

Benchmarking local innovation – the innovation geography of England: 2017

ERC Research Report

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EXECUTIVE SUMMARY

Firms' ability to innovate successfully plays an important role in their ability to sustain growth and competitiveness. This report provides innovation benchmarks for local areas in England, updating our previous analysis published in 2015.

The benchmarks are based on a new analysis of data from the 14,000 firms which responded to the UK Innovation Survey 2015. The analysis is designed to provide representative results for each local economic area. Information is provided on ten benchmarks including new indicators for organisational innovation.

Three benchmarks focus on forms of organisational and marketing innovation. Three further metrics relate to the inputs and structure of firms' innovation activity with a focus on R&D, design investment and collaboration. Arguably the most important, the remaining four metrics relate to the outcomes from firms' innovation reflecting both the extent of innovation across the population of firms as well as the success of innovation.

Three key results stand out in terms of the overall geography of innovation in England:

- Reflecting the results of our earlier analysis of the 2013 UK Innovation Survey, we find a concentration of relatively high levels of product and service innovation and new-to-the market innovation in an arc of local economic areas in the South and East Midlands and along the M4 corridor. Albeit with some variation, these areas are characterised by high proportions of innovating firms, a high incidence of new-to-the-market innovation, and relatively high levels of revenue from innovation. Outside this area, Cheshire and Warrington also performs well on a number of metrics.
- We observe a rather different geography in terms of process innovation with higher levels of process innovation activity in some Northern and peripheral areas where product/service innovation is less common.
- Our new benchmarks for organisational innovation also suggest a rather different geography to that of product/service and process innovation. Organisational innovation seems particularly prevalent in Cheshire and Warrington and in several more rural areas.

Our analysis highlights the diversity of innovation activity across the UK. Some local areas are marked by strengths in organisational innovation but weaker elsewhere; others exhibit higher levels of collaborative behaviour and R&D. Both suggests the value of differentiated local innovation strategies which can build on existing strengths and remedy weaknesses.

In considering these results and the benchmarks for individual areas it is important to remember that our benchmarks are based on survey data. This inevitably means that our results are subject to some measurement error.

1. INTRODUCTION

Firms' ability to innovate successfully plays an important role in their ability to sustain growth and competitiveness. For local areas this means that the more innovative are local companies the stronger the prospects for growth. In this report we provide a series of benchmarks which profile the level of innovative activity for local economic areas across England.

The benchmarks we report cover Local Economic Areas, defined by individual LEPs in England. They are based on a new analysis of the UK Innovation Survey 2015 which relates to firms' innovation activity during the three-year period from 2012 to 2014. Constructing the benchmarks has involved re-weighting survey responses to provide results which are representative of each local economic area. We report a wider range of benchmarks than in our 2015 report and representing different aspects of firms' innovation activity. The first three benchmarks focus on forms of organisational and marketing innovation:

- ***Firms engaged in the introduction of new business practices*** – the proportion of firms reporting the adoption of new business practices during the 2012 to 2014 period.
- ***Firms engaged in the introduction of new methods of organising work responsibilities*** – the proportion of firms reporting the adoption of new work organisation methods during the 2012 to 2014 period.
- ***Firms engaged in marketing innovation*** – the proportion of firms reporting changes to marketing concepts or strategies.

The next three metrics relate to the inputs and structure of firms' innovation activity with a focus on R&D, design investment and collaboration:

- ***Firms engaged in R&D*** – the proportion of firms reporting undertaking R&D over the 2012 to 2014 period (either internal or external).
- ***Firms engaged in design*** – the proportion of firms reporting investing in design as part of their innovation activity over the 2012 to 2014 period.
- ***Firms that were collaborating as part of their innovation activity*** – the proportion of firms partnering with other organisations as part of their innovation activity.

Arguably the most important benchmarks, the remaining four metrics relate to the outcomes from firms' innovation reflecting both the extent of innovation across the population of firms as well as the success of innovation:

