

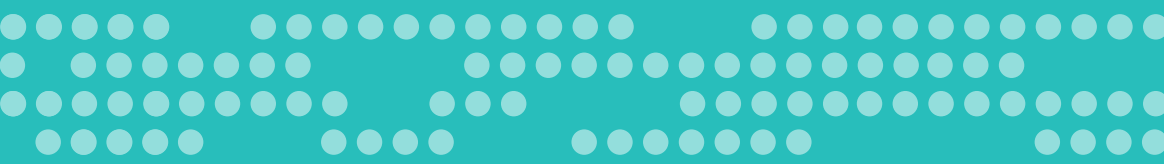
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The Nationality of Workers in the UK's Digital Tech Industries



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Summary of Key Findings

- 1** | The digital tech sector has a higher proportion of non-UK nationals working in it than the rest of the UK economy as a whole.
- 2** | Non-UK nationals have a higher share of Master's and PhD qualifications compared to UK nationals.
- 3** | London and the South East have a higher share of the digital tech workforce comprised of EU and non-EU workers.
- 4** | Non-EU workers account for a larger share of employment in the digital tech industries than EU workers – however, employment for EU nationals has grown faster than non-EU nationals from 2011 – 2015.
- 5** | There is evidence in the Tech City UK survey that some tech companies have a much higher share of international workers than the rest of the digital workforce. There is also evidence from DueDil that a high share of founders, 21%, are non-UK nationals.

Introduction:

Measuring the nationality of the UK's tech workforce

Digital tech businesses are at the heart of the UK economy and are playing an important role in driving growth.¹ This growth requires tech talent.

Why is this research important?

It is essential for the UK to **1)** understand the impact on the UK's digital tech industries of changes to freedom of movement across Europe and other migration policy, **2)** understand the national digital skills landscape and implications for education; and **3)** evaluate the share of the digital workforce across the regions and nations in the UK to inform policy.

Ideally, detailed migration information would be available to contribute to these discussions, however as this is not readily available, an alternative is to study the nationality of workers in digital tech industries. This report therefore analyses the nationality of workers in the digital tech industries, their qualifications, and distribution across the country to help inform these important debates.

There has been limited research on the impact of migration policy aimed at non-UK workers in the digital tech industries². Quantitative research has tended to focus on non-EU migrants because of data availability³ and the fact that EU migrants are not currently subject to any restrictions under the UK's migration policy⁴. One of the reasons visa routes have been tightened in recent years is arguably that non-EEA (European Economic Area) migration rules are the only policy lever the government has in a system where the UK is bound to accept EU migrants⁵. The context in which this policy is enacted is rapidly changing - to ensure that the UK maintains its strong performance and global competitiveness into the future, employers will need to continue to be able to recruit talent from across the world. The shortage of sector specific data on both EU and non-EU workers in the UK makes this research important when trying to understand the breakdown of the digital tech workforce⁶.

1 Tech City UK and Nesta (2016) *Tech Nation 2016*. London: TCUK/ Nesta.

2 See House of Commons Science and Technology Committee (2016) *Digital skills crisis*. Second Report of Session 2016-17.

3 See for example, MAC reports on Tier 1 and Tier 2 non-EEA migrants working in the UK.

4 See Gov.uk (2016) Visas and Immigration [Available at: <https://www.gov.uk/browse/visas-immigration>].

5 Ibid.

6 Vargas-Silva, C. (2016) *The Fiscal Impact of Immigration in the UK*. Oxford: The Migration Observatory. [Available at: http://www.migrationobservatory.ox.ac.uk/wp-content/uploads/2016/04/Briefing-Fiscal_Impacts-2.pdf].

What data is used?

To build on the limited published information on levels of non-UK nationals in the UK digital tech workforce⁷, we use data from the Office for National Statistics' (ONS) Annual Population Survey (APS).

The APS is the basis for the UK government's official statistics on the labour force⁸. It can tell us about the composition of the digital tech industries workforce, including the proportion of workers in digital tech industries that are UK nationals, EU nationals and non-EU nationals. Using the APS we are also able to show evidence on how migration has affected the nationality of the digital tech industry across its sub-sectors.

