Research report: November 2010

NESTA Making Innovation Flourish

Creative clusters and innovation

Putting creativity on the map

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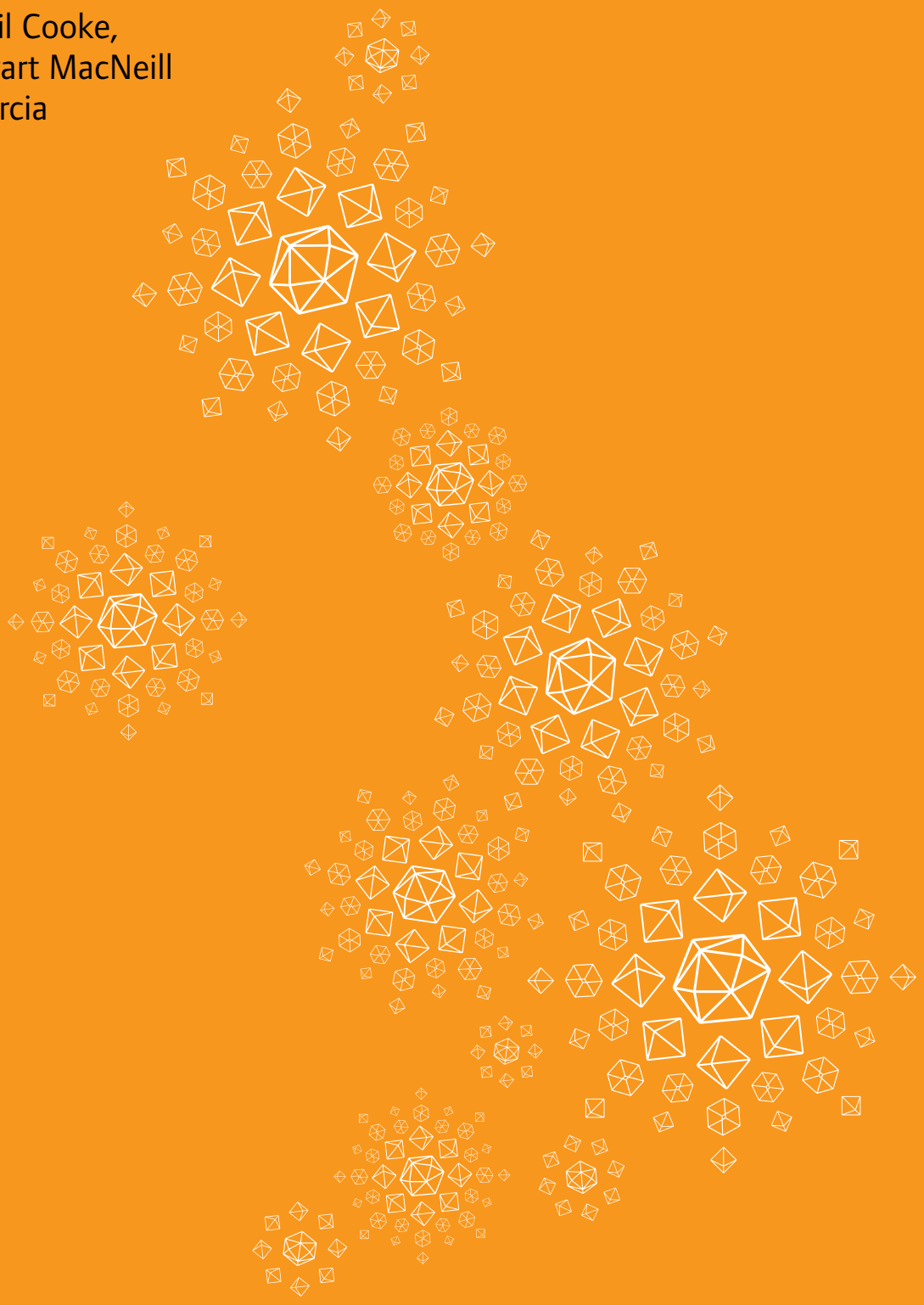

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Foreword

No one doubts the economic importance of the creative industries to the UK. At 6.2 per cent of the economy, and growing at twice the rate of other sectors, they are proportionately the largest of any in the world.

But there is some evidence that the UK's creative industries support innovation and growth in other parts of the economy too. The significance of these spillovers has only recently begun to be examined rigorously. And we know next to nothing about their geographical dimensions.

This gap in our understanding is what NESTA set out to address in Creative Clusters and Innovation, the outcome of a two-year collaboration with Birmingham and Cardiff Universities. The study adopts the concept of creative clusters as a starting point to examine the role that creative industries play in local and regional innovation systems. Its publication accompanies an online platform we have developed for users to examine creative industry concentrations at a fine level of detail in their localities.

As ever, I look forward to hearing your views.

Hasan Bakhshi
Director, Creative Industries, NESTA

November, 2010

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Executive summary

It has long been recognised that industrial clustering benefits businesses by giving them access to skilled staff and shared services, and the opportunity to capture valuable knowledge spillovers. This is equally true of creative businesses, as exemplified by Hollywood, or closer to home by a host of thriving UK clusters, from post-production in Soho to video games in Dundee.

This report is the most ambitious attempt yet to map the UK's creative clusters, showing where they are, which sectors form them, and what their role is in the systems of innovation where they are embedded.

It makes a case for a new approach to local economic policy as it relates to the creative industries: one that goes beyond 'urban branding' rationales, and acknowledges their great potential as active players in local innovation systems.

The research has shown that London is the heart of the creative industries in Britain, dominating in almost all creative sectors, and particularly in the most intrinsically creative layers of the value chain for each sector. The high level of geographical detail used in the mapping has allowed us to pin-point nine other creative hotspots across Britain. They are Bath, Brighton, Bristol, Cambridge, Guildford, Edinburgh, Manchester, Oxford and Wycombe-Slough.

NESTA is making this unique dataset available on an online platform that can be accessed at http://www.nesta.org.uk/areas_of_work/creative_industries/geography_of_innovation. This platform will enable its users to examine creative industry concentrations at a high level of geographical resolution. It will be updated annually as a basis for policymaking at a national and local level.

The analysis also shows which creative industries tend to co-locate. Advertising and Software firms often cluster near each other; the same is true of Music, Film, Publishing and Radio and TV businesses.

It also shows that different cities across Britain have different profiles of specialisation: cities across the South present more diversity in their creative specialisation, whereas Northern and Midlands cities (Manchester excepted) have similar creative profiles. This might reflect common structural challenges for cities in the North, but it could also be indicative of a 'me too' approach to economic development that compromises cities' competitiveness.

The research also shows that the creative industries are more innovative than many other high-innovation sectors, for example professional and business services. What is more, the creative industries provide a disproportionate number of the innovative businesses in most parts of the country.

The research analyses co-location between creative sectors and other innovative industries such as High-Tech Manufacturing and Knowledge Intensive Business Services (KIBS). It shows statistically robust patterns of co-location in several cases. Advertising and Software firms are very often found near both High-Tech Manufacturing businesses and KIBS. Other creative sectors that provide content and cultural experiences show weaker, although still significant, patterns of co-location with KIBS.

These findings suggest the existence of complementarities between some creative sectors and innovative businesses in other parts of the economy. These complementarities may be brought about by value chain linkages and shared infrastructures. They could also be a consequence of knowledge spillovers that happen when creative businesses share new ideas with their commercial partners, or when creative professionals move into other sectors, bringing useful ideas, technologies and ways of working with them. In other cases, the presence of creative firms generates an

'urban buzz' that attracts skilled workers and encourages collaboration.

The report examines some of these issues in further detail through four detailed case studies of creative clusters, produced using business surveys and interviews with local businesses and stakeholders. They are:

- Software in Wycombe and Slough.
- Film Production, Post-Production and Visual Effects in Soho, London.
- Media Production (including Radio and TV and Digital Media) in Cardiff.
- Advertising in Manchester.

The case studies show how digitisation is driving innovation in the creative industries, with most firms investing heavily in internal research and development (R&D), and devoting large numbers of their staff to technology-intensive activities in order to benefit from this digital revolution.

The case studies also show that the mere existence of a creative agglomeration is not enough for the benefits from clustering to emerge. The other crucial ingredient is connectivity between firms within a cluster, with collaborators, business partners and sources of innovation elsewhere (both in the UK and overseas), and finally, with firms in other sectors that can act as clients, and as a source of new and unexpected ideas and knowledge. These three layers of connectivity are underpinned by a dense web of informal interactions and networking.

Implications for policy

NESTA is publishing its detailed dataset online, and will update it annually to provide a powerful resource for local areas seeking to understand and support their creative industries. We are also publishing the survey instruments used to undertake the four detailed case studies, so that areas looking to pursue more in-depth analysis – for instance, to identify 'weak links' in their networks that could be supported with targeted initiatives – can easily replicate our approach.

Having a better understanding of an area's true creative strengths makes it easier to create the right conditions for further growth, and to avoid wasting money on poorly considered interventions. Armed with this knowledge, policymakers concerned with local economic development should do the following:

- **Catalyse latent clusters rather than try to build new ones from scratch**
  Building clusters from scratch is notoriously difficult; far better to identify whether there are any latent clusters 'hidden' in their regions or localities that would benefit from networking and awareness-raising. Increasing the visibility of such clusters can also help creative graduates find employment locally.

- **Think about which sectors work well together**
  The co-location findings presented in this report suggest that there are important synergies between some creative sectors, but not others. The same thing happens between creative sectors and Knowledge Intensive Business Services, and High-Tech Manufacturing. Local policymakers should harness these complementarities, and avoid potentially wasteful 'one-size-fits-all' strategies for creative clusters that don't pay sufficient attention to the distinctive needs of different sectors.

- **Universities should do more to promote innovation in increasingly tech-intensive creative industries**
  It is important to complement the somewhat narrow view of universities as mostly providers of creative talent with a stronger emphasis on innovation. Technology-intensive creative industries, for example, have something to gain from tapping into the public research base in their local universities. Universities should also provide local knowledge hubs where creative firms can share information and build stronger networks.

- **Help remove barriers to collaboration**
  Even if they are aware of each other, local creative businesses may be keen to protect their valuable ideas or client portfolios and be wary of collaborating for fear of disclosing sensitive information. Local bodies need to take this into account when they design initiatives to encourage networking and knowledge sharing. NESTA's Connect programme has found that an 'airlock' model where a neutral organisation acts as a go-between can help build the trust needed to collaborate. Training sessions that bring together professionals from different companies to upgrade their skills can also act

as venues for networking, killing two birds with one stone.

- **Build bridges as well as towers**
  Although investments in iconic public buildings may be a way to signal public commitment to an area, they are expensive. In many cases, much cheaper initiatives to build links between potentially collaborative businesses and sectors may produce longer-lasting impacts for less outlay. Policymakers should ensure the right balance between the two types of public investment in the creative industries.

Epilogue: East London Tech City as the beginning of a new approach to creative cluster development in the UK?

The Prime Minister's recent announcement of the East London Tech City set of initiatives, aimed at building up the vibrant high-tech and digital media cluster in Old Street and Shoreditch, is a step in the right direction.[1] Rather than trying to create a new cluster from the ground up, East London Tech City is aimed at taking an organic, already competitive cluster to the next level, by providing it with the right infrastructure (both physical and digital), and developing its connections with global companies and London's world-class universities.

This should only be the first step. Other budding creative clusters across Britain can, with the right policy interventions, become global hubs for high-growth, innovative creative industries. This report has identified where they are, and puts forward ways to support them.

1. See http://www.number10.gov.uk/news/speeches-and-transcripts/2010/11/east-end-tech-city-speech-56602.

Contents

Part 1: Introduction to the report

The geographic dimensions of innovation

The concept of industrial cluster has played a pivotal role in the analysis of innovation, and the formulation of policies to support it since its introduction by Michael Porter in 1990.[2] Industrial clusters are geographical concentrations of firms from the same sector – or related sectors along the value chain – that collaborate and compete with one another, and have links with other local actors (such as universities).

Industrial clusters can be a source of agglomeration economies – the geographical proximity of firms produces collective benefits – contributing to local competitiveness and economic growth. The presence of several industrial clusters in the same place can bring other benefits too. These are referred to as 'urbanisation economies', which occur when ideas and knowledge 'jump' across industries generating unexpected, often more radical innovation outcomes.[3]

Policymakers are showing a renewed interest in clusters

With the recession, clusters have gained new currency in policy debates – they appeal to policymakers keen to kick-start self-sustaining growth trajectories in the face of ever-increasing global competition, and a tight public purse. Nurturing high-technology clusters is also seen as a way of rebalancing the economy away from the construction and financial services sectors. In the USA, there have been calls for the federal government to play a more active role in catalysing industrial clusters,[4] while the European Commission is currently developing a strategy to support clusters across Europe.[5]

In the UK, David Willetts MP, Minister of State for Universities and Science, used his first speech to state his belief in clusters as sources of innovation[6] – the key policy development in this respect is the ongoing overhaul of the framework for regional development, with the abolition of Regional Development Agencies (RDAs) in England and the creation of Local Enterprise Partnerships that, it is argued, reflect more accurately the nation's economic geography. These new bodies, which will bring together local authorities, businesses, universities and local communities with the aim of driving private sector growth, should play a crucial role in nurturing the clusters on which the UK will rely for its competitiveness and prosperity in the coming years.

Creative clusters have not been examined from an innovation perspective

The evidence shows that creative firms tend to locate close to each other even more than most other sectors.[7] But, to date, there has been little analysis of the direct contribution of creative clusters to local innovation.

Policies to support the creative industries at a local level have tended to see them as drivers of urban regeneration and branding. This is in line with the dominant interpretation of Richard Florida's work on 'Creative Cities' and the 'Creative Class'.[8] According to this view, the creative industries act as providers of cultural amenities and services that make certain cities

2. Porter, M. (1990) 'The competitive advantage of nations.' London: Macmillan.
3. Jacobs, J. (1972) 'The Economy of Cities.' London: Cape; also Feldman, M.A. and Audretsch, D. (1999) Innovation in cities: Science-based diversity, specialization and localized competition. 'European Economic Review.' 43, pp.409-429.
4. Mills, K., Reynolds, E. and Reamer, A. (2008) 'Clusters and Competitiveness: A New Federal Role for Stimulating Regional Economies.' Washington, DC: Brookings Institution. Available at: http://www.brookings.edu/reports/2008/04_competitiveness_mills.aspx.
5. European Commission (2008) 'Towards world-class clusters in the European Union: Implementing the broad-based innovation strategy.' Brussels: European Commission. Available at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2008:0652:REV1:en:pdf.
6. Willetts, D. (2010) 'Science to drive economic growth.' Speech given at the Royal Institution, 9 July 2010. Available at: http://bis.gov.uk/news/speeches/david-willetts-science-innovation-and-the-economy.
7. Freeman, A. (2010) 'London's creative workforce: 2009 update.' GLA Economics Working Paper Series, 40. London: GLA Economics. Available at: http://legacy.london.gov.uk/mayor/economic_unit/docs/wp40.pdf [Last accessed 21 April 2010].
8. Florida, R. (2004) 'The Rise of the Creative Class.' London: Basic Books; also Flew, T. (2010) Toward a Cultural Economic Geography of Creative Industries and Urban Development: Introduction to the Special Issue on Creative Industries and Urban Development. 'The Information Society.' 26, pp.85-91.

attractive for a 'creative class' of knowledge workers and their innovative employers. In this sense, they impact indirectly on the innovative potential of the places where they are located. Although some policies have focused more broadly on the creative industries as drivers of local economic growth, and provided them with business support (including grants and loans, training, networking and marketing), they have rarely focused on them as a source of innovation.[9]

But the creative industries are an active force for innovation

Generating novelty is at the core of what many creative businesses do.[10] Some creative sectors, such as Advertising, Design and Software, provide inputs and skills that are crucial to the innovation processes of businesses in other sectors.[11] Creative businesses facing uncertain, ever-shifting markets have developed organisational practices, skill sets and ways of working that can be fruitfully applied elsewhere.[12] In fact, David Willetts used the example of video games development in Dundee to illustrate the importance of clustering for innovation.

The magnitude of the creative industries' impacts on innovation has however only recently begun to be examined rigorously. And we know next to nothing about their geographical dimensions.

The 'Creative clusters and innovation' project

This study adopts the concept of creative cluster as a starting point to examine the role that the creative industries play in local and regional innovation systems. In doing so, it addresses gaps in our understanding of the dynamics of creativity and innovation at the local and regional levels. It also builds a robust and nuanced evidence base for the formulation of local, regional and UK-wide policies that can augment the contribution that the creative industries make to innovation and economic growth.

Structure of the report

Part 2 presents the main findings of *The Geography of Creativity*, an interim report published in August 2009 where we mapped creative clusters across the UK using economic geography techniques.

In Part 3 of the report we draw on the latest UK Innovation Survey (UKIS 2006) to examine the innovative performance of the creative industries nationally and regionally. Our analysis shows that the creative industries are, overall, highly innovative across a range of dimensions. This suggests that they play an important role in the systems of innovation where they are located.

Part 4 focuses on potential spillovers from creative clusters. Highly innovative creative firms are a likely source of beneficial creative spillovers in the rest of the regional economy. We identify the mechanisms through which this could happen, and explore the hypothesis statistically through an analysis of the extent to which creative industries, High-Tech Manufacturing firms and KIBS firms are co-located at the Travel to Work Area (TTWA) level.[13]

The causal nature of the links between creative industries and innovation at the local level are further explored, in Part 5, through four in-depth case studies of creative clusters in Wycombe and Slough, Soho, Cardiff and Manchester.

Part 6 discusses the findings of the project, and presents their policy implications.