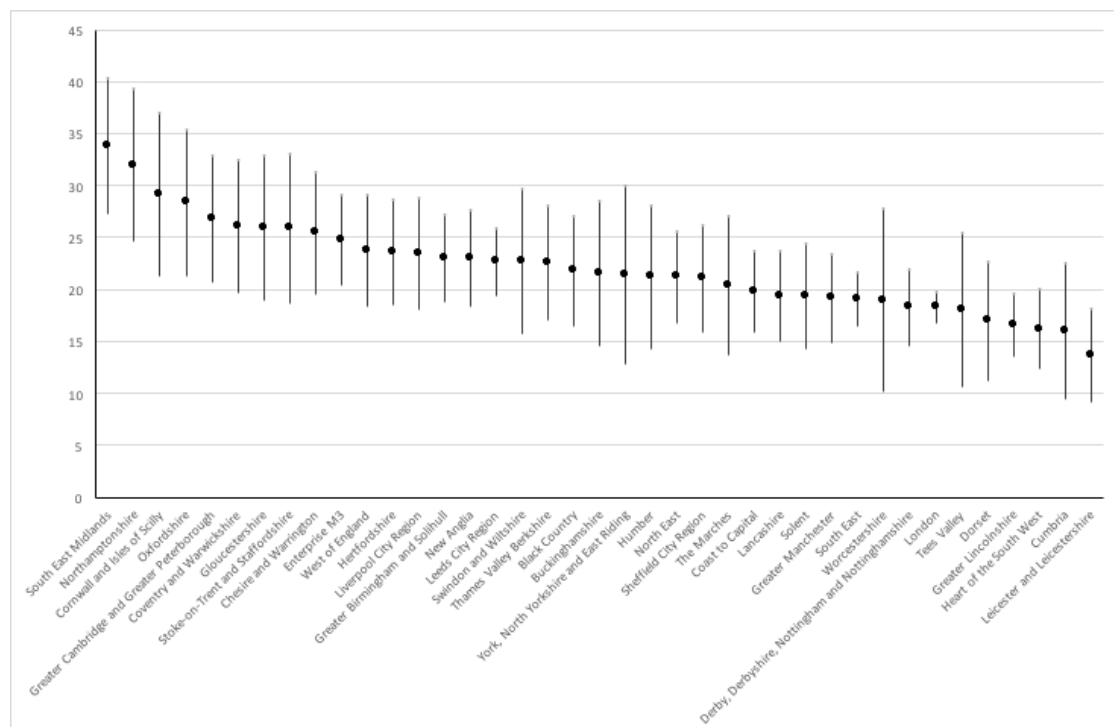
- ***Firms engaged in product or service innovation*** – measured as the proportion of firms reporting the introduction of a new or significantly improved product or service during the 2012 to 2014 period.

- **Firms engaged in new to the market innovation** – measured as the proportion of firms reporting that their new products or services were new to the market.
- **Firms' sales of innovative products or services** – measured as the average proportion of sales derived from innovative products and services in 2014. This provides an indication of the early market success of firms' new products and services.
- **Firms engaged in process innovation** - the proportion of firms reporting the introduction of a new or significantly improved process during the 2012 to 2014 period.

Details of the approach used to derive the individual benchmarks are provided in Annex 1. For the maps we divide local areas evenly into four quartiles and provide a colour key to link tabular data and maps.

In reading the report it is important to acknowledge that the benchmarks are based on firms' survey responses and, importantly, that in some smaller areas the number of respondents is relatively low. This inevitably means that the benchmarks are subject to potential measurement errors due to non-response or disproportionate response by particular groups of firms to the 2015 UK Innovation Survey. To illustrate Figure A below provides the mid-point estimates and 95 per cent confidence intervals for the benchmark for the proportion of firms engaged in product or service innovation (see also Table A2).

Figure A: Mid-point estimates and 95 per cent confidence intervals for the percentage of firms engaged in product or service innovation



Care is therefore necessary in interpreting the results which should only be seen as providing a general indication of the engagement of firms with innovation in each local area. In many cases, however, local areas which performed strongly in our previous analysis of the 2013 UK Innovation Survey also perform well here.