For the analysis we adopt a definition of digital tech industries used by Tech City UK in their 2016 Tech Nation report and developed by Nesta in its 2015 Dynamic mapping of the information economy report⁹. Figure 1 lists the industries that fall within it.

Information on other sources of data on migration is included in Appendix 1 with further information on the UK's points based migration system in Appendix 2.

In addition to the APS, we also draw on some sector specific surveys and sources, including the 2017 Tech City UK survey, research by DueDil research and LinkedIn. They are broadly consistent with the findings from the APS and illustrate the recruitment challenges currently faced by tech companies.

7 See MAC reports on Tier 1 and Tier 2 non-EEA migrants working in the UK and DCMS (2016), DCMS Sectors Economic Estimates Employment Update [Available at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/546262/DCMS_Sectors_Economic_Estimates_-_Employment.pdf] The latter report uses a definition of digital tech that while overlapping is not exactly comparable with the current report.

8 Nomis (2016 Annual Population Survey. [Available at: <https://www.nomisweb.co.uk/articles/932.aspx>].

9 Spilsbury, M. (2016) *Dynamic mapping of the information economy industries*. London: Nesta/TechUK.

Figure 1 Definition of digital tech industries¹⁰

Definition of digital tech industries

We define digital tech industries using the set of Standard Industrial Classification (SIC) codes outlined in Tech Nation 2016, which classifies digital tech industries as:

- 26.20** Manufacture of computers and peripheral equipment
- 58.21** Publishing of computer games
- 58.29** Other software publishing
- 61.10** Wired telecommunications activities
- 61.20** Wireless telecommunications activities
- 61.30** Satellite telecommunications activities
- 61.90** Other telecommunications activities
- 62.01** Computer programming activities
- 62.02** Computer consultancy activities
- 62.03** Computer facilities management activities
- 62.09** Other IT & computer service activities
- 63.11** Data processing, hosting & related activities
- 63.12** Web portals
- 95.11** Repair of computers & peripheral equipment

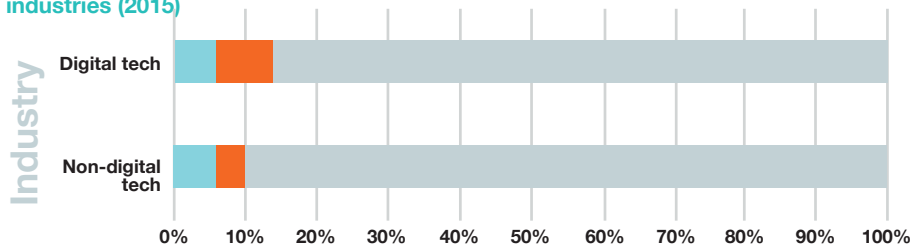
¹⁰ We used SIC codes to encompass all workers in the digital tech industries, including non digital tech jobs in the digital tech sector. Digital jobs are changing / growing at a rapid rate therefore we recognise that this data may not reflect the most up to date landscape.

Share of employment of international workers in digital-tech industries in 2015

Although the majority of digital tech workers are UK nationals, there are a growing number of international workers in the sector.

In the UK's digital tech industries in 2015, workers from non-EU¹¹ nations account for a higher share of employment than EU workers (7 per cent vs 6 per cent) - EU numbers here and elsewhere exclude UK workers.¹² This is a higher share than they account for in the rest of the workforce where non-EU workers comprise 4 per cent of the workforce. The share of employment made up of EU nationals is the same for digital tech and non-digital tech industries at 6 per cent. The digital tech sector is therefore more international than the rest of the workforce, with non-UK workers accounting for 3 per cent more of the digital-tech workforce.

Figure 2 International share of employment in UK digital tech and non-digital tech industries (2015)



	Non-digital tech	Digital tech
Rest of EU	6%	6%
Non-EU	4%	7%
UK	90%	87%

Share of employment (%)

Note: These shares are based on digital tech workers being defined as workers who had either a main or second job in the digital tech industries listed in Figure 1

11 We exclude non-EU, EEA countries – the largest (by population) being Norway and Switzerland.

12 Here and elsewhere, country is defined in terms of nationality rather than country of birth.

Higher educational qualifications

International workers in digital tech industries are more likely to have advanced higher educational qualifications¹³.

