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# The Geography of Creativity in the UK

## Creative clusters, creative people and creative networks

**Juan Mateos-Garcia** and **Hasan Bakhshi**

July 2016

## Acknowledgements

**Johanna Bolhoven**, **Gail Caig**, **Caroline Norbury** and **Dawn Paine** at Creative England have contributed valuable input and feedback to the project from its beginning. **Federico Cilauro** and **Ian Hathaway** from Frontier Economics accessed and processed the ONS data used in this report. We thank them for their expert advice, support and responsiveness. **James Gardiner** collected the Meetup data building on a script created by **Matthew Williams**.

We also thank the participants in two cluster stakeholder workshops organised in August and December 2005. They are: **Eddie Berg**, **Neil Cocker**, **Nikolaos Goumagias**, **Suzanne Jameson**, **Katherine Jewkes**, **Phil Jones**, **Mark Lawler**, **Sara Pepper**, **Adam Price**, **Clare Reddington**, **Helana Santos** and **Anthony Story**.

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# Forewords

In recent years, Nesta has invested considerable efforts in developing policy strategies for the creative industries, including our landmark publication A Manifesto for the Creative Economy. However, the creative industries consist of wide-ranging sub-sectors, from content industries like film and video games to service industries like advertising and design, so the right policy mix in any given area depends on its sub-sectoral make-up. We have therefore consistently urged policymakers to ground their support measures in a deep and rigorous mapping of their region's strengths.

In *The Geography of Creativity in the UK* – a collaboration with our friends at Creative England – we provide a systematic mapping of the UK's creative clusters making use of data from the official business registry. Where businesses choose to locate is of course a defining feature of a creative cluster, but the cluster's health is determined by other characteristics too. In this report, we paint a more holistic picture of creative clusters using data on indicators including the local supply of talent, the volume of industry-relevant research and the extent of creative networking activity.

As well as deepening our understanding of the geography of the UK's creativity, our aim in this research has been to produce a practical resource that policymakers, development agencies, Local Enterprise Partnerships and universities can use to inform their strategies. We would love to hear your feedback as to whether we have succeeded.

**Hasan Bakhshi MBE**, Senior Director, Creative Economy and Data Analytics, Nesta

At Creative England, we're dedicated to the growth of the creative industries – we invest in talented people and their creative ideas, nurturing our richly diverse games, TV, film and digital media industries. From direct investment and soft loans to business mentoring; we champion the best ideas of talented people and their businesses.

This report proves we're putting our efforts in the right place – it clearly shows the power of the creative industries to drive jobs and prosperity - not only in London and the South East, but in communities across the UK.

Yet there is no room for complacency and much more to be done. We must work harder to spread the benefits of London's power as a global creative hub across the rest of the UK. We must do more to give our creative talent the opportunities and backing they need to flourish, innovate and grow wherever they come from. We must strengthen our already sophisticated creative ecosystem, so that it can continue to network across the private and public sectors, across education and across our arts, science and technology sectors.

We publish this report at arguably one of the most challenging times in our history. Whatever the future holds we know for certain that the creative industries will continue to be at the centre of our economic future. It is more crucial now than perhaps ever before, that we work together to make sure our creative industries are equipped to play their part in driving a strong economy and maintaining our position as a world leader in an increasingly competitive global marketplace.

Work with us to make that ambition a reality.

**Caroline Norbury MBE**, Chief Executive, Creative England

# Executive Summary

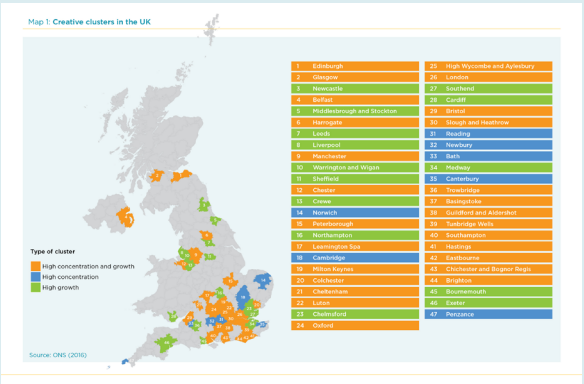
That the creative industries make important economic contributions at the national level is gaining increasing recognition in the UK. The official statistics put their Gross Value Added contribution at £81.4 billion or 5.2 per cent of the whole economy. A high growth sector, creative industries GVA grew by 8.9 per cent between 2013 and 2014, almost twice as fast as the UK as a whole.

While it is equally well known that the creative industries are engines of growth in cities like London, Bristol, Manchester, Edinburgh and Cardiff, their importance in other parts of the UK is less widely appreciated. In this report – a collaboration between Nesta and Creative England – we reveal hotspots of creative activity in all nations and regions of the UK, and produce data that economic development agencies and policymakers charged with promoting business growth can use when setting strategic priorities.

Specifically, the report presents the findings of a systematic mapping of the UK's creative industries using Office for National Statistics data, combined with geographical analysis of data on the supply of university graduates and research and a novel 'big data' analysis of social networking activity. As well as highlighting where in the country we find concentrations of creative activity, the report presents a rich account of the important differences that exist between creative clusters too.

We find that:

- The **creative industries are growing more rapidly than other sectors in most parts of the country**. In fact, between 2007 and 2014 more than nine in ten of the 228 metropolitan areas (or Travel-to-Work-Area geographies) that make up the UK experienced faster growth in the number of creative businesses than in the whole business population. Over two-thirds of these areas saw faster growth in creative industries employment than in overall employment too.
- **Rapid growth has been experienced in all sub-sectors that make up the creative industries, but particularly in services activities like Design, Software and digital, and Advertising**. More than half of metropolitan areas observed faster growth in the number of businesses, levels of employment and volume of turnover in these sub-sectors than in other sectors.
- A striking feature of this picture is the **explosion in entrepreneurial activity, measured by the number of creative businesses**. But the concomitant is that almost all sub-sectors have experienced a **reduction in average firm size**: in 2007, creative businesses in the UK employed on average just under four workers; by 2014, this figure had declined by 15 per cent to 3.3.
- In total, **we identify 47 creative clusters in the UK**, based on a method developed by leading academic economists (Map 1). The basic idea is to identify groups of creative sub-sectors that are similar to each other, and look for geographic hotspots of activity in these groups, measured by their relative importance in the local economy. We add to this list 'up and coming' clusters that have seen particularly rapid growth over the period we consider but are not yet large enough to qualify on the basis of concentration alone.



- The map confirms that creative clusters have a dominant presence in London and the South-East of England (which together comprise around a third of clusters identified). **But just over one-fifth of clusters are found in the North of England, and Scotland, Wales and Northern Ireland all feature too**.
- The map also suggests that there are several creative agglomerations which encompass more than one metropolitan area: for example, around Manchester, Leeds, Bristol and Cardiff. In the South-East of England, there are similar agglomerations along the coast around Brighton, Southampton and Bournemouth too.
- These findings remind us that **not all creative clusters follow the 'creative cities' model. 'Creative conurbations' like Slough, High Wycombe, Peterborough and Guildford rarely feature in creative cluster mappings**. These clusters – specialising in a smaller number of creative sub-sectors with a high technology component – may be less 'hip' than creative cities like Brighton, Liverpool and Glasgow, but our research suggests they make significant economic contributions. In particular, they are associated with larger-sized creative businesses, and potentially **higher levels of business productivity**.

The report also documents the significant levels of relevant university activity – in both education and research – that takes place in the UK's creative clusters. Comparing these activities with the size of the creative industries, we find that **Northern clusters like Liverpool, Leeds, Newcastle and Sheffield are particularly well served by universities**. By implication, **in other cities with vibrant creative industries, there may be opportunities for universities to play a greater role**.

Using data from online events platform Meetup.com, our report also quantifies the importance of networking activity in the UK's creative industries. **Paralleling the growth in creative businesses across the UK, we see an explosion of meetup activity in the creative industries. Topics like 'freelance work', 'user experience', digital marketing' and 'data analytics' are trending up particularly strongly**. The data provided by Meetup.com also let us look at geographical variations in networking activity. One striking contrast is between creative cities like Cambridge, Manchester and Edinburgh and creative conurbations like Reading, High Wycombe and Guildford, with the latter showing notably low levels of networking activity relative to the size of their creative workforce, a narrower range of topics discussed and low levels of inter-sector networking. Partly a reflection of the more specialised and large-firm nature of creative activity in these clusters, these findings nonetheless raise the question of **whether more developed levels of networking will be needed to help these creative conurbations retain their economic edge in the future**.

The meetup data is also instructive in revealing the 'hidden' connections between the UK's creative clusters, based on meetup co-membership patterns of different individuals. It points to some **examples of strong connections between clusters, including Bristol, Bath and Cardiff in the West, Edinburgh and Glasgow in Scotland and Manchester, Leeds, Sheffield, Liverpool, Chester and Wigan in the North. Policymakers, development agencies and universities should factor these connections into their network support initiatives and ensure they do not inadvertently displace them**.

The meetup data also highlights the **international connectivity of the UK's creative clusters**. Around one in ten of the members of creative meetups in the UK are actually based outside of the UK. Forty-one per cent of these overseas members are based in EU countries. Again, creative cities display higher levels of international networking. **Ensuring that these international connections are maintained in the face of the EU referendum outcome will be a high priority going forward**.

# 1. Introduction

## Creative clusters matter

**The creative industries are now widely recognised as a driver of UK jobs, innovation and growth.**

According to statistics from the Department for Culture, Media and Sport (DCMS), their Gross Value Added (GVA) in 2014 was £81.4 billion, making up 5.2 per cent of the UK economy.[1] In 2015, they accounted for 1.9 million jobs.[2] Creative industries GVA grew by 8.9 per cent between 2013 and 2014 – almost twice as fast as the economy as a whole, while creative industries jobs grew by 5.5 per cent (compared with 2.1 per cent in the UK workforce).

In addition to driving economic growth directly, the creative industries make indirect contributions to the economy by supplying other sectors with creative production inputs such as advertising, design and software.[3]

The future outlook for the sector looks rosy too. In particular, creative jobs, with their typically high levels of discretion and unpredictable outputs, will likely be in high demand in the *"second machine age"*.[4] Previous Nesta research suggests that UK creative jobs are three times less likely to be at risk of future automation than those in the rest of the workforce.[5]

But how do we ensure that the economic benefits are felt across the UK?

The creative industries display a strong tendency to concentrate in a small number of locations. In doing so, they form creative clusters – agglomerations of creative businesses and workers that collaborate and compete with each other.[6] This geographical proximity has important advantages: creative businesses are able to tap into a critical mass of creative workers, access clients, and collaborate and share information with one another.[7]

However, building creative clusters is far from straightforward. They emerge as the result of long and complex processes combining creative entrepreneurship, a supportive environment, and a measure of good luck. Attempts to build clusters from scratch rarely succeed.[8] This creates the risk for the UK of a geographical 'winner-takes-all' dynamic where those locations that have existing creative strengths continue growing, while newcomers are left behind. Since the creative industries tend disproportionately to locate in London and the South East of England,[9] there is a risk therefore that the growth of the creative industries will further intensify the UK's regional economic imbalances.[10]

The answer is for all of the UK's creative clusters we identify to create environments which support growth, and the starting point should be a hard look at the data – hence this report.

## About this report

In this report – a collaboration between Nesta and Creative England – we deploy official, open and web data to understand the geography of creativity in the UK, its evolution and its drivers. A better understanding of the local economic significance of the creative industries and their strengths and weaknesses in one area vis-à-vis other areas can inform the priorities of local policymakers and help them design targeted policies to support creative businesses.

Creative clusters don't just consist of businesses and workers however, they are made up of other important local institutions such as universities and business networks too. Measuring these institutions can help policymakers identify a wider set of strengths and weaknesses in the ecosystem, and design suitable interventions.

At the national level, evidence about the geographical distribution of the creative industries and its clusters, and, importantly, the connections between them, can inform policies to address regional imbalances, and enable more joined-up policies that focus on the UK as a connected creative system, instead of a disconnected set of clusters.

This report responds directly to one of the recommendations in the Creative Industries Council's Create UK strategy: namely, to map creative clusters in the UK.[11] Alongside the report, we are publishing datasets and interactive data maps to allow users to query the data for their own uses.

## Structure

The structure of this report is inspired by the seven-point programme to support creative clusters that we put forward in Nesta's *A Manifesto for the Creative Economy*.[12]

Section 2 **Be pragmatic and data-driven**, gives local policymakers economic reasons to care about the creative industries around them, while pointing out some potential threats to the health of the sector: business fragmentation and regional concentration.

Section 3 **Listen: one size does not fit all** identifies a set of creative clusters, for which we conduct a 'deep dive' in the rest of the report. This section also highlights the diversity of UK creative clusters in terms of their location, industrial structure and sectoral composition.

Section 4 **Invest in knowledge and people** uses open data about university research, education and knowledge exchange activities to illustrate their role in supporting creative clusters.

Section 5 **Raise visibility and build networks**, measures local industry networking using web data from Meetup.com, a platform which is used to organise networking events.

Section 6 **Think Systemically**, also uses Meetup.com data to show the levels of networking between different creative clusters in the UK, as well as the international connections of UK clusters.

Section 7 concludes.

We briefly describe each of the data sources we have used as they appear in the report. The methodological annex describes them in further detail, and provides additional information about the criteria we have used for identifying creative clusters.

# 2. Be pragmatic and data-driven

In this section, we use official data to quantify the local economic significance of the UK's creative industries, and their growth rates over time. As well as charting the impressive growth of the creative industries, we also highlight some challenges for sustaining their growth – in particular, a tendency towards falling average firm size, which creates a risk of creative fragmentation, and a propensity to concentrate in London and the South-East of England at the expense of other parts of the country.

## Before we start: a note on definitions

Our economic analysis uses official data sources and industrial classifications. In particular, we measure business activity for the 2007-2014 period, using the Office for National Statistics' (ONS) Business Structure Database (BSD), which contains location, employment and turnover information about most registered businesses in the UK.[13] The BSD does not contain information about very small businesses and freelancers, however, so we have in some cases complemented BSD data with jobs figures from the Annual Population Survey (APS).[14]

We adopt the DCMS's official classification of creative industries and occupations.

In terms of geographies, we conduct our analysis at the level of the Travel-to-Work-Area (TTWA). Travel-To-Work-Areas are ONS geographies bounding local labour markets based on commuting patterns from the 2011 Census. They are generally acknowledged to be an effective measure for industrial clusters which operate at the sub-regional level (and which rarely respect administrative boundaries).[15]

We have accessed our official data with the help of Frontier Economics from the ONS's Virtual Micro-data Laboratory (VML). In order to eliminate the risk that individual businesses will be identified, it is not possible to extract data from VML for areas in which there are very few creative businesses. Unfortunately, as a consequence of this we are unable to analyse and present data for two important creative sub-sectors in the DCMS's classification – Crafts and Museums and Libraries – as well as data for other sub-sectors in a few small, rural areas with low levels of activity.

For example, the characteristics of craft businesses do not lend themselves easily to the approach used in the report. Crafts Council evidence shows that 88 per cent of craft businesses are sole traders. Craft is spatially and sectorally widely distributed, embedded in the economy, yet not at the level of density of other sectors featured, owing to typical business size. The majority of craft employment is located outside of the South-East, in contrast to other creative industries.[16]

Disclosure considerations also mean that, when reporting the findings for individual creative sub-sectors, we have to aggregate data for individual years into two periods, 2007-2010 and 2011-2014.