9. Evans, G. (2009) Creative Cities, Creative Space and Urban Policies. 'Urban Studies.' 46, pp.1003-1040.
10. Stoneman, P. (2009) 'Soft Innovation.' London: NESTA.
11. NESTA (2009) 'The Innovation Index.' London: NESTA; also Higgs, P., Cunningham, S. and Bakhshi, H. (2008) 'Beyond the Creative Industries.' London: NESTA; also Bakhshi, H., McVittie, E. and Simmie, J. (2008) 'Creating Innovation.' London: NESTA.
12. Potts, J. and Morrison, K. (2008) 'Nudging Innovation.' London: NESTA; also Oakley, K., Sperry, B. and Pratt, A. (2008) 'The Art of Innovation.' London: NESTA.
13. 'Travel to Work Areas' are geographical units comprising a 'local labour market'. They are a more finely grained geography than 'regions'. A more detailed definition of TTWAs is available at http://www.statistics.gov.uk/geography/ttwa.asp

Part 2: Putting creativity on the map

2.1 The first geography of the British creative industries

Although there is a growing body of research examining creative clusters in specific places across the UK, no previous study has looked systematically at the geographical distribution of creative activities across Britain. The *Geography of Creativity*, published in August 2009, set out to address this gap.[14]

Following two operational definitions of the creative industries

The mapping makes use of two alternative definitions of the creative industries:

- First, the official definition used to produce estimates of the economic performance of the creative industries that was introduced by the Department for Culture, Media and Sport (DCMS) in 1998.[15] This definition includes nine creative sectors – 'Advertising', 'Architecture', 'Arts and Antiques', 'Designer Fashion', 'Video, Film and Photography', 'Music and the Performing Arts', 'Publishing', 'Software, Computer Games and Electronic Publishing', and 'Radio and TV'.

  Each sector includes the firms (and employees) operating within a selected number of Standard Classification Codes at the four-digit level (SIC-4). The DCMS definition also applies adjustment factors to some of these codes because not all activities inside them can be considered as part of the creative industries – for example, it is assumed that around 5 per cent of businesses in the 'textiles' collection of SIC-4 codes are part of the designer fashion creative sector.[16]

- Second, an experimental definition more recently developed for the DCMS by Frontier Economics.[17] This definition classifies firms in each of these creative sectors (plus Design) into different stages (or layers) of a 'creative value chain', beginning with those activities which are more 'intrinsically' creative (for example, 'writing' in the case of the Publishing sector), and ending with those related to the production of complementary inputs (in the case of the publishing sector, book binding and the manufacture of paper), as well as their sale.

  By contrast with the DCMS official definition, Frontier Economics classifies firms and employees into sectors (and the layers inside them) that are disaggregated at the 5-digit SIC code level. It is assumed that these SIC-5 codes are sufficiently detailed not to require the application of adjustment factors in order to distinguish between the 'creative' and 'non-creative' activities that they capture.

See Appendix 1 for a list of the SIC codes included in each of the two definitions.

Zooming down from regions to micro-geographies

The mapping of the creative industries across Great Britain is carried out at three geographical levels, going from large areas to smaller and more detailed geographies.[18]

- The regional level analysis focuses on Government Office Regions and Nations, of which there are 11 in Great Britain.

- The middle level analysis examines 243 Travel to Work Areas (TTWAs) which capture local labour markets.[19]

14. For an in-depth literature review of cluster studies in the UK and overseas, see De Propris, L., Chapain, C., Cooke, P., MacNeill, S. and Mateos-Garcia, J. (2009) 'The Geography of Creativity.' London: NESTA.
15. Department for Culture Media and Sport (1998) 'Creative Industries Mapping Document 1998.' London: DCMS.
16. In Geography of Creativity these adjustment factors are applied at the local level, whereas the DCMS's Creative Industries statistics are calculated at the national level.
17. Frontier Economics (2007) 'Creative industry performance. A statistical analysis for the DCMS.' London: Frontier Economics. Available at: http://www.culture.gov.uk/images/research/Statistical_Analysis_of_the_Creative_Industries_Frontier_Economics_2007.pdf [Last Accessed 21 April 2010].
18. Lack of standardisation in the available data meant that Northern Ireland had to be excluded from the analysis.
19. 'Travel to Work Areas' are those where, of the resident economically active population, at least 75 per cent actually work in the area, and also, of everyone working in the area, at least 75 per cent actually live in the area; see http://www.statistics.gov.uk/geography/ttwa.asp.

Box 1: Defining creative clusters

The *Geography of Creativity* reviews the literature on creative clusters and other allied concepts such as 'cultural quarters' and 'creative cities'. Following Michael Porter (1990), the literature presents geographical agglomeration as a necessary – but not sufficient – prerequisite for the existence of a cluster. Firms in close proximity need also to be related as competitors or collaborators – and be embedded in a social and institutional ecosystem, including universities and support bodies. This is acknowledged in the original Department for Culture, Media and Sport (DCMS 2008) definition of creative clusters, which also emphasises the role that policy can play in nurturing them.

This firm-level industrial analysis of creative agglomeration contrasts with the work of Richard Florida and, in the UK, Clifton and Cooke (2007), who focus on geographical concentrations of 'creative professionals', rather than firms, in a given place.

De Propris (2008) synthesises these streams of work in her definition of creative clusters, which underpins this project. According to her, a creative cluster is a place that brings together:

1. A community of 'creative people' who share an interest in novelty but not necessarily in the same subject.

2. A catalysing place where people, relationships, ideas and talents can spark each other.

3. An environment that offers diversity, stimuli and freedom of expression.

4. A thick, open and ever-changing network of inter-personal exchanges that nurture individuals' uniqueness and identity.

For measurement purposes, the *Geography of Creativity* employs data on the number of firms located in a given area. The relational, social and institutional aspects of clustering – which are specific to different places – are then examined in the in-depth case studies in Part 5 of this report.

Source: Porter, M. (1990) 'The competitive advantage of nations.' London: Macmillan; DCMS (2008) 'Creative Britain: New Talents for the New Economy.' London: DCMS; Clifton, N. and Cooke, P. (2007) 'The 'Creative Class' in the UK: An Initial Analysis.' Centre for Advanced Studies: Regional Industrial Studies Research Report 43. Cardiff: Centre for Advanced Studies; De Propris, L. and Hypponen, L. (2008) Creative Clusters and Governance: The Dominance of the Hollywood Film Cluster. In: Cooke, P. and Lazzeretti, L. (Eds) 'Creative Cities, Cultural Clusters and Local Development.' Cheltenham: Edward Elgar. pp.340-371.

- The micro level analysis, at the highest level of resolution, focuses on Middle Layer Super Output Areas (MSOAs), which are micro areas based on population count.[20] There are 7,193 MSOAs across England and Wales.[21]

Using the most up-to-date data

We use two indicators to help identify the presence of creative clusters at each geographical level: the absolute numbers of creative firms in a given sector; and the sector's location quotient (LQ). Location quotients are a standard metric of agglomeration in economic geography that measure a given area's degree of specialisation in a sector, compared with the national average. A location quotient larger than 1 indicates that a particular sector is more important to the local economy than it is to the British economy.

These indicators were calculated using the latest available data (2007 and 2008) on the number of firms classified according to SIC-4s (following the DCMS definition) and SIC-5s (following the Frontier Economics definition). SIC-4 level data were extracted from the Annual Business Inquiry (ABI), and SIC-5 level data from the Inter Departmental Business Register (IDBR).

20. See http://www.idea.gov.uk/idk/core/page.do?pageId=7175806.
21. Data availability issues mean that our analysis didn't include Northern Ireland. Data at the MSOA level of analysis are not available for Scotland, so while our regional and TTWA analyses cover England, Wales and Scotland, the MSOA analysis only includes England and Wales.

Table 1: Measure of firm concentration (LQ) by creative sectors and by regions – 2007 – DCMS definition

Industry	North East	North West	Yorkshire & The Humber	East Midlands	West Midlands	East	London	South East	South West	Wales	Scotland
Advertising	0.69	1.18	0.74	0.72	0.76	0.91	1.77	1.06	0.8	0.42	0.55
Architecture	1.39	1.07	0.86	0.93	0.97	1.04	0.81	1.06	0.96	0.75	1.42
Arts and Antiques	1.09	1.05	1.09	0.98	1.03	0.97	0.82	0.95	1.15	1.1	1.08
Designer Fashion	0.64	1.15	0.77	2.73	0.98	0.55	1.73	0.39	0.55	0.48	0.76
Video, Film and Photography	0.55	0.57	0.56	0.49	0.5	0.71	2.68	0.94	0.77	0.55	0.69
Music and the Visual and Performing Arts	0.55	0.62	0.59	0.59	0.55	0.82	2.36	1	0.88	0.73	0.6
Publishing	0.51	0.62	0.65	0.7	0.66	1.06	1.82	1.13	1.07	0.64	0.75
Software, Computer Games and Electronic Publishing	0.71	0.97	0.64	0.73	0.81	1.09	1.31	1.41	0.87	0.52	0.75
Radio and TV	0.38	0.53	0.36	0.3	0.43	0.56	3.05	0.9	0.74	0.96	0.56
Total Creative Industries	**0.91**	**0.94**	**0.79**	**0.82**	**0.84**	**0.97**	**1.37**	**1.09**	**0.95**	**0.75**	**0.94**

Source: ONS, ABI.

2.2 The findings of our mapping

a. At the regional level: Creative London, Creative South-East

The regional analysis using both the official DCMS and the Frontier Economics definitions of the creative industries confirms a strong concentration of creative activities in London, and, to a lesser extent, the South East of England (see Table 1). This is particularly the case for the most intrinsically creative layers of the creative industries according to the Frontier Economics definition (see Table 2).

This points to there being a creative 'regional division of labour' in Britain, with London specialising on 'core' creative activities, and other regions and nations providing complementary inputs (such as raw materials and production technologies) that feed into the creative process.

b. At the TTWA level: creative hubs across the UK

One important limitation of examining the industrial agglomeration of regions is that their sheer size can hide substantial industrial concentrations in specific areas. Indeed, our analysis at the more disaggregated TTWA geographical level reveals several creative agglomerations, in addition to London, not visible at the regional level (see Table 3 for a summary).

Most of these creative agglomerations encompass several creative sectors at the same time. They include Bath, Bristol, Edinburgh, Manchester, Brighton, Oxford, Cambridge, Wycombe-Slough and Guildford. Some other places specialising in a single creative sector are also identified.

c. At the MSOA level: a wide scatter of creative pockets of activity

Adopting the highest level of geographical resolution (MSOAs) produces an even more complex picture, with a large number of 'creative pockets' – including core creative activities – scattered across Britain.[22]

22. The risk that this result could simply reflect the relatively large impact of random variations in the numbers of creative businesses on the clustering metrics was addressed by setting a high threshold in the metrics used to establish creative clusters at the MSOA level.

Table 2: Measure of firm concentration (LQ) by creative sectors, creative layers and regions – 2008 – Frontier Economics.

	North East	North West	Yorkshire & The Humber	East Midlands	West Midlands	East	London	South East	South West	Wales	Scotland	Great Britain
Advertising	**0.73**	**1.04**	**0.76**	**0.71**	**0.79**	**0.93**	**1.75**	**1.08**	**0.83**	**0.45**	**0.58**	**1**
L1- Planning advertising campaigns	0.7	0.95	0.79	0.68	0.74	0.97	1.77	1.11	0.9	0.45	0.54	1
L5- Other advertising activities	0.8	1.21	0.72	0.78	0.9	0.85	1.71	1.02	0.7	0.43	0.66	1
Architecture	**1**	**0.99**	**1.04**	**1.06**	**1**	**1.17**	**0.75**	**1.05**	**1.1**	**1**	**1.03**	**1**
L1- Architectural design & urban planning	0.83	0.78	0.85	0.76	0.8	0.88	1.49	0.96	1	0.76	1.3	1
L2- Engineering advice & design	1.45	1.15	0.81	0.95	0.97	1.01	0.73	1.05	0.94	0.71	1.6	1
L3- Scientific Surveying (e.g. geological), construction, real estate	0.95	0.93	1.04	1.04	0.95	1.19	0.83	1.04	1.16	1.1	0.9	1
L4- Sale of construction materials	0.96	1.02	1.1	1.12	1.07	1.2	0.63	1.06	1.09	0.98	1	1
Arts, Antiques and Craft Activities	**0.83**	**0.91**	**1.14**	**1.09**	**1.38**	**0.95**	**1.06**	**0.88**	**1.03**	**0.85**	**0.77**	**1**
L2- Exhibitions & fairs, antiques	0.61	0.55	0.78	0.8	0.87	0.84	1.78	1.03	1.07	0.65	0.88	1
L3- Manufacture of jewellery, metal products, pottery	0.98	1	1.28	1.28	1.75	0.98	0.6	0.82	1.06	1.06	0.8	1
L4- Wholesale of craft products	0.68	0.95	1.09	0.92	1.06	0.97	1.43	0.91	0.96	0.61	0.65	1
Designer Fashion	**0.97**	**1.11**	**1.05**	**1.19**	**0.94**	**0.82**	**1.33**	**0.79**	**0.85**	**0.86**	**0.93**	**1**
L1- Fashion, interior & graphic design	0.74	0.7	0.82	0.89	0.74	0.95	1.83	1.07	0.84	0.54	0.66	1
L3- Manufacture of clothing	0.66	1.13	0.77	2.67	1.1	0.53	1.7	0.39	0.54	0.54	0.74	1
L4- Manufacture of textiles and fabrics	0.47	1.48	1.19	1.65	0.78	0.71	1.71	0.54	0.57	0.49	0.63	1
L5- Retail sale of clothes	1.26	1.13	1.12	0.95	1.04	0.85	0.97	0.84	0.98	1.13	1.16	1
Video, Film and Photography	**0.67**	**0.65**	**0.68**	**0.57**	**0.58**	**0.78**	**2.34**	**0.97**	**0.8**	**0.6**	**0.7**	**1**
L1- Specialist photography, production of films & documentaries, post-production	0.49	0.57	0.52	0.46	0.45	0.69	2.76	0.97	0.77	0.54	0.58	1
L2- Portrait photos	0.69	0.86	0.91	0.68	0.68	0.94	1.9	0.98	0.69	0.63	0.8	1
L3- Film distribution, camera & film manufacture	1.08	0.79	1.02	0.83	0.87	1	1.43	0.99	0.88	0.67	0.94	1
L5- Cinemas	0.95	0.92	0.9	0.55	0.79	0.76	1.4	0.83	1.26	1.38	1.19	1
Music and Performing Arts	**0.55**	**0.6**	**0.59**	**0.57**	**0.55**	**0.83**	**2.35**	**1.02**	**0.88**	**0.74**	**0.57**	**1**
L1- Live theatrical presentation, artistic interpretation	0.4	0.47	0.48	0.43	0.45	0.79	2.7	1.06	0.85	0.59	0.47	1
L2- Casting, theatres and concert halls, music publishing	0.56	0.58	0.45	0.59	0.58	0.71	2.65	0.9	0.76	0.63	0.65	1
L3- Sale of musical instruments, sound recording	0.68	0.74	0.82	0.71	0.64	0.95	2.08	0.99	0.79	0.63	0.53	1
L4- Wholesale of records	0.59	0.51	0.59	0.64	0.52	1.4	2.44	1.05	0.49	0.21	0.37	1
L5- Other recreational activities	1.25	1.18	0.92	1.1	0.99	0.88	0.57	0.91	1.28	1.83	1.15	1

	North East	North West	Yorkshire & The Humber	East Midlands	West Midlands	East	London	South East	South West	Wales	Scotland	Great Britain
Publishing	**0.81**	**1.01**	**0.8**	**0.93**	**0.99**	**1.03**	**1.2**	**1.1**	**0.97**	**0.88**	**0.74**	**1**
L1- Journalism & news syndicates	0.54	0.67	0.54	0.76	0.58	1.01	2.19	0.94	0.67	0.59	0.96	1
L2- Publishing	0.61	0.62	0.66	0.74	0.7	1	1.64	1.16	1.16	0.68	0.85	1
L3- Bookbinding, printing	0.72	0.99	0.76	0.95	1	1.06	1.22	1.15	0.98	0.85	0.63	1
L4- Manufacture of paper and ink	0.62	1.8	1.25	1.21	1	1.11	0.57	0.76	0.82	1.13	1.04	1
L5- Retail sale of books, newsagents etc.	1.34	1.25	1.08	0.91	1.05	0.84	0.94	0.81	0.92	1.12	1.27	1
Software and Computer Games	**0.56**	**0.81**	**0.7**	**0.79**	**0.84**	**1.13**	**1.31**	**1.4**	**0.93**	**0.59**	**0.7**	**1**
L1- Manufacture of video games, software development & consultancy	0.49	0.72	0.63	0.75	0.82	1.16	1.47	1.46	0.83	0.49	0.67	1
L2- Other computer related work	0.58	0.96	0.74	0.79	0.86	1.03	1.14	1.39	1.16	0.7	0.62	1
L3- Hardware consultancy	0.68	0.75	0.84	0.99	0.8	1.29	1.18	1.38	0.9	0.6	0.59	1
L4- Wholesale of hardware and software	0.66	0.9	1.01	0.94	0.99	1.2	1.08	1.23	0.86	0.62	0.77	1
L5- Retail sale	1.07	1.09	1.08	0.96	0.96	1.05	0.62	1.02	1.16	1.18	1.31	1
Radio and TV	**0.72**	**0.85**	**0.77**	**0.8**	**0.83**	**0.94**	**1.63**	**0.97**	**0.91**	**0.98**	**0.79**	**1**
L1- Radio & TV production and broadcast	0.36	0.54	0.36	0.34	0.44	0.56	2.99	0.9	0.74	0.99	0.56	1
L3- Transmitters and TV cameras	0.42	0.98	0.68	0.55	1.21	1.26	0.7	1.5	1.12	1.23	0.7	1
L4- Wholesale and manufacture of TV & cameras	0.79	0.93	0.92	0.95	1.01	1.23	1.11	1.13	0.91	0.73	0.73	1
L5- Retail sale	0.97	1.04	1	1.08	1.02	1.07	0.92	0.94	1.04	1.07	0.99	1
All Creative Industries	**0.85**	**0.94**	**0.91**	**0.96**	**0.94**	**1.07**	**1.13**	**1.08**	**1**	**0.86**	**0.87**	**1**
Layer 1	0.56	0.69	0.63	0.67	0.71	0.98	1.86	1.23	0.84	0.55	0.69	1
Layer 2	0.97	0.99	0.76	0.84	0.88	0.98	1.13	1.17	1.02	0.69	1.07	1
Layer 3	0.85	0.95	0.93	1.03	1	1.11	1.02	1.07	1.06	0.97	0.78	1
Layer 4	0.9	1.04	1.1	1.14	1.05	1.16	0.76	1.03	1.04	0.92	0.95	1
Layer 5	1.23	1.15	1.08	0.96	1.03	0.89	0.9	0.86	1.01	1.17	1.19	1

Source: ONS/IDBR (2008)

Table 3: Summary of creative clustering at the Travel to Work Area Level

Industry	DCMS Definition TTWA Level (Absolute number of firms)	DCMS Definition TTWA Level (LQ)
Advertising	Large number of firms in London and Manchester	South of London (from St Albans to Tunbridge Wells and Guildford), a south belt around Manchester and Birmingham and its south counties, Warwickshire and Worcestershire. Higher than average agglomeration in Harrogate and Ripon and Blackpool
Architecture	Evenly distributed, with large numbers of firms in the larger cities	Concentrated in hot construction spots such as Aberdeen, Newcastle and Southampton/Portsmouth
Arts and Antiques	Very evenly distributed across the country, in both urban and rural areas	Very evenly distributed across the UK
Designer Fashion	Evenly distributed, with larger number of firms in London, the South East, Birmingham, Manchester and Cardiff	Midlands, North London and around Manchester
Video, Film and Photography	Large number of firms in London, Manchester, Birmingham, Brighton, Bristol and Glasgow	Very highly concentrated in London and its surrounding area (towards Oxford and Guildford, as well as Slough and Wycombe), and Brighton, Bristol and Bath
Music and the Visual and Performing Arts	Evenly distributed, with larger number of firms in London, Manchester, Bristol and Brighton	London, Brighton, Bath and the South West of England
Publishing	Very large number of firms in London, its surroundings, Cambridge, Oxford, Bristol and Bath, Manchester, Glasgow and Edinburgh	Strong concentration in Oxford, Bath and Minehead. Significant specialisation in London, Cambridge, Peterborough, Ludlow and the North of Scotland
Software, Computer Games and Electronic Publishing	Evenly distributed across the country, large number of firms in London and its surroundings, Birmingham, Manchester, Milton Keynes and Bristol	Clustering around the West of London, around a triangle Oxford-Cambridge-Reading and between Blackpool and Manchester
Radio and TV	Large numbers of firms around London, Manchester, Cardiff, Bristol, Glasgow and Manchester. Significant presence in the South-West of London	Very strong level of concentration with high agglomeration in London and its surrounding areas (Wycombe and Slough), Brighton, Bristol, Cardiff and the North of Wales and Scotland

2.3 The *Geography of Creativity* also examines statistical patterns in the clustering data

The *Geography of Creativity* also uses correlation techniques to identify statistically significant patterns in the way in which creative sectors co-locate with each other, and to explore similarities and divergences in the creative specialisation profiles of different cities.

a. **Creative co-location: some creative sectors tend to be found together**
The analysis of creative sectors' co-location identifies two broad groups of creative industries that tend to be found in the same places.