Analysis shows that non-UK nationals have a high share of Master's and PhD qualifications (Master's degrees being much more common than PhDs). For non-EU workers 17.6 per cent have a Master's or PhD qualification - this is consistent with the requirements of the UK migration policy system - under the Tier 2 skilled worker route, many non-EU workers in skilled jobs will be required to hold higher educational qualifications.

Figure 3 Average share of digital-tech industry workforce by nationality 2011-2015 with Master's degree or PhD

	Rest of EU	Non-EU	UK
Proportion of workforce with Master's degree or PhD	12.5%	17.6%	10.5%

There is also evidence from analysis by LinkedIn of its platform data that migrants have higher levels of qualifications than domestic workers. This work has found that 40% of professional migrants¹⁴ into the UK in the past three years are from EU with 60% having a Masters or Doctoral degree in comparison to 34% of UK LinkedIn members. It was also found that highly qualified professional migrants are 1.3 times more likely to work in the tech sector.¹⁵

¹³ The qualifications of workers are available in the APS, containing information on both the level of qualification (by National Qualification Framework level) and type of qualification.

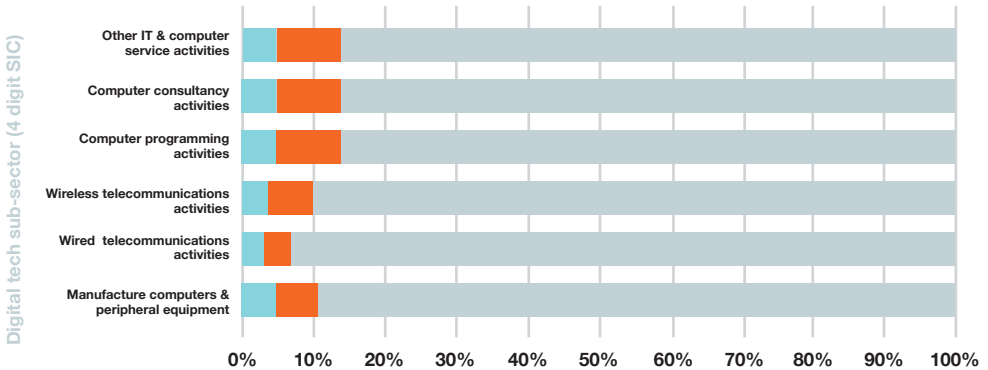
¹⁴ Professional migrants are defined in the article as people who have moved to the UK in the last 3 years. The analysis offers a snapshot of labour migrants through those that use LinkedIn, and LinkedIn does not verify qualifications, or employment history.

¹⁵ Financial Times (2016), 'LinkedIn says EU workers more skilled than UK peers', September 29th. <https://www.ft.com/content/abd6c660-8633-11e6-8897-2359a58ac7a5>

Digital sub-sectors: share of employment (2011-2015)

Figure 4 shows the international share of employment (2011-2015) by digital tech sub-sector. The analysis shows that IT SIC codes tend to have higher levels of both EU and non-EU nationals, as distinct from those that relate to telecommunications and forms of manufacturing in the sector. For instance, Other IT and computer services activities and Computer consultancy activities both have 5 per cent EU workers, and 9 per cent non-EU workers. Particularly in the case of non-EU nationals, this is higher than non-digital tech industries at 4 per cent. Wired telecommunication activities has a lower proportions of non-UK nationals employed – with 3 per cent EU and 4 per cent non-EU workers.

Figure 4 International share of employment (2011-2015) by digital tech sub-sector



	Manufacture computers & peripheral equipment	Wired telecommunications activities	Wireless telecommunications activities	Computer programming activities	Computer consultancy activities	Other IT & computer service activities
Rest of EU	5%	3%	4%	6%	5%	5%
Non-EU	6%	4%	6%	8%	9%	9%
UK	89%	93%	90%	87%	86%	86%

Share of employment (%)

Note: The analysis above is based on workers whose main job was in the digital tech industries and excludes sectors that have small sample sizes in the APS. Percentages may not sum to 100 due to rounding.