## The UK's creative industries are becoming more important in local economies across the UK

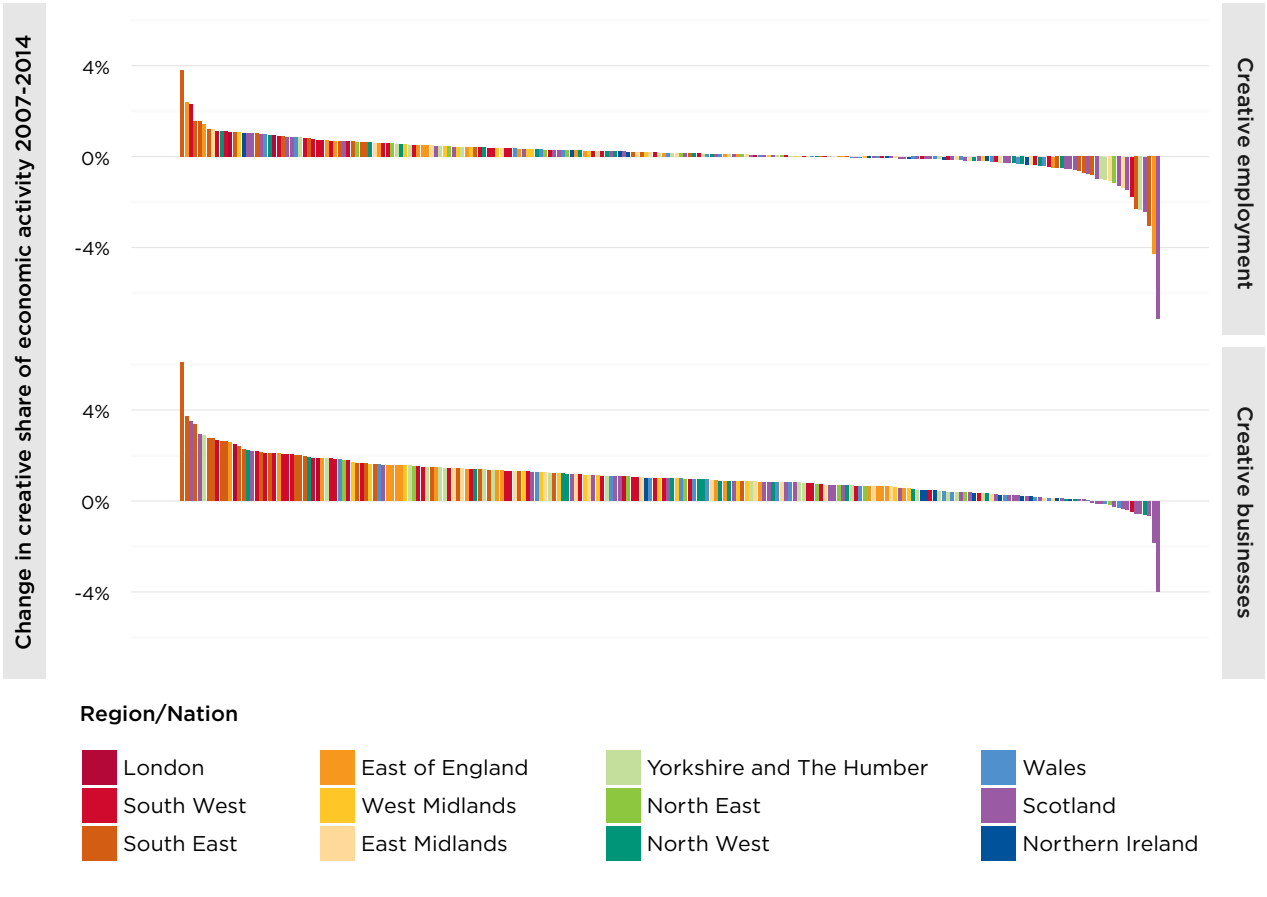
In 2014, according to the BSD, the creative industries accounted for 5.3 per cent of businesses and 2.7 per cent of employment in the average TTWA. These figures mask much higher levels of activity in certain TTWAs, consistent with the idea that creative businesses 'cluster'. In 2014, there were in fact 20 TTWAs where creative businesses represented 10 per cent or more of the total number of businesses, and ten TTWAs where creative employment represented more than 5 per cent of the total.

Our analysis also reveals that the creative industries are becoming more important in cities and towns across the whole of the UK.

We illustrate this in Figure 1, where we represent TTWAs by their percentage point change in the creative industries share of local employment (top panel) and of business counts (bottom panel) between 2007 and 2014. The chart shows that the creative industries have gained importance in most TTWAs, both in terms of creative employment and in the number of businesses. The increased importance of the creative industries in local business populations is particularly remarkable: more than nine in ten of UK TTWAs have grown their creative business numbers as a share of all businesses, and over two-thirds have proportionately grown their levels of creative employment.

In this figure, we have also used colours to represent the region of each TTWA. It shows that the creative industries are becoming an important component of local economies right across the UK – not just in London and the South-East of England.

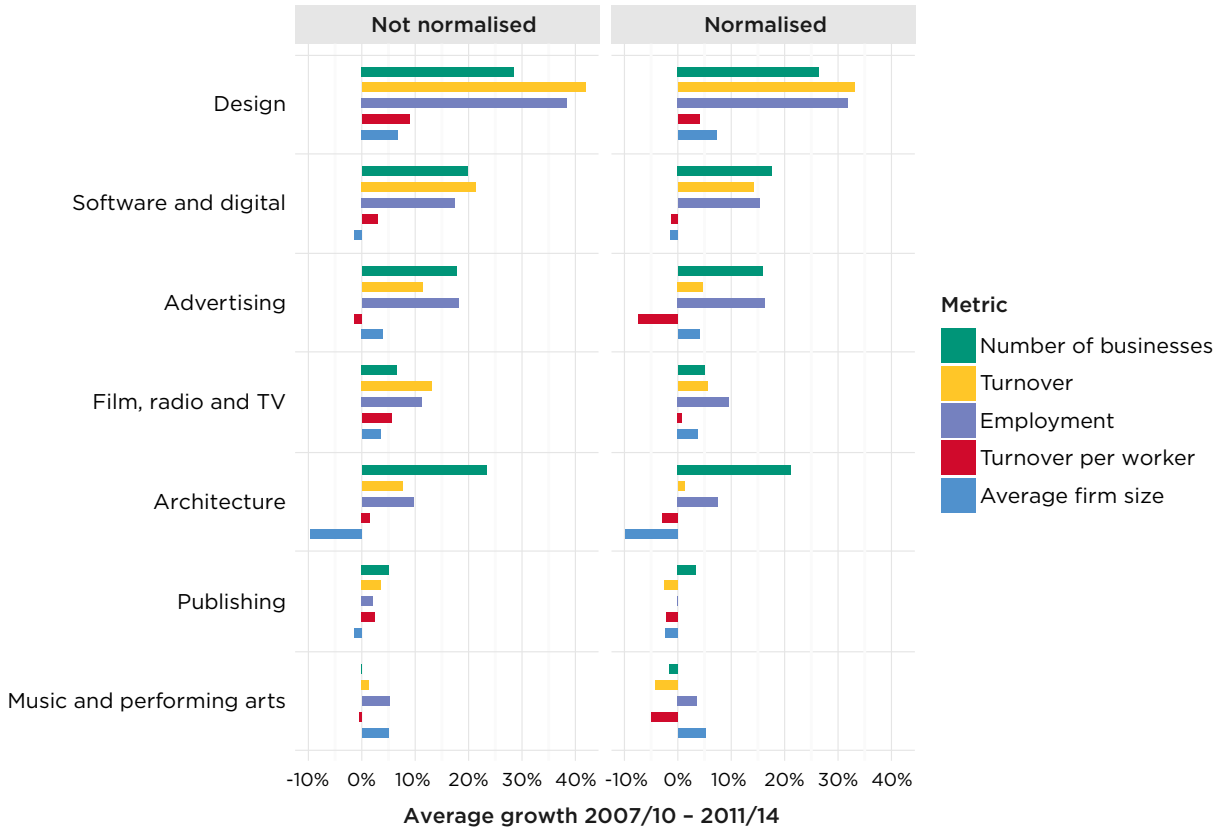
Figure 1: **The creative industries have gained importance as a share of employment and businesses**




Source: ONS, Business Structure Database; Nesta analysis.

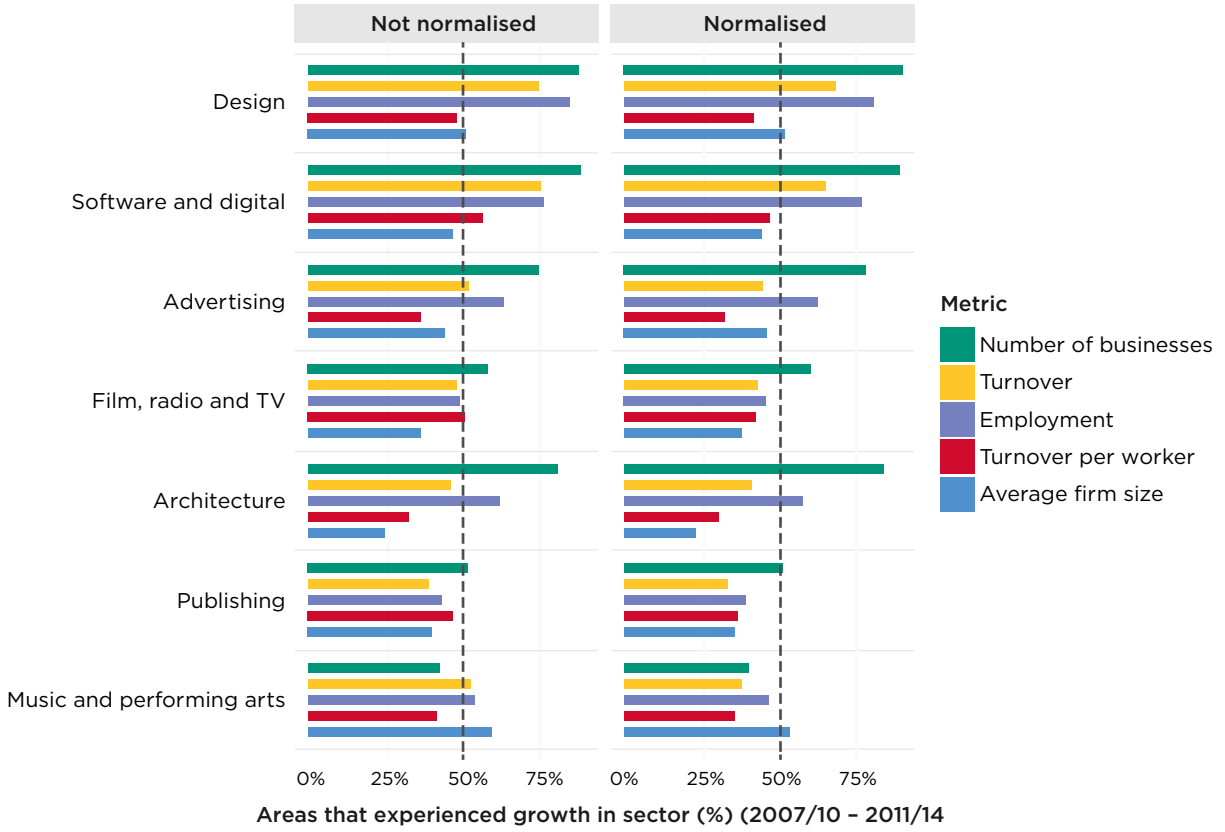
In Figures 2 and 3 we look at the growth rates of different creative sub-sectors on a range of measures.

Figure 2: **Average growth in most creative sub-sectors is fast**




Source: ONS, Business Structure Database; Nesta analysis.

Figure 3: **Creative sub-sectors are growing in most areas and metrics**




Source: ONS, Business Structure Database; Nesta analysis.

Both figures show that most UK TTWAs are growing their number of businesses and employment in most creative sub-sectors. What's more, this result holds even after we control for wider growth in the local economy (right-hand panel in both charts).

Creative services sub-sectors like Design, Software and digital and Advertising have grown particularly rapidly. According to Figure 3, more than half of TTWAs have grown their numbers of businesses, employment and turnover in these sub-sectors. The picture in other creative industries such as Publishing and Music and Performing Arts is more mixed, with lower average growth rates, and a smaller fraction of TTWAs experiencing increasing activity.

## The average size of creative businesses is declining

While in 2007 the average creative firm size in the UK was just under four workers, by 2014 this figure had declined to 3.3 (a 15 per cent fall). Figures 2 and 3 imply that this picture of declining average firm size is seen in many sub-sectors.

While small and flexible creative businesses stand to benefit from digital markets with low barriers to entry, they may also suffer from lack of visibility, and face greater difficulties in accessing finance to invest in R&D and in workforce training. We revisit what this means for policy in the conclusions.

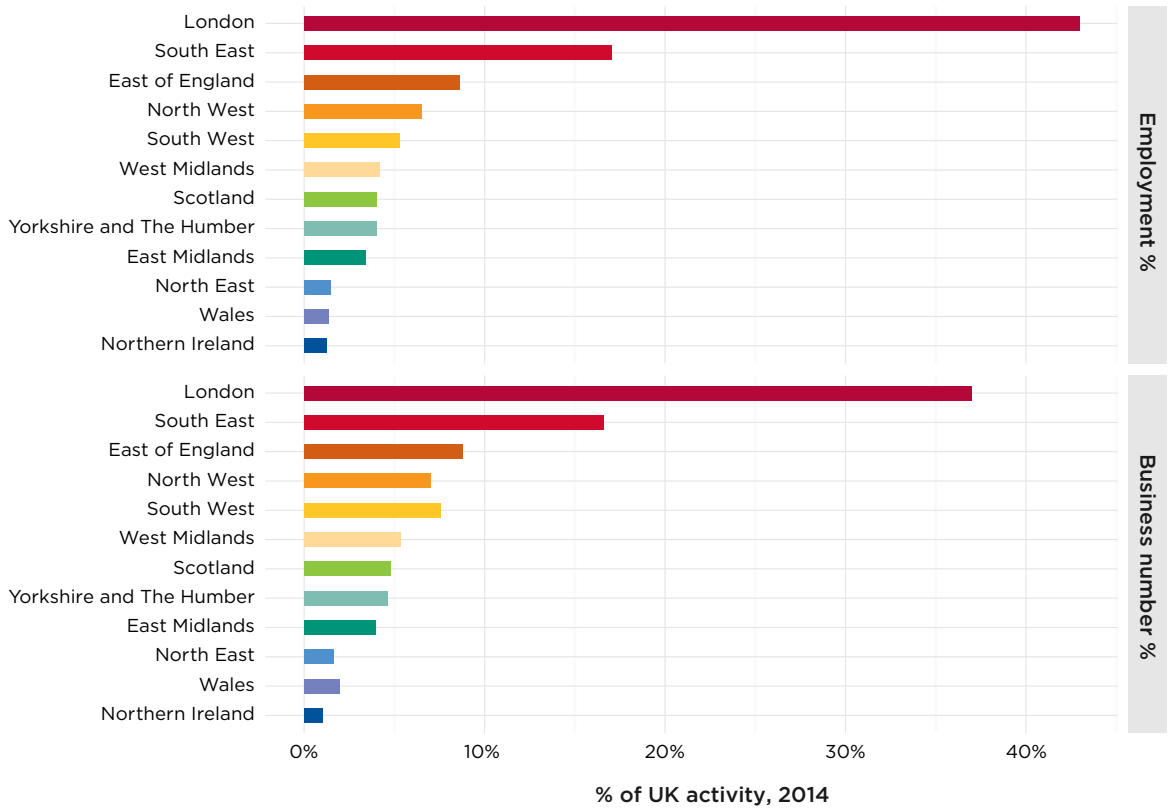
## Most creative industries activity is concentrated in London and in the South-East of England

Figure 4, which ranks regions and nations based on their share of UK creative industries employment and businesses in 2014, confirms that there are high levels of concentration in London and the South-East of England. In fact, according to BSD data, more than half of all creative industries employment and businesses are found there. London alone accounts for four in ten UK creative industry employees, and a third of creative businesses.

And Figure 5 suggests that the trend is towards more, not less, concentration: it ranks TTWAs based on the change in their creative industries employment and in the number of creative businesses as a share of the UK total between 2007 and 2014. It shows that a small number of TTWAs have become more important nationally.

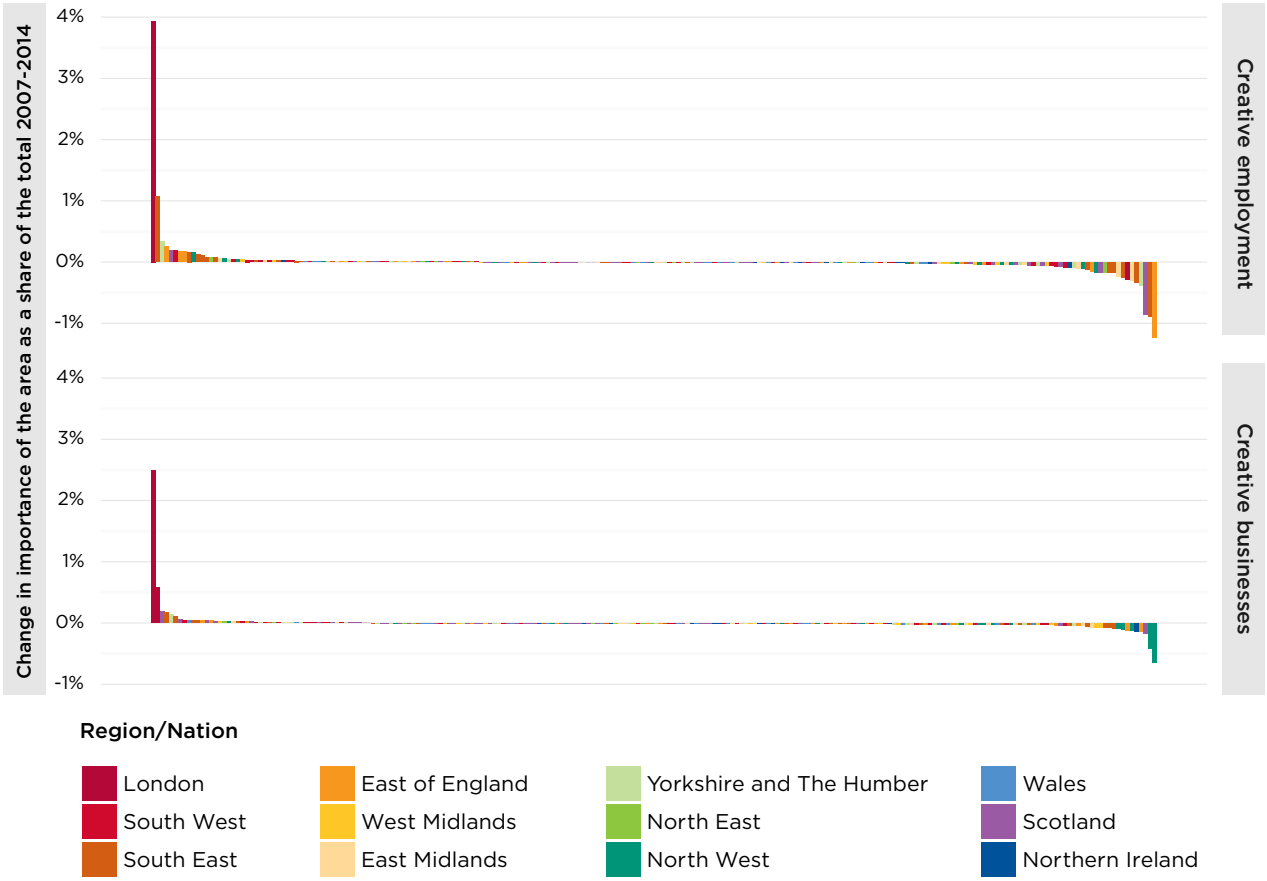
As Table 1 confirms, London has become even more important in the last seven years, both in terms of creative industries employment and in the number of creative businesses. Although TTWAs in the South East dominate the list of areas that have gained importance in terms of the proportion of UK creative employment and business numbers that they represent (they comprise 26 per cent of those TTWAs becoming more important nationally in terms of the number of creative businesses, and 40 per cent of those becoming more important in terms of creative industries employment), some TTWAs in other parts of the UK, such as Leeds, Edinburgh and Glasgow, and Cardiff are also in the list. It is also worth noting that several of the TTWAs featured in the table – places such as Milton Keynes, Slough, Wycombe or Southampton – are rarely mentioned in other studies as UK creative clusters. Our analysis suggests, however, that these are gaining importance in the UK's geography of creativity – we come back to this finding in the next section, where we present the creative clusters we have identified in our study.