- The first group includes Advertising, Designer Fashion and Software, Computer Games and Electronic Publishing.

- The second group includes Music and the Performing Arts, Video, Film and Photography, Publishing, and Radio and TV.

This finding supports the idea that places endowed with certain resources – such as specialised labour pools, physical and digital infrastructures and markets – attract some creative activities but not others. It also suggests that there are synergies, complementarities and knowledge spillovers between some creative sectors, but not others.

b. **Creative specialisation: homogeneity in the North, diversity in the South**
We also build a 'specialisation profile' for every TTWA in Great Britain by ranking all creative sectors in each of them according to their level of specialisation as indicated by LQs. These rankings are then compared using ranked correlation techniques. This analysis identifies significant similarities between the specialisation profiles of some cities located in the North of England, Yorkshire and the Midlands (with the exception of Manchester). By contrast, cities across the South prove to be more diverse in their creative specialisations.

2.4 Taking stock of the findings

The *Geography of Creativity* presents, for the first time, a rich and multi-layered picture of the geographical distribution of creative activities in Britain. Although London is predominant in most creative sectors – and especially in the most intrinsically creative stages of the value chain, we also identify other places that 'create above their weight' – or alternatively, that 'create under the radar'.

The statistical analysis of co-location and specialisation has potentially significant implications. It suggests that there may be important interdependencies and complementarities between different types of creative activities. So 'one size fits all' policies for creative industries might not be the most efficient way to support creative cluster growth.

The high levels of homogeneity in the creative profiles of cities in the North and the Midlands might help to explain why they are lagging in the development of their creative industries. While the specialisation of cities further South seems to reflect their distinctive sources of competitive advantage (for example, Cambridge focuses on Publishing and Software, two sectors linked to its strong research and technology base), cities in the North, with the notable exception of Manchester, are found to focus and compete in the same creative sectors.

Part 3: Innovation in the creative industries, nationally and regionally

The mapping of the creative industries across Britain presented in Part 2 is the first step towards analysing their role in the innovative dynamics of the places where they are located. In Part 3, we provide an overview of some of the difficulties with measuring innovation in the creative industries, and then examine it at the national and regional level using data from the 2006 UK Innovation Survey (UKIS 2006). The findings from this analysis support the idea that the UK's creative industries play an important role in the dynamics of innovation of the places where they are located.

3.1 Measuring innovation in the creative industries

Traditional indicators of innovation fail to capture many innovative activities in the creative industries

As with services,[23] the innovative activities of the creative industries are only imperfectly captured by traditional 'hard' indicators such as R&D investments or number of patents. The innovation outputs from services and creative businesses are instead very often intangible, 'co-produced with customers', simultaneous (consumed as they are produced), heterogeneous and perishable. As such, they are difficult to measure.[24] They include the adoption of new organisational arrangements and market innovations, inter-organisational and client-facing innovations, and aesthetic – or soft – innovations.[25]

Organisational and service innovations are being increasingly recognised

An increasing interest in wider forms of innovation beyond those which are technology-intensive or science-based, and recognition of the importance of services in Western economies, have informed the most recent definition of innovation published by the OECD in the Third Version of the Oslo Manual. This definition acknowledges the non-technological aspects of innovation.[26]

Along similar lines, the UK's Department for Business, Innovation and Skills (BIS) defines organisation and marketing innovations as including new knowledge management systems, changes to the organisation of work and its management, changes in the relationship with other firms, changes in design and packaging and changes in sales or distribution methods.[27]

But some innovation processes and outputs in the creative industries are still not well understood

Innovations in these industries tend to present an 'aesthetic', 'artistic' or 'stylistic' element.[28] In a recent NESTA report, Paul Stoneman defines soft innovation as that which *"primarily impacts upon sensory perception and aesthetic appeal rather than functionality"* of goods and services. This form of innovation is therefore dependent on individuals' subjective assessment, and hard to evaluate.

3.2 Are the creative industries innovative?

Bearing all of this in mind, we have compiled data from the UKIS 2006 to assess the levels of innovation in the creative industries. The UKIS includes data on services as well as 'tangible good' innovation, measures of wider innovation – such as organisational change – and the use of Intellectual Property measures capturing

23. Abreu, M., Grinevich, V., Kitson, M. and Savona, M. (2008) 'Taking Services Seriously: How policy can stimulate the 'hidden innovation' in the UK's services economy.' London: NESTA.
24. Nijssen, A.F., Edwin, J., Hillebrand, B., Vermeulen, P.A. and Kemp, R.G. (2006) Exploring product and service innovation similarities and differences. 'International Journal of Research in Marketing.' 23(3), pp.241-251.
25. Miles, I. and Green, L. (2008) 'Hidden Innovation in the Creative Industries.' London: NESTA; also Stoneman, P. (2009) 'Soft Innovation.' London: NESTA.
26. "An innovation is the implementation of a new or significantly improved product (good or services), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations." (OECD (2005) 'The Measurement of Scientific and Technological Activities: Oslo Manual 3rd Edition.' Paris: OECD, p.46).
27. DIUS (2008) 'Innovation modes and productivity in the UK.' London: DIUS.
28. Schweizer, T.S. (2003) Managing Interactions between Technological and Stylistic Innovation in the Media Industries. 'Technology Analysis and Strategic Management.' 15(1), pp.19-41; also Handke, C. (2006) 'Measuring Innovation in Media Industries.' Available at: http://www.recida.org/downloads/handke2.doc [Last Accessed 21 April 2010]; also Stoneman, P. (2009) 'Soft Innovation.' London: NESTA; also Castañer, X. and Campos, L. (2002) The Determinants of Artistic Innovation: Bringing in the Role of Organizations. 'Journal of Cultural Economics.' Vol.26, pp.29-52.

Box 2: The 2006 UK Innovation Survey

The 2006 UK Innovation Survey survey, undertaken by the department for Business, Innovation and Skills (BIS) was sent to 28,000 firms with 10 or more employees and obtained a response rate of 53 per cent (14,870 firms). It asks firms about their innovation behaviours from 2004 to 2006. The survey sample is stratified by firm size and by sector (based on the 2003 Standard Industry Classification (SIC)) as well as UK Government Office Regions and Nations (DIUS, 2008). The UKIS sample is not suitable for analysis below this geographical level.

The sample frame doesn't cover all the SIC codes used to measure the creative industries according to their official DCMS definition. Nevertheless, growing attention has been paid to these industries in the last two editions (DIUS, 2006 and 2008). The survey includes creative sectors such as Advertising, Architecture, Arts and Antiques, Designer Fashion, most of Publishing (except News agency activities) and most parts of Video, Film and Photography and Software, Computer Games and Electronic Publishing. The survey, however, excludes firms in Radio and TV, and all firms in artistic and literacy creation and operation of arts facilities which are part of the Music, Visual and Performing Arts sector (Appendix 1 provides the detailed list of the SIC codes for the creative sectors that are covered by the UKIS survey).

The UKIS is part of a pan-European initiative and follows the general guidelines for measuring innovation as defined in the Oslo Manual (OECD, 2005). It provides information on:

- **Product innovation** – where a firm introduces a new or improved product, including both tangible goods as well as services. A distinction is made between products that are only new to the business, and those which are also new to the market.
- **Process innovation** – where a firm introduces significant changes in the processes through which it produces goods or services, again distinguishing between processes new to the business from those which are new to the industry.
- **Categories of innovation-related expenditures** such as R&D investments, acquisition of capital goods and software, and design activities.
- **Management-related changes** sometimes referred to as 'wider innovation'. These are *"strategic changes in the organisation of a business or its functions, aimed at improving competitiveness through increased efficiency or services improvements."* (DIUS, 2008: 7)
- **Use of Intellectual Property Rights** such as patents, copyright, trademarks, confidentiality agreements and other informal methods.

Source: OECD (2005) 'The Measurement of Scientific and Technological Activities: Oslo Manual 3rd Edition.' Paris: OECD; DIUS (2008) 'Persistence and change in UK innovation: 2002-2006.' London: BIS.

some aspects of service and soft innovation which are crucial in the creative industries (see Box 2 for a summary).

The then Department of Trade and Industry already used data from a previous UKIS in a study of innovation in the UK that included an overview of innovative activities in the UK's creative industries at an aggregate level.[29] Its findings supported the idea that the creative industries are more innovative than the rest of the economy as a whole. The DCMS used the same data to show that they present levels of innovation activity above even sectors deemed to be highly innovative such as Engineering-based manufacturing or KIBS.[30]

29. DTI (2006) 'Innovation in the UK: Indicators and Insights.' DTI Occasional Paper No.6. London: DTI.
30. Wilkinson, A. (2007) 'An Assessment of Productivity Indicators for the Creative Industries.' London: DCMS.

Our analysis partly updates those studies using more recent UKIS data. But it also goes beyond them in disaggregating the creative industries into those specific sectors that are included in UKIS 2006. Following Abreu *et al.* (2008), we examine product innovations (which can be tangible goods or services), and process innovations.[31]

We also try to capture 'soft' or aesthetic innovation outputs (that might be particularly relevant for the creative industries) through a composite indicator that measures whether a firm has used formal (including patents, trademarks, copyright or registration of design) or informal (confidentiality agreements, secrecy, lead-time advantage or complexity of design) intellectual property (IP) protection methods during 2004-2006 – we refer to it as the 'Intellectual Output Index'.[32]

These protection methods apply to goods, services, processes and other intangible outputs of innovative activities. No assumption has been made about the intellectual property methods adopted by different economic sectors. By including informal methods of protection, this indicator takes into account the difficulty that some creative firms face in 'formalising' their innovation outputs.[33]

The creative industries display high levels of innovation...

Table 4 and Figure 1 confirm that the creative industries overall display levels of innovation above the national average for all indicators. The differences are particularly visible in the use of internal R&D and the extent to which they launch new products in the market.

This does not mean that the creative industries are the most innovative sector in the UK economy. 'Engineering-based manufacturing' and 'Other Manufacturing' tend to innovate in their products and processes more frequently. It seems that the innovation profile of the

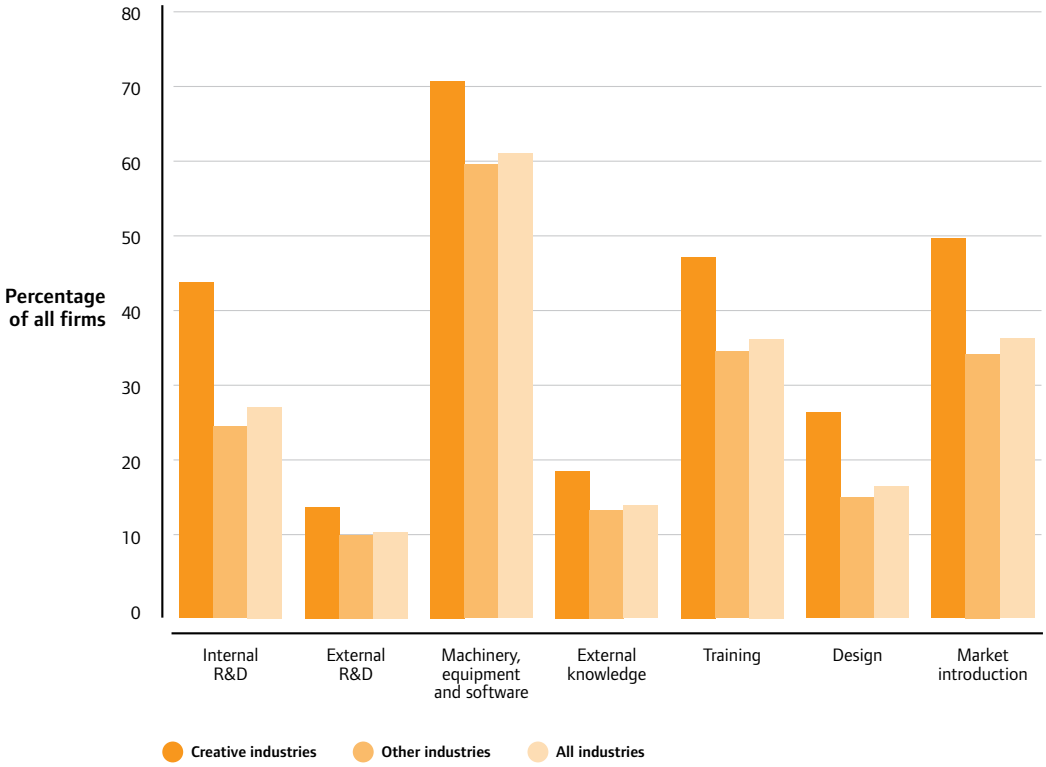
31. Abreu, M., Grinevich, V., Kitson, M. and Savona, M. (2008) 'Taking Services Seriously: How policy can stimulate the 'hidden innovation' in the UK's services economy.' London: NESTA.
32. Stoneman, P. (2009) 'Soft Innovation.' London: NESTA.
33. A cautionary note regarding the analysis below is that different creative and industrial sectors present qualitative differences in their innovation processes and outputs – in that sense, different rates of innovative activity as indicated by UKIS might have as much to do with such differences (and the extent to which their respective innovation outputs are captured by the survey questions) as they do with the actual levels of innovation in the sectors being considered. Nevertheless, such comparisons are standard in the Innovation Studies literature. See Smith, K. (2006) Measuring Innovation. In: Fagerberg, J., Mowery, D. and Nelson, R. (Eds) 'The Oxford Handbook of Innovation.' Oxford: Oxford University Press.

Table 4: Innovation activities and outputs by sector (percentage of all firms in each sector) – 2004-2006

	Innovation in tangible products ('goods')	Innovation in service products	Innovation in process	Innovation in product or process innovation	Intellectual Output Index
Innovation in Advertising	NA*	26%	NA*	26%	65%
Architecture	11%	28%	17%	32%	61%
Arts and Antiques	11%	20%	10%	23%	33%
Designer Fashion	31%	NA*	NA*	32%	57%
Film, Video and Photo	10%	18%	9%	20%	45%
Publishing	30%	19%	14%	35%	62%
Software	38%	55%	26%	59%	81%
Total Creative Industries	17%	30%	16%	34%	57%
Engineering-based Manufacturing	32%	14%	21%	39%	63%
Other Manufacturing	32%	14%	23%	40%	59%
Retail & Distribution	13%	18%	8%	21%	34%
KIBS	9%	26%	18%	31%	53%
Other Services	6%	16%	6%	18%	27%
All industries	**14%**	**18%**	**12%**	**26%**	**41%**

Source: ONS. NA indicates cells with data that cannot be made available due to potential disclosure issues.

Figure 1: Innovation-related activities by creative businesses and other sectors in the UK



Source: ONS.

creative industries resembles most closely that of KIBS firms, particularly in the importance of innovation in service provision.[34]

...but there are visible differences in the innovative performance of specific creative sectors

As Table 4 shows, the most innovative creative sector is Software, Computer Games and Electronic Publishing, where almost 60 per cent of firms report having innovated in product or process from 2004 to 2006. Firms in this sector also rely strongly on IP measures.

There are many innovative firms in other creative sectors such as Advertising, Publishing, Architecture and Designer Fashion. By contrast, Film, Video and Photography and Arts and Antiques firms show an innovation performance below the national average for most variables.

Reflecting the results for the creative industries overall, specific creative sectors are usually less innovative than manufacturing in terms of new 'tangible goods' and 'production processes', and more so in respect to services. This difference is particularly visible in the case of Advertising, Architecture and Software, which often provide business services to companies in other sectors.