2. ORGANISATIONAL AND MARKETING INNOVATION

2.1 Introduction of new business practices: 2012 to 2014

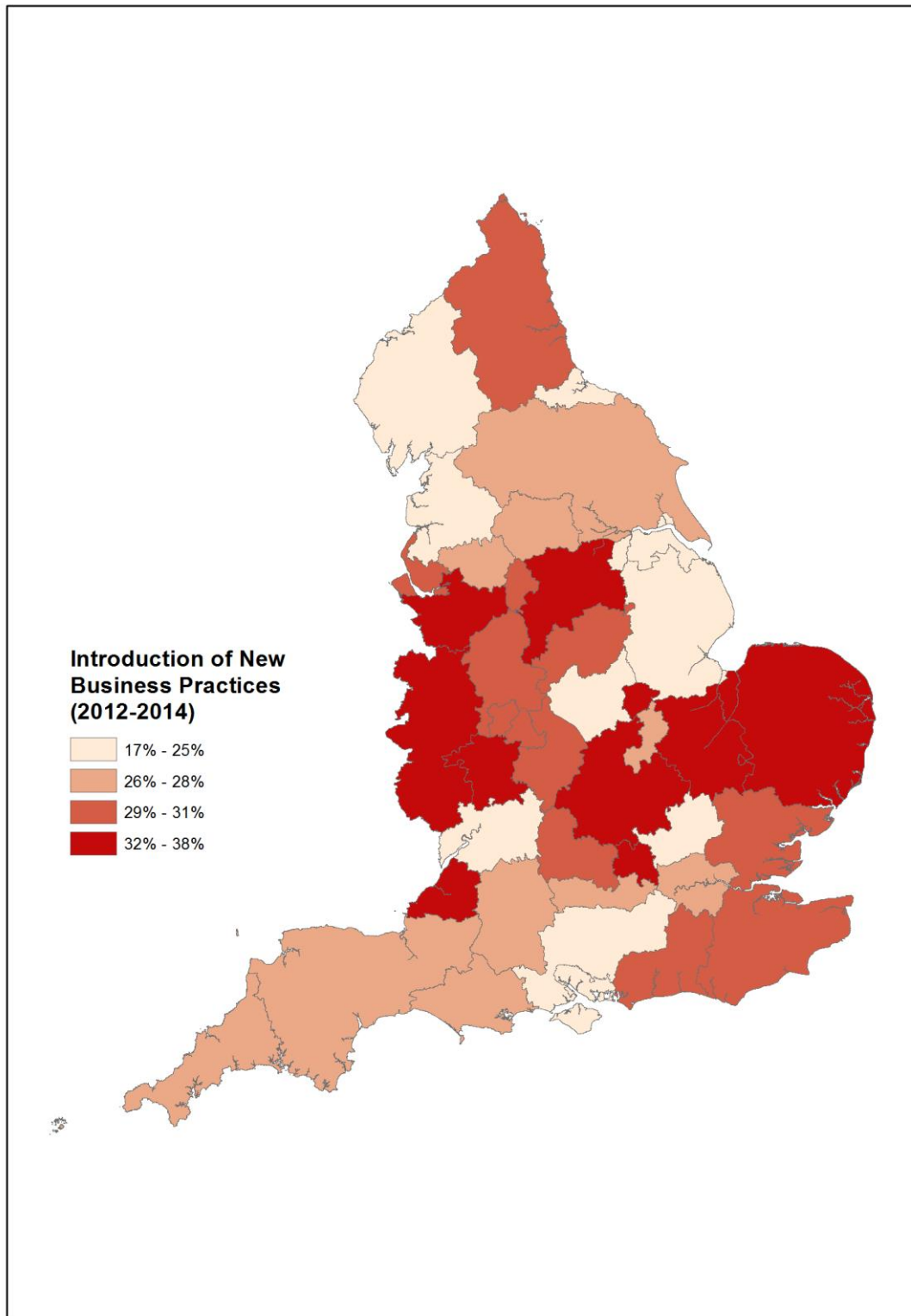
Business model innovation has attracted significant attention in recent years as firms seek new profit opportunities and new ways of creating value for customers and other stakeholders. This benchmark relates to firms' adoption of new organisational processes over the 2012 to 2014 period. Examples of this type of innovation would be: supply chain management, business re-engineering, knowledge management, lean production, quality management.

The spread of this benchmark across local economic areas is relatively wide: 38 per cent of firms in Cheshire and Warrington reported introducing new business practices over the 2012 to 2014 period compared to only 17 per cent in Leicester and Leicestershire. Several relatively rural local economic areas rank highest on this benchmark - e.g. Cheshire and Warrington, Buckinghamshire, New Anglia - but we see little clear geographic pattern across England. A very similar group of local economic areas also perform well on the other organisational and marketing metrics (see below). Those local economic areas which perform more strongly on product and service innovation and innovative sales – e.g. Oxfordshire, South East Midlands, Greater Cambridge and Peterborough - also tend to perform relatively strongly in terms of new business practices.

**Table 1: Introduction of new business practices by local economic area
(% of firms)**

LEP	% firms		LEP	% firms	
Cheshire and Warrington	38		Leeds City Region	28	
Buckinghamshire	36		Cornwall and Isles of Scilly	28	
New Anglia	34		Northamptonshire	28	
West of England	33		Greater Manchester	28	
The Marches	33		Thames Valley Berkshire	28	
South East Midlands	32		Heart of the South West	27	
Worcestershire	32		Swindon and Wiltshire	26	
Sheffield City Region	31		London	26	
Gtr Cambridge and Gtr Peterborough	31		York, North Yorks and East Riding	25	
Coast to Capital	31		Humber	25	
Liverpool City Region	30		Solent	25	
Oxfordshire	30		Greater Lincolnshire	25	
Black Country	30		Lancashire	24	
Coventry and Warwickshire	30		Cumbria	24	
Greater Birmingham and Solihull	30		Gloucestershire	24	
Stoke-on-Trent and Staffordshire	30		Tees Valley	23	
Derby, Derbyshire, Nottingham, Notts.	29		Hertfordshire	22	
North East	29		Enterprise M3	19	
South East	28		Leicester and Leicestershire	17	
Dorset	28				