Figure 4: **Creative employment and business activity concentrate in London and the South-East**




Source: ONS, Business Structure Database; Nesta analysis.

## Figure 5: TTWAs in London and the South of England have gained importance between 2007 and 2014




Source: ONS, Business Structure Database; Nesta analysis.

## Table 1: Top 15 TTWA areas by increase in creative industries importance (2007–2014)

| | Employment | | | Business count | |
|---|---|---|---|---|---|
| | TTWA | % | | TTWA | % |
| 1 | London | 3.94 | 1 | London | 2.50 |
| 2 | Reading | 1.07 | 2 | Slough and Heathrow | 0.58 |
| 3 | Leeds | 0.34 | 3 | Edinburgh | 0.18 |
| 4 | Luton | 0.26 | 4 | Milton Keynes | 0.17 |
| 5 | Edinburgh | 0.20 | 5 | Leeds | 0.13 |
| 6 | Bristol | 0.19 | 6 | Brighton | 0.10 |
| 7 | Southend | 0.18 | 7 | Livingston | 0.05 |
| 8 | Colchester | 0.17 | 8 | Bristol | 0.05 |
| 9 | Southampton | 0.16 | 9 | Cardiff | 0.05 |
| 10 | Chester | 0.15 | 10 | Reading | 0.04 |
| 11 | Milton Keynes | 0.13 | 11 | Basingstoke | 0.04 |
| 12 | Brighton | 0.11 | 12 | Southend | 0.04 |
| 13 | High Wycombe and Aylesbury | 0.08 | 13 | Dunfermline and Kirkcaldy | 0.04 |
| 14 | Newcastle | 0.07 | 14 | Stevenage and Welwyn Garden City | 0.03 |
| 15 | Portsmouth | 0.07 | 15 | Glasgow | 0.03 |

Source: ONS, Business Structure Database; Nesta analysis.

# 3. Listen: one size does not fit all

Discussions about creative place-making and creative cities sometimes make it sound as if there is only one possible model for creative clustering – that of the creative city. This viewpoint, inspired by the work of American urban theorist, Jane Jacobs and popularised by Richard Florida, argues that dense urban areas benefit from access to amenities, creative diversity and local 'buzz', which attract creative talent and the creative businesses that employ them. Creative clustering, the argument goes, ensues.[17]

In this report, we identify creative clusters using economic indicators, and don't consider the 'qualities' of place that are often used to define creative cities. The findings we present in this section confirm that UK creative clusters can take very different shapes. The message for the policymakers who want to support them is clear: there is not a one-size-fits-all for creative clusters, and local context matters.

## Our method

The method we have used to identify creative clusters is based on the approach developed by economists Mercedes Delgado, Michael Porter and Scott Stern.[18] The basic idea is to identify groups of creative sub-sectors that are similar to each other, and look for geographic hotspots of activity in these groups.[19] We measure activity in terms of current levels of agglomeration (relative importance of the sector in the local economy), and also in terms of rapid clustering growth between the first period and the second period we consider (in this way we try to capture 'up and coming' locations).

## Creative clusters span the UK

The map below shows the 47 areas we have identified using this method – it highlights that although creative clusters have a stronger presence in London and the South East (which together comprise around a third of all clusters identified), there are also hotspots of creative activity throughout the UK – just over one-fifth of the clusters are in Northern TTWAs, for example. All of the UK nations are represented on the list.

The map also suggests that there are several creative agglomerations encompassing more than one TTWA: we see this around Manchester (including Liverpool, Warrington and Wigan, Chester, and Crewe), Leeds (also including Harrogate), and the South West around Bristol and Cardiff (also including Bath and Trowridge).

In the South-East of England, we see similar agglomerations along the coast around Brighton (which is surrounded by other hotspots of creative activity in Hastings, Eastbourne and Tunbridge Wells), and further west, in Southampton and Bournemouth. We examine further the extent to which these creative clusters are networked in ways that indicate patterns of collaboration in Section 5.

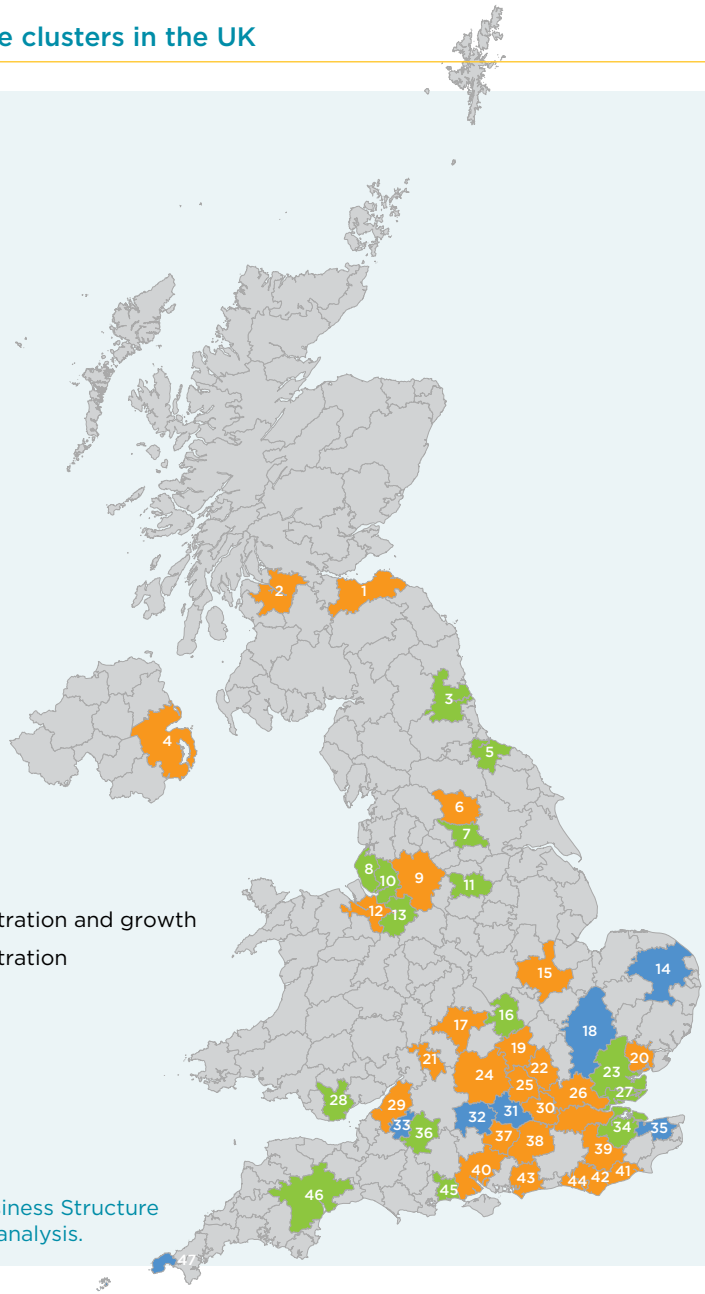
## Not all creative clusters are 'creative cities'

In Figure 6, we show TTWA scores on the measures we have used to define our clusters. If a TTWA has an orange cell on an indicator (e.g. London in concentration of Architecture businesses), this means that the TTWA is in the top ten for the UK on that measure.[20] In the figure, we have ranked the TTWAs based on the total number of indicators where they are UK leaders.

Unsurprisingly, London comes out on top – it is in the top ten for the UK in half of the indicators we have considered. What's perhaps more interesting is that some of the locations that follow it – places such as Tunbridge Wells, Slough and Heathrow, High Wycombe and Aylesbury, Peterborough and Guildford and Aldershot – are not really examples of 'creative cities', at least as usually defined; for example, none of them appear in the top ten 'Boho index' produced by Richard Florida in collaboration with think-tank Demos, in 2003.[21]

Our analysis suggests that in addition to London and 'hip' creative cities such as Brighton, Bristol, Manchester, Edinburgh and Liverpool, the UK boosts another type of creative industries hotspot – we'll refer to these as 'creative conurbations' – that are perhaps less visible, but may be equally important for the UK's creative health.

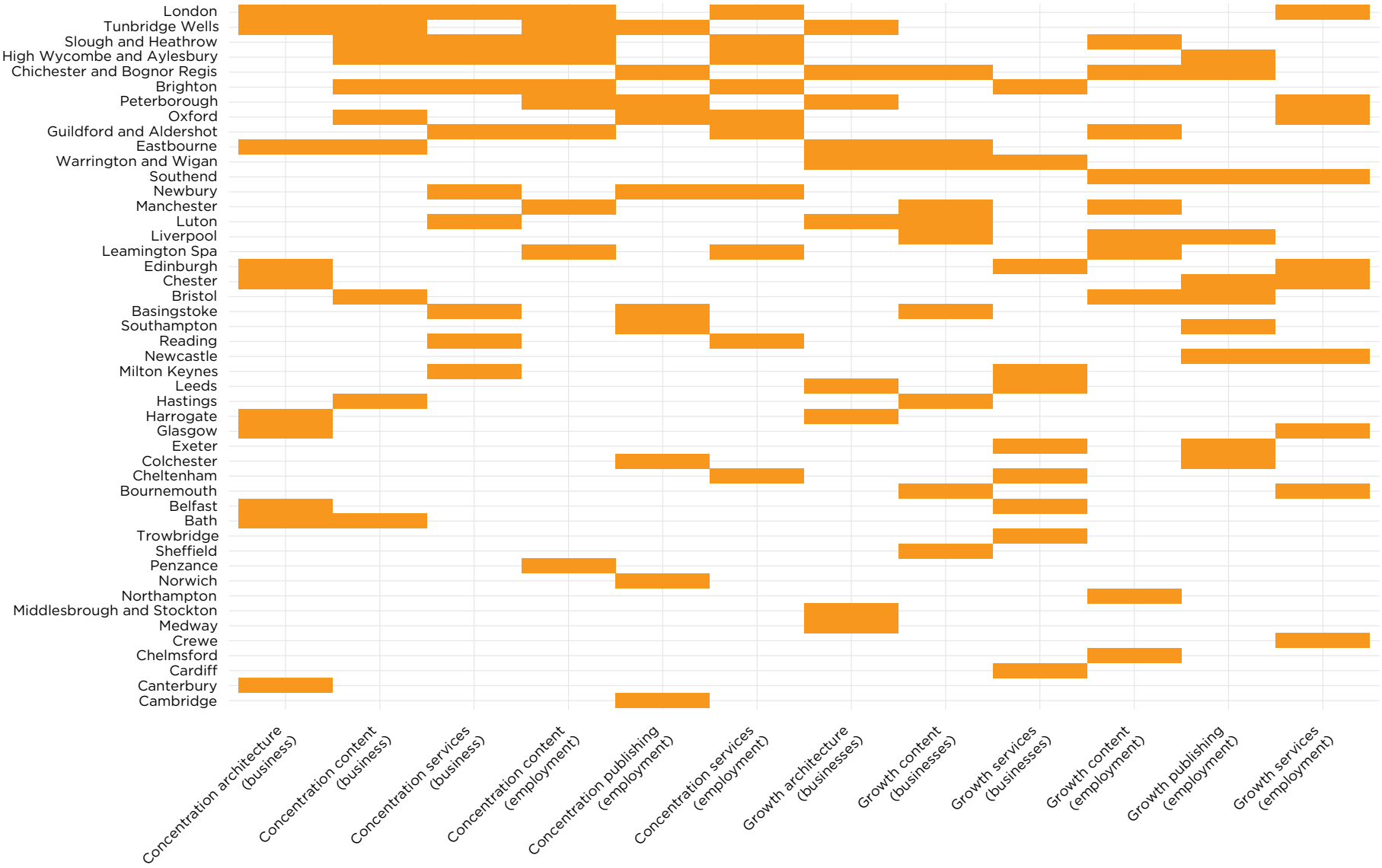
## Map 1: **Creative clusters in the UK**




| | | | |
|---|---|---|---|
| 1 | Edinburgh | 25 | High Wycombe and Aylesbury |
| 2 | Glasgow | 26 | London |
| 3 | Newcastle | 27 | Southend |
| 4 | Belfast | 28 | Cardiff |
| 5 | Middlesbrough and Stockton | 29 | Bristol |
| 6 | Harrogate | 30 | Slough and Heathrow |
| 7 | Leeds | 31 | Reading |
| 8 | Liverpool | 32 | Newbury |
| 9 | Manchester | 33 | Bath |
| 10 | Warrington and Wigan | 34 | Medway |
| 11 | Sheffield | 35 | Canterbury |
| 12 | Chester | 36 | Trowbridge |
| 13 | Crewe | 37 | Basingstoke |
| 14 | Norwich | 38 | Guildford and Aldershot |
| 15 | Peterborough | 39 | Tunbridge Wells |
| 16 | Northampton | 40 | Southampton |
| 17 | Leamington Spa | 41 | Hastings |
| 18 | Cambridge | 42 | Eastbourne |
| 19 | Milton Keynes | 43 | Chichester and Bognor Regis |
| 20 | Colchester | 44 | Brighton |
| 21 | Cheltenham | 45 | Bournemouth |
| 22 | Luton | 46 | Exeter |
| 23 | Chelmsford | 47 | Penzance |
| 24 | Oxford | | |

Source: ONS, Business Structure Database; Nesta analysis.

## Figure 6: **Creative clustering scores by TTWA**




Source: ONS (2016)

## What about creative clusters like Birmingham?

The clusters in our list capture just under three-quarters of all creative businesses, 81 per cent of creative industries employment, and 87 per cent of creative industries GVA in the UK (see Tables 2a and 2b). The list also includes all the 'creative hotspots' identified in Nesta's *Creative Clusters and Innovation* report in 2010.

There are some interesting omissions, however, such as Birmingham. To check if this finding is robust, we lowered the threshold of our cluster-detection algorithm to select 20 high-scoring TTWAs per indicator (instead of ten). When we did this, Birmingham still only appeared in one of these indicators considered (growth in employment concentration for Publishing) and, even there, it ranked last of all the TTWAs. Another location where there are examples of significant creative activity – York – appears only once in the expanded list (growth in creative content Business count concentration).

That these cities – and others not represented in Figure 6 – are home to some of the UK's leading creative companies is not in question. In the case of Birmingham – a focus of much public creative industries investment in recent years – there can also be found several recently arrived 'anchor' institutions such as the BBC Academy and Birmingham Ormiston Academy, so we would expect to see growth there in the future.

More generally, it is important to recognise that the creative cluster list we have produced is not immutable, making it all the more important to repeat the mapping exercise in the future, so that we can track the changes in the UK's geography of creativity, and identify new creative clusters as they emerge.

## Clusters for courses

Figure 7 looks at the creative sub-sector composition of different clusters, further illustrating their diversity.

Horizontally, we have sorted sectors by their relative importance in each TTWA. More locally important sectors appear to the left in both panels. Although Software and digital is generally the largest creative sub-sector, both in terms of employment and the number of businesses, the picture is far from homogeneous. For starters, other sectors play a very important role in some creative clusters: we see this with Film, Radio and TV in London, or Music and Performing Arts in Eastbourne. Several locations including Oxford, Cambridge, Southampton, Norwich and – especially – Peterborough have a strong publishing presence. The relative importance of different sub-sectors also varies across clusters.