3.3 Creative industries innovation at the regional level

Although the creative industries have been shown to be at the forefront of innovation nationally, they could contribute more directly to innovation in some regions, and less so in others. This is an important question for the analysis of the impact of creative clusters on innovation. We have examined this issue through an analysis of regional innovation activities by creative firms using UKIS 2006 data. Our findings are presented in Tables 5, 6 and 7, and Figure 2.[35]

The creative industries contribute directly to regional innovation

Tables 5 and 6 show that the creative industries are generally ahead of the rest of the regional economy in their innovative performance no matter where they are located (with the notable exception of London, which is discussed below). The differences with other

34. These comparative results might appear to conflict with those of the aforementioned DCMS (2007) study. However, note that Table 4 focuses specifically on the introduction of new products and processes, and use of IP measures. This contrasts with 'innovation activeness', a wider indicator which also considers innovative activities in progress or abandoned, as well as innovation expenditures in different areas – both of which are considered in the DCMS study.

35. Once again, we advise caution in the interpretation of these results, as differences in innovative performance across regions could be explained by variations in the sector breakdown of the creative industries in different places. For example, those regions where there is a majority of Software, Computer Games and Electronic Publishing firms (which were shown to be the most innovative creative sector) will present higher levels of innovation than those with a predominance of Arts and Antiques companies (which are less innovative according to UKIS data). As such the results discussed above reflect as much on the differences in make-up between creative firms and non-creative firms inside each region as they do differences in innovation within creative sectors across regions.

Table 5: Innovation performance at the regional level: creative industries and other sectors – 2004-2006

Region	Creative product innovation (new to firm)	Other sectors product innovation (new to firm)	Creative product innovation (new to market)	Other sectors product innovation (new to market)	Creative process innovation (new to firm)	Other sectors process innovation (new to firm)	Creative process innovation (new to industry)	Other sectors process innovation (new to industry)
North East	33%	21%	15%	6%	16%	11%	NA*	4%
North West	37%	21%	NA*	7%	15%	11%	NA*	3%
Yorks & Humber	32%	19%	17%	6%	16%	11%	NA*	2%
East Midlands	36%	23%	15%	7%	15%	11%	NA*	3%
West Midlands	34%	22%	15%	8%	21%	13%	NA*	3%
East	36%	25%	17%	8%	19%	12%	10%	3%
London	19%	20%	11%	6%	7%	11%	4%	3%
South East	40%	20%	16%	8%	19%	11%	8%	3%
South West	33%	24%	15%	7%	15%	11%	5%	2%
Wales	34%	21%	12%	7%	11%	12%	NA*	3%
Scotland	30%	19%	10%	6%	20%	11%	NA*	3%
Average	**33%**	**21%**	**14%**	**7%**	**16%**	**11%**	**7%**	**3%**

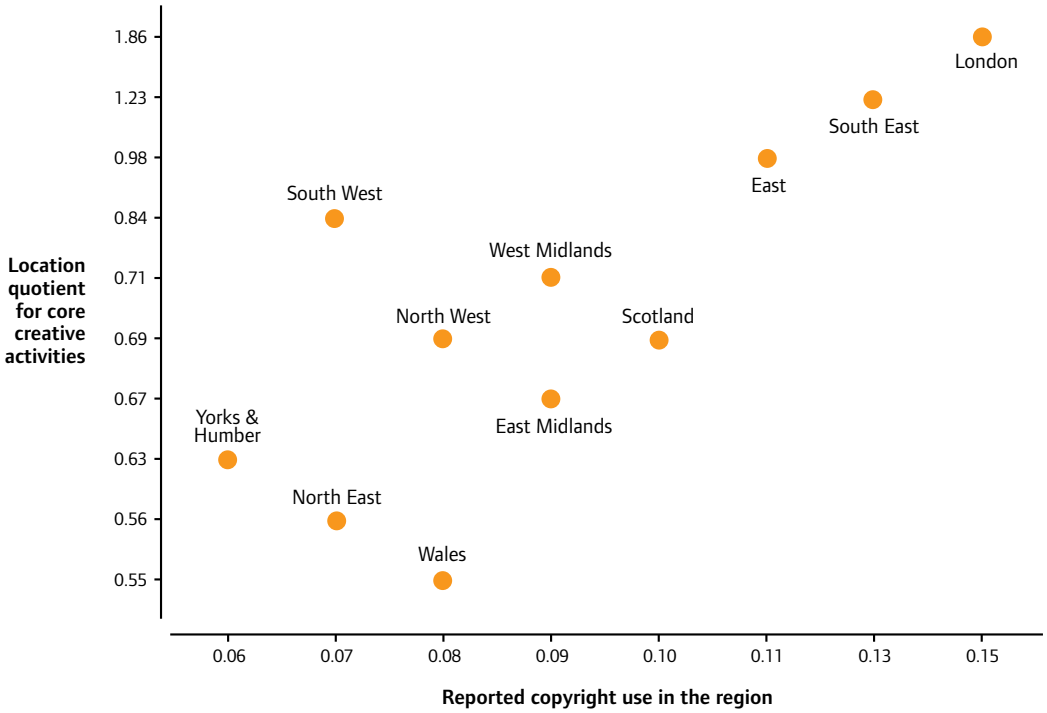
Source: ONS. *NA indicates cells with data that cannot be made available due to potential disclosure issues.

Table 6: Innovation performance at the regional level: creative industries and other sectors – 2004-2006

Region	Creative Wider Innovation	Other sectors wider innovation	Creative Collaboration for innovation	Other sectors collaboration for innovation	Creative collaboration outside of the region	Other sectors collaboration outside of the region	Creative Intellectual Property Index	All sectors Intellectual Property Index	All Sectors Copyright use
North East	64%	29%	23%	10%	83%	78%	61%	36%	7%
North West	48%	29%	10%	11%	NA*	74%	61%	44%	8%
Yorks & Humber	56%	28%	12%	11%	NA*	85%	53%	40%	6%
East Midlands	44%	29%	20%	13%	73%	86%	49%	44%	9%
West Midlands	51%	27%	14%	12%	76%	82%	59%	45%	9%
East	46%	34%	22%	13%	88%	90%	57%	47%	11%
London	16%	39%	17%	10%	86%	68%	50%	43%	15%
South East	32%	36%	17%	12%	84%	84%	66%	47%	13%
South West	42%	30%	15%	11%	79%	80%	59%	41%	7%
Wales	59%	26%	14%	9%	NA*	78%	58%	41%	8%
Scotland	45%	28%	15%	9%	62%	66%	59%	36%	10%
Average	**46%**	**30%**	**16%**	**11%**	**79%**	**79%**	**57%**	**42%**	**9%**

Source: ONS. *NA indicates cells with data that cannot be made available due to potential disclosure issues.

Figure 2: Location quotient for core creative activities, and share of firms in all sectors that report the use of copyright as important or very important to protect innovation



sectors are particularly striking with respect to the introduction of products that are new to market: creative firms in almost all regions are twice as likely to have introduced new products to the market as businesses in other sectors.

This does not mean that the creative industries are the most innovative sector at the regional level. Table 7 shows that Engineering-based Manufacturing companies are more likely to introduce new products in all regions apart from the North East. Something similar happens with Other Manufacturing businesses (which include food, wood, paper, chemical, rubber, metal, non-mineral metal products and furniture manufacturing), The South East and Yorkshire and the Humber being the only exceptions.

The creative industries are clearly shown to be more innovative than retail and distribution, KIBS and Other Services on all these measures, with London again the only exception.

And they punch above their weight as regional innovators

Table 7 estimates the weight of creative businesses in the regional populations of innovators in products or processes drawing on ABI and UKIS 2006 data. It shows that for all regions and nations with the exception of London, the proportion of creative industry innovators is larger than one would expect given their weight in the regional economy. For example, while creative businesses comprise 14 per cent of all firms in the South East, they constitute 22.5 per cent of all innovators in products and processes.

Why is London the outlier?

In Part 2 we showed that London presents the strongest concentration of creative industries in Britain – in some sectors, overwhelmingly so. And those firms based in the capital specialise in the most intrinsically creative stages of the value chain. However, our analysis in this Part has also shown that these creative firms are

Table 7: Firms' product or process innovation by industrial sectors and regions – 2004-2006 (percentage of all firms by sector in the region).

Region	Creative industries	Engineering-based Manufacturing	Other Manufacturing	Retail & Distribution	KIBS	Other Services	All industries	Share of CIs in the regional economy
North East	37%	35%	45%	18%	31%	18%	24%	12%
North West	37%	38%	37%	27%	30%	14%	26%	12%
Yorks & Humber	36%	39%	33%	19%	31%	20%	24%	10%
East Midlands	38%	38%	48%	25%	32%	16%	28%	11%
West Midlands	39%	40%	47%	20%	35%	16%	27%	11%
East	38%	47%	44%	25%	36%	23%	30%	12%
London	19%	33%	41%	19%	30%	18%	22%	18%
South East	43%	44%	38%	19%	30%	18%	27%	14%
South West	35%	41%	38%	25%	36%	21%	28%	12%
Wales	34%	41%	40%	17%	31%	18%	25%	10%
Scotland	37%	38%	40%	18%	31%	18%	24%	12%
UK	**34%**	**39%**	**40%**	**21%**	**31%**	**18%**	**26%**	**13%**

Source: ONS.

less innovative than the rest of the economy, as well as those in other regions.[36] This seems broad-based.

One potential explanation is that the content innovation that London's creative industries specialise in – that is, 'aesthetic' or 'soft' innovation – is not captured well by conventional measures of innovation such as the introduction of new 'products', 'services' or 'processes'. That London appears to specialise in this form of content innovation is seen in Figure 2. This shows that the propensity to use copyright measures to protect innovation in a region is positively linked to the degree to which that region presents a high intensity of firms engaged in more intrinsically creative activities, as captured in the 'creative layer 1' according to the Frontier Economics definition of the creative industries – and this time, London is at the top.[37]

36. The low levels of innovative performance by London firms more generally have already been highlighted elsewhere. See Robson, S. and Kenchatt, M. (2010) 'First findings from the UK Innovation Survey 2009.' Available at: http://www.statistics.gov.uk/elmr/03_10/downloads/ELMR_Mar10_Robson.pdf [Last accessed 21 April 2010].
37. See Part 2 for a description of the Frontier Economics definition, and Appendix Z for a list of the industrial activities comprised in 'layer 1'.

Part 4: Creative spillovers and co-location

The high levels of innovation in the creative industries reported above supports the idea that, in addition to contributing *directly* to regional innovation processes through the innovative activities in which they engage, they could also do so *indirectly*, by generating spillovers that benefit the wider economies of the places where they are located.

This part of the report reviews existing studies that articulate the mechanisms through which such spillovers might take place, and presents the results of a statistical analysis of the co-location patterns between creative firms and those in other highly innovative sectors such as High-Tech Manufacturing and KIBS. Such patterns might indicate – though of course not prove – that spillovers indeed take place.

4.1 The case for creative spillovers

Innovation can generate beneficial spillovers in other sectors

It is generally acknowledged that innovative sectors and activities such as R&D are an important source of spillovers with benefits that spread across the economy.[38] These spillovers occur where the knowledge activities of one firm or industry result in economic benefits for another one that the former is not able to fully capture. Establishing their existence and magnitude is important for policy: their presence is an instance of market failure that may justify the introduction of measures to support the activities that generate them (if the benefits of intervention are shown to outweigh the costs) – for instance, tax credits for R&D, and public investment in the science base. Otherwise, they will occur less than would be socially optimal.

A typology of creative industry spillovers

As we noted in Part 3, the consideration of the creative industries as a force for innovation is only a recent development and in no small part a reflection of NESTA's previous research. Only a few studies have begun to examine the creative industries from an innovation perspective. This means that there have been few analyses of the potential spillovers that their activities generate. We now draw on an emerging body of literature that looks into the mechanisms through which 'creative spillovers' could occur. In doing so, we build on and augment the typology of creative industry spillovers developed by Frontier Economics for DCMS in 2007.[39]

- **Knowledge spillovers** occur when new ideas and technologies developed by creative businesses are fruitfully applied elsewhere without compensation: for example, the use of social networking features originally developed by digital media companies to manage communications in businesses. In some cases, these spillovers are mediated by business-to-business interactions, for example, design firms working with clients in different sectors have been shown to channel knowledge beyond their brief and across firms, thus producing unexpected novelty.[40] NESTA research shows that firms that spend double the average on creative inputs are 25 per cent more likely to introduce products which are new to the firm or market.[41]

  Australian economist Jason Potts argues that many creative businesses organise their productive and innovative activities using open and collaborative models which are more suitable for highly dynamic competitive environments, and that these models can spread to those businesses in other sectors

38. Griliches, Z. (1992) The Search for R&D Spillovers. 'Scandinavian Journal of Economics.' 94 Supplement, pp.29-47.
39. Frontier Economics (2007) 'Creative Industry Spillovers: understanding their impact on the wider economy.' London: Frontier Economics.
40. Hargadon, A. and Sutton, R. (1997) Technology Brokering and Innovation in a Product Development Firm. 'Administrative Science Quarterly.' 42, pp.716-749; also Sunley P., Pinch, P., Reimer, S. and Macmillen, J. (2008) Innovation in a creative production system: the case of design. 'Journal of Economic Geography.' 8, pp.675-698.
41. Bakhshi, H., McVittie, E. and Simmie, J. (2008) 'Creating Innovation.' London: NESTA; also Sunley P., Pinch, P., Reimer, S. and Macmillen, J. (2008) Innovation in a creative production system: the case of design. 'Journal of Economic Geography.' 8, pp.675-698.

that engage with them – he refers to this as a creative 'nudging of innovation'.[42]

Knowledge spillovers can also be embodied in labour flows. Creative professionals such as designers, advertisers or software developers may be employed outside the creative industries, bringing with them new techniques, ideas and ways of working. Or, they may start spin-off companies in a different sector – for example, Apple's Steve Jobs and Steve Wozniak met while working at Atari, a video games developer.[43] NESTA research shows that creative and arts professionals have skill sets that can induce innovation in the organisations that employ them.[44]

In addition to these 'creative push' knowledge spillovers, there are also instances where creative businesses can make their suppliers more innovative through knowledge embodied in their sophisticated demand (this is what innovation researchers call 'demand pull' effects).[45] The development of new computer chips and server technologies in response to the graphically intensive demands of video games developers is one example of this.

The literature on user innovation has shown that some 'lead users' with advanced needs in some cases develop new technologies to address them, and that these are then adapted and commercialised in the market by specialist suppliers. A recent NESTA study of user innovation across the UK economy has shown that the creative sectors considered explicitly in the survey (Software and Other Creative Activities, including Architecture, Advertising and Photography) present comparatively high levels of user innovation, which might spill over into their suppliers. 50 per cent of all the Software firms and 25 per cent of those in Other Creative Activities reported that they engage in user innovation.[46]

- **Product spillovers** take place when creative goods and services increase demand for complementary goods in other sectors, or are adapted to other markets: the widespread availability of online music increases the attractiveness of iPods, or a Disney film generates additional revenues through the sale of merchandise and toys.

- **Network spillovers** occur where the mere presence of creative businesses in a given place benefits other local firms. Florida's 'Creative Cities' noted how a thriving cultural scene attracts knowledge workers, who can then be employed by other local businesses (or indeed bring in foreign investment from companies attracted by the strong local talent pool).[47] Michael Storper and Tony Venables argue that the creative industries also create an 'urban buzz' or atmosphere which is more conducive to local collaboration and innovation.[48]

4.2 Co-location between creative firms and other sectors

Location, location, location

Many of the mechanisms for the knowledge and network spillovers described above – such as commercial relationships and collaborations, and labour flows across sectors – are more likely to take place between firms that are located close to each other.

The economic geography literature has also shown that specialist knowledge conducive to innovation is often hard to 'codify' into easily understandable instructions and information. In order to be communicated effectively between different parties, there needs to be a degree of trust between them – this trust emerges more easily 'on site' through face-to-face interactions.[49]

All of this creates barriers for the perfect transmission of knowledge to places far away, making it 'geographically sticky'. An implication of this is that knowledge spillovers tend to 'degrade' with distance – geography and location matter for innovation. It also means that the presence of spillovers can drive the firms that benefit from them closer to their sources – as when corporations set up a subsidiary somewhere near to a research laboratory: in this sense, the close location of firms in the same place could be explained by spillovers between them.

A first step towards establishing creative spillovers in the local economy

Here we consider the results of a statistical analysis looking into the patterns of co-location between the creative industries and two other innovative sectors, High-Tech Manufacturing and KIBS.

The presence of such patterns might suggest strong value chain inter-linkages (firms in these sectors are found in the same places because they trade frequently) and beneficial

42. Potts, J. and Morrison, K. (2008) 'Nudging Innovation.' London: NESTA.
43. Kent, S. (2001) 'The Ultimate History of Video Games.' New York: Prima Publishing.
44. Oakley, K., Sperry, B. and Pratt, A. (2008) 'The Art of Innovation.' London: NESTA.
45. Markusen, A., Gilmore, S., Johnson, A., Levi, T. and Martinez, A. (2006) 'Crossover: How Artists Build Careers across Commercial, Nonprofit and Community Work.' Available at: http://www.haassr.org/html/resources_links/pdf/caCrossover.pdf [Last accessed 21 April 2010].
46. Flowers, S., von Hippel, E., deJong, J. and Sinkowicz, T. (2010) 'Measuring User Innovation in the UK.' London: NESTA.
47. Florida, R. (2004) 'The Rise of the Creative Class.' London: Basic Books.
48. Storper, M. and Venables, T. (2004) Buzz: face-to-face contacts and the urban economy. 'Journal of Economic Geography.' 4(4), pp.351-370.
49. Iammarino, S. and McCann, P. (2006) The structure and evolution of industrial clusters: Transactions, technology and knowledge spillovers. 'Research Policy.' 35(7), pp.1018-1036.

knowledge spillovers (mediated by those business to business transactions, labour flows and informal networking which occur more easily when firms are close to each other). The reason we focus on high-technology manufacturing and KIBS firms is that these sectors are perceived to embody high levels of innovation.

Co-location does not, however, imply causation: proximity between creative firms and these other sectors does not demonstrate the existence of creative spillovers. Indeed, there could be backwards spillovers from other sectors into the creative industries. Or there could be other underlying factors unrelated to spillovers which underpin co-location – such as the presence of universities or a research infrastructure attracting many firms to a given place.