**Figure 1: The geography of new business practices by local economic area
(% of firms)**



2.2 New Methods of Work Organisation

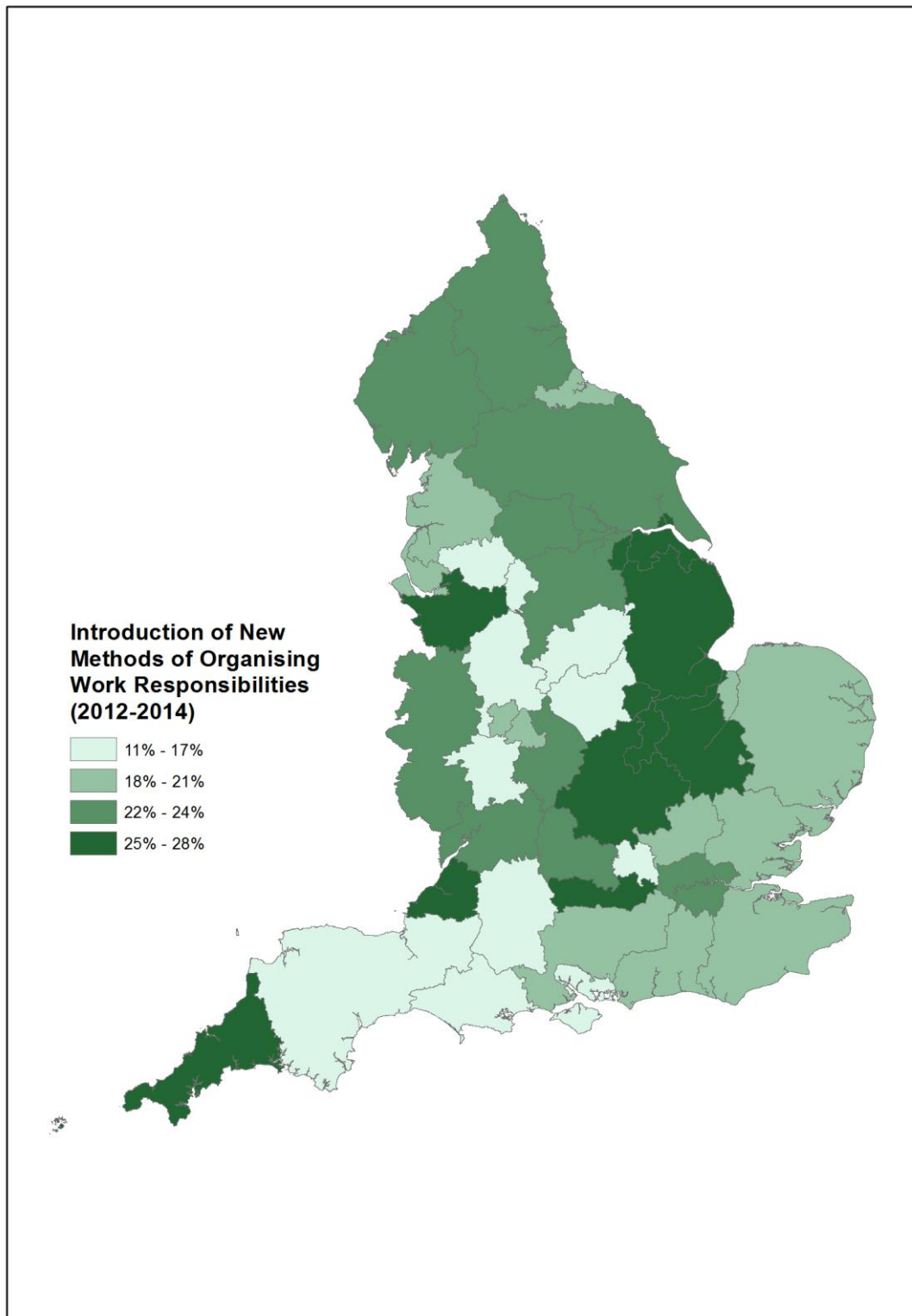
The way work is organised and structured can play an important role in shaping levels of innovative activity. Rigid, hierarchic forms of work organisation can hinder innovation, while more fluid, risk-tolerant regimes can facilitate creative thinking. This metric relates to a survey question which focuses on firms' adoption of 'new methods of organising work responsibilities and decision making. Examples are firms' first use of a new system of employee responsibilities, team work, decentralisation, integration or de-integration of departments, education / training systems.