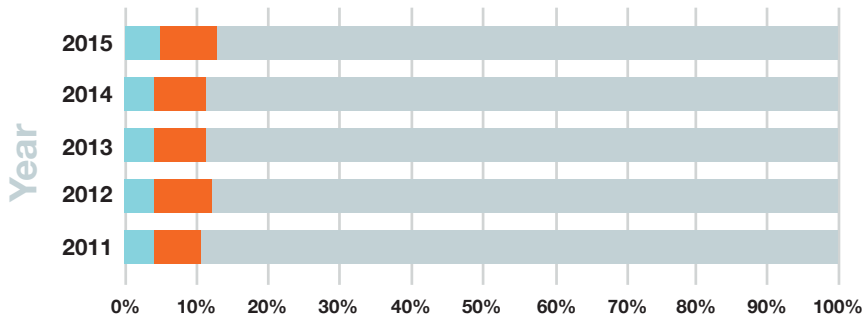
Longitudinal analysis:

The share of workers over time

From 2011 to 2015 the share of employment of EU workers in the digital tech industries rose from 4 to 6 per cent. Over the same time period, the share of non-EU workers remained relatively stable at 7 per cent. This compares to the UK's non-digital tech industries where the share of EU workers rose from 5 to 6 per cent and non-EU workers stayed at 4 per cent. The share of UK nationals in non-digital tech industries declined - from 91 to 90 per cent, although overall employment of UK nationals increased from 25.7 million to 27 million workers.

The share of employment of EU workers in the tech sector has risen in line with its rapid growth over the past four years. This could be an indication that the employment needs of the UK's tech industry have outstripped the supply of domestic skill with EU migrants, to a certain extent, making up for this shortfall.¹⁶

Figure 5 International share of employment from 2011-2015 in UK digital tech industries



	2011	2012	2013	2014	2015
Rest of EU	4%	5%	5%	5%	6%
Non-EU	7%	8%	7%	7%	7%
UK	89%	87%	88%	88%	87%

Share of employment (%)

¹⁶ There are a number of other factors that have a bearing on this share of employment. This includes, but is far from limited, to supply of relevant domestic skills, the economic performance of other countries, the conditions of their labour markets and political situation.

Geography:

The international share of employment across the UK in the digital tech sector

As can be seen from Figure 6, which illustrates the international share of employment of digital tech industries (2011-2015) by UK region, London and the South East have a higher share of the digital tech workforce comprised of EU and non-EU workers.

London also accounts for a large share of all international workers in the UK. Around one fifth of the digital tech industry workforce is based in London - 164,000 workers of the 881,000 workers employed in digital tech industries in the UK (2011-2015 average).¹⁷

London, in particular has a significantly higher EU workforce with EU workers accounting for 11 per cent of employment in digital tech sectors compared to, for example, 5 per cent in the East of England and 2 per cent in the West Midlands.¹⁸ Non-EU nationals are a larger percentage still at 20 per cent of digital tech industry employment.

There may be several reasons behind these findings. London is home to a significant proportion of the UK's digital tech labour market opportunities reflecting competition for talent and a greater need for specialised skills in hotspots of digital tech activity. The higher share of international employment in London provides evidence that employer demand for tech skills outstrips the supply in the capital with employers as a result using non-UK talent to address skills shortages. Research has also found that London has a well-established tech startup ecosystem.¹⁹ London's status as a world city with a diverse population and large number of cultural amenities is also likely to influence businesses' propensity to locate in London.^{20,21}

¹⁷ Tech Nation 2016 highlights that there are 1.56 million digital tech economy jobs in the UK. The difference in the number of digital tech jobs in the UK quoted here is down to definition differences. Tech Nation 2016 covers digital tech economy jobs (see page 117) which includes digital tech jobs in non-digital tech industries – digital tech industry jobs excludes people who work outside these industries (see Figure 1).