As such, the findings below should be seen as indicative rather than demonstrative of creative spillovers. The direction of causality, as well as the role of other environmental and infrastructural factors in the local dynamics of creativity and innovation, is explored in the case studies presented in Part 5.

Data and methodology for the co-location analysis

Our study of co-location uses the location quotients of the nine creative sectors identified by the DCMS mapping of the creative industries, and of the industries included in the definitions of High-Tech Manufacturing and KIBS produced by AeA and EFILW.[50] The location quotients have been calculated at the TTWA level (which captures local labour markets) using ONS data.

The value of the partial correlation coefficients between each of the sectors being compared indicates the likelihood of finding them strongly concentrated in the same places (in which case the sign of the coefficient is positive) or in opposite places (in which case the sign is negative). For example, a positive correlation coefficient of 1 means that whenever one finds one sector 'in strength', the other is always present with the same strength. The results can be considered only robust when they are statistically significant – that is, when significant underlying patterns are detected in the data.

The total number of firms in a TTWA has been used to control for the 'industrial mass' of each of the considered places, thus attenuating 'urbanisation effects' that could account for the simultaneous strong presence of several sectors in more industrious areas. Although the way in which location quotients are calculated (capturing the weight of a sector in the local economy relative to their national importance) should in principle reduce the severity of this effect, by introducing industrial mass as an additional control, we have sought to reduce the effects on the correlation of other factors that may be approximated by it – for instance, better infrastructure that benefits all firms located in a place, or large consumer markets.

Many creative sectors co-locate with High-Tech Manufacturing and KIBS

Table 8 presents the results of the analysis of co-location between the nine DCMS creative sectors and High-Tech Manufacturing and KIBS firms at the aggregate level.[51]

Advertising, Designer Fashion and Software, Computer Games and Electronic Publishing are shown to co-locate significantly and strongly with KIBS (coefficients above 0.5). All these sectors also co-locate significantly, although less intensely, with High-Tech Manufacturing businesses.

Most other creative sectors co-locate with KIBS, but not with High-Tech Manufacturing industries. Their pattern of co-location with KIBS is strong for Architecture and Video, Film and Photography and weak for Music and the Performing Arts, and TV and Radio. The Arts and Antiques sector presents negative patterns of co-location with other innovative sectors: this sector tends to be found strongly in TTWAs where KIBS or High-Tech Manufacturers are absent.

A more detailed analysis of co-location

The results of a more detailed examination of co-location patterns between creative sectors and specific sectors within the High-Technology Manufacturing and KIBS categories are presented in Table 9.[52]

Firms in Advertising co-locate strongly with some KIBS businesses such as Hardware Consultants, Accountants, Consultants and Market Researchers. Firms in Designer Fashion are found close to some High Tech Manufacturers – Computer Manufacturing and Measuring Equipment as well as Information Technology (IT)-based KIBS activities such as Hardware Consultancy, Data Processing and Database Work. Predictably, Software, Computer Games and Electronic Publishing present very strong co-location patterns with IT-related high-tech sectors and KIBS such

50. AeA (2002) 'High-Tech Industry Definition.' Available at: http://www.aeanet.org/Publications/Idmk_definition.asp; also EFILW (2005) 'Sector Futures: The knowledge-intensive business services sector.' Available at: http://www.emcc.eurofound.eu.int/publications/2005/ef0559en.pdf [Last accessed 21 April 2010). See Appendix 1 for the SIC codes included in these two definitions. The SIC-92 used in the AeA definition has been linked to the SIC-2003s according to which ONS data are currently classified. Any SIC codes in the DCMS definition have been removed from these definitions to avoid spurious correlations.
51. See Appendix 2 for tables with the values of the correlation coefficients summarised in Tables 8 and 9.
52. Arts and Antiques is not included in the table: Table 9 shows that this creative sector shows negative correlation coefficients with a large number of High-Tech Manufacturing and KIBS sub-sectors.

Table 8: Results of the aggregate co-location analysis

	Strongly co-locates with	Colocates with	Weakly co-locates with	Negatively locates with
Advertising	KIBS	High-Tech		
Architecture		KIBS		
Arts and Antiques				High-Tech, KIBS
Designer Fashion	KIBS	High-Tech		
Video, Film and Photography		KIBS		
Music and the Performing Arts			KIBS	
Publishing		KIBS		
Software, Computer Games and Electronic Publishing	KIBS	High-Tech		
TV and Radio			KIBS	

Note: All results significant at the 1% level. Strongly co-location reflects a correlation coefficient greater than 0.5. Co-location coincides with a correlation coefficient between 0.2 and 0.5, and weakly co-location with a correlation coefficient smaller than 0.2.

as Business Consultancy, Management of Holdings, Marketing Research and Personnel.

Other creative sectors that focus on content production and cultural experiences display positive co-location patterns with KIBS and, interestingly, with R&D, both scientific and in the social sciences. Their patterns of co-location with KIBS tend to be nevertheless weaker than those observed for Advertising, Software, Computer Games and Electronic Publishing.

In a few cases, negative patterns of co-location are identified between creative sectors and High-Tech Manufacturing sectors. This is true of firms in Video Film and Photography, Music and the Performing Arts, and TV and Radio, on the one hand, and firms involved in the Manufacture of Motor Vehicles, on the other.

Interpretation of the co-location results: what brings these sectors together?

The co-location analysis shows clearly that creative sectors such as Advertising, Architecture and Software, Computer Games and Electronic Publishing – the 'interface' between the creative industries and the broader economy – tend to co-locate with several KIBS and High-Tech Manufacturing sectors. This is intuitive: it could be explained by strong trading patterns between these respective sectors: both Advertising and Software provide valuable inputs in other sectors' innovation processes. These interactions could be a vehicle for positive spillovers between them.[53]

The strong co-location between Designer Fashion and some KIBS and High-Tech Manufacturing sectors might also in part be attributed to the way in which the DCMS defines Designer Fashion, including several textile activities that could be expected to locate in similar areas to other manufacturing businesses (including high-technology ones). The DCMS definition also includes the 2003 SIC-4 code '74.87' (Other business activities not elsewhere related sector), capturing graphic and other product design activities on which both KIBS and High-Tech Manufacturers draw. This might raise concerns about the extent to which the current operational definition of this sector in particular provides an accurate depiction of its economic importance, or geographical location.

As we have seen, there might be other infrastructural factors behind these co-location patterns. For example, good broadband access and cheap office space might attract KIBS, high-tech and creative businesses to the same location. The availability of specialist labour pools could prove similarly attractive. It should be noted that those local advantages still attract – or increase the competitiveness of – some collections of sectors and not others,

53. Bakhshi, H., McVittie, E. and Simmie, J. (2008) 'Creating Innovation.' London: NESTA.

Table 9: Results of the detailed co-location analysis

Industry	Strongly co-locates with	Co-locates with	Weakly co-locates with	Co-locates negatively with
Advertising	Hardware consultancy, Accounting, Consulting, Holding Companies, Market Research	Computer Manufacturing, Measuring Equipment, Manufacture of Process Equipment, Data Processing, Database Consulting, Personnel	Valves Manufacturing, TV and Radio Transmission Equipment, Aircraft Manufacturing	
Architecture	Testing Equipment	Measuring, Manufacture of Process Equipment, Hardware Consultancy, Database Processing, Consultancy, Holding Companies	Scientific R&D	
Designer Fashion	Hardware Consultancy, Accounting, Consulting, Market Research	Computer Manufacturing, Manufacturing of Process Equipment, Valves Manufacturing, TV and Radio Transmission Equipment, Radio Receivers, Measuring Equipment, Data Processing, Database Consultancy, Holding Companies, Personnel	Motor Manufacturing	
Video, Film and Photography		Consultancy, Market Research, Database Work, Accounting	Data Processing, Scientific R&D	Motor Manufacturing
Music and the Performing Arts		Market Research, Accounting, Consulting	Database Work, Scientific R&D, Social Sciences R&D	Motor Manufacturing, Pharmaceutical Preparations, Holding Companies, Testing, Personnel
Publishing		Scientific R&D, Accounting, Consultancy, Market Research	Manufacturing of Radar Receivers, Database Work, Social Science R&D, Accounting, Consultancy,	Manufacturing of Process Equipment, Testing
Software, Computer Games and Electronic Publishing	Computer Manufacturing, Measuring Equipment, Hardware Consultancy, Data Processing, Consultancy, Market Research, Personnel	Valves Manufacturing, TV and Radio Transmitters, Radio Receivers, Telecommunications, Accounting, Testing	Aircraft Manufacturing, Scientific R&D	
TV and Radio		Scientific R&D, Social Science R&D, Consultancy, Market Research		Motor Manufacturing

Note: All results significant at the 1% level. Strongly co-location reflects a correlation coefficient greater than 0.5. Co-location coincides with a correlation coefficient between 0.2 and 0.5, and weakly co-location with a correlation coefficient smaller than 0.2.

which suggests substantial complementarities and shared resources and infrastructures between certain creative sectors, High-Tech Manufacturing and KIBS firms. The results are less suggestive of significant spillover, value-chain and infrastructural drivers for co-location between firms in Music or TV and Radio broadcast content sectors and KIBS and High-Tech Manufacturing businesses.

Part 5: A tale of four clusters

The analysis of UKIS 2006 data at the regional level has shown that the creative industries play a direct role in the dynamics of local and regional innovation. Although the co-location analysis of the creative industries and other innovative sectors undertaken in the previous section has provided indicative evidence of linkages between creative industry presence and local and regional innovative performance, it is not enough to establish any causal relationship between both variables and, in particular, whether the creative industries generate spillovers in the rest of the economy.

Additionally, it is difficult to characterise the institutional context within which creative clusters operate in purely quantitative terms. Yet these are crucial issues for policymakers.

To address this, we introduce four in-depth case studies of creative clusters in Britain and summarise our findings in relation to them. By comparing and contrasting creative clustering and innovation dynamics in these different cases – selected to represent a spread of cluster types – we aim to draw some generalisable inferences, that will, in turn, complement the previous part of the report.

5.1 Selection of the case studies

Getting the right mix

As we have shown, different creative sectors tend to be present in different places across Britain, with different levels of innovative performance. In some places, the creative industries form 'hubs' including several sectors, while other places specialise in a single sector. The wider local economy also varies in its sector composition and innovative performance.

We take into account all these variables, together with the rates of growth in businesses and employment within the dominant creative industry for each 'candidate' (defined at the TTWA level) when selecting the case studies. This allows us to cover different configurations of creative clusters which may or may not be linked to the local and regional economy.

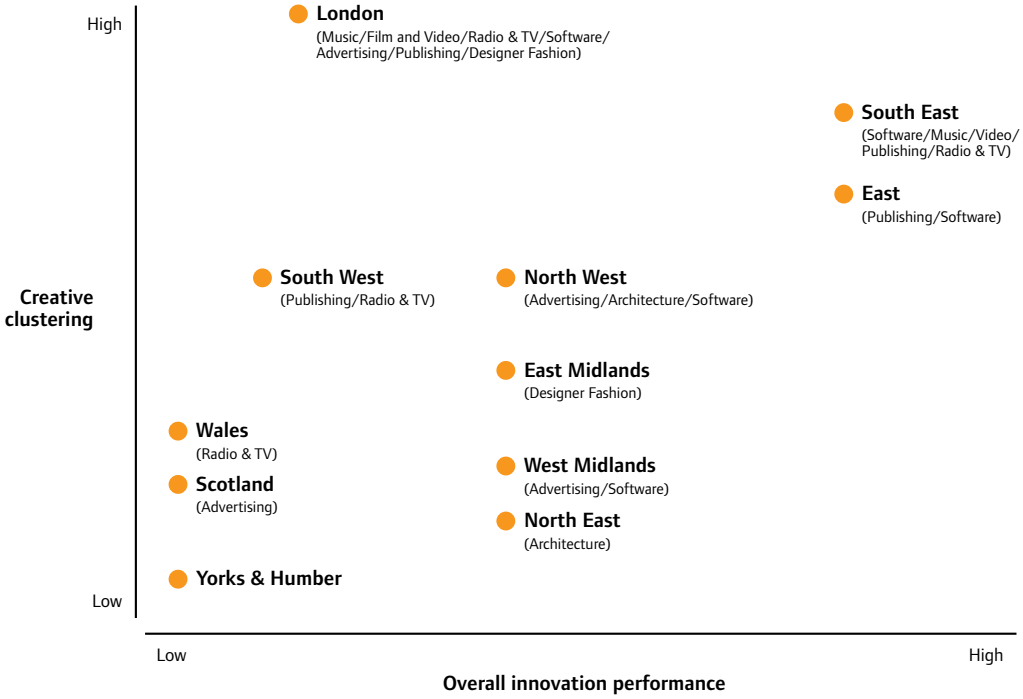
Particular attention is paid to the two variables depicted in Figure 3: the intensity of cluster presence and the innovative performance of the rest of the economy.

On the basis of these variables, we select the following creative clusters for an in-depth analysis:

- Software in Wycombe and Slough.
- Film, post-production and visual effects in London (Soho).
- Media Production (incorporating TV production and Digital Media) in Cardiff.
- Advertising in Manchester.

This selection includes a combination of places with strong focus on a small number of sectors (Cardiff and Wycombe-Slough), as well as creative hubs concentrating various creative sectors (London and Manchester), clusters comprising creative business services and content providers (Wycombe-Slough and Cardiff), and clusters with different levels of overall innovation (higher for Wycombe-Slough and Manchester, and lower for London and Cardiff).

Figure 3: Creative cluster presence and innovation as criteria for case study selection



5.2 Methodology and Data

Framing the case studies
The design of the case studies has been informed by the Regional Innovation System (RIS) analytical framework briefly summarised in Box 3. This approach emphasises the importance of relationships between local private and public sector actors, as well as the role of the public institutions that support innovation activities within the system.

We have also reviewed the available literature to characterise the value chains, industrial structures and innovation processes of each of the creative sectors at the core of the clusters being analysed.

Each case study is based on data collected through two sequential surveys
The Stage 1 survey targets firms operating within each creative cluster (bounded geographically at the TTWA level). Crucially, this first survey is used to identify those 'related sectors' with which firms within the cluster tend to interact more frequently – that is, those that might be expected to play a stronger role in their innovation processes and which are more likely to benefit from any creative spillovers.

Firms in these related sectors located in the regions surrounding the cluster are then targeted in a Stage 2 survey.

Ninety-two firms are surveyed as part of each case study (with the exception of Cardiff, which is discussed below), with a small degree of variation across cases in the split between Stage 1 and Stage 2 sample sizes.

The surveys administered to firms in the four cases studies examine:

1. **The factors that drive creative clustering:** The Stage 1 survey explores the factors that explain creative clustering in the places being analysed.

2. **Innovation activities and innovation sources:** Both Stage 1 and Stage 2 surveys ask firms about their innovative performance, activities and investments.

3. **Relationships and cooperation:** The Stage 1 and Stage 2 surveys assess the significance of different mechanisms for knowledge sharing between firms in the area, the geographical location of their partners, and channels for informal networking.

Box 3: Regional Innovation Systems

Innovation systems have traditionally been analysed at the national level. It is, after all, at this level where scientific priorities and basic university funding (including research and teaching) are decided, and much of the business and employment regulatory framework set.

Nevertheless, many national policies are moderated and implemented regionally. It is also at this level where regional paths of historical evolution lead to the emergence of specific institutional frameworks and patterns of industrial specialisation.

Indeed, differences in economic performance are often more visible regionally than they are nationally – regions situated in the same National Innovation System (NIS) diverge markedly in economic performance. Within the European Union, for example, intra-state differences are at least as significant as inter-state ones (European Commission 2004, 2007). This means that, for the most part, EU economic development policy is implemented in regions.

The Regional Innovation Systems (RIS) framework which underpins these case studies was first proposed by one of this report's authors, Phil Cooke (1992, 1993), to describe the systems of public and private organisations and institutions that interact at the regional level in order to produce innovation outputs. The framework builds upon Perroux's (1955) pioneering work on regional growth poles, and several research strands in economic geography that have examined regional industrial networks, such as the industrial networks in the 'third Italy' and regional 'innovative milieus'.

The application of the RIS approach 'on the ground' has shown that, in successful regions such as Silicon Valley, Baden Württemberg and Emilia Romagna, it is possible to identify a system of strong, 'locally embedded' and trust-based relationships between firms and other innovation 'agents' (Braczyk *et al.*, 1998).

Developing trust and coordinating activities is easier when different participants in an innovation system are located close to each other – opportunistic behaviours are easier to detect and 'tacit' knowledge can be transmitted more effectively. This geographical 'stickiness' of knowledge helps explain the persistence of some regional specialisation in the face of globalisation.

Sources: European Commission (2003) 'Innovation policy: Updating the Union's Approach in the Context of the Lisbon Strategy, COM (2003) 112 Final.' Luxembourg: EC Publications Office; European Commission (2004) 'Third Report on Economic and Social Cohesion.' Luxembourg: EC Publications Office; Cooke, P. (1992) Regional Innovation Systems: Competitive Regulation in the New Europe. 'Geoform.' 23, pp.365-382; Cooke, P. (1993) Regional Innovation Systems: An Evaluation of Six European Case Studies. In: Getimis, P. and Kafkalas, G. (Eds) 'Urban and Regional Development in the New Europe.' Athens: Topos; Braczyk, H., Cooke, P. and Heidenreich, M. (Eds) (1998) 'Regional Innovation Systems.' London: UCL Press; Perroux, F. (1955) Note sur la Notion de Pôle de Croissance. 'Economie Applique.' 8, pp.307-320.

4. **Creative clustering and the regional dynamics of innovation:** The Stage 2 survey examines the patterns of collaboration between firms in the creative cluster and those in 'related sectors' as reported by the former. Specific attention is paid to the impact of the cluster on the innovation activities of other sectors in the regional economy.

We also use in-depth interviews with local creative firms and stakeholders
This has helped to characterise more accurately some of the 'softer' innovation dynamics at play in the locality and the region, and the impact of policy on the activities of the creative industries in the region.