As with the introduction of new business practices, we see wide variation between the proportion of firms in each LEP area reporting the implementation of new forms of work organisation. The overall correlation with the benchmark relating to the introduction of new business practices – 0.12 – is, however, relatively low. Note also that, in general, the percentages of firms introducing new methods of work organisation are lower than those implementing new business practices. This pattern also varies somewhat between areas. For example, while 38 per cent of firms in Cheshire and Warrington reported implementing new business practices 28 per cent implemented new methods of work organisation. In Cornwall and the Isles of Scilly, 28 per cent of firms implemented both new business practices and new forms of work organisation.

Table 2: Introduction of new methods of work organisation by local economic area (% of firms)

LEP	% firms		LEP	% firms	
	%				
Cornwall and Isles of Scilly	28		Tees Valley	21	
Cheshire and Warrington	28		South East	20	
Humber	28		Lancashire	19	
Northamptonshire	28		Black Country	19	
Thames Valley Berkshire	27		Greater Birmingham and Solihull	19	
Gtr Cambridge, Gtr Peterborough	26		Hertfordshire	19	
South East Midlands	26		Enterprise M3	18	
West of England	25		New Anglia	18	
Greater Lincolnshire	25		Liverpool City Region	18	
Oxfordshire	24		Dorset	17	
York, North Yorks and East Riding	24		Greater Manchester	17	
Coventry and Warwickshire	24		Solent	17	
Cumbria	23		Buckinghamshire	17	
North East	23		Worcestershire	17	
Gloucestershire	22		Swindon and Wiltshire	17	
London	22		Stoke-on-Trent and Staffordshire	16	
Sheffield City Region	22		Derby, Derbyshire, Nottingham, Notts.	16	
The Marches	22		Heart of the South West	15	
Leeds City Region	22		Leicester and Leicestershire	11	
Coast to Capital	21				

**Figure 2: The geography of new methods of work organisation by local economic area
(% of firms)**



2.3 Marketing innovation

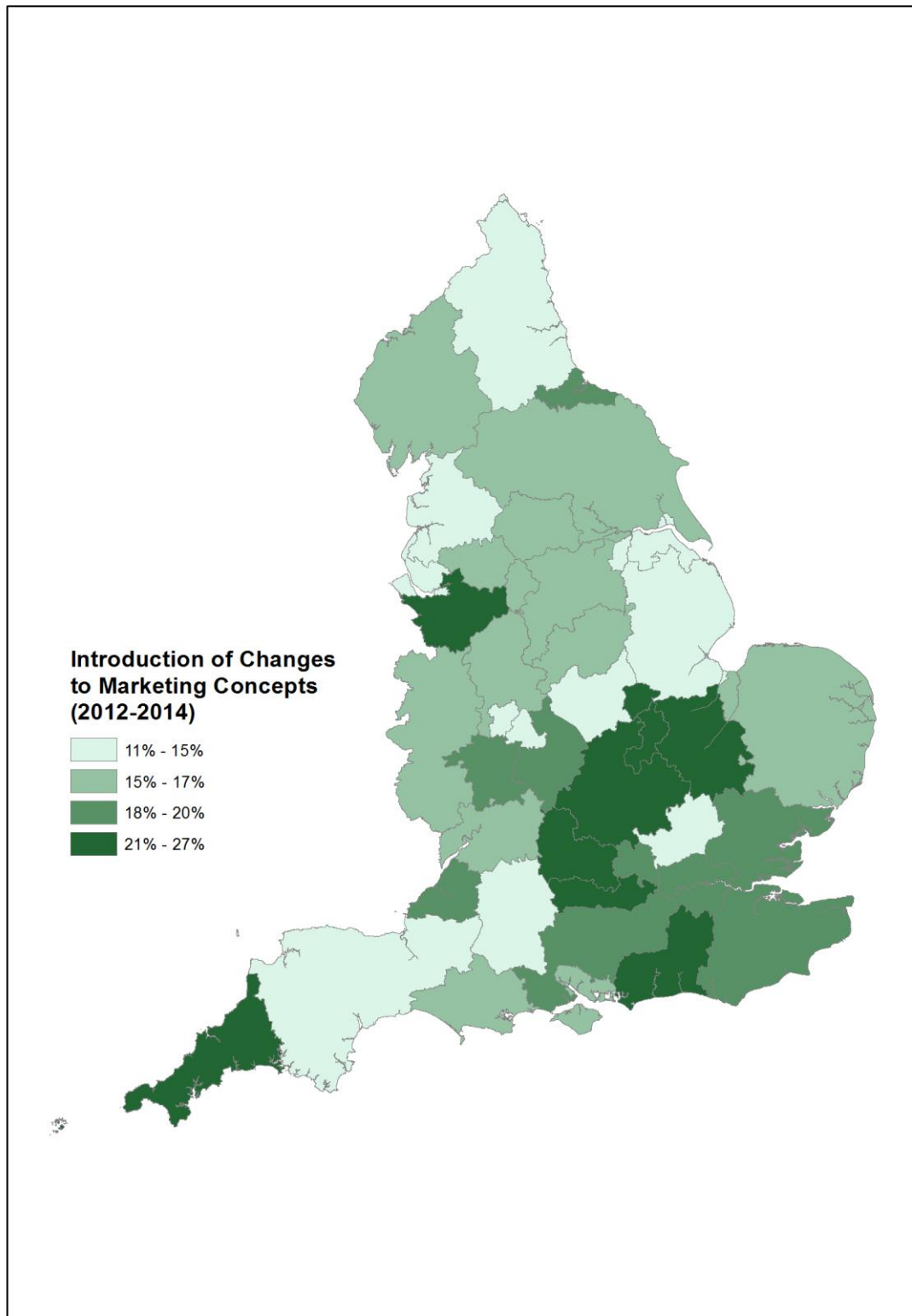
Alongside product, service and process innovation it is increasingly recognised that significant commercial advantage may also stem from marketing innovations. This metric is derived from a survey question which asks firms whether over the 2012 to 2014 period they implemented 'changes to marketing concepts or strategies'. As previously the metric is expressed as the percentage of firms in each local economic area undertaking this type of marketing innovation over the three-year period covered by the survey. Interestingly, this benchmark has the strongest correlation of any of the benchmarks reported here with the measure of innovative sales outlined later in the report. This emphasises the importance of marketing in successful innovation.