Creative clusters are also heterogeneous in their levels of sub-sectoral diversification. To illustrate this, we have sorted them vertically by their level of sectoral diversity. Those locations at the top of Figure 7 tend to have more diversified creative ecosystems, while those at the bottom are more specialised.[22] Many 'creative cities' like Glasgow, Cardiff, Manchester, Brighton and Edinburgh sit at the top of the figure. Other creative clusters – and particularly creative conurbations such as High Wycombe and Aylesbury, Slough and Heathrow, Guildford and Aldershot etc., - tend to be more specialised.

## What does this mean for policy?

Specialisation and diversity have their pros and cons in terms of the economic performance of creative clusters. On the one hand, specialisation contributes to efficiency. But on the other, it can create fragile creative ecosystems reliant on the fortunes of a few large businesses or sectors. Managing the trade-off between exploiting existing business models to capture value, and exploring connections between sectors to create new forms of value, is one of the greatest challenges facing creative entrepreneurs and the policymakers who support them.

## Table 2a: **Economic statistics for creative clusters**

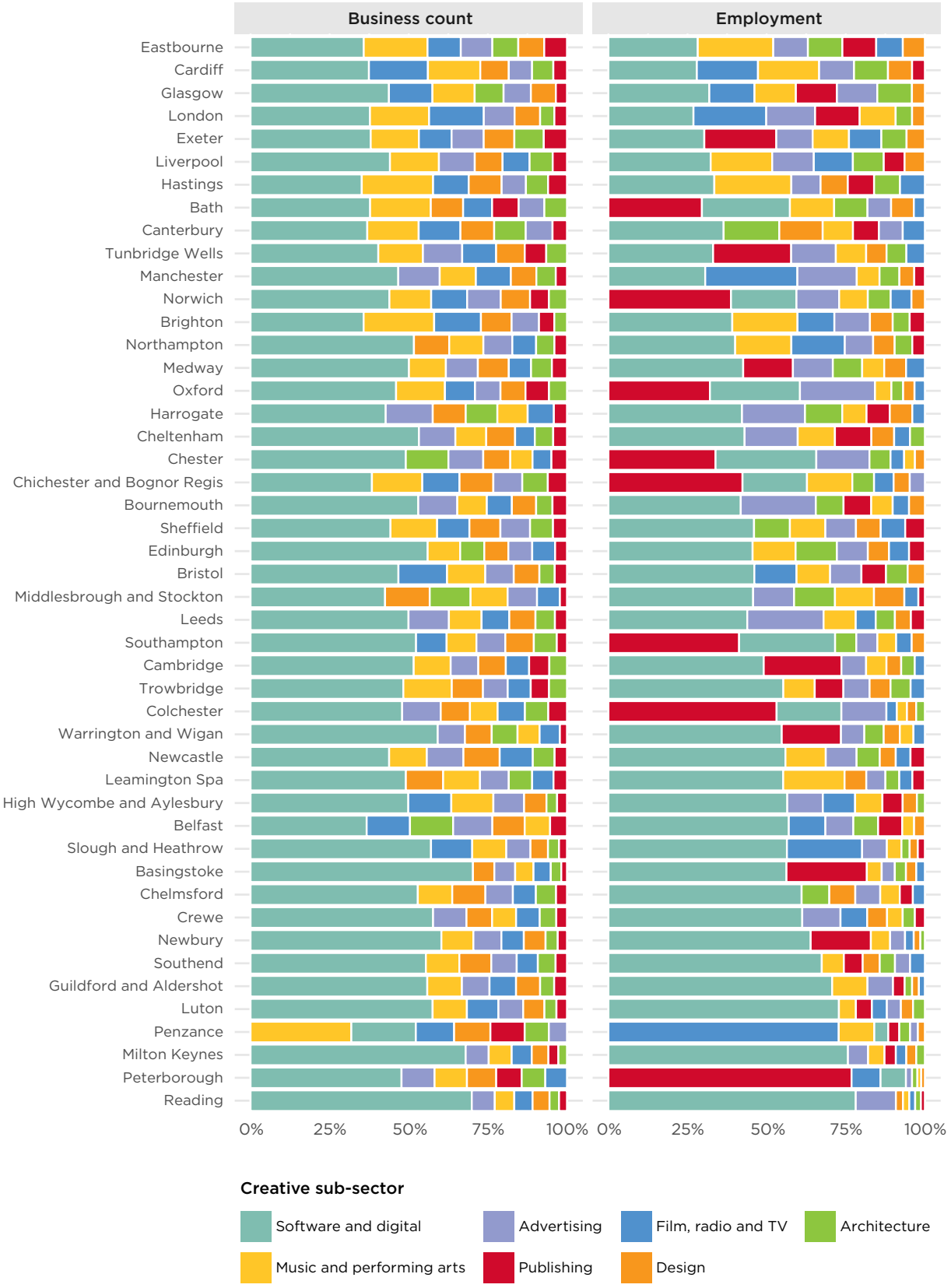
| TTWA | Number of creative businesses | Creative businesses (% of total) | Creative employment | Creative employment (% of total) | Creative jobs | Creative jobs (% of total) | Sales per worker (£K GBP) | Average firm size | Creative GVA | Creative GVA (% of total) |
|---|---|---|---|---|---|---|---|---|---|---|
| London | 81,704 | 15.3% | 442,482 | 7.0% | 484,752 | 12% | 176.09 | 5.42 | 41,830,957 | 12.2% |
| Slough and Heathrow | 14,100 | 15.3% | 66,366 | 6.7% | 74,765 | 9% | 261.59 | 4.71 | 6,274,048 | 11.1% |
| Manchester | 8,220 | 8.1% | 43,050 | 3.5% | 62,972 | 5% | 142.14 | 5.24 | 2,309,992 | 5.1% |
| Reading | 4,842 | 15.4% | 40,638 | 11.2% | 30,337 | 11% | 164.61 | 8.39 | 3,068,438 | 19.6% |
| Guildford and Aldershot | 5,120 | 13.2% | 38,963 | 8.8% | 30,300 | 9% | 153.88 | 7.61 | 2,941,964 | 14.9% |
| Luton | 4,565 | 12.6% | 21,113 | 3.6% | 25,664 | 7% | 113.20 | 4.62 | 1,065,848 | 4.7% |
| Oxford | 3,061 | 11.1% | 18,933 | 5.7% | 26,974 | 9% | 146.44 | 6.19 | 1,429,567 | 9.6% |
| Glasgow | 3,237 | 8.9% | 18,812 | 3.4% | 28,005 | 5% | 83.19 | 5.81 | 1,012,418 | 4.2% |
| Cambridge | 3,919 | 10.7% | 16,459 | 4.8% | 30,851 | 8% | 113.02 | 4.20 | 830,900 | 6.0% |
| Leeds | 2,749 | 8.9% | 15,076 | 2.4% | 21,297 | 6% | 88.43 | 5.48 | 637,226 | 2.8% |
| Bristol | 4,074 | 11.2% | 14,535 | 3.5% | 33,937 | 8% | 104.90 | 3.57 | 780,272 | 4.5% |
| Peterborough | 1,100 | 7.8% | 13,246 | 7.8% | 9,835 | 6% | 159.93 | 12.04 | 668,698 | 9.7% |
| High Wycombe and Aylesbury | 3,262 | 12.9% | 13,170 | 6.1% | 19,390 | 10% | 146.79 | 4.04 | 994,422 | 10.1% |
| Southampton | 2,614 | 8.9% | 12,877 | 3.8% | 20,737 | 6% | 68.48 | 4.93 | 972,299 | 6.0% |
| Belfast | 1,646 | 6.1% | 11,545 | 2.9% | * | * | 82.78 | 7.01 | 433,115 | 3.2% |
| Newcastle | 1,989 | 7.2% | 11,175 | 2.3% | 20,070 | 4% | 84.52 | 5.62 | 542,426 | 2.7% |
| Edinburgh | 3,215 | 12.2% | 11,002 | 2.3% | 22,858 | 7% | 86.21 | 3.42 | 592,102 | 2.6% |
| Milton Keynes | 2,697 | 13.4% | 10,073 | 3.7% | 12,470 | 6% | 131.44 | 3.73 | 760,578 | 5.8% |
| Chelmsford | 2,220 | 8.9% | 8,809 | 4.1% | * | * | 137.39 | 3.97 | 444,705 | 4.8% |
| Southend | 1,881 | 8.1% | 8,266 | 4.3% | 12,628 | 5% | 95.36 | 4.39 | 417,293 | 4.5% |
| Basingstoke | 1,946 | 14.2% | 7,825 | 4.2% | * | * | 119.37 | 4.02 | 590,839 | 7.1% |
| Brighton | 2,956 | 16.2% | 7,694 | 6.0% | 18,056 | 11% | 76.61 | 2.60 | 580,948 | 10.1% |
| Warrington and Wigan | 1,743 | 6.1% | 7,128 | 2.2% | 13,869 | 4% | 58.66 | 4.09 | 382,477 | 3.2% |
| Leamington Spa | 1,504 | 9.6% | 7,033 | 4.6% | * | * | 90.72 | 4.68 | 417,552 | 6.5% |

Table 2b: **Economic statistics for creative clusters (continued)**

| TTWA | Number of creative businesses | Creative businesses (% of total) | Creative employment | Creative employment (% of total) | Creative jobs | Creative jobs (% of total) | Sales per worker (£K GBP) | Average firm size | Creative GVA | Creative GVA (% of total) |
|---|---|---|---|---|---|---|---|---|---|---|
| Cardiff | 1,765 | 7.8% | 6,936 | 2.3% | 16,052 | 5% | 88.82 | 3.93 | 299,682 | 2.6% |
| Sheffield | 1,825 | 7.5% | 6,873 | 2.0% | * | * | 85.03 | 3.77 | 290,505 | 2.3% |
| Norwich | 1,345 | 7.2% | 6,734 | 3.0% | * | * | 69.91 | 5.01 | 339,953 | 3.8% |
| Colchester | 865 | 8.8% | 6,587 | 5.7% | * | * | 85.92 | 7.62 | 332,532 | 7.5% |
| Tunbridge Wells | 2,138 | 11.5% | 6,292 | 5.5% | * | * | 99.02 | 2.94 | 475,088 | 9.4% |
| Liverpool | 1,790 | 6.6% | 5,604 | 1.6% | 17,176 | 4% | 73.60 | 3.13 | 300,701 | 2.1% |
| Medway | 1,699 | 7.4% | 5,593 | 2.4% | * | * | 123.39 | 3.29 | 422,308 | 3.9% |
| Newbury | 1,014 | 11.9% | 4,954 | 6.3% | * | * | 98.19 | 4.89 | 374,060 | 10.5% |
| Chester | 919 | 7.4% | 4,919 | 2.6% | * | * | 61.23 | 5.35 | 263,945 | 3.8% |
| Bath | 1,127 | 12.9% | 4,912 | 3.7% | 7,822 | 10% | 97.17 | 4.36 | 263,687 | 4.3% |
| Northampton | 1,240 | 7.7% | 4,391 | 2.1% | * | * | 74.52 | 3.54 | 205,951 | 2.6% |
| Bournemouth | 1,285 | 8.8% | 4,336 | 3.2% | 9,813 | 6% | 91.83 | 3.37 | 232,766 | 4.0% |
| Exeter | 1,145 | 5.9% | 4,081 | 2.2% | * | * | 87.15 | 3.56 | 219,077 | 2.7% |
| Crewe | 1,062 | 7.8% | 3,449 | 2.9% | * | * | 104.02 | 3.25 | 185,068 | 4.2% |
| Chichester and Bognor Regis | 873 | 8.2% | 3,422 | 3.6% | * | * | 142.42 | 3.92 | 258,384 | 5.7% |
| Cheltenham | 1,027 | 10.7% | 3,335 | 4.5% | * | * | 108.59 | 3.25 | 179,030 | 6.0% |
| Trowbridge | 986 | 9.0% | 2,804 | 3.0% | * | * | 94.28 | 2.84 | 150,525 | 3.7% |
| Harrogate | 747 | 7.9% | 2,723 | 3.2% | * | * | 223.17 | 3.65 | 115,095 | 4.1% |
| Eastbourne | 969 | 9.1% | 2,703 | 2.9% | * | * | 75.97 | 2.79 | 204,094 | 4.5% |
| Middlesbrough and Stockton | 624 | 4.8% | 1,929 | 1.4% | 5,033 | 2% | 74.86 | 3.09 | 93,632 | 1.6% |
| Canterbury | 625 | 8.4% | 1,764 | 2.5% | * | * | 94.96 | 2.82 | 133,194 | 4.5% |
| Hastings | 654 | 9.4% | 1,319 | 3.0% | * | * | 65.09 | 2.02 | 99,593 | 4.7% |
| Penzance | 162 | 6.2% | 1,259 | 7.4% | * | * | 54.90 | 7.77 | 67,586 | 9.7% |

Source: ONS, Business Structure Database, Annual Business Survey, Annual Population Survey; Nesta analysis.

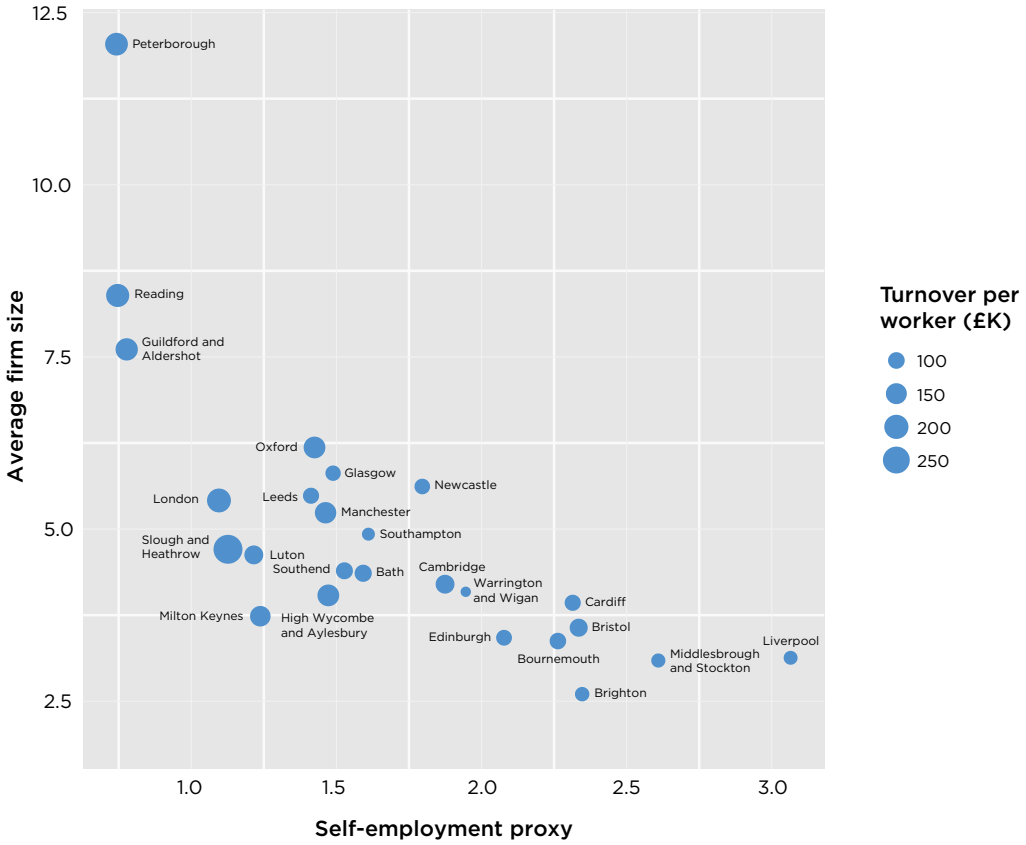
## Figure 7: **Industrial composition of creative clusters (2011–2014)**




Source: ONS, Business Structure Database; Nesta analysis.

Figure 8 provides another example for this. In this scatterplot, we have plotted, for creative clusters, an indicator of creative self-employment on the horizontal axis, and average creative firm size on the vertical axis. The size of the points represents turnover per worker, a rough proxy for labour productivity.[23]

Figure 8: **Industrial structure of selected creative clusters**




Source: ONS, Business Structure Database, Annual Population Survey; Nesta analysis.

The slope of the relationship suggests a negative link between average firm size and the importance of self-employment, which is intuitive because freelancers are a substitute for creative industry employees. There also appears to be a negative relation between turnover per worker and levels of creative self-employment, however. Frontier Economics (2016) note that the especially high levels of micro-businesses and self-employed in the creative industries acts to depress aggregate measures of productivity. Several of the sectorally diversified creative cities we mentioned before – Liverpool, Brighton, Cardiff, Bristol – are located in the bottom right corner of the chart, while creative conurbations such as Reading, Guildford and Slough are on the top left.

Before jumping to the conclusion that stronger specialisation is the way to grow creative businesses and secure productivity gains, however, we need to remember that freelancers give creative businesses the flexibility to scale up and down in response to the vagaries of creative markets, and help diffuse knowledge between creative businesses (thereby making important contributions to the creative ecosystem).[24] Their importance in some clusters is probably telling us something about the business models that predominate in those locations.