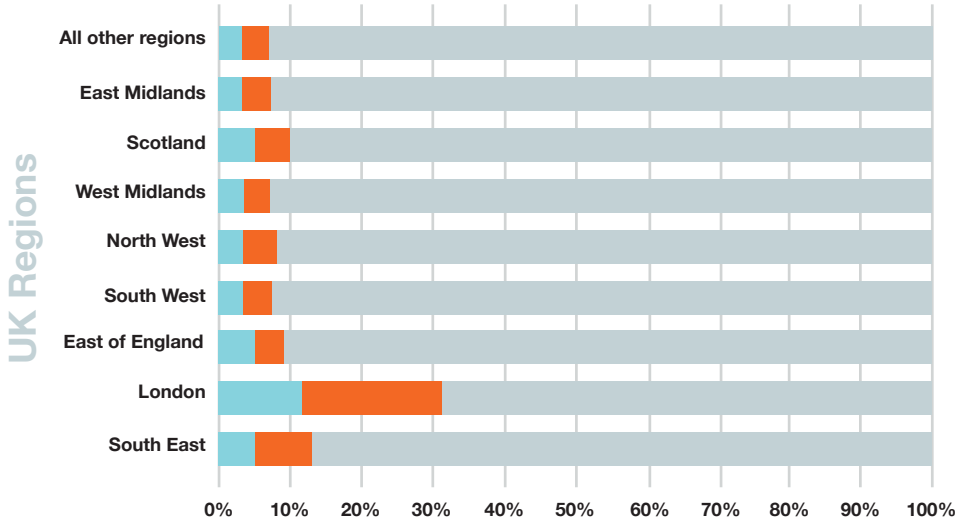
¹⁸ The statistic (in Figure 6) for all other UK regions is an average across all the remaining regions, owing to small sample sizes.

²⁰ See Nathan, M., and Vandore, E. (2014) Here Be Startups: Exploring London's 'Tech City' Digital Cluster. *Environment and Planning A*, 46(10), 2283-2299. and Foord, J. (2013) The new boomtown? Creative city to Tech City in east London. *Cities*, 33, 51-60.

²⁰ See Bathelt, H., Malmberg, A., and Maskell, P. (2004) Clusters and knowledge: local buzz, global pipelines and the process of knowledge creation. *Progress in human geography*, 28 (1), 31-56.

²¹ See Lee, N., and Nathan, M. (2011) Does cultural diversity help innovation in cities: evidence from London firms. SERC Discussion paper 69.

Figure 6 International share of employment (Average 2011-2015) by UK region

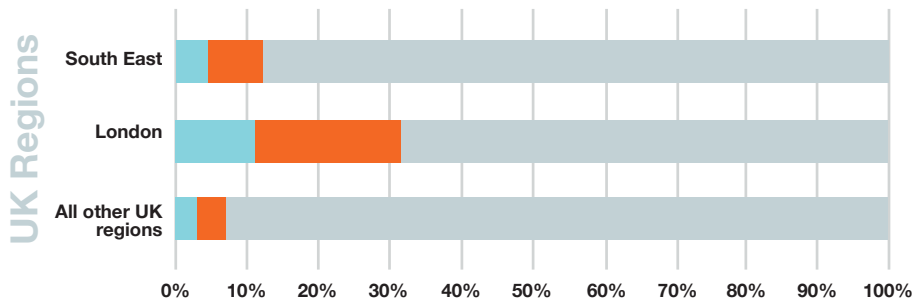


	South East	London	East of England	South West	North West	West Midlands	Scotland	East Midlands	All other regions
Rest of EU	5%	11%	5%	2%	2%	2%	5%	4%	3%
Non-EU	7%	20%	4%	3%	4%	3%	5%	3%	3%
UK	88%	69%	91%	95%	94%	95%	90%	93%	94%

Share of employment (%)

Note: The shares for Figures 6 are based on digital tech workers being defined as workers who had either a main or second job in the digital tech industries listed in Figure 1. Region of a worker is defined in terms of the place of residence, as opposed to place of work.

Figure 7 International share of employment (Average 2011-2015) by UK region: London and the South East and All other UK regions



	All other UK regions	London	South East
Rest of EU	3%	11%	5%
Non-EU	4%	20%	7%
UK	93%	69%	88%

Share of employment (%)

Note: The shares for Figures 6 and 7 are based on digital tech workers being defined as workers who had either a main or second job in the digital tech industries listed in Figure 1. Region of a worker is defined in terms of the place of residence, as opposed to place of work.

Conclusions

With the future of the UK's relationship with Europe in a state of uncertainty, migration data has never been so key for the UK to renegotiate its relationship with Europe. It is imperative that evidence on the international share of employment in fast growing and economically significant sectors like digital tech is published and brought to bear in the policymaking processes.