Again we see significant variations in this metric between local economic areas with 27 per cent of firms in Cheshire and Warrington and Oxfordshire reporting the implementation of new marketing concepts and strategies compared to only 11 per cent in Swindon and Wilts. There is a tendency for areas which perform well on the other organisational metrics also to perform well in terms of marketing innovation. Again, however, correlations between the benchmarks across areas are not particularly strong (0.29 with new business practices and 0.43 with work practices).

**Table 3: Marketing innovation by local economic area
(% of firms)**

LEP	% firms		LEP	% firms	
	%				
Cheshire and Warrington	27		Leeds City Region	17	
Oxfordshire	27		Dorset	17	
Cornwall and Isles of Scilly	22		Stoke-on-Trent and Staffordshire	16	
Gtr Cambridge, Gtr Peterborough	21		Greater Manchester	16	
Northamptonshire	20		The Marches	16	
Thames Valley Berkshire	20		Cumbria	16	
Coast to Capital	20		Sheffield City Region	16	
South East Midlands	20		Derby, Derbyshire, Nottingham, Notts.	16	
Tees Valley	20		Greater Birmingham and Solihull	16	
Enterprise M3	19		Heart of the South West	16	
Worcestershire	19		Hertfordshire	16	
West of England	19		Black Country	16	
South East	19		Lancashire	16	
Coventry and Warwickshire	19		North East	15	
Buckinghamshire	18		Humber	15	
London	18		Liverpool City Region	15	
Gloucestershire	17		Leicester and Leicestershire	14	
Solent	17		Greater Lincolnshire	13	
York, North Yorks and East Riding	17		Swindon and Wiltshire	11	
New Anglia	17				