Perhaps the main takeaway from the figure – and from this whole section – is that there isn't a single creative clusters model that dominates all others. Different specialisation profiles and industrial structures present advantages and disadvantages. The job for local policymakers, having understood the strengths and weaknesses of their clusters, is to harness the former, and ameliorate the latter.

# 4. Invest in knowledge, and in people

If there is one feature that all creative clusters share, it is their reliance on creative talent, often highly skilled and supplied by universities.[25] Research at universities also creates a knowledge base that R&D-intensive creative businesses in particular draw on. Universities also undertake knowledge exchange activities which transform this knowledge into impact, through entrepreneurship, training and dissemination activities. For all of these reasons, universities are widely acknowledged as central players in the local ecosystems that drive the success of creative clusters.[26]

## Measuring creative talent and knowledge ecosystems

In this section, we use open data from the Higher Education Statistics Agency (HESA) and the Higher Education Funding Council (HEFCE) to illustrate these roles. Our indicators capture:

- **Talent supply**: Numbers of graduates in Arts and Design and Computer Science subjects (based on HESA's Qualifier dataset, for 2013-2014).[27]
- **Research**: Number of full-time equivalent researchers doing world-class research in Arts and Design and Computer Science – two areas of obvious relevance to the creative industries (from HEFCE's 2014 Research Excellence Framework assessment of research quality).
- **Knowledge Exchange**: Measures of revenue generated through engagement with SMEs (including consultancy, contract research and hiring of facilities and equipment) as well as training, turnover from university spinouts in 2014 and number of attendees at events organised by universities, from HESA's Higher Education Business-Community Interaction Survey (HE-BCI), 2014.

Table 3 summarises the total levels of activity in the UK, and the distribution across the creative clusters identified in Section 3.

Column three shows the percentage of activity in each of the metrics taking place in creative clusters. It suggests that there are very significant levels of university activity relevant for the creative industries outside of our creative clusters (recall that the proportion of economic activity that these clusters represent ranged between 75 per cent and 87 per cent, generally higher proportions than those in column three of Table 3). This means that there are substantial resources that could be harnessed to drive creative cluster development elsewhere in the UK.

Having said that, creative clusters represent, on average, much higher levels of activity on all of the indicators considered, even after excluding London (column 6).[28] This is consistent with the idea that creative clustering goes hand-in-hand with a supportive education and research environment.[29]

Table 3: **Creative talent and knowledge ecosystems metrics**

| Area | Metric | 1 Total UK | 2 Creative clusters total | 3 Creative clusters % | 4 Creative cluster mean, w/o London | 5 Other TTWA mean | 6 Difference cluster/ other |
|---|---|---|---|---|---|---|---|
| Talent (qualifiers) | Computer Science | 18,912 | 12,237 | 65% | 296 | 185 | 60% |
| | Arts and Design | 52,450 | 36,192 | 69% | 793 | 452 | 76% |
| Research (top rated researchers full-time equivalent) | Computer Science | 528 | 400 | 76% | 9 | 3.55 | 152% |
| | Arts and Design | 409 | 285 | 70% | 5.19 | 3.45 | 51% |
| Knowledge Exchange | SME Engagement (£K) | £136,458 | £92,811 | 68% | £2,450 | £1,212 | 102% |
| | SME training (£K) | £272,492 | £199,270 | 73% | £3,563 | £2,033 | 75% |
| | Spinout turnover (£K) | £1,815,003 | £1,244,741 | 69% | £33,549 | £15,840 | 112% |
| | Event attendees | 21,408,374 | 18,562,034 | 87% | 476,302 | 79,065 | 502% |

Source: HESA qualifier database, HE-BCI Survey, HEFCE Research Excellence Framework results; Nesta analysis.

Figures 9 and 10 further illustrate this finding. In Figure 9, the coxcomb diagrams represent the levels of talent provision, research and knowledge exchange that are particularly relevant for the creative industries in each creative cluster. The length of the segments represents the level of local activity on each of those indicators, and ranges between one and ten (one means that an area is in the bottom 10 per cent of all creative clusters in that metric, and ten means that it is in the top 10 per cent).

As expected, London scores highly in all the relevant variables. Scottish and Northern England creative clusters also appear to benefit from strong talent and knowledge ecosystems, as does Cardiff.

Some of the findings appear to reflect differences in cluster specialisations – Brighton's excellence in Arts and Design, and its high levels of event activity could be linked to the city's cultural atmosphere, for example, while Bristol – the UK's HQ for Hewlett Packard and home to a vibrant tech cluster – has strengths around computer science education and research.

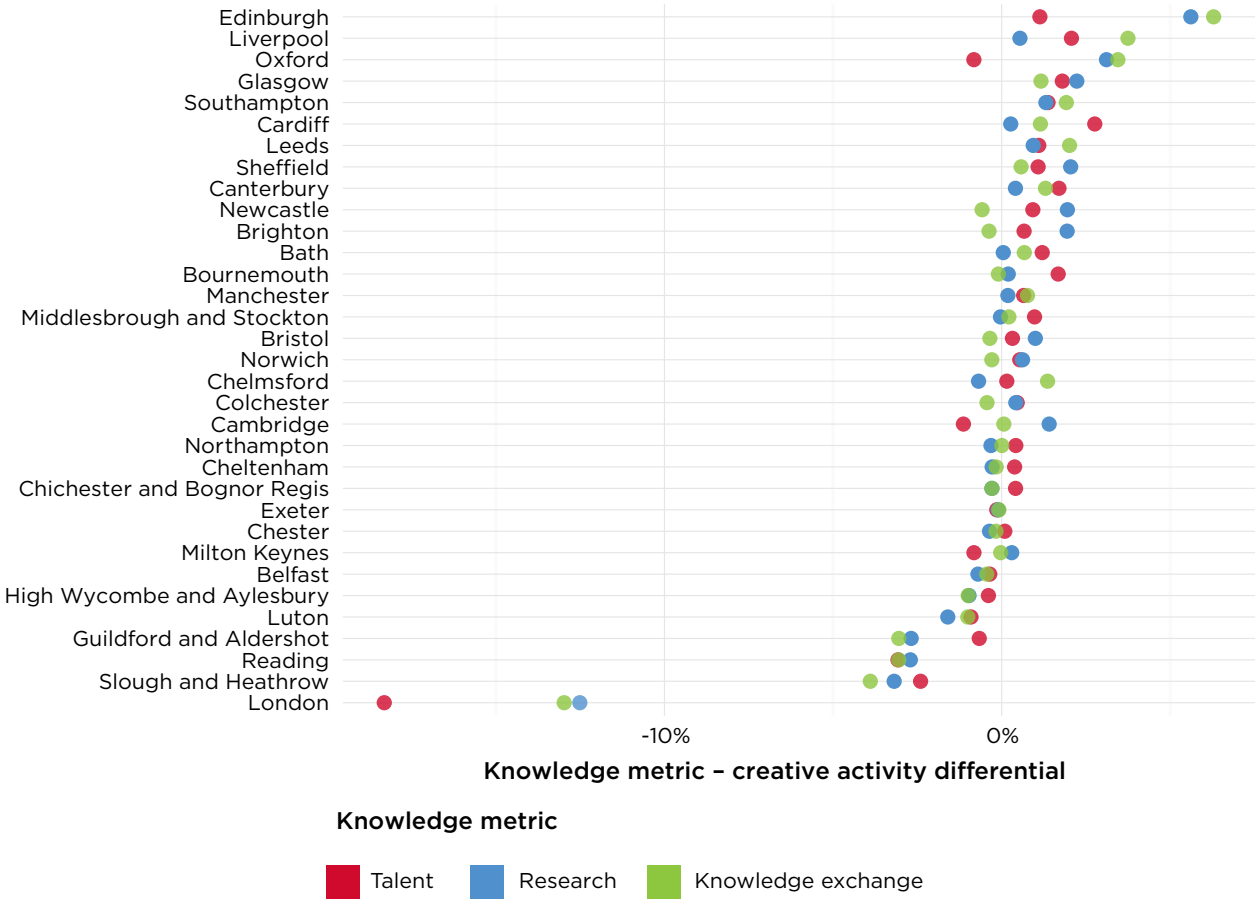
In other places, such as Cambridge and Oxford, we detect what may be 'blind spots' and gaps in support for some creative sub-sectors. Both TTWAs have strong capabilities in the digital area, but less so in Arts and Design. This is despite the fact that content sub-sectors such as Publishing and Music and the performing arts (for which Arts and Design graduates and research may be particularly relevant) are important local creative employers in both clusters (see Figure 7, page 22).[30]

Figure 9 also raises the question of whether there are new opportunities for creative entrepreneurship, and for developing new creative sub-sectors in some clusters. For example, Guildford and Aldershot, a cluster strongly specialised in Software, has a very strong supply of Arts and Design graduates, and Arts and Design research activity. These capabilities could perhaps harnessed to diversify the profile of the cluster, and create more opportunities for cross-sectoral innovation.

## Figure 9: **Local knowledge and talent capabilities in creative clusters**


Source: HESA qualifier database, HE-BCI Survey, HEFCE Research Excellence Framework results; Nesta analysis.

Figure 10: **Differential between creative industries activity and local support**




Source: HESA qualifier database, HE-BCI Survey, HEFCE Research Excellence Framework results; Nesta analysis.

## Matching supply and demand, and anchoring creative clusters

Figure 9 does not consider the fact that TTWAs have different levels of creative industries activity. We try to account for this in Figure 10, where, in each TTWA, we have compared the local levels of talent supply, research and SME support activity with its level of creative industries employment (all these are calculated as proportions of the UK total).[31] The horizontal axis captures the difference between both.

Take London as an example. It represents 37 per cent of all creative industries employment in the UK, but only 24 per cent of world-leading researchers in subjects relevant for the creative industries are based there. The blue dot in the horizontal axis captures the difference between both metrics, and could be thought of as a proxy for the relative abundance or scarcity (in the case of London, scarcity) of support for the local creative industries.

The most striking finding is that London seems relatively underserved in terms of the volume of locally grown talent, research and knowledge exchange (though of course that may be because London can rely on importing these resources from other parts of the country and overseas). The sheer scale of creative industries activity in the capital outweighs the supply of talent, research and knowledge exchange from its world-leading universities. Going up the chart, we find apparent 'gaps' in support for some of the South East 'creative conurbations'

previously identified. This contrasts with the situation in other clusters, particularly in Scotland and in Northern cities such as Liverpool, Leeds, Newcastle and Sheffield, where there is a relative abundance of local support for the creative industries.

These findings have several implications. First, they suggest that what has in some cases been described as a brain drain of creative talent from the UK's regions to London may simply reflect the importance of the capital for the UK's creative industries, with a demand for talent over and above what local universities are able to provide (we come back to the idea of connections between creative clusters across the UK in Section 4). Second, they tentatively point to a potential barrier for the continued success of creative conurbations that appear to have less ready access to talent, research and knowledge exchange resources than those in other creative clusters. Finally, our findings underscore the importance of universities as anchor institutions in emergent creative clusters, particularly in the North of England.

# 5. Raise visibility and build networks

Local networks are another important driver of creative cluster success.[32] As we pointed out in *A Manifesto for the Creative Economy*, *"An unconnected, 'un-self-aware' mass of creative businesses will not benefit from knowledge spillovers or from lower transaction costs. Policymakers can help remedy this situation by supporting local business networks, and bridging the gap between communities and groups with complementary resources and capabilities."*

But how do we find those communities, and identify the gaps in their networks? We know that networks are the lifeblood of creative clusters,[33] but measuring them is hard because unlike what happens in industries that patent or publish research papers, creative collaborations leave a less visible 'paper trail'.[34] In this section, we use data from Meetup.com to try and address this issue.

## Measuring creative industries networking with Meetup data

Meetup.com is an online platform that helps its users organise informal networking events ('meetups'), with tools to set up, manage, promote and discover interesting meetup groups and events. It currently has just under 25 million global users, and hosts the activities of 243,000 groups in 180 countries.[35] In previous Nesta research, we have used Meetup data to analyse tech networking in the UK, and to look at the interface between arts and tech communities.[36]

In this report, we have obtained data about active UK meetup groups focused on tech and business networking, and used text-mining to identify those that specialise in creative topics.[37] We have identified 13 creative topics such as *Mobile and Games, Web Design and Digital Marketing*, and 1,202 active meetup groups focusing on them, with participation of around 170,000 unique individuals.[38]

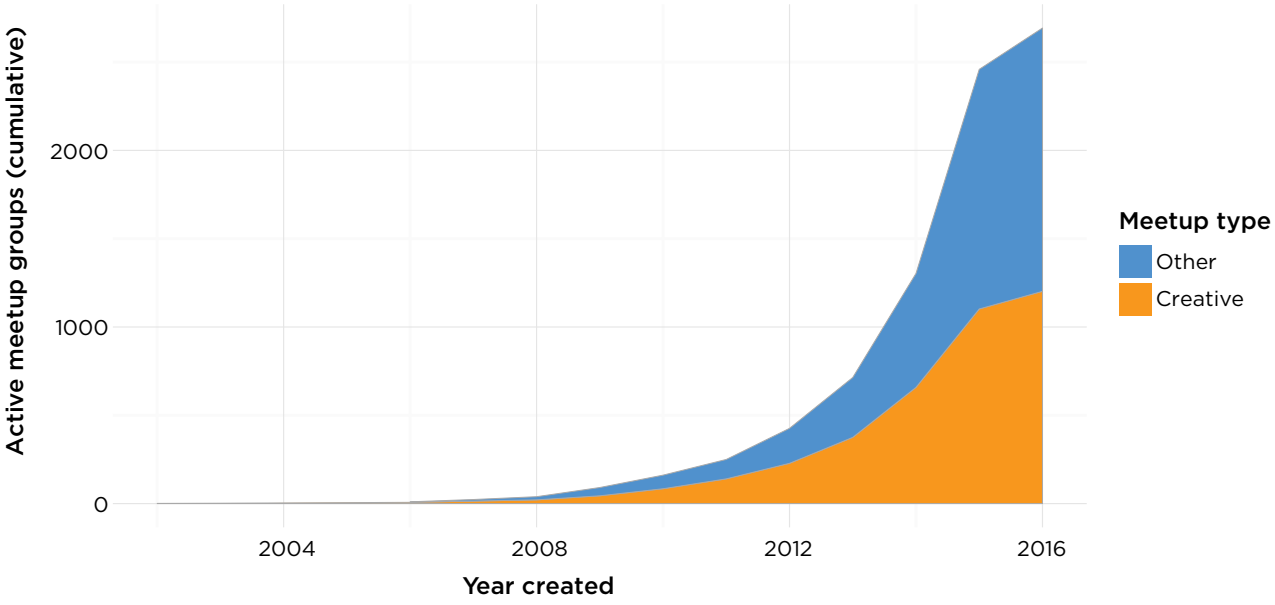
## Hyper-networking in the UK creative industries

The first UK meetup group in Meetup.com was established in 2002. Its name is London Web, and it is still an active creative meetup, specialising in internet technologies and marketing. Figure 11 tracks the evolution of all 'business' and 'tech' meetup groups in the UK since then.[39]

It shows that there has been an explosion in meetup activity on Meetup.com in recent years, with the creative industries playing a central part. In particular, over eight in ten of the UK tech and business meetup groups active today were created after 2012, and 44 per cent specialise in 'creative' topics. Over half of the unique, active users in our dataset are members of at least one creative meetup group. By comparison, UK creative jobs represent just under 6 per cent of all creative jobs in the UK, according to the latest DCMS statistics. This suggests that the creative industries are vastly overrepresented in the UK networking scene, as captured by the meetup data.

What is driving this all this networking?

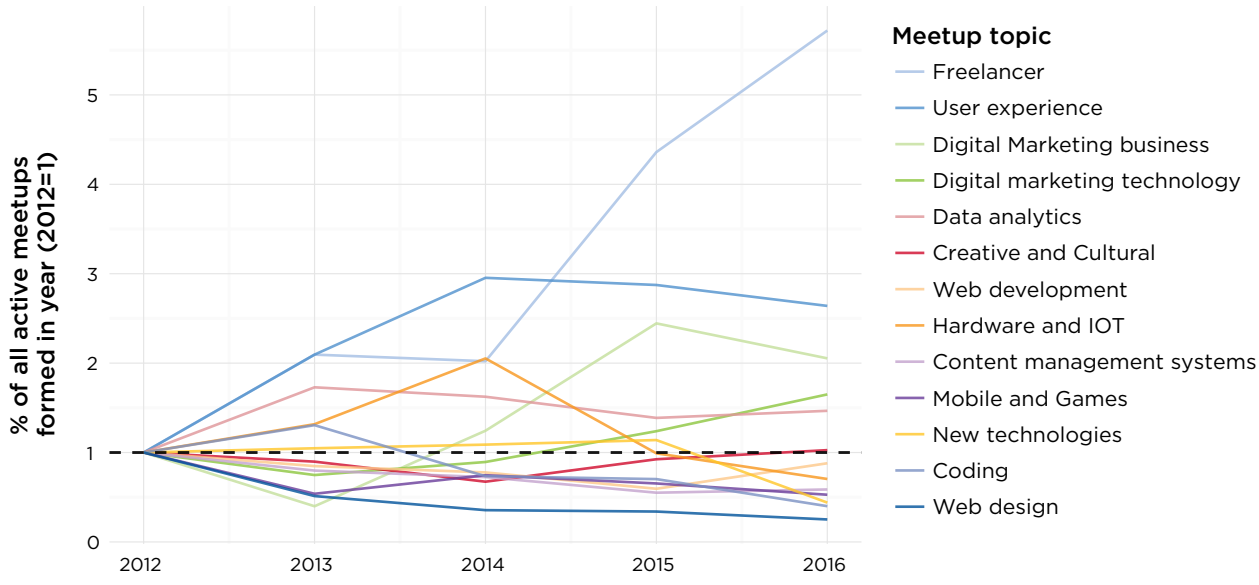
Figure 11: **Over half of active tech and business meetups are creative**




Source: Meetup.com; Nesta analysis.

