
- Roxanne Varza, Station F
- Russ Shaw, Tech London Advocates
- Suzanne Ashman, Localglobe
- Tom Shirley, BEIS
- Tom Wilson, Seedcamp
- Zia Hayat, Callsign

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