**Figure 3: The geography of marketing innovation by local economic area
(% of firms)**



3. R&D, DESIGN INVESTMENT AND COLLABORATION

3.1 Research and development (R&D)

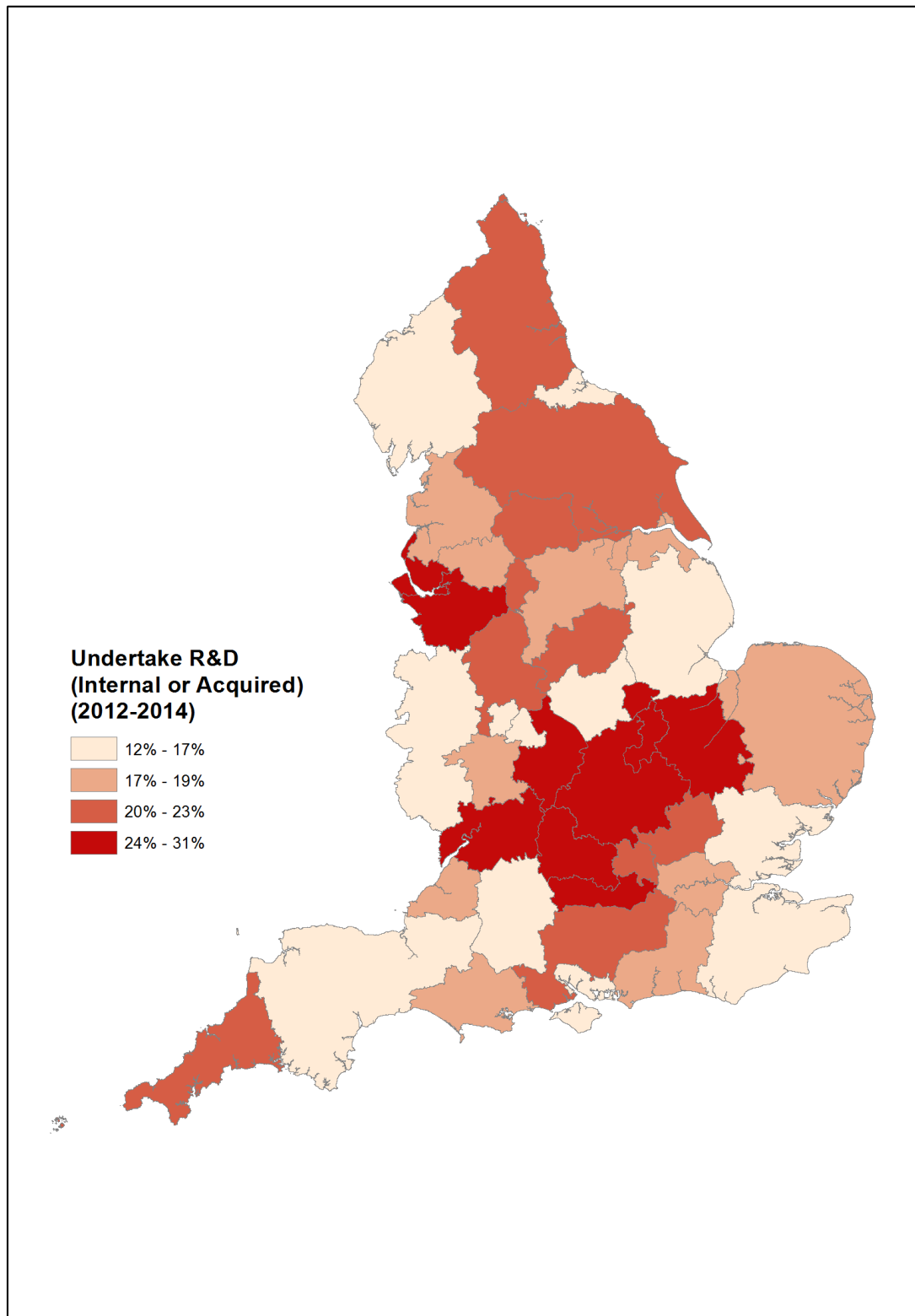
R&D provides one of the key inputs into firms' innovation activity. Not only can R&D provide the new knowledge or technological discovery which might drive innovation. There is also substantial evidence that R&D personnel are important in enabling firms to identify external knowledge or technologies which may help to develop the firm's own innovation. In part this may reflect the expertise of R&D personnel but may also be related to their personal links and networks to other researchers.

Again there is significant variation between local areas in terms of the proportion of firms reporting either in-house or externally sourced R&D activity. Some of the highest reported figures are consistent with the 'arc of innovation' identified in our 2015 report covering Oxfordshire, SE Midlands and Greater Cambridge and Peterborough. Other areas reporting relatively high rates of R&D activity include Cheshire and Warrington which also performed strongly on indicators of organisational innovation.

Table 4: Percentage of firms undertaking R&D by local economic area (% firms)

LEP	% firms		LEP	% firms	
	%				
Cheshire and Warrington	31		Dorset	19	
Gtr Cambridge and Gtr Peterborough	30		Lancashire	19	
Oxfordshire	29		London	19	
Gloucestershire	27		Coast to Capital	19	
Northamptonshire	25		Humber	19	
South East Midlands	25		West of England	18	
Liverpool City Region	23		Greater Manchester	18	
Coventry and Warwickshire	23		Sheffield City Region	18	
Thames Valley Berkshire	23		Black Country	18	
Leeds City Region	23		Solent	18	
Cornwall and Isles of Scilly	22		South East	17	
Enterprise M3	22		Tees Valley	17	
Derby, Derbyshire, Nottingham, Notts.	22		The Marches	17	
North East	21		Swindon and Wiltshire	16	
Stoke-on-Trent and Staffordshire	20		Greater Lincolnshire	16	
York, North Yorks and East Riding	20		Heart of the South West	15	
Buckinghamshire	20		Leicester and Leicestershire	13	
Hertfordshire	20		Cumbria	12	
Worcestershire	19		Greater Birmingham and Solihull	12	
New Anglia	19				