This report has shown that employment in the UK's digital tech industries has grown since 2011 with both the number of UK and non-UK workers accounting for this increase.

Over this period non-EU workers have accounted for a larger share of employment in the digital tech industries than EU. However, between 2011 and 2015, employment among EU nationals has grown faster than non-EU nationals rising from 4 per cent to 6 per cent, while non-EU national employment has remained stable at 7 per cent. The UK's digital tech industries have a higher share of non-UK workers than the rest of the workforce as a whole (13 per cent vs 10 per cent). Non-EU workers in the digital-tech industries, were more likely to have Master's or PhD qualifications than EU and UK nationals. In terms of digital tech sub-sectors, non-EU workers accounted for the highest workforce share in Computer Consultancy activities and

Other IT and computer service activities at 9 per cent on average between 2011 and 2015. In interpreting these findings it is important to note that there is significant regional variation, with London and the South East containing higher levels of international workers (both EU and non-EU nationals) in terms of absolute numbers and as a percentage of the workforce than other UK regions. London accounts for a significant proportion of digital tech employment, as shown in Tech Nation 2016²².

It was found that 20 per cent of the London digital tech workforce is comprised of non-EU workers and 11 per cent from the EU. This compares to, for example, 5 per cent EU, 4 per cent non-EU in the East of England and 2 per cent EU, 3 per cent non-EU in the West Midlands – implying that international workers are particularly important for the capital's digital tech industries.

There is also evidence that some tech businesses in the UK start-up ecosystem have an even higher share of their workforce (from founders to tech professionals) that is international, with a particular emphasis on workers from the EU. It would be beneficial for there to be more research on the skills needs that companies have at different stages of their growth and how this relates to UK skills shortages.

²² Tech City UK and Nesta (2016) *Tech Nation 2016*. London: TCUK/ Nesta.

Tech City UK's online survey of people working in the UK digital tech sector²³ suggests that there are skills shortages in the sector, with 22 per cent of Founders and CEOs considering that hiring highly skilled workers is a major challenge.

There is evidence that restrictions on skilled digital tech workers from outside the UK could have a particular impact on certain companies. 25 per cent of Founders and CEOs in Tech City UK's online survey reported that over 75 per cent of the workers in their company was an EU national, while 5 per cent of Founders stated that over 75 per cent of workers in the company were from outside of the EU. Furthermore, research from DueDil²⁴ on founder nationality indicates that 21% of UK tech start-ups are founded by non-UK nationals, of which 9% were founded by EU nationals.

Research on non-EEA Tier 1 entrepreneurs²⁵ shows the positive economic and labour market contributions of founders and owners under Tier 1 of the UK's Points Based System (see Appendix 2) and the impact of these migrants beyond the labour market. The Department of Business Innovation and Skills' report on the economic impact of Tier 1 entrepreneurs²⁶ shows that the 1,580 sample of companies (of 13,746 business identified through Home Office Management Data) run by

Tier 1 (Entrepreneur) visa holders employ just under 10,000 people, and collectively turn over £1.45 billion.

With political pressure to reduce net-migration to the UK, it is likely that any future settlement on migration will have a focus on reducing levels of unskilled migration. In this context, it is therefore important to ensure that the skills needs of expanding sectors like the digital tech sector are considered.

The data available, and analysed in this note is, by necessity, highly aggregated - owing to the costs of data collection, privacy issues and limitations inherent in measuring dynamic sectors like the tech sector with annual surveys. The UK should therefore look to using new data sources, such as web-based data from job advertisements²⁷ to improve understanding of the skills needs of the economy to inform its future migration policy.

23 This is a survey of people working in the digital tech sector. The survey was distributed primarily via Tech City UK's network of community partners and it was publicised through social media channels. A total 2,732 surveys were completed over the period 16 November to 10 December 2016. Of these, 997 surveys were with tech company founders or CEOs, 744 were with tech workers and 891 were with other members of the digital tech community (for example, people working in incubators, academics, investors and other service providers). All data are un-weighted.