As we noted earlier, networking is an intrinsic feature of the creative industries. Work in the sector is often project-based, bringing together 'motley crews' of creative professionals for short periods of time.[40] Talent finds out about new creative and commercial opportunities through their social networks. Digitisation has probably intensified this process by speeding up the pace of change in the sector, and spawning new opportunities to experiment with business models and creative tools. Meetups are an effective way to stay on top of these opportunities and to upskill cheaply. As the typical company becomes smaller, finding partners and freelancers to tackle bigger projects is another important need that can be addressed via networks.

Figure 12: **Trends in creative meetup group formation**




Source: Meetup.com; Nesta analysis.

## What's trending in the creative networking scene?

Figure 12 illustrates how rapidly the scene is changing, and gives a sense of the multitude of creative tech and business networking opportunities that have emerged in recent years. It presents the relative importance (share) of a creative topic among all the meetup groups formed in any given year, but normalised so that this share on the first year (2012) is 1. This way, we are able to see easily which creative topics have been 'trending up' (generating groups at a faster clip than they were doing in 2012), and which have slowed down.[41]

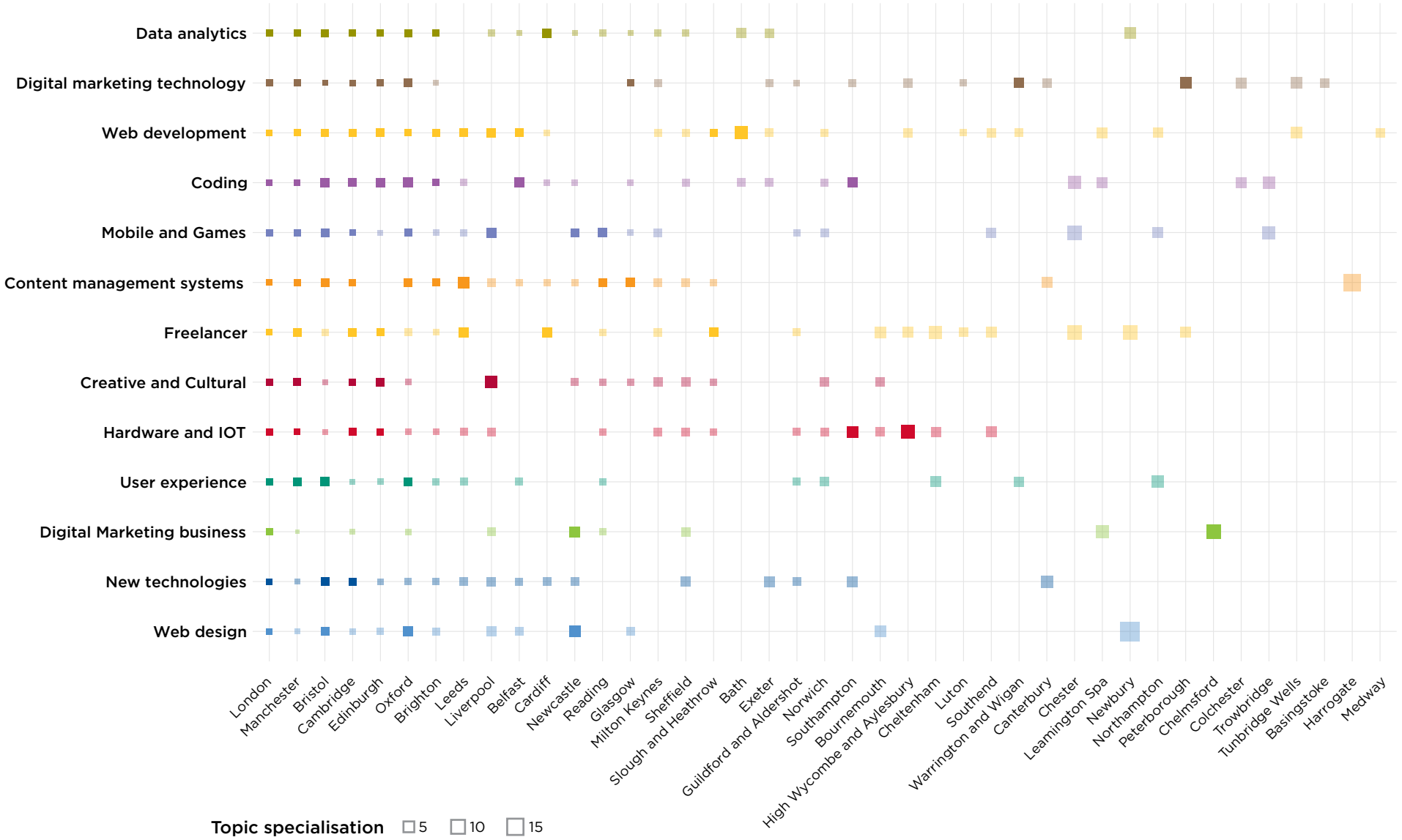
The figure shows that freelancing meetup groups have gained most in importance since 2012 – their share of all new meetup groups has multiplied by five compared with 2012. One interpretation for this is that production models reliant on freelancers are gaining importance in the UK's creative industries, and that meetup groups are one way in which these freelancers share skills and look for work. User Experience (UX), digital marketing (including business topics as well as new marketing technologies), and data analytics have also gained importance, reflecting the digitisation of design and advertising, and the 'big data' revolution.[42]

## Creative topic specialisation

We have also looked at the topics that different creative clusters specialise in. In Figure 13, the size of the squares represents the relative specialisation of a TTWA in a topic, based on its number of meetup groups in that topic.[43] We represent areas with relatively low levels of activity (and where measures of specialisation may be less robust) with semi-transparent symbols.[44] On the horizontal axis, we have sorted TTWAs by their number of creative groups, and on the vertical axis, we have done the same with creative topics. This shows that London – unsurprisingly – has the most active creative meetup scene; Data analytics is the creative topic with the biggest number of meetup groups.

Creative cities tend to have more diversified creative meetup scenes, with activity in a wider range of topics. We also detect hotspots of specialisation in other TTWAs, such as Hardware and Internet of Things (IOT) in Wycombe and Southampton, Digital marketing technology in Warrington and Wigan, and Web development in Bath.

Figure 13: **Relative creative topic specialisation in creative clusters**




Source: Meetup.com; Nesta analysis.

## Local networking indices

We have also used levels of meetup activity as a proxy for local networking. More specifically, Unique members represents unique members of creative meetup groups in the area; Networking intensity represents unique members of creative meetup groups as a share of all creative industries employment in the area (in 2014); Topic concentration measures member concentration in topics (high scores indicate that meetup participants tend to concentrate in a small number of creative topics, while low scores indicate a more diversified networking scene); Inter-topic connectivity captures the number of users who participate in meetups in different topics, potentially connecting separate creative communities (normalised by the total number of users in the considered groups).[45] The heat-map in Figure 14 presents the results.

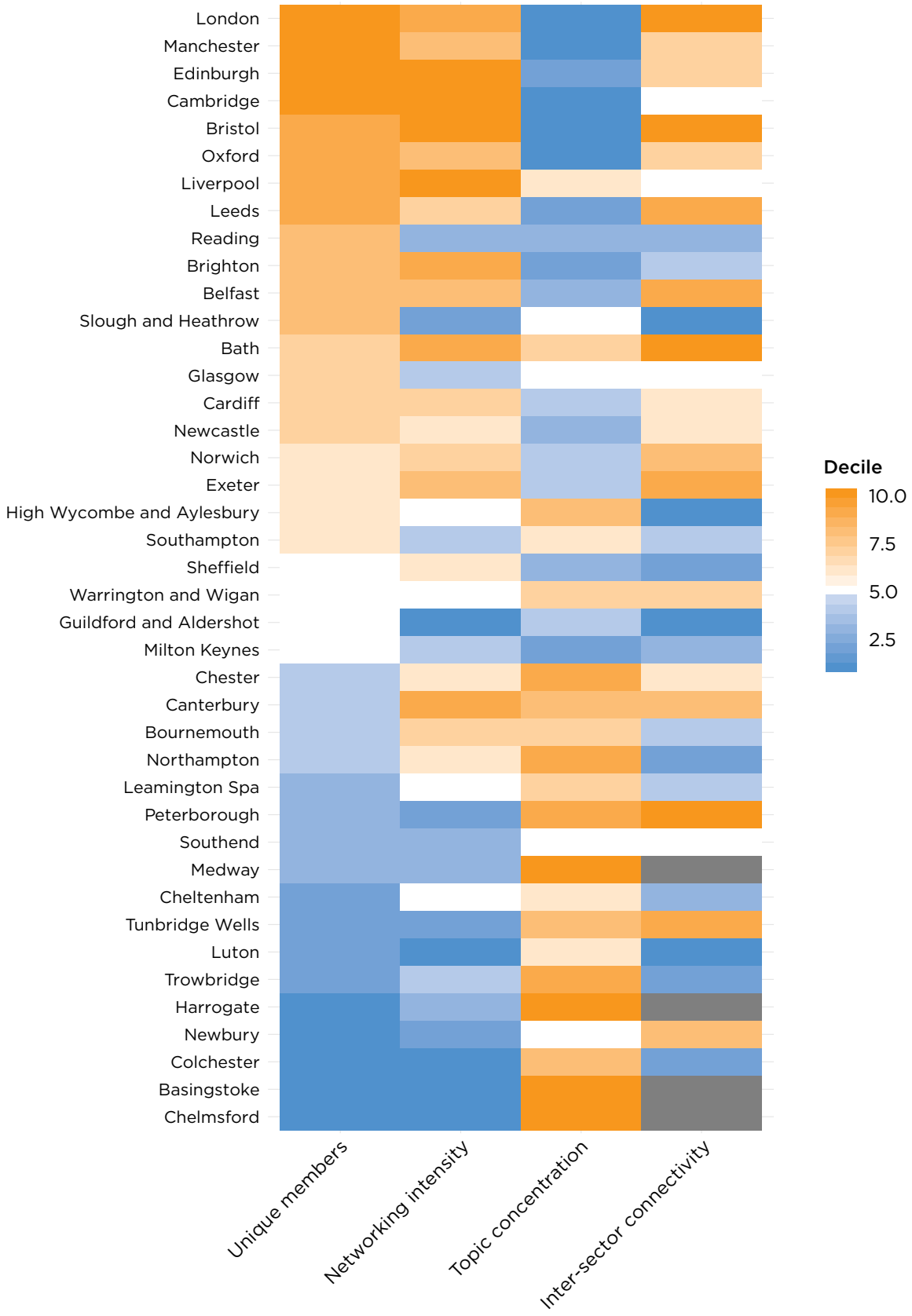
The shade of each cell represents the score for the creative cluster, ranging between one and ten. A score of ten means that a location is in the top 10 per cent of UK creative clusters in that metric. A score of one means that it is in the bottom top 10 per cent among creative clusters.

As we already mentioned, London has most creative meetup users – 69 per cent of unique meetup participants in the UK are involved with creative meetups in the city, and 55 per cent of creative meetup groups in the UK are based there. It is followed by other creative cities and tech hotspots such as Cambridge and Oxford.

Perhaps the most interesting comparison in this figure is between 'creative cities' and 'creative conurbations' – the latter group, including TTWAs such as Reading, Slough and Heathrow, High Wycombe and Aylesbury and Guildford and Aldershot, have lower levels of networking intensity, topic diversity and inter-sector connectivity than creative cities.

This is consistent with the idea that there is less business networking taking place in these clusters. Although this may make sense for them – as we saw previously, firms based there are on average larger, less reliant on freelancers, and more specialised – the lack of networking could also create risks for these clusters. For instance, the economic geography literature suggests that under-networked clusters tend to pay in the longer term, because they struggle to access rapidly the information required to detect and adapt to new and disruptive trends.[46] Creative networking is also a way to build a sense of community, and a shared voice, that can help creative clusters raise their visibility, potentially attracting investment and collaboration from the outside, and helping build a more supportive policy environment.[47] We come back to the policy implications of this in the conclusions.

Figure 14: **Local networking in creative clusters**




Source: Meetup.com, ONS Business Structure Database; Nesta analysis.

# 6. Think systemically

In previous sections, we talked about the complexity of creative clusters, and the importance of different factors – industrial activity, a talent and knowledge ecosystem, and networking – for their success. In *A Manifesto for the Creative Economy*, we pointed out that local policymakers who wanted to develop creative clusters would be well advised to pay attention to all of these factors, and to the linkages between them, instead of looking for a single 'silver bullet' intervention.

In this section, we take a step back and consider the systemic aspects of the geography of creativity at the level of the UK as a whole – that is to say, the fact that creative clusters are not disconnected from each other. On the contrary, they should be viewed as nodes in a bigger local and international system of creative communication, collaboration and commerce. As we said before, these networks have remained largely 'hidden' to policymakers until now, because we have lacked the right data to reveal them. In this section, we use meetup data again to overcome this hurdle, and start exploring the inter-regional and international networks that connect up the UK's creative clusters.

## The UK's creative geography is also a network

Forty per cent of the unique users in our meetup data set are members of at least one creative meetup outside of the city where they are based: this starts to give an indication of the interconnectivity between creative communities in the UK, but who is connecting with who?

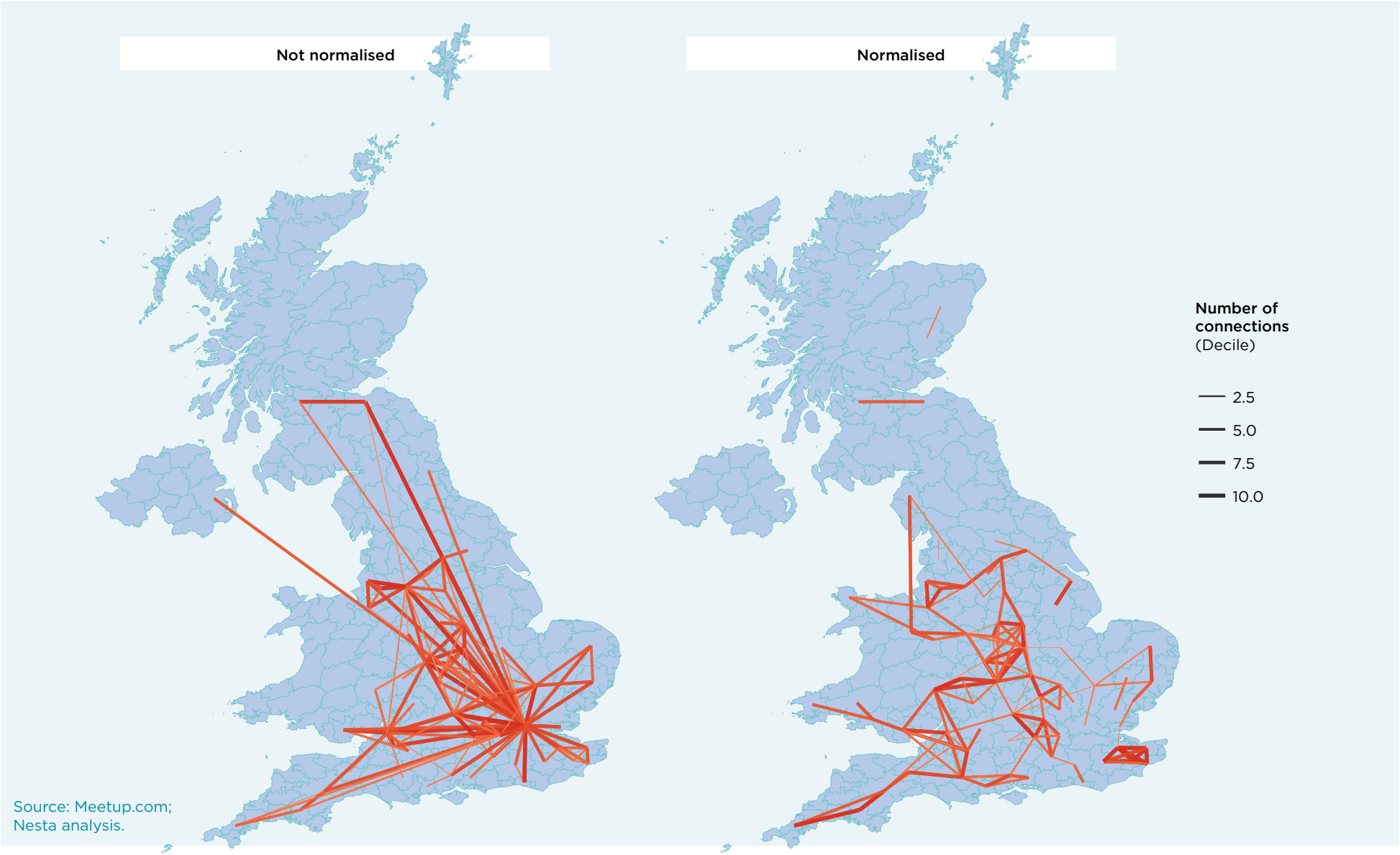
Our approach for getting a handle on this phenomenon is intuitive: we suggest that those locations that share participants in creative meetups are more likely to be connected with each other than those that do not.[48]