**Figure 4: Percentage of firms undertaking R&D by local economic area
(% of firms)**



3.2 Design investment for innovation

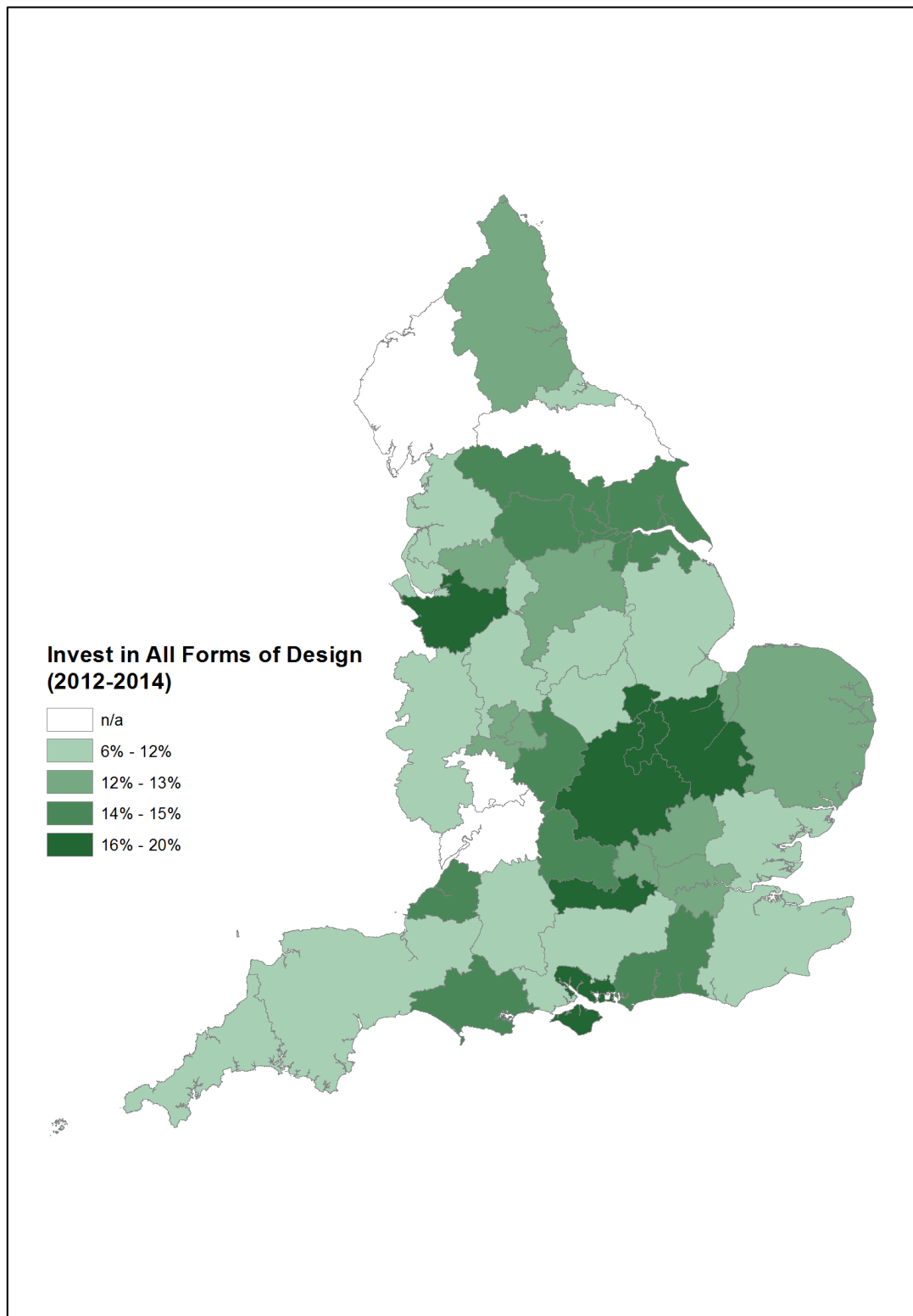
Studies have repeatedly linked design investment to enhanced innovation outcomes in both manufacturing and services. This benchmark relates to firms' investment in all forms of design related to the development or implementation of new or improved goods, services and processes. For this benchmark, figures are not available for four local areas due to confidentiality constraints.

The proportion of firms making design investments for innovation again varies relatively widely between local areas. There is a relatively strong relationship however between areas which perform strongly in terms of R&D (Table 4) and design investment (Table 5). Six of the best performing areas in terms of design investment are also in the top ten performing areas in terms of R&D. Conversely, several local areas which have lower levels of R&D activity also exhibit relatively low levels of design investment.

Table 5: Percentage of firms undertaking design investment for innovation by local economic area (% firms)

LEP	% firms		LEP	% firms	
	%				
Cheshire and Warrington	20		London	12	
South East Midlands	20		New Anglia	12	
Gtr Cambridge, Gtr Peterborough	20		Cornwall and Isles of Scilly	12	
Northamptonshire	19		The Marches	12	
Thames Valley Berkshire	16		South East	11	
Solent	16		Tees Valley	11	
Humber	15		