Box 4: Digital innovation in four creative sectors

- **Software:** Cloud computing is making it possible for users to access information, entertainment and software applications through their internet connections without the need to store them in their computers. New gestural user interfaces (which rely on hand gestures or screen touching rather than keyboards) are changing the way in which users interact with software.
- **Film:** Film content is increasingly being distributed and promoted online. The development of sophisticated rendering, animation and Artificial Intelligence technologies, as well as 3D, is making it possible to create wholly new visual experiences.
- **Media Production:** Television content is being distributed across myriad channels, and consumed in a wide range of devices, from mobile to PCs. TV franchises are increasingly exploited in new media such as video games or interactive websites.
- **Advertising:** Brands are looking for new ways to engage with online audiences – for example in portable platforms such as the iPad, as well as in online worlds. Sophisticated analytic techniques are being deployed to target advertisements and measure their impact more accurately.

The special case of Media Production in Cardiff

The results from the Cardiff Media Production cluster are presented in a slightly different format from the rest of the cases, following suggestions from local stakeholders who pointed out that it was not meaningful to consider firms engaged in the production of TV content (which had been targeted in the 'Stage 1' survey) separately from the digital media companies with which they interact (which comprised the target for the 'Stage 2' survey).

Cardiff should instead be seen as the locus of a Media Production cluster where production for broadcasting is tightly integrated with digital media services.[54]

54. An implication of this is that, in the case of Cardiff, we don't have data on the interactions between the Media Production cluster and the wider local and regional economy. It also means that we only have responses from TV and Radio companies for the items that were only included in the Stage 1 survey (including, for instance, the reasons why they decided to locate in Cardiff). Whenever available, we report the data in a disaggregated form for each of these two sub-sectors comprising 'Media Production' in Cardiff.

5.3 The findings of the case studies

Table 10 outlines some distinctive features of the Regional Innovation System where each cluster is embedded, and summarises the key findings concerning the four core areas of interest above. The rest of this part discusses these findings.

a) Creative goes digital

The surveyed firms are getting up to speed with digitisation

The overview of innovation processes in the four creative sectors shows the pervasive impact of digitisation on the creative industries – not only is creative content moving online, but it is also being produced, monetised and promoted in wholly new ways (see Box 4 for examples).

These profound transformations in the processes through which creative goods are produced, distributed and exploited are forcing creative businesses to build their digital capabilities. As Table 11 shows, creative firms in our case clusters are investing heavily in in-house R&D and new software and hardware, and devoting a significant proportion of their staff to activities that require high levels of technology-related knowledge.

Creative firms are also establishing commercial and collaborative relationships with specialist technology suppliers. In fact, it appears that the presence of a strong digital base can drive creative cluster growth: the emergence of the

Table 10: Summary of findings of the case studies

Cluster	Description	Drivers of clustering	Innovation within the cluster	Cooperation and information sharing	Linkages to the wider economy
Software in Wycombe and Slough	The South of England hosts several leading IT multinationals. Several world-class computing departments. Diverse client base.	Few respondents are aware of the existence of the cluster. Location decisions driven by proximity to home, clients and suppliers, and a strong skills base.	Less innovative than the national Software sector. Sources of innovation are mostly based in-house, or clients, and usually based in the UK.	Local information plays a minor role in supporting innovation. There are low levels of informal networking inside the cluster – the Internet is the main source of informal contacts.	Relationships with pharmaceutical firms, consultants and advertising. Where collaboration occurs, it focuses on innovation activities.
Film in Soho	Strong cluster of film and video firms in distribution, post-production and visual effects. London hosts most of the sector's support institutions and professional associations.	Strong awareness of the Soho film cluster. The cluster is seen to support the business objectives of Soho film and video firms. Proximity to clients and suppliers, a critical mass of businesses and social networks make Soho an attractive location for firms.	Highly innovative, technology-intensive firms. Diversified portfolio of innovation sources: internal, external and interstitial (such as freelancers). Innovation sources are both local and international.	High levels of networking. Local availability of information about technology and markets play an important role in supporting innovation. Professional association meetings help companies to 'keep up to speed' with technological trends in the sector.	Strong linkages to other sectors such as optical instruments and photographic equipment, TV and historical sites. The cluster is the main source of innovation for some of these sectors. Inter-sector collaboration focuses on innovation, design and information sharing.
Media Production in Cardiff	Three major TV broadcasters are based in Cardiff. IP ownership has driven growth. Strong linkages between TV production and digital media.	There isn't a strong awareness of the existence of a Cardiff TV cluster. Central location, availability of skilled labour and proximity to clients are more important than a critical mass of TV firms in the area.	Digital Media companies provide TV firms with technologies and services for innovation. Digital Media businesses are more open and internationally focused in their sources of innovation.	Local information supports innovation by digital media companies. They tend to network more intensely. TV production businesses cooperate less with each other due to concerns about IP.	Most instances of cooperation take place inside the media production cluster. The activities of the cluster produce economic benefits for Cardiff and Wales more generally in terms of tourism.
Advertising in Manchester	Strong digital and media sector. Local bodies are building a robust evidence base to support local innovation and linkages.	Advertising firms are strongly aware of the cluster and its benefits. Central location, proximity to other firms and social networks are strong attractors, as well as a critical mass of clients and suppliers.	Mostly small firms specialising in different stages of the value chain. Wide portfolio of innovation sources, both local and international.	Local information and critical mass support innovation in the cluster. There are strong levels of informal networking in the cluster – Professional Association meetings, training courses and public events play an important role.	Other sectors are less aware of the cluster – they still tend to use advertising firms in London. Collaboration focuses on production and innovation activities.

Table 11: Innovation activities and investments in the four clusters

	Software Wycombe -Slough	Film and Video Soho	Media Production Cardiff		Advertising Manchester
			TV	Digital Media	
Innovation activities					
In-house R&D	57%	40%	38%	53%	54%
Software acquisition	50%	48%	38%	65%	50%
Hardware acquisition	52%	40%	38%	59%	42%
Innovation investments					
Firms that invest above 30% of their turnover on innovation	29%	38%	27%	24%	26%
Firms that employ more than 30% of their staff on tasks requiring high levels of technology-intensive knowledge	45%	59%	57%	43%	58%
Number of observations	42	50	21	50	50

Source: Authors' surveys.

Manchester Advertising cluster over the last decade is causally linked to the city's strong software sector.

Reciprocally, creative industries' strong demand for technology and digital services supports the growth of local digital clusters: in Cardiff, the high levels of collaboration between TV production companies and Digital Media firms are blurring the boundaries between both sectors. Firms in the Wycombe and Slough Software cluster often sell their services to regional Advertising companies.

New opportunities to generate value
Digital distribution gives smaller creative firms new channels to reach existing audiences, and also create new ones. As distribution channels and media for the consumption for content multiply, so do the opportunities to generate revenues from creative IP.

This makes IP ownership more important than ever. In the Cardiff Media Production cluster, the changes in terms of trade between independent TV producers and broadcasters brought by the Communications Act of 2003 have enabled production companies to retain ownership over their IP, and strengthened their incentives to innovate in order to exploit it.

Creative firms can also generate revenues by licensing the innovative technologies, tools and platforms that they develop. Post-production firms in Soho are investing in the development of visualisation and modelling technologies for specific clients, and then exploiting the resulting innovations in subsequent projects.

b) Clusters for courses

Different rationales for cluster development
The case studies have shown diverse drivers for the emergence and growth of creative clusters (see Table 12). Software firms in Wycombe and Slough benefit from a skilled labour pool, proximity to clients and the perceived good quality of life in the South East. Although there is clearly a critical mass of Software firms in the area, respondents do not actually consider themselves to be part of a cluster.

The presence of three large television broadcasters in Cardiff has attracted TV

Table 12: Innovation activities and investments in the four clusters

	Software Wycombe -Slough	Film and Video Soho	Media Production Cardiff		Advertising Manchester
			TV	Digital Media	
Drivers of location (percentage of firms in Stage 1 who report a factor as important)					
Proximity to clients	14%	30%	22%	N/A	12%
Proximity to suppliers	12%	17%	22%	N/A	6%
Skilled labour pool	14%	11%	19%	N/A	12%
Critical mass of firms in the sector	5%	19%	11%	N/A	16%
Proximity to social networks	7%	15%	11%	N/A	16%

production firms to the Welsh capital. Local TV firms do not tend to see themselves as part of a cluster, perhaps because they do not collaborate much as they are wary of disclosing sensitive IP to competitors.

By contrast, a critical mass of firms in the sector, and proximity to important social networks play a more significant role in firms' decisions to locate in Manchester and Soho. In both cases, there is a strong feeling that the cluster makes firms in the sector more competitive. Indeed, it seems that these more 'self-aware' and active clusters are stronger innovators than their creative sectors nationally.

The strength of local ties

The case studies have shown that firms feel part of a cluster to the extent to which they have strong relationships with each other (see Table 13). Firms in Manchester and Soho collaborate locally as part of their innovation activities, and engage in higher levels of informal networking, both through contacts and meetings with personnel in other firms, and participation in professional associations. In both cases, freelancers who move across businesses play a significant role as a source of ideas and new knowledge for innovation. The survey also shows that, in some cases such as Digital Media in Cardiff, and Advertising in Manchester training courses can operate as a venue for networking between creative professionals.

A dense web of relationships is crucial, not only as a source of new knowledge, but also to support the development of smooth value chain links within the cluster, which improves its efficiency and ability to satisfy customer demand. As respondents from the Soho cluster have highlighted, the availability of a well-developed ecosystem of suppliers of support services – ranging from production facilities to lawyers and a freelancer pool – makes them more flexible and efficient. On-site collaboration is seen as crucial to ensure the quality of the final product.

The situation is very different in Wycombe and Slough. Reflecting the lack of awareness of a Software cluster in the area, firms rarely collaborate with each other. Their levels of informal networking are also lower than in the other clusters. This means that information about markets and technology is not shared locally. This could explain why local information about technology and markets is a minor factor supporting innovation by firms in the cluster by comparison to those in Soho or Manchester.

Cardiff is a special case that illustrates the trade-offs between collaborating and appropriating value. Although the TV regulatory framework has driven growth and innovation, local stakeholders interviewed as part of the research report that it has also created barriers to collaboration between TV firms keen to protect their IP from competitors. Freelancers make a limited contribution to innovation because they are often subject

Table 13: External sources of innovation, networking and local information sharing

	Software Wycombe -Slough	Film and Video Soho	Media Production Cardiff		Advertising Manchester
			TV	Digital Media	
Sources of innovation					
Cooperation with other firms	0%	8%	0%	10%	8%
Competitors	5%	6%	4%	0%	8%
Freelance Designers	5%	14%	4%	8%	10%
Informal networking					
Contact with friends in the area of business	19%	60%	42%	47%	58%
Contact with ex-colleagues	2%	34%	31%	45%	42%
Informal personal meetings with other firms	2%	36%	35%	55%	46%
Contact with other firms on training courses or in training	2%	4%	19%	37%	26%
Professional association meetings	5%	22%	11%	35%	40%
Local factors that support innovation					
Access to information about markets	2%	38%	23%	35%	40%
Access to information about technology	21%	36%	19%	49%	40%

to non-disclosure agreements (NDAs) that constrain the diffusion of knowledge between TV companies.

By contrast, the Digital Media firms that supply these TV companies with digital platforms and technology services are much more open to collaboration, networking and the use of external sources of innovation. As such, they can facilitate the diffusion of relevant knowledge for innovation across TV production firms operating inside their 'IP silos'.

These local ties need to be balanced with wider links

Both participation in national and international value chains and access to global sources of innovation are crucial for competitive success. Digitisation has created new production networks spanning continents, and also integrated markets in what has come to be known as 'the long tail' (where the aggregation of audiences across different countries makes it possible to generate sustainable revenues from specialised or niche content and services).

Keeping abreast of the latest business and creative trends requires constant scanning beyond the local environment.[55] Introspective clusters face the risk of falling behind as their sector moves on, driven by technological and market shifts initiated and diffused elsewhere.

Strong local ties can support the development of those international connections. Information about new opportunities ('know what') and international partners ('know who') shared by local firms can help reduce the uncertainties of distant collaboration. At the same time, a strong and highly visible cluster is more likely to attract international firms, creating new commercial opportunities for its members, and drawing in foreign direct investment. As Table 14 shows, effective clusters such as Soho or Manchester tap into international sources of innovation frequently.

55. Mahroum, S., Huggins, R., Clayton, N., Pain, K. and Taylor, P. (2008) 'Innovation by Adoption.' London: NESTA; also Huggins, R. (2008) The Evolution of Knowledge Clusters. 'Economic Development Quarterly.' Vol.22, No.4, pp.277-289.

Table 14: Location of sources for innovation

	Software Wycombe -Slough	Film and Video Soho	Media Production Cardiff		Advertising Manchester
			TV	Digital Media	
Location of sources of innovation					
Rest of the UK	29%	24%	35%	48%	46%
The rest of the region	27%	36%	16%	67%	28%
The same area	20%	22%	16%	34%	24%
London	10%	N/A	0%	10%	16%
Rest of the world	4%	20%	4%	14%	16%

Software firms in Wycombe and Slough draw readily on online information for their innovation activities, and partner with other companies overseas using real-time collaborative tools. But the lack of networking between them might mean that valuable information about international opportunities and technological trends is not shared more widely, to the detriment of the cluster's competitiveness.

Table 14 also illustrates the complementarities between what seems to be a rather introspective and 'locally focused' TV production sector in Cardiff and the pool of Digital Media firms, all quite well connected with sources of innovation located further away. Insofar as Digital Media firms channel these ideas and knowledge into the TV companies with which they work, there might be less need for these to scan the international environment directly.

Table 15: Collaboration partners of firms in the cluster at the local and regional level

	Software Wycombe -Slough	Film and Video Soho	Media Production	Advertising Manchester
Cooperation for innovation				
Local	4%	8%	5%	18%
Regional	13%	13%	18%	20%
Cooperation for production				
Local	17%	18%	9%	18%
Regional	13%	30%	23%	20%
Cooperation for design				
Local	17%	2%	7%	20%
Regional	13%	14%	17%	18%

Table 16: Relationships between other sectors and the cluster

	Software Wycombe -Slough	Film and Video Soho	Advertising Manchester
Firms in Stage 2 that chose the current location because of the cluster	10%	48%	14%
Firms in Stage 2 that have relationships with the cluster	46%	55%	35%
Firms in Stage 2 that use the cluster as its main source of innovation	3%	10%	28%

c) Clusters as part of the Regional Innovation System

Creative clusters are embedded in regional innovation processes

Creative clusters have much to gain from establishing links with other local sectors. They could be expected to address local demand better than competitors located elsewhere, generating revenues that can be reinvested in innovation and growth.

Cross-sector linkages can also be a source of valuable new information and knowledge spillovers supporting radical forms of innovation that keep clusters and cities ahead of their competitors.[56] According to the economic geography literature, while relationships within a cluster generate information that is more conducive to incremental innovation, it is through linkages to other sectors that unexpected and novel combinations occur.[57]

Our case studies show that creative clusters are embedded in local and regional systems within which they collaborate on innovation, production and design activities. As Table 15 shows, this is the case for firms in all the clusters that we have analysed.

These results need to be qualified on the basis of the findings of the Stage 2 survey, which targeted firms in those 'related sectors' identified by creative firms at Stage 1 (see Table 16).[58] The second survey shows differences in the degree to which firms in these related sectors know about or engaged actively with the creative clusters being analysed.

In Soho, firms in related sectors (including firms that manufacture optical instruments and photographic equipment, TV and performing art companies, and operators of historical and tourist attractions) are very much aware of the cluster – indeed, about half the respondents report having chosen their current location to be close to it. Some see it as one of their main sources of innovation.

By contrast, few respondents in related sectors in the South East (which include Advertising, Pharmaceutical firms and Consultants) are aware of a 'Wycombe and Slough Software cluster', although many have relationships with firms in it.

Similarly, few firms in related sectors (such as Market Research and Opinion Polling, Software Services and Telecommunications) seem to know about or engage with Advertising firms in the Manchester Cluster.

The latter result is in line with the findings of the analysis of Innovation, Trade and Connectivity for the Manchester Independent Economic Review in 2008.[59] According to this Review, creative firms in the Manchester City Region are not sufficiently well connected with the rest of the local economy. This limits the beneficial diffusion of innovations across the city-region and the region more widely. It could also have a negative impact on the commercial sustainability of Manchester creative firms that are not tapping into their local markets.

This result is no doubt partly explained by the relative youth of the Manchester Advertising cluster. According to local stakeholders, the cluster is mostly composed of small firms that are still developing production links enabling them to provide an integrated suite of services to their clients. This fragmentation explains why companies in the Manchester area and the wider North West region in some cases

56. Jacobs, J. (1972) 'The Economy of Cities.' London: Cape.
57. Recent reviews of the 'cluster lifecycles' literature suggest that those clusters that tap more effectively into the knowledge generated by other sectors around them are more successful in adapting to (or in some cases initiating) shifts in the competitive landscape. See Menzel, M. and Fornahl, D. (2010) Cluster life cycles: dimensions and rationales of cluster evolution. 'Industrial and Corporate Change.' 19(1), pp.205-238.
58. Cardiff is excluded from these tables for the reasons discussed previously.
59. MIER (2008) 'Innovation, Trade and Connectivity.' Available at: http://www.manchester-review.org.uk/projects/view/?id=719 [Last accessed 21 April 2010].

Table 17: Nature of collaboration between related sectors and the cluster

	Software Wycombe -Slough	Film and Video Soho	Advertising Manchester
Collaboration for innovation	6%	20%	7%
Collaboration for production	5%	18%	17%
Collaboration for design	4%	20%	10%
Collaboration for information sharing	1%	20%	5%

choose to hire the services of more established Advertising agencies in London, with which Manchester competes.

Table 17 presents the types of collaboration with the cluster reported by firms in related sectors. It shows that whenever it takes place, collaboration focuses on innovation, production and design. In Soho, there is also evidence of significant levels of knowledge-sharing between film companies and those in other sectors.

Local universities are missing from the innovation picture

Creative clusters are part of a wider Regional Innovation System that includes firms in other sectors, as well as local institutions, public support bodies and universities. These actors supply skills and other knowledge resources, as well as an infrastructure to support local innovation.

Although the availability of a skilled labour pool – largely provided by universities – is an important factor underpinning the decision to locate in each of our four clusters (see Table 12), the findings paint a starker picture regarding other forms of engagement between universities and nearby creative firms (Table 18).

The creative businesses that we have surveyed rarely see universities as an innovation source or a local factor supporting innovation. Even in the Manchester Advertising Cluster, where a larger proportion of firms have identified universities as supporting local innovation, they are the least important factor, and none of the surveyed firms acknowledge them as a direct source of innovation.