Map 2 and Figure 15 show the results of this analysis of connections between creative communities. The left hand panel of Map 2 shows the most intense creative community connections between pairs of TTWAs, while the right hand one normalises our measure of connectivity by the sizes of the participating communities. In both cases, thicker, darker links between TTWAs represent a stronger link.[49] The heatmap in Figure 14 displays normalised connections between creative clusters. Warmer colours indicate a stronger connection, and blue indicates no connections.[50]

The maps and the heatmap paint a consistent picture: there are examples of strong connections within regional groups spanning more than one TTWA. The clearest examples of this are:

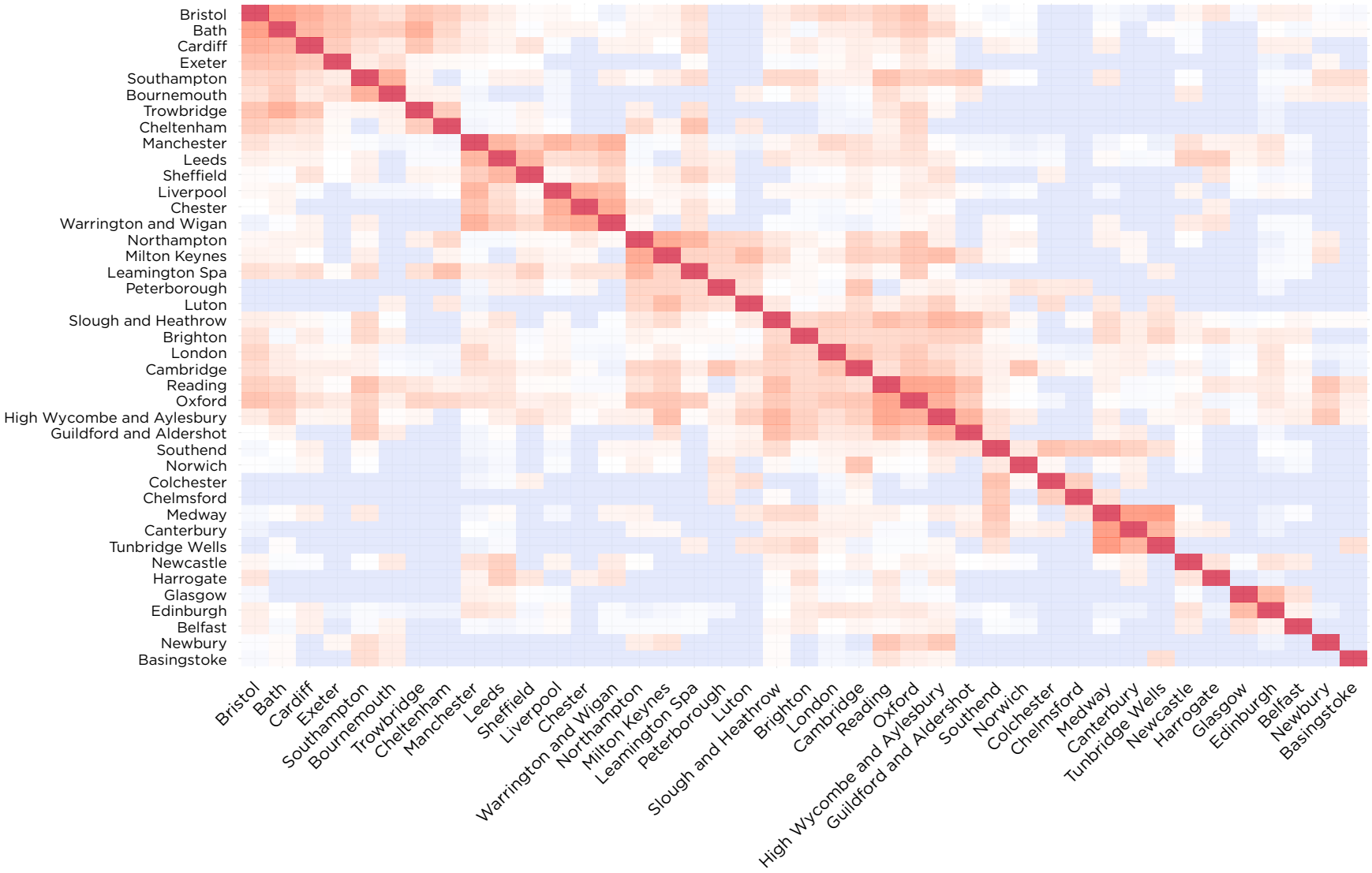
- Bristol, Bath and Cardiff in the West of the UK.
- Edinburgh and Glasgow in Scotland.
- A Northern cluster of interconnectivity with Manchester, Leeds, Sheffield, Liverpool, Chester and Warrington and Wigan.
- Northampton, Milton Keynes, Peterborough and Luton towards the Midlands.
- A loose hub of connectivity in the South East including London, Cambridge, Slough and Heathrow and Brighton, and a more strongly connected group around the M4, including Reading, Guildford and Aldershot, Oxford and High Wycombe and Aylesbury.
- Canterbury, Medway and Tunbridge Wells in the South East.

## Map 2: **Inter-regional creative networking in the UK**




Source: Meetup.com;
Nesta analysis.

## Figure 15: **Networking between UK creative clusters**




Source: Meetup.com; Nesta analysis.

Our analysis is consistent with the idea that the UK has a connected creative geography, and suggests – though of course does not prove – that creative communities across the country come together in larger hubs that don't necessarily respect administrative boundaries.

This should not come as a surprise, of course: it is simply an extension of the networking imperative we referred to in the previous section. UK creative clusters are different from each other in their specialisation profiles (Figure 7), knowledge capabilities (Figure 8) and creative communities (Figure 12). By networking and collaborating, they can realise opportunities arising from their differences without having to reinvent the wheel. This key finding has important implications for local and national policymakers who should consider ways to support these collaborations, and acknowledge the beneficial spillovers that investments and interventions in one location can have for communities in other places but in the same networks.

## Measuring international ties

The academic literature tells us that successful industrial clusters are *"densely connected hubs within global knowledge pipelines"*.[51] Here, we again use meetup data to study the international connections of the UK's creative clusters. In particular, we do this by looking at people based outside of the UK who are members of UK creative meetups. This tells us that those individuals are aware of UK creative communities, have participated in creative networking while visiting the UK, or used to be based there – and networked – in the UK before going overseas. Again, our argument is that the existence of these social links at least increases the likelihood of collaboration, though this time with an international dimension.[52]

There are 16,500 people from outside of the UK involved in creative meetups according to our data – that is, just under 10 per cent of all unique members. They represent 151 countries: 41 per cent of international participants in UK creative meetups are based in European Union countries, 29 per cent are in the US and 14 per cent are in Asia.

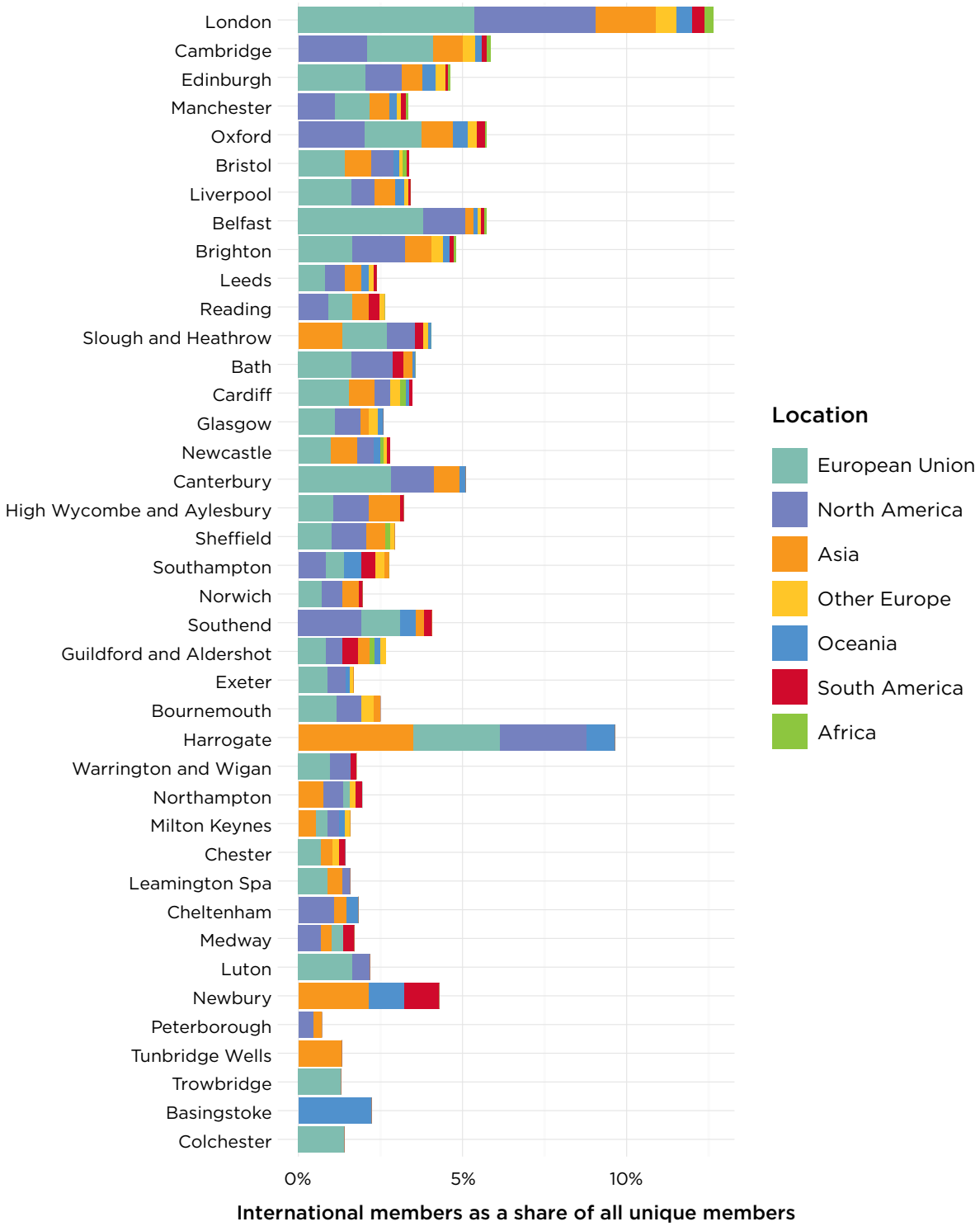
Figure 16 looks at the relative share of these international participants in the communities of different creative clusters. The bars represent international participants from different parts of the world as a proportion of unique participants in local meetups. These are sorted by importance, so that the most important source of international participants for each cluster is shown first (e.g. for London, it is people based in the European Union, while in Cambridge, it is North Americans).

We have sorted the creative clusters based on their total number of international participants. Some of the creative clusters further down the list, such as Harrogate, display relatively high share of international participants, but their numbers are low in absolute terms.

The results confirm London's status as the UK's 'global creative hub', with 12 per cent of unique members based overseas. In proportional terms, cities in the North of England (such as Manchester, Leeds or Liverpool) appear to have less international participation than venerable university cities such as Oxford or Cambridge, or cosmopolitan creative cities like Brighton and Edinburgh. Interestingly, Belfast displays high levels of international connections (this is driven by strong ties with creative communities in Ireland).

By contrast, creative conurbations such as Reading, High Wycombe and Aylesbury, Guildford and Milton Keynes seem to have lower levels of international connectivity. To repeat the point we made before, this may simply be a consequence of differences in business models and needs, and the types of networking which are relevant for their businesses. However, it may also reflect a lower level of international awareness of these creative clusters, consistent with the idea that they are rarely mentioned in discussions about creative clusters compared with the UK's established creative cities. Perhaps this could be addressed through changes in local, national and international programmes for creative cluster promotion and collaboration.

Figure 16: **Internationalisation of creative meet-ups**




Source: Meetup.com; Nesta analysis.

# 7. Conclusions

In this report, we have combined official, open and web data to analyse the geography of creativity in the UK. Along with the datasets and interactive maps we are publishing, we hope that the report will serve as a practical resource for agencies and policymakers interested in developing targeted policies to support their local creative industries.

## Beyond London and the South East

Our analysis shows that the creative industries are gaining in economic importance right across the UK. Although London is dominant in most sub-sectors and on almost all of the indicators we have considered, we have detected hotpots of creative activity elsewhere in the UK, and not in just the South-East of England. Around one in five of the creative clusters we identify are in the North of England, and Scotland and Wales are also home to thriving creative ecosystems, with strong support from their highly engaged universities.

More can be done though to strengthen the UK's creative clusters. At the local level, we note, for example, that over half of Local Enterprise Partnerships fail to even mention the creative industries in their strategy plans.[53] We hope that the evidence that we have presented in this report, and the companion datasets we are publishing, will persuade some of them to reconsider their position, and take action to boost the creative industries growth that is taking place on their doorstep. We also believe that national and devolved governments can play a more active role to scale up creative clusters outside London and the South East, with well-resourced, locally relevant interventions along the lines of Nesta's previous recommendations.[54]

## Beyond creative cities

Our analysis has also shown the diversity of the UK's creative clusters. In particular, we have identified creative clusters that don't fit neatly with the idea of the 'creative cities' that have long dominated debates about the role of the creative industries in local economic development. We need to recognise the important and growing role of creative conurbations in the UK's creative industries, and put in place suitable strategies to help them develop further.

When we have looked at the support ecosystems and levels of networking in these creative conurbations, we have identified some potential weaknesses – a relative scarcity of talent, relevant research and knowledge exchange, as well as low levels of local networking – that may, unless addressed, hold back future growth. These issues deserve further attention from local policymakers and stakeholders, as well as national bodies promoting UK creative clusters abroad, such as UKTI and creative industry trade associations.

At the same time, our study confirms the central importance of dense, diverse and highly networked creative cities to the UK's creative industries. We have noted the predominance of small and micro-creative businesses in these places. Agile freelancers and businesses play an important role in the UK's creative innovation system. However, their clusters may experience barriers to growth insofar as smaller businesses may lack resources for R&D and training, or visibility in the eyes of policymakers and universities. Policymakers need to consider ways of supporting those small and micro creative businesses with the highest growth potential to scale up, as well as helping those that don't but nonetheless play an important indirect role in the ecosystem.

## Beyond zero-sum games

The diversity of the UK's creative landscape creates many opportunities for collaboration, and this is consistent with what we have learned about networking across clusters. Local policymakers need to take this into account when they set up programmes to support their creative industries, and find ways to reward collaboration even where that also generates economic benefits outside of their local area. The growth of creative clusters should not in this sense be viewed as a zero-sum game. National policymakers, support agencies and trade bodies should explore ways to enhance the beneficial spillovers from collaborations across creative clusters.

Our analysis has also revealed the international span of the UK's creative networks – particularly with regard to the EU. Ensuring that these connections are maintained in the face of the EU referendum outcome will be an important challenge going forward.

## Beyond this analysis

Creative cluster development is a complex process involving many different stakeholders and networks. Nesta and Creative England strongly believe that all these actors can make better decisions if they have access to good data and rigorous evidence. In this report, we have used that data to explore some questions that we think are particularly important to creative clusters, but we know that there are many more. This is why we are publishing a companion data set for the report, which includes many indicators we have used in our analysis, as well as some interactive maps for people to explore. We hope that these will be used by local and national policymakers, universities, bodies like the Creative Industries Council and creative businesses, as they work together to further strengthen and grow the UK's creative industries.

# Appendix

## Data sources

### Official business data and definitions

We have used the following official data sources to identify and measure creative clusters:

- **The Business Structure Database**:[55] An administrative dataset including SIC, location, employment and turnover data for all UK businesses registered for PAYE/VAT.[56]
- **The Annual Population Survey (APS)**:[57] The APS is a household survey including information about respondent's occupation (SOC) and industry of employment (SIC). It has an important advantage over BSD: it captures freelancers. On the downside, it is based on a survey and the sample sizes are small for many TTWAs. For this reason, we have used it sparingly, mostly to complement our economic statistics for creative clusters.
- **The Annual Business Survey**:[58] A business survey with 2007 SIC, location and detailed financial data allowing the estimation of approximate GVA figures.

We queried these datasets with a list of official creative industries SIC and SOC codes based on the Dynamic Mapping methodology developed by Nesta.[59]

Where possible, we used these datasets to produce estimates of creative industries business counts, employment, turnover, and GVA at the TTWA level. One barrier to doing this with GVA is that ABS data is not available at the TTWA level. We addressed this by estimating creative GVA per worker at the regional level, and scaling this, for the areas (TTWAs) inside a region, by their digital employment levels based on BSD data.[60] We advise caution in the interpretation of this proxy.