24 <http://startups.co.uk/one-in-five-uk-tech-start-up-founders-are-immigrants/>

25 Nathan, M., Rolfe, H., and Vargas-Silva, C. (2013) *The economic and labour market impacts of Tier 1 entrepreneur and investor migrants*. Report to the Migration Advisory Committee. [Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/257258/economic-research.pdf]

26 [Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/472236/Report_Tier_1_Entrepreneurs.pdf]

27 Nesta (2017) *The UK needs a Skills Map*. [Available at: <http://www.nesta.org.uk/blog/uk-needs-skills-map>]

Appendices

Appendix 1 What other data is available?

There are two main sources of alternative data with information on levels of non-UK nationals working across UK industry sectors.

Data from employer surveys.

This is data collected through employer surveys to understand skills supply, demand and gaps/shortages. There are two main types of employer survey – 1) official government surveys, like the Employer Skills Survey²⁸, formerly administered by the UK Commission for Employment and Skills, and 2) industry, or type of employer specific surveys, such as Creative Skillset's Creative Media Workforce Survey²⁹, or Tech Partnership's Employer Insights: Skills Survey³⁰. The mechanisms and questions used in these surveys tend to vary by industry and sub-sector – recently, this may reflect the array of sector specific priorities stemming from the uncertainty caused by Brexit negotiations. Higher sample employer survey data can allow for more fine grained analysis of migration and skills (for example, by 6 digital SIC codes rather than 4 digit used here) compared to large scale household surveys like the APS.

Administrative data from the Home Office.

This is available on request for non-EEA workers who are subject to the UK's migration policy system. The points-based immigration system is the means of regulating immigration to the United Kingdom from outside the European Economic Area where applicants are awarded points for attributes and skills that count towards their application. A summary of the different Tiers of the points based system is set out in Figure 2 below.

Data available includes Tier 1 (High value), Tier 2 (Skilled work), Tier 4 (Study), and Tier 5 (Youth mobility and temporary work). However, this covers only part of the picture when addressing non-UK workers, as EU migrants are not subject to the points based migration system, and currently have freedom of movement across EU member states. The volume and type of data available varies across tiers, for instance, for Tier 5 Youth mobility and temporary work, significantly less information (in terms of both volume and granularity) on workers is available compared with Tier 2.

28 UKCES (2015) Employer Skills Survey 2015: UK Results. [Available at: <https://www.gov.uk/government/publications/ukces-employer-skills-survey-2015-uk-report>].

29 See Creative Skillset (2014) The Creative Media Workforce Survey [Available at: https://creativeskillset.org/assets/0001/0465/Creative_Skillset_Creative_Media_Workforce_Survey_20_14.pdf].

30 See Tech Partnership (2015) Employer Insights: Skills Survey [Available at: https://www.thetechpartnership.com/globalassets/pdfs/research-2015/tec_employer_skill_survey_web.pdf].

Appendix 2 Outline of the UK's Points Based Immigration System

The Points Based System (PBS) for migrants to the UK from outside the European Economic Area (EEA) was introduced in 2008 and currently consists of five tiers.

TIER 1	High Value	Tier 1 covers entrepreneurs, investors and individuals that are deemed to have exceptional talent under the scheme. For these routes sponsorship from a UK-based employer is not required. Graduate Entrepreneurs are also included in Tier 1, for this route sponsorship is needed from a UK-based educational institution
TIER 2	Skilled Worker	Tier 2 covers skilled workers with a job offer from a Tier 2 licensed, UK-based employer. This employer is known as the sponsor.
TIER 3	Low Skilled (closed)	Tier 3 is designated for low-skilled migrants to fill specific, temporary skills gaps. Although legislation for this route exists, it has never been opened by the government.
TIER 4	Study	All student visas fall under Tier 4. To qualify, applicants must have been offered a place at an educational institution which is licensed to sponsor migrants.
TIER 5	Youth Mobility and Temporary Work	Tier 5 is for migrants who have a job offer for temporary or short-term work from a UK-based company and young people (18-30) who want to live and work in the UK for up to 2 years.

Acknowledgements

Thanks to the Nesta research team and report authors; Hasan Bakhshi, John Davies and George Windsor.

Thanks to Atomico for their research via their www.atomico.com/InventedHere : Dan Hynes, Tom Wehmeier and Elena Mustatea for their support.

Thanks to Index Ventures: Dominic Jacquesson for his invaluable input and on going support.

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