Table 18: Universities and innovation by creative clusters

	Software Wycombe -Slough	Film and Video Soho	Media Production Cardiff		Advertising Manchester
			TV	Digital Media	
Universities as a source of innovation	0%	0%	4%	6%	0%
Proximity to universities as a local factor that supports innovation	2%	2%	0%	0%	12%

5.4 Summary of the case studies

Different drivers for different clusters
Different creative clusters emerge, operate and innovate following distinctive drivers, shaped by their sector's industrial structure and value chain, and local conditions.

- The strong Software presence in **Wycombe and Slough** is explained by the availability of a skilled labour pool and a diverse client base. Despite large numbers of Software firms in the area, most do not consider themselves to be part of a cluster. This is reflected in low levels of information-sharing, collaboration and informal networking between them.

- **Soho** is a well-established Film and Video cluster that has developed world-leading technological capabilities in the post-production and visual effects stages of the value chain, and is supported by a strong network of relationships – both commercial and informal – between its businesses and with other sectors, as well as internationally.

- The **Cardiff** Media Production cluster works closely with several 'anchor' broadcasters – most obviously the BBC – who commission creative content that TV producers can then exploit elsewhere. The ability to generate revenues from their IP after it is broadcast provides these firms with incentives to seek alternative distribution routes, often through digital innovation. These activities are supported by a thriving digital media sector, which can also help to disseminate knowledge between TV production firms that don't talk much to each other for fear of disclosing valuable IP.

- The **Manchester** Advertising Cluster has developed over the last decade in close connection with the city's strong digital sector. It is mostly composed of small businesses that engage in high levels of information sharing and networking. Local and regional firms in other sectors do not show high levels of awareness of this young cluster.

Three layers of connectivity for innovation
Even with these differences, when considered together, our case studies highlight how different types of connections support the innovation activities of firms in clusters, and strengthen each other, potentially generating the virtuous circles of innovation and growth that have been described in the literature:[60]

- Local connections within the cluster help small creative companies to establish smooth and fluid value chain linkages that increase their efficiency and flexibility, and to disseminate knowledge that supports innovation.

- External connections enable firms in a cluster to draw on sources of innovation located elsewhere, and to embed themselves in global creative value chains.

- External links with other local sectors are important commercially, and are a source of novel ideas that can be recombined for innovative purposes. As content converges across different platforms, the boundaries between different creative sectors – and between creative and digital sectors – are becoming increasingly blurred. This means that collaboration across sectors can help local clusters develop the innovative and interactive forms of content increasingly demanded by global audiences.

These three layers of connectivity have a 'formal' aspect, as when businesses develop new commercial relationships or engage in collaborations for innovation, and an informal one, exemplified by social networking and information sharing.

These three layers reinforce each other
There are positive feedbacks between the three layers of connectivity described above:

- Building the dense web of relationships that underpins a strong and visible cluster can help to attract the attention of potential partners elsewhere in the UK, or overseas. By sharing information with each other, firms can diminish the uncertainties and risks of collaboration with parties located far away.

- Collaboration with other sectors – for example, technology suppliers – helps disseminate valuable information across the cluster, and generates cross-sector innovations that distinguish it from its competitors.

Proximity is not enough
The case studies have also shown that the mere spatial proximity of a critical mass of firms within a sector is not sufficient for these beneficial relationships to emerge. If the firms are not aware of each other – as with Wycombe and Slough – it is doubtful they will seek to establish such connections. Something similar happens between firms in the young

60. They also show how weak connections, as is the case of software in Wycombe-Slough, can constrain the benefits from agglomeration.

Manchester Advertising cluster and the rest of their regional economy.

As the Cardiff case study has shown, there are other barriers to collaboration between firms in a cluster – the zeal to protect valuable IP can make them wary of sharing information and lead them to put in place practices (such as non-disclosure agreements for freelancers) that prevent the dissemination of valuable knowledge across the cluster.

Creative clusters play a role in the dynamics of innovation of the places where they are located

Our evidence shows the existence of links between creative businesses and the wider Regional Innovation System. The case studies show that, very often, interactions between the creative industries and other sectors in their vicinity have an innovation rationale.

This is perhaps unsurprising given the high levels of innovation in the creative industries documented in Part 3. Creative firms are responding to the challenges of digitisation by sourcing and developing sophisticated tools and platforms for content production and distribution, some of which can be adopted in other sectors.

The missing link: universities

According to the RIS framework, public institutions – including universities, public R&D labs and other bodies – have a crucial role to play in supporting regional processes of innovation. But our case studies reveal few links between firms in creative clusters and these actors.

Although universities play an important role in supplying skilled labour, there is very little evidence, at least in our case studies, of any other direct contributions to innovation in the creative industries. They are rarely mentioned by respondents as a source of innovation, or even as a local factor that supports innovation in their areas.

Part 6: Conclusions and policy implications

6.1 Creative clusters in the new framework for local economic development

The 'Local Growth: Realising Every Place's Potential' White Paper published in October 2010 sets out a new policy architecture for local and regional development in England. Local Enterprise Partnerships (LEPs), bringing together the private sector and civic leaders, are replacing Regional Development Agencies (RDAs) as the bodies in charge of creating local environments conducive to business growth.

Some roles which were in the past carried out by the RDAs – including inward investment, sector leadership, business support, innovation and access to finance – will now be led by national bodies such as the Technology Strategy Board, UK Trade and Investment (UKTI) and the Skills Funding Agency. The UK Screen Agencies, which have played an important role in supporting the creative industries regionally, will continue operating, although it is not yet clear how they will coordinate their activities with Local Enterprise Partnerships.[61]

The White Paper also describes in further detail the £1.4 billion Regional Growth Fund announced in June 2010.[62] This fund is available for private sector and public private partnerships with proposals that support private sector growth in areas at risk of being affected by public spending cuts.

Why do creative clusters matter?
Although the framework for local economic growth is still taking shape, what this report has made clear is that creative clusters have a role to play in it – not only as competitive, connected agglomerations of high-growth firms, but also as potential sources of spillovers into other sectors.

The creative industries are a force for innovation at the national and regional level
Data from UKIS 2006 presented in Part 3 of this report put the creative industries at the forefront of the UK knowledge economy. Their particular strengths are in services innovation and the introduction of new products to market. They rely strongly on IP measures to protect aesthetic forms of innovation and intangible outputs.

A regional analysis of the innovation performance of the creative industries confirms that they punch well above their weight in terms of innovation across almost all regions in the UK.

And a strong element of the regional knowledge economy
High levels of innovation in the creative industries make them a potential source of innovation spillovers into other sectors. Whilst a growing number of studies have begun to articulate mechanisms through which these spillovers might occur, establishing their presence and magnitude is difficult. Available data for the creative industries do not yet lend themselves to sophisticated econometric analyses that are possible in sectors with heavy R&D outputs or substantial patenting.

Part 4 of this report has nevertheless taken a first step towards evidencing these spillovers through an analysis of the patterns of co-location between creative firms and those in other innovative sectors such as High-Tech Manufacturing and KIBS.

61. See http://www.communities.gov.uk/news/corporate/1708630.
62. See http://www.communities.gov.uk/news/newsroom/1626475.

This analysis has revealed statistically significant connections between the presence of creative businesses (particularly in sectors such as Advertising or Software) in a given place, and firms in these other highly innovative sectors. This suggests that these sectors thrive on the same resources, and that there is the potential for knowledge spillovers between them. It also reinforces the view that creative industries are part of complex value chains comprising other high technology and knowledge-intensive companies outside of what are traditionally defined as the 'creative industries' – a theme that NESTA is planning to develop in future research.

Digitisation is increasing the potential innovation impacts of the creative industries…
It is often said that the creative industries do not have a monopoly on creativity. This is true, but neither do manufacturing nor engineering have a monopoly on technological innovation. As the overview of the innovation processes and activities of the clusters studies carried out in Part 5 has shown, digitisation is making creative firms more technology-intensive. To remain competitive in online, convergent and data-rich markets, they are procuring and producing technologies, tools and technology-related knowledge that could be used in other tech-rich sectors of the economy.

The high levels of technology-related innovation from creative businesses could also be expected to exert a 'demand pull' on the innovative activities of hardware and other equipment supplies. The co-location between creative sectors and high-tech manufacturers that were identified in Part 4 supports this argument.

…and it could dramatically change their location
The industrial cluster lifecycle literature has shown that radical changes in the competitive environment can make established clusters obsolete by destroying the competences on which they relied on in the past.[63] Digitisation constitutes one such shift for the creative industries.

This makes the current instability as good a time as ever for traditionally 'peripheral' localities – some of which were identified in the *Geography of Creativity* – to attempt to top the 'global creative league' by developing strong synergies between their creative and digital industries. The rapid growth of Media Production in Cardiff, and Advertising in Manchester illustrates this.

Dominant UK clusters – particularly London – would on their part be well advised not to rest on their creative laurels, and ensure that their firms have access to the technological resources and relationships needed to remain innovative leaders in the emerging digital marketplace.

6.2 Zooming in on creative clusters, and supporting their innovation activities

Having made a case for why creative clusters should be part of national and local strategies to drive economic growth across the UK, this section sets out recommendations on how best to support them.

NESTA is launching an online platform to support an evidence-based approach to cluster identification and development
This platform will provide policymakers, businesses and researchers with access to the data on creative industry location that we compiled to produce the *Geography of Creativity*. These data will be available at the level of Government Office Regions and Nations, Travel to Work Areas and Middle Layer Super Output Areas. Yearly updates in these data will make it possible to identify and track emerging clusters, and evaluate local initiatives to support the creative industries.

Look for 'latent clusters' before trying to build them from scratch
As mentioned in the introduction, clusters have become a 'holy grail' for policymakers keen to support local and regional development. There are, however, doubts about the extent to which policy initiatives can produce strong and sustainable clusters. Competitive industrial agglomerations emerge through lengthy and organic processes that require the right mix of local resources and relationships.

Before trying to build new clusters from scratch, policymakers should use data to establish whether there are any *existing* industrial agglomerations in their regions that, with the right support, could develop the dense web of internal and external links conducive to local competitiveness, innovation and growth. The disconnected agglomeration of Software firms in Wycombe and Slough is a good example of a 'latent' cluster that would benefit from publicly sponsored networking and

63. Menzel, M. and Fornahl, D. (2010) Cluster life cycles: dimensions and rationales of cluster evolution. 'Industrial and Corporate Change.' 19(1), pp.205-238.

awareness-raising activities. An implication of this is that creative clusters can be branded and promoted in the same way in which creative cities and cultural quarters are.

The survey instruments that we have used to analyse the relationships within creative clusters and across creative sectors can help identify the 'weaker links' in their layers of connectivity that might deserve further support through targeted networking initiatives. We are making these survey instruments available online.

Nurture talent, and give it reasons to stay
In all the case studies, the presence of a specialised and knowledge-intensive pool of labour is a key factor in businesses' decision to locate there. But if talent pools from local universities are to be harnessed, it is important that there are local employment opportunities for graduates and that where they exist, graduates are aware of them.

In the absence of sufficient information about young yet thriving clusters in their vicinity, new graduates searching for a job in the creative industries might be driven somewhere else in the UK (usually London), missing employment opportunities that existed 'on their own doorstep' (and at the same time depriving local creative firms from access to talent). In this sense, sharing of intelligence and collaboration between local bodies that support the creative industries, universities and the creative industries themselves can help to ensure that investments in 'creative capital' are captured locally. Manchester Masters, a programme partly funded by NESTA that teams high calibre graduates from Manchester Universities with companies in the city, is an example of the sort of initiative that can help cities across the UK to keep hold of the talent that they produce.[64]

Harness the power of complementarities between sectors
The analysis of co-location between creative sectors summarised in Part 2, and of co-location between creative sectors and other highly innovative parts of the economy presented in Part 4 suggests that there are beneficial complementarities between some sectors, but not others.[65]

Policymakers would be well advised to pay attention to these complementarities when they set in place their strategies for local economic growth – what they mean is that supporting a given industry can be beneficial for other sectors with which it trades, or exchanges knowledge. Attempting to implement 'one size fits all' policies to support the creative economy, understood as an undifferentiated whole, will be less efficient than adopting better targeted, and more realistic strategies that focus, as discussed above, on 'building up and connecting' those sectors which are already present – and complementary with each other.

Balance the trade-offs between collaboration and appropriation
Raising awareness about the presence of a critical mass of firms in a locality is a necessary, but not sufficient, condition for connections to happen. As the Cardiff case study has shown, local creative businesses keen to protect their valuable ideas or client portfolios might be wary of collaborating for fear of disclosing sensitive information.

Local bodies need to take this into account when they design initiatives to encourage networking and knowledge sharing between local businesses. NESTA's own experience in building relationships between small and large companies for Open Innovation suggests that the use of an 'airlock' model (where engagement takes place in a neutral space managed by a trusted and independent organisation) can help businesses to build the trust needed to collaborate.

The ProfitNet Programme, currently being run by the Centre for Innovation Management (CENTRIM) at the University of Brighton is another example of this sort of initiative. ProfitNet brings together firms in the South East in facilitated workshops aimed at improving their innovation capacity, helping them to network and connecting them to university experts.[67] This illustrates how universities can harness their knowledge and 'trusted status' to facilitate the sorts of local relationships that underpin strong clusters.

It is also possible to design certain business support initiatives (for example computer or marketing training) in ways that encourage networking and collaboration, both within local businesses in a sector and across them. Indeed, one result of our surveys is that training courses can play an important role as a source of informal contacts – the first step towards closer forms of collaboration. In providing well-needed training for innovation and a venue for networking at the same time, these courses can help to 'kill two birds with one stone'.

64. See http://www.manchestermasters.com.
65. Economic geographers refer to these collective advantages generated by the proximity between distinct but nevertheless connected sectors as 'related variety'.
66. See http://www.brighton.ac.uk/profitnet

Enhance the impact of local universities on innovation in the creative industries
In the context of the creative industries, universities tend to be seen mainly as a source of skilled labour. This contrasts with the technology and science-based sectors, where universities are a crucial source of knowledge for innovation, as well as high-growth spin-offs. This divergence may explain why the creative businesses that we interviewed in our case studies do not currently see universities as a source of innovation, or a local factor supporting their innovation activities.

But as this report has shown, the creative industries are becoming increasingly reliant on sophisticated knowledge and tools (which is often technology-related), and this increases the potential benefits of linking with the local research base.

It is important to ensure that the local creative industries engage more actively with universities to harness research outputs that might enhance their productivity and innovative performance. At the same time, universities should adopt 'connected models' and engage more actively with the local creative industries from an innovation standpoint.[67] The way in which the University of Abertay has supported the growth of the renowned Video Games cluster in Dundee[68] – not only by collaborating with local firms to produce industry-ready graduates, but also by providing bespoke services to developers, and setting up a Prototyping fund for promising new video games ideas – should be an inspiration for other universities seeking to build deeper relationships with the creative firms in their vicinity.

Capture creative value locally
The generation of original IP is at the core of what many creative businesses do. Where they retain ownership over their IP, they have more incentives to innovate to exploit it, generating additional revenues that can be reinvested in growth, and building commercial and collaborative relationships with other local firms.

The extent to which specific projects and organisations produce creative value that can be captured by local firms through IP ownership and exploitation, should be taken into account by bodies funding or co-funding content production (such as the Screen Agencies), and by bodies trying to attract foreign direct investment to their localities. Other things being equal, any such public funding should favour those investors and projects that allow local firms to retain ownership over the IP that they generate. Initiatives that enable local creative firms to experiment with digital distribution methods where they are able to go straight to their customers, such as NESTA's funded consortium for video games self-publishing, also show much promise.

Be aware of the opportunity costs of large-scale capital investments
Although investments in the iconic public buildings that are seen to be the hallmark of creative cities can produce undoubted cultural and economic benefits, they also take money from other initiatives to support local creative businesses using an 'industry and innovation' approach – such as those that have been outlined above.[69]

Although the latter approach creates less immediately visible outputs, it might also be more conducive to developing a healthy and sustainable local creative ecosystem – one where creative graduates are able to gain employment when they finish their degree, creative value is captured locally, and local and regional innovative performance is improved. It is thus crucial to ensure the right balance between both types of investments.

Epilogue: East London Tech City as the beginning of a new approach for creative cluster development?
The Prime Minister's recent announcement of the East London Tech City set of initiatives, aimed at building up the vibrant high-tech and digital media cluster in Old Street and Shoreditch is a step in the right direction.[70] Rather than trying to create a new cluster from scratch, East London Tech City aims to take an organic, already competitive cluster to the next level, by providing it with the right infrastructure (both physical and digital), and developing its connections with global companies and London's world-class universities.

This should only be the first step. Other budding creative clusters across Britain can, with the right policy interventions, become global hubs for high-growth, innovative creative industries. This report has identified where they are, and how best to support them.

67. Kitson, M., Howells, J., Braham, R. and Westlake, S. (2009) 'The Connected University.' London: NESTA.
68. CIHE (2010) 'The Fuse: Igniting High Growth for Creative, Digital and Information Technology Industries.' Available at: http://www.cihe.co.uk/wp-content/themes/cihe/document.php?file=1009TheFuse.pdf.
69. Markusen, A. and Gadwa, A. (2010) Arts and Culture in Urban or Regional Planning: A Review and Research Agenda. 'Journal of Planning Education and Research.' Vol.29, No.3, pp.379-391.
70. See http://www.number10.gov.uk/news/speeches-and-transcripts/2010/11/east-end-tech-city-speech-56602.