### Geography: Travel to Work Areas (2011 version)

Travel to Work Areas are official statistics that capture local labour markets, that is, areas where most (70 per cent) of the population who live there work there, and where most (70 per cent) of the population who work there live there. These measures are based on responses to the 2011, and used to algorithmically define the TTWAs. Currently, there are 228 TTWAs in the UK. TTWAs are frequently used in analyses of industrial clustering where it is acknowledged that the activity of interest may be distributed in a way that cuts across administrative boundaries such as local authority districts or NUTS areas. We have previously used TTWAs (in their older, 2001 edition) in 2009's *Geography of Creativity*, and in *Tech Nation 2016*.

### HESA

We have licensed HESA data about qualifiers from UK universities between the periods 2010-2011 – 2013-2014. This dataset includes information about the type of qualification (undergraduate, MSc/MA, PhD etc.), the subject, and the awarding Higher Education Institution. We have allocated qualifiers to the TTWA where a HEI's head office is based. Since we are interested in local employable labour supply, we have removed from our analysis distance learners who are not based in an area, and qualifiers from 28 non-EU countries who might not be able to get a job in industry straight after graduation for visa reasons.

### HEFCE REF

The Research Excellence Framework datasets contains an evaluation of quality of research at UK departments in different disciplines between January 2008 and December 2013. For each unit of submission (discipline), we obtain data about the percentage of researchers graded at different levels of excellence, and the total Full Time Equivalent for the submission. We have used this data to generate estimates of FTE 'world leading researchers' in two disciplines of particular relevance for the creative industries (Computer Science, with 89 submissions, and Art and Design, with 84 submissions), and aggregated those over TTWAs (again, using the head office of universities to allocate them to TTWAs).

### HE-BCI

We have bought the Higher Education Business-Community Interaction survey, a survey administered by HESA that contains information about knowledge exchange and third stream activities in 161 UK universities. This includes

- Strategy and organisation of KE (including impact areas, governance and incentives).
- Income from KE activities (consulting, licensing, collaborative research etc.).
- University entrepreneurialism (employment, turnover, investment) in spinouts and startups related to university.

We assigned these universities TTWAs with their head office address, and aggregated their levels of activity in different variables. In this report, we use the following metrics:

- Turnover from contract research, consultancy and use of facilities and equipment with SMEs.
- Turnover from training and CPD for SMEs and individuals.
- Turnover from university spinouts.
- Attendees at university events.

### Meetup.com

We have obtained our meetup data from Meetups' Groups and Members API.[61] We obtained data about all groups in the tech and business categories (total=3,807) and removed groups with no event activity in 2015-2016, leaving us with a total of 2,693 groups. We then used an unsupervised machine learning method (Dirichilet Latent Allocation), to model the topics of these groups using the labels that their organisers used to describe them. This analysis suggests that there are 30 topics in the dataset - we identified 13 of these as creative. The full list includes:

**Data analytics, Digital marketing technology, Freelancer, Web development, Creative and Cultural, Digital Marketing business, Content management systems, Mobile and Games, User experience, Coding, Hardware and IOT, New technologies, Web design.**

We have then selected those groups that specialise in these topics. This gives us a total of 1,202 creative groups active in the UK, and around 171,000 unique users. We geocoded these groups to 2001 TTWAs using shapefiles obtained from the ONS Open Geography Portal.

### Tools

All data analysis in this report was performed with R, an open source statistical application. This involved the following packages: base, bitops, datasets, dendextend, dplyr, extrafont, Formula, ggmap, ggplot2, ggrepel, graphics, grDevices, grid, gridExtra, Hmisc, httr, igraph, jsonlite, lattice, lubridate, magrittr, maptools, methods, network, plyr, RColorBrewer, RCurl, reshape2, rgdal, RgoogleMaps, rJava, rjson, RJSONIO, scales, sna, sp, stats, stringr, survival, tidyr, treemap, utils, xlsx, xlsxjars, XML.

The Meetup.com data was obtained from Meetup.com's API using a Python wrapper originally developed by Matt Williams.

## Defining creative clusters

Our methodology for identifying creative clusters looks for agglomerations of business and/or employment activity in groupings of creative subsectors that are similar to each other.

We want to go below the level of 'All creative industries' to address the fact that specific creative sectors may be attracted by different local factors. Proximity to clients is likely to matter more for advertisers and designers, while a vibrant cultural scene will probably be more important for Music and Performing Arts.

At the same time, we do not consider each creative sub-sector separate from each other because there may be complementarities between specific subsets of them if they trade with each other, or exchange ideas. This is in line with previous research showing that creative content businesses in Radio, Film and TV and Music and Performing Arts tend to co-locate with each other, and the same is true for creative services businesses in Advertising, Design and Software.[62]

We have used measures of geographic co-location (correlations between the location quotients for creative subsectors at the TTWA level) to identify which sectors are similar to each other, considering measures of creative employment as well as creative business counts. With this, we want to account for the fact that large creative employers may prefer to locate in different places from small creative businesses, even if they are in the same sub-sector.

The resulting subgroupings are based on a hierarchical clustering method where highly co-located subsectors are considered similar to each other. This leads to identify three creative subsector groupings based on business co-location, and three groupings based on employment co-location (see Table 4). We have then estimated the location quotients for each area and grouping, and extracted the top ten TTWAs in terms of agglomeration in 2011-2014, and growth in agglomeration between 2007-2010 and 2011-2014. We have excluded from this list areas that were not in the top quartile of business or employment activity in overall terms, to make sure we are only considering locations with a 'critical mass' of creative activity.

Table 4: **Industry similarity (co-location)**

| Measure | Groupings |
|---|---|
| Creative business co-location | 1. Architecture.<br>2. Software, Advertising, Design.<br>3. Publishing, Film, Radio and TV, and Music and Performing Arts. |
| Creative employment co-location | 1. Film, Radio and TV, Design, Architecture, and Music and Performing Arts.<br>2. Publishing.<br>3. Advertising and Software. |

# Endnotes

1. Creative Industries Economic Estimates – January 2016, DCMS https://www.gov.uk/government/statistics/creative-industries-economic-estimates-january-2016
2. Creative Industries: Focus on Employment – June 2016, DCMS https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/528173/Creative_Industries_2016_Focus_on_Employment.pdf
3. Bakhshi, H., McVittie, E. and Simmie, J. (2008) 'Creating Innovation: Do the creative industries support innovation in the wider economy?' London: Nesta; Bakhshi, H., Edwards, J., Roper, S., Scully, J., Shaw, D., Morley, L. and Rathbone, N. (2013) 'Creative Credits: A Randomized Controlled Industrial Policy Experiment.' London: Nesta.
4. Brynjolfsson, E. and McAfee, A. (2014) 'The Second Machine Age: Work, Progress and Prosperity in a Time of Brilliant Technologies.' London: W. W. Norton & Company.
5. Bakhshi, H., Frey, C.B. and Osborne, M. (2015) 'Creativity vs Robots.' London: Nesta.
6. This definition is based in Michael Porter's traditional definition of industrial clusters.
7. Boschma, R.A. (2005) Proximity and innovation. A critical assessment. 'Regional Studies.' Vol. 39, Issue 1. In fact, some economists argue that the increase in the rate of innovation brought about by digital technologies has put a stronger premium on physical proximity, which explains 'The Triumph of Cities' (Glaeser (2011) 'The Triumph of The City.' Macmillan
8. Chapain, C., Cooke, P., de Propris, L., MacNeill, S. and Mateos-Garcia, J. (2010) 'Creative Clusters and Innovation: Putting creativity on the map.' London: Nesta.
9. Bakhshi, H., Davies, J., Freeman, A. and Higgs, P. (2015) 'The Geography of the UK's Creative and High-Tech Economies.' London: Nesta.
10. Gardiner, B., Martin, R., Sunley, P. and Tyler, P. (2013) Spatially unbalanced growth in the British economy. 'Journal of Economic Geography.'
11. Creative Industries Council (2014) 'Create UK: Creative Industries Strategy.' Creative Industries Council.
12. Bakhshi, H., Hargreaves, I. and Mateos-Garcia, J. (2013) 'A Manifesto for the Creative Economy.' London: Nesta.
13. We analyse enterprises rather than local units. The reason for doing this is that turnover information is only available for enterprises. The risk is that this may create a 'head office' bias since, in the case of business groups, we only capture the location of the head office. In practice, this bias appears to be limited, as the results barely change when we consider local units instead of enterprises. Details are available from the authors.
14. One limitation we face when doing this is low sample sizes at the level of geographical resolution we are interested in.
15. The TTWAs using the 2011 Census have only relatively recently become available. In Chapain et al. (2010) and Tech Nation 2016 we used the TTWAs based on the 2001 Census.
16. See Crafts Council (2012) 'Craft in an Age of Change.' London: Crafts Council. http://wcc-europe.org/sites/default/files/Craft_in_an_Age_of_Change.pdf and http://www.nesta.org.uk/blog/where-do-creatives-cluster
17. Storper, M. and Venables, A.J. (2004) Buzz: face-to-face contact and the urban economy. 'Journal of Economic Geography.' Florida, R. (2014) 'Rise of the Creative Class Revisited.' New York NY: Basic Books.
18. Delgado, M., Porter, M.E. and Stern, S. (2014) 'Defining Clusters of Related Industries.' NBER working paper no. 20375.
19. We measure similarity using levels of co-location in terms of business counts, and of employment. We measure clustering using location quotients, while removing areas with very low levels of overall activity where location quotients are noisier. See the appendix for more details.
20. Excluding areas with very low levels of overall activity, as we previously pointed out.
21. It is worth noting that this result is not just driven by strong agglomerations of software businesses. Several of these areas also score highly in the levels of business and employment concentration in content businesses.
22. We estimate this as the average of the Herfindahl sectoral concentration index for business counts and employment.
23. The 'self-employment' indicator is the ratio of creative jobs in the Annual Population Survey (APS) to creative employment in the BSD. Since the APS captures self-employed and freelancers, we take the size of the ratio to represent levels of self-employment in the creative industries. When looking at this figure, it is important to remember however, that the APS is a survey with small sample sizes so its estimates are likely to be noisy. We have tried to address this by removing from the figure (as well as in Table 2) jobs data for TTWAs with less than 50 creative industries responses in the APS sample. This noise also explains the fact that in some locations, the index is below 1.
24. Sapsed, J., Camerani, R., Masucci, M., Petermann, M., Rajguru, M. and Jones, P. (2015) 'Brighton Fuse 2: Freelancers in the Creative and Digital Economy.' Swindon: AHRC.
25. Nesta (2011) 'Next Gen: Transforming the UK into the world's leading talent hub for the video games and visual effects industries.' London: Nesta; Bakhshi, H., Hargreaves, I. and Mateos-Garcia, J. (2013) 'A Manifesto for the Creative Economy.' London: Nesta.
26. Mateos-Garcia, J. and Sapsed, J. (2011) 'The role of universities in enhancing creative clustering.' Paper prepared for Brighton Fuse.
27. See appendix for a full description. Note that our talent supply figures do not include distance learners or students from outside the UK/EU. The reason for this is that we only wanted to consider students that could, in principle, get a job in their local creative industries straight after graduation.
28. All the differences are statistically significant at the 5 per cent level with the exception of amounts spent on SME training, and number of FTE equivalents doing world-class Arts and Design research.
29. Obviously, this finding does not by itself tell us anything about the direction of causality between university activity and creative clustering.
30. The relatively low levels of computer science qualifiers in both clusters are probably linked to the fact that their universities focus on more traditional academic disciplines like Mathematics or Physics that equip their graduates and researchers with the core skills to do cutting edge computer science research (something can be seen by their high scores in the Computer Science research excellence metric).
31. To do this, we have aggregated some of the metrics presented earlier in the section. Talent captures total number of Arts and Design and Computer Science Graduates, Research includes world class researchers in Arts and Design and Computer Science, and SME support aggregates revenues from SME training and engagement.

32. Sapsed et al. (2015) op. cit.
33. Storper, M. (1989) The transition to flexible specialization in the US film industry: external economies, the division of labor, and the crossing of industrial divide. 'Cambridge Journal of Economics.' Vol. 13, No.2. Pratt,A.C. (1997) The cultural industries production system: a case study of employment change in Britain, 1984-91. 'Environment and Planning A.' 29 (11). De Vaan, M., Boschma, R. and Frenken, K. (2013) Clustering and firm performance in project-based industries: the case of the global video games industry, 1972-2007. 'Journal of Economic Geography.'
34. Until recently, the main exception to this where title credits, which have been used to analyse creative collaboration networks e.g. Uzzi, B. and Spiro, J. (2005) Collaboration and Creativity: The Small World Problem. 'American Journal of Sociology.', which looks at Broadway shows.
35. http://www.meetup.com/
36. Mateos-Garcia, J. (2015) 'Using Meetup data to explore the UK digital tech landscape.' See: http://www.nesta.org.uk/blog/using-meetup-data-explore-uk-digital-tech-landscape; Davies, J. (2016) 'State of the Art: Analysing where art meets technology using social network data.' London: Nesta.
37. Of course, and like any other web data source, Meetup.com has potential limitations that one needs to be aware of – in particular the fact that it may not be representative of networking activity in all areas and locations. We acknowledge this issue, and throughout the report use it as an useful proxy for activities that wouldn't be able to measure otherwise, rather than, for example, a way to quantify robustly numbers of individuals networking, numbers of connections etc.
38. See the appendix for more information. The full list of creative topics includes Coding, Content Systems, Creative and cultural, Data analytics, Digital marketing business, Digital marketing tech, Freelancer networking, Hardware and Internet of Things, Mobile and games, New tech, User Experience, Web design, and Web development.
39. Meetup.com organises its groups into categories based on their focus, with each group allocated to one category. These include professional networking as well as hobbies and socialising.
40. Caves, R. (2002) 'Creative Industries: Contracts Between Art and Commerce.' Cambridge MA: Harvard University Press.
41. 'Slowing down' does not mean that a topic is in decline – it could well be that it has a thriving set of meetup groups, and therefore there is no need to create new ones. Figure 12 does not consider this.
42. Mateos-Garcia, J, Bakhshi, H. and Windsor, G. (2015), 'Skills of the datavores: talent and the data revolution' London: Nesta
43. The measure is a location quotient capturing the relative weight of that topic in the area compared to the UK average.
44. We do this based on whether their number of groups in any given topic is above the median for all creative clusters.
45. The value for this metric is missing where a TTWA only has meetups in one creative topic.
46. Saxenian, A. (1996) 'Regional Advantage: Culture and Competition in Silicon Valley and Route 128.' Cambridge MA: Harvard University Press.
47. Chapain et al. (2010) op. cit.
48. There is a long tradition of mapping networks through co-participation in events and conferences. See for example Cronin, B., De Vita, R. and Conaldi, G. (2015) 'Joining up the dots: Using social data to measure the effects of events on innovation.' London: Nesta Working Paper No. 15/13.
49. To make things easier to visualise, we only show links where the numbers of connections are in the top 10 per cent of activity (otherwise, the sheer number of connections make the map hard to read). We have normalised the connectivity figures to control for the fact that TTWAs with large numbers of creative meetup activity are likely to be connected with many other places, even if it is only by chance.
50. TTWAs in the figure are arranged by their similarity, based on the scores from a hierarchical cluster algorithm that assumes that TTWAs with strong overlap in their communities are similar to each other.
51. Bathelt, H. and Cohendet, P. (2014) The Creation of Knowledge: Local Building, Global Accessing and Economic Development – Toward an Agenda. 'Journal of Economic Geography.'
52. It is important to point out that out analysis is not looking at the nationalities of participants in UK meetups. We would expect many 'local' participants in creative meetups to have non-UK nationality, and also some of the internationally based participants, to be UK nationals now based overseas.
53. http://www.lgcplus.com/Journals/3/Files/2010/9/24/SQW-LEPs%20report.pdf
54. http://www.nesta.org.uk/blog/ps200-million-programme-develop-uks-creative-clusters
55. The BSD and ABS micro-data required for the project was accessed by Frontier Economics, one of our data partners, in the fall of 2014.
56. https://discover.ukdataservice.ac.uk/catalogue?sn=6697
57. We obtained the APS via the DCMS. https://discover.ukdataservice.ac.uk/series/?sn=200002
58. https://discover.ukdataservice.ac.uk/catalogue?sn=6697
59. https://www.gov.uk/government/statistics/creative-industries-economic-estimates-january-2016
60. Government Office Regions do not perfectly overlap TTWAs - for example, the London TTWA is larger than the London GOR because it captures a commuter belt beyond London's administrative boundaries. We have addressed this issue by allocating each TTWA to the GOR where it has a majority of postcodes, based on the NSPL (National Statistics Postcode Lookup) dataset. An interesting result of this is that the Slough and Heathrow TTWA is allocated to the London region.
61. The data was collected by James Gardiner, using a Python wrapper for the Meetup API initially developed by Matthew Williams.
62. Chapain et al. (2010) op. cit.

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