Appendix 1: Industrial Classifications of the Creative Industries, High-Technology Manufacturing and Knowledge-Intensive Business Services followed in the report

Table 19 : The DCMS definition of the creative industries

Sector	2003 SIC-4 code	SIC definition
Advertising	74.4	Advertising
Architecture	74.2	Architecture and engineering activities and related technical consultancy
Arts and Antiques	52.48	Other retail sale in specialised stores
	52.5	Retail sale of second-hand goods in store
Crafts	ND	
Design	ND	
Designer fashion	17.71	Clothing manufacture
	17.72	
	18.1	
	18.21	
	18.22	
	18.23	
	18.24	
	18.3	
	19.3	
	74.87	Other business activities not elsewhere related
Video, Film & Photography	22.32	Reproduction of video recording
	74.81	Photographic activities
	92.11	Motion picture and video production
	92.12	Motion picture and video distribution
	92.13	Motion picture projection
Music and the Visual & Performing Arts	22.14	Publishing of sound recording
	22.31	Reproduction of sound recording
	92.31	Artistic and literary creation and interpretation
	92.32	Operation of arts facilities
	92.34	Other entertainment activities not elsewhere specified
	92.72	Other recreational activities not elsewhere specified
Publishing	22.11	Publishing of books
	22.12	Publishing of newspapers
	22.13	Publishing of journals and periodicals
	22.15	Other publishing
	92.4	News agency activities
Software, Computer games & Electronic publishing	22.33	Reproduction of computer media
	72.21	Publishing of software
	72.22	Other software consultancy and supply
Radio & TV	92.2	Radio and television activities

Table 20: The Frontier Economics definition of the creative industries

Advertising		
Layer 1	74.40/2	Planning, creating and putting in place advertising campaigns
Layer 5	74.40/9	A 'catch-all' code for advertising, including handing out free samples and aerial advertising
	74.40/1	Selling or leasing advertising space or time
Architecture		
Layer 1	74.20/1	Architectural design and construction supervision
	74.20/2	Urban planning and landscape architecture
Layer 2	74.20/4	Engineering advice and design for construction projects
Layer 3	74.20/6	Scientific consultancy like weather and geological surveying
Layer 4	74.15/3	Construction holding companies and head offices
	70.11	Real estate developers
	45.21/1, 45.21/2, 45.21/3, 45.22, 45.23, 45.24, 45.25	All types of construction work, like residential buildings, bridges, roads, sports facilities, dams and related work like laying foundations and putting up scaffolding
	74.20/3	Quantity surveying
	51.54	Wholesale of hardware, plumbing and heating equipment and supplies
	51.53	Wholesale of construction materials and sanitary equipment (e.g. toilets and sinks)
	51.13	Agents who sell timber and building materials
	45.41, 45.42, 45.43, 45.44, 45.45	All types of building completion like plastering, painting and glazing, floor and wall covering and installing swimming pools
	45.31, 45.32, 45.33, 45.34	All types of building installation like electrical work, insulation work and plumbing
Arts, Antiques and Craft Activities		
Layer 2	74.87/3	Exhibition and fair organisation
	52.50/1, 52.48/6	Retail sale of antiques and retail sale in commercial art galleries
Layer 3	36.63/9	Catch-all SIC code for 'other manufacturing' (potentially some craft firms, if they are large enough to be covered by the IDBR)
	36.22, 36.61	Manufacture of jewellery and dinnerware made of precious metals and imitation jewellery
	36.30, 33.50	Making musical instruments and watch and clock making
	28.75, 28.61	Making various metal products like swords but also ship propellers etc. and making cutlery
	27.54, 27.41, 26.82/9	Casting and production of heavy and precious metals and manufacture of mineral products
	26.30, 26.25, 26.21, 26.70	Making ceramic tiles, pots, jars, tableware, statuettes etc. and cutting stone for building and ornamental use
	17.51/9, 17.51/2, 17.51/1	Carpet and rug making
Layer 4	51.47/9	A catch all SIC code that includes the wholesale of floor coverings but also stationary and sportswear etc.
	51.44, 51.47/8	Wholesale of china and of travel and fancy goods
	51.47/3, 51.47/4	Wholesale of jewellery and imitation jewellery

Design Activity		
Layer 1	74.20/5	Engineering design for industry

Designer Fashion		
Layer 1	74.87/2	Fashion design but also interior design and graphic design
Layer 3	17.53, 17.71,17.72, 18.10, 18.22/1, 18.22/2, 18.23/1, 18.23/2, 18.24/1, 18.24/3, 18.24/9, 18.30, 19.20, 19.30	Manufacture of clothing items like hats, shoes, outerwear and underwear or accessories like bags and luggage
Layer 4	17.11, 17.12, 17.13, 17.14, 17.15, 17.16, 17.17, 17.21, 17.22, 17.23, 17.24, 17.25, 17.30, 17.54/1, 17.54/2, 17.54/9, 17.60, 19.10	Manufacture of fibres, textiles, prepared fur and prepared leather
	51.16, 51.24/1, 51.24/9, 51.41, 51.42/1, 51.42/2, 51.42/3, 51.42/9	Wholesale of, and activities of agents involved in the sale of fabrics, fur and clothing
Layer 5	52.42/1, 52.42/2, 52.42/3, 52.42/4, 52.43/1	Retail sale of cloths, accessories and footwear

Video, Film and Photography		
Layer 1	74.81/3	Specialist photography (e.g. underwater)
	74.81/9	Photos for commercials, fashion, tourism etc.
	92.11/1	Producing films, cartoons and documentaries
	92.11/9	Dubbing, editing, post production etc.
Layer 2	74.81/2	Portrait photos (mainly passport photo companies, although doesn't include photo machines)
Layer 3	92.12	Motion picture distribution
	74.81/4	Film processing
	52.48/2	Retail sale of cameras but also office equipment
	51.47/6	Wholesale of photographic goods
	33.40/3	Manufacture of cameras, projectors etc.
	24.65	Manufacture of unrecorded media (also includes unrecorded media for computers)
	24.64	Manufacture of photographic chemicals
	22.32	Reproduction of DVDs and tapes
Layer 5	92.13	Cinemas

Music and Performing Arts		
Layer 1	92.31/1	Live theatrical presentation
	92.31/9	Artistic and literary creation and interpretation
Layer 2	92.72/1	Casting for theatres, motion pictures or television
	92.32	Theatres, concert halls, arts facilities and ticket agencies
	22.14	Music publishing
Layer 3	92.34/9	'Other entertainment activities' code that includes VUE and Tussauds
	51.47/5	Wholesale of musical instruments
	22.31	Reproduction of sound recording
Layer 4	51.43/1	Wholesale of records, CDs etc. and players
Layer 5	92.72/9	'Other recreational activities' code

Publishing		
Layer 1	92.4	Journalists, press photographers and news syndicates
Layer 2	22.13	Publishing journals
	22.12	Publishing newspapers
	22.11	Publishing books
Layer 3	74.87/9	Business activities note covered by other SIC codes, including author's agents but also consultants etc.
	22.25	Activities like embossing and laminating
	22.24	Pre-press work, like composition and typesetting
	22.23	Bookbinding
	22.22	Printing maps, magazines, music manuscripts, diaries and similar items
	22.21	Printing newspapers
	22.15	Publishing photos, posters, timetables etc.
Layer 4	24.30/2	Manufacture of printing ink
	21.12	Manufacture of paper and paperboard
	21.11	Manufacture of pulp
Layer 4	52.47	Retail sale of books, newspapers and stationery
	52.11/1	Retail sale by newsagents, confectioners etc.

Software and computer games		
Layer 1	36.50/9	Manufacture of video game machines but also chess sets, dolls, playing cards etc.
	72.21	Development and supply of ready made software 'off the shelf'
	72.22	Development of made to order software, software consultancy and web page design
Layer 2	72.6	Computer-related work not covered under other SIC codes
Layer 3	72.1	Hardware consultancy
	22.33	Reproduction of software
Layer 4	51.84	Wholesale of computers, peripherals and software
	51.47/7	Wholesale of toys, including video games
	36.50/1	Manufacture of arcade games, including billiards etc.
Layer 5	52.48/5	Retail sale of toys (including video games), sports goods, stamps and coins

Radio and TV		
Layer 1	92.20/1	Radio production and broadcast
	92.20/2	Television production and broadcast
Layer 3	32.20/2	Transmitters and television cameras
Layer 4	51.43/9	Wholesale of radios, TVs, lighting equipment and some other appliances
	32.3	Manufacture of TVs, video recorders, camcorders, record decks, microphones and similar goods
Layer 5	52.45	Retail sale of radios, TVs, DVDs, musical instruments and musical scores

Table 21: SIC codes for High-Technology Manufacturing/KIBS

SIC-4 Code 2003	Name
High-tech	**Based on AeA (2002): 'High-Tech Industry Definition', expanded with Aerospace, Automobile Manufacturing and Pharmaceuticals**
30.00	Manufacture of office machinery
30.01	Manufacture of computers and other information processing equipment
32.10	Manufacture of electronic valves and tubes and other electronic components
32.20	Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy
32.30	Manufacture of television and radio receivers, sound or video recording or reproducing apparatus and associated goods
33.20	Manufacture of instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process control equipment
33.30	Manufacture of industrial process control equipment
33.40	Manufacture of optical instruments and photographic equipment
35.30	Manufacture of aircraft and spacecraft
34.10	Manufacture of motor vehicles
64.20	Telecommunications
24.41	Manufacture of basic pharmaceutical products
24.42	Manufacture of pharmaceutical preparations
KIBS	**Based on EFILW (2005): 'Sector Futures: The knowledge-intensive business services sector'**
72.10	Hardware consultancy
72.30	Data processing
72.40	Database activities
73.10	Research and experimental development on natural sciences and engineering
73.20	Research and experimental development on social sciences and humanities
74.11	Legal activities
74.12	Accounting, book-keeping and auditing activities, tax consultancy
74.13	Market research and public opinion polling
74.14	Business and management consultancy activities
74.15	Management activities of holding companies
74.30	Technical testing and analysis
74.50	Labour recruitment and provision of personnel

Appendix 2: Detailed results of the co-location analysis

Description

The co-location analysis uses the location quotients for the nine DCMS creative sectors and location quotients for high-technology and KIBS industries following the definitions produced by AeA and EFILW.[71] The location quotients have been calculated using the latest ONS data.[72] Any SIC codes in the DCMS definition have been removed from these definitions to avoid spurious correlations.

We have estimated partial correlation coefficients between these location quotients. The sign of the correlation coefficients indicate whether the pair of sectors under consideration tends to be found strongly concentrated in the same places (in which case the coefficient is positive) or in opposite places (in which case the coefficient is negative). The value of the coefficient shows the regularity of co-location or dislocation. A lack of statistical significance for a coefficient means that no underlying patterns have been detected in the data.

Tables 22 and 23 respectively present the partial correlation coefficients between each creative sector included in the DCMS operational definition and the High-Technology Manufacturing and KIBS aggregates, and between these creative sectors and the individual sectors that comprise the High-Technology Manufacturing and KIBS definitions that have been adopted.

71. AeA (2002) 'High-Tech Industry Definition.' Available at: http://www.aeanet.org/Publications/Idmk_definition.asp; also EFILW (2005) 'Sector Futures: The knowledge-intensive business services sector.' Available at: http://www.emcc.eurofound.eu.int/publications/2005/ef0559en.pdf [Last accessed 21 April 2010].
72. See Appendix 3 for the SIC codes included in these two definitions.

Table 22: Partial correlations between creative, high-tech and KIBS sectors controlling for size

Control Variables			LQ ADV	LQ ARCH	LQ ART	LQ DES	LQ VID	LQ MUS	LQ PUB	LQ SOFT	LQ TV
TOTAL firms	LQ High Tech	Correlation	.321	.125	-.353	.398	-.002	-.065	.070	.494	.017
		Significance (2-tailed)	.000	.058	.000	.000	.973	.327	.290	.000	.795
		df	229	229	229	229	229	229	229	229	229
	LQ KIBS	Correlation	.651	.335	-.395	.644	.362	.184	.260	.742	.180
		Significance (2-tailed)	.000	.000	.000	.000	.000	.005	.000	.000	.006

Table 23: Partial correlations between creative, high-tech and KIBS sectors

Control Variables		LQ ADV	LQ ARCH	LQ ART	LQ DES	LQ VID	LQ MUS	LQ PUB	LQ SOFT	LQ TV
TOTAL firms	LQ OFFMACH	.077	-.029	-.025	.074	.064	-.051	-.003	.094	.023
		.245	.657	.701	.264	.336	.437	.963	.153	.730
		229	229	229	229	229	229	229	229	229
	LQCOMPMAN	.341	.059	-.261	.427	.045	.078	.052	.401	.025
		.000	.373	.000	.000	.497	.235	.435	.000	.700
		229	229	229	229	229	229	229	229	229
	LQVALVES	.201	.025	-.090	.264	-.010	-.033	-.041	.280	-.062
		.002	.704	.170	.000	.882	.613	.530	.000	.346
		229	229	229	229	229	229	229	229	229
	LQTVRADTRANS	.182	.022	-.150	.277	.062	.092	.025	.269	.048
		.005	.739	.023	.000	.351	.165	.708	.000	.467
		229	229	229	229	229	229	229	229	229
	LQRADREC	.210	.047	-.193	.272	.030	.092	.158	.233	-.027
		.001	.478	.003	.000	.650	.162	.016	.000	.681
		229	229	229	229	229	229	229	229	229
	LQMEASURING	.205	.254	-.184	.439	.060	.071	.116	.435	-.015
		.002	.000	.005	.000	.362	.281	.077	.000	.821
		229	229	229	229	229	229	229	229	229
	MANPROCESSEQ	.247	.235	-.238	.302	-.085	-.107	-.175	.240	-.004
		.000	.000	.000	.000	.201	.105	.008	.000	.952
		229	229	229	229	229	229	229	229	229
	MANOPTICAL	.079	-.048	-.079	.001	-.085	-.041	-.068	.000	-.052
		.234	.471	.229	.992	.199	.534	.300	.999	.435
		229	229	229	229	229	229	229	229	229
	LQ Aircraft	.168	.046	-.146	.280	-.061	-.076	-.016	.193	-.035
		.010	.483	.026	.000	.352	.252	.806	.003	.598
		229	229	229	229	229	229	229	229	229
	LQ Motor	.086	-.067	.033	.156	-.177	-.135	-.022	.001	-.186
		.194	.307	.619	.018	.007	.040	.742	.985	.004
		229	229	229	229	229	229	229	229	229

Control Variables		LQ ADV	LQ ARCH	LQ ART	LQ DES	LQ VID	LQ MUS	LQ PUB	LQ SOFT	LQ TV
TOTAL firms	LQ Telco	.080	.034	-.277	-.041	.031	-.099	.051	.225	.138
		.224	.611	.000	.537	.636	.134	.443	.001	.036
		229	229	229	229	229	229	229	229	229
	LQBASPHARMA	-.006	.059	-.084	.044	-.064	-.023	.001	.051	.000
		.926	.375	.201	.510	.336	.730	.986	.440	.996
		229	229	229	229	229	229	229	229	229
	LQPHARMAPREP	.035	-.040	.011	-.016	.050	-.150	.085	.128	-.003
		.599	.547	.874	.805	.453	.022	.199	.052	.960
		229	229	229	229	229	229	229	229	229
	LQHARDCONS	.510	.256	-.361	.589	.129	.031	.080	.649	.082
		.000	.000	.000	.000	.050	.643	.226	.000	.212
		229	229	229	229	229	229	229	229	229
	LQDATAPROC	.377	.276	-.285	.410	.165	.018	.090	.575	.060
		.000	.000	.000	.000	.012	.780	.171	.000	.361
		229	229	229	229	229	229	229	229	229
	LQDATABASE	.389	.078	-.152	.455	.282	.192	.195	.476	.092
		.000	.236	.021	.000	.000	.003	.003	.000	.164
		229	229	229	229	229	229	229	229	229
	LQR&DSCI	.064	.175	-.121	.029	.162	.168	.289	.190	.221
		.336	.008	.066	.666	.014	.011	.000	.004	.001
		229	229	229	229	229	229	229	229	229
	LQR&DSOCSCI	.002	-.021	-.113	-.018	.070	.196	.183	.025	.303
		.979	.750	.088	.787	.290	.003	.005	.704	.000
		229	229	229	229	229	229	229	229	229
	LQLEGAL	.100	.057	.067	-.110	.111	-.083	-.125	-.027	.021
		.128	.388	.307	.095	.093	.208	.058	.687	.750
		229	229	229	229	229	229	229	229	229
	LQACCOUNT	.579	.064	-.102	.586	.312	.253	.257	.345	.077
		.000	.334	.122	.000	.000	.000	.000	.000	.247
		229	229	229	229	229	229	229	229	229

Control Variables		LQ ADV	LQ ARCH	LQ ART	LQ DES	LQ VaID	LQ MUS	LQ PUB	LQ SOFT	LQ TV
TOTAL firms	LQCONSULT	.588	.290	-.367	.619	.391	.284	.321	.719	.221
		.000	.000	.000	.000	.000	.000	.000	.000	.001
		229	229	229	229	229	229	229	229	229
	LQHOLDING	.416	.271	-.388	.396	.034	-.223	-.051	.488	-.063
		.000	.000	.000	.000	.610	.001	.438	.000	.341
		229	229	229	229	229	229	229	229	229
	LQTESTING	.015	.622	-.300	.023	-.120	-.227	-.192	.271	-.024
		.825	.000	.000	.727	.069	.000	.003	.000	.719
		229	229	229	229	229	229	229	229	229
	LQ Market Research	.420	.044	-.178	.404	.380	.342	.264	.421	.281
		.000	.505	.007	.000	.000	.000	.000	.000	.000
		229	229	229	229	229	229	229	229	229
	LQPERSON	.384	.224	-.331	.358	.024	-.192	.015	.461	-.047
		.000	.001	.000	.000	.716	.003	.825	.000	.480
		229	229	229	229	229	229	229	229	229

Source: ONS.

Acknowledgements

The authors would like to thank the members of the steering group for the project for their expert input. They are: Iain Bennett, Sandra Bulli, Alan Freeman, Simona Iammarino, Alexandra Jones, Rubbina Karruna, David Mulligan, Kate Oakley, Anna Smart and Peter Sunley.

Anthony Szary and Andy Botterill at the ONS, Stephanie Robson at BIS and the ONS Virtual Micro-data Laboratory Team also provided helpful input while accessing and interpreting the data that underpin the research.

Julie Porter assisted in the production of the Cardiff Media Production case study.

Hasan Bakhshi at NESTA has been one of the driving forces behind the research. His sustained engagement and contributions have been invaluable in the production of this report. Stian Westlake and Albert Bravo-Biosca have provided valuable suggestions and feedback, while Brian MacAulay has been instrumental in the timely implementation of the online platform that accompanies this report.

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Published: November 2010
CCI/63

ISBN 978-1-84875-112-5
9 781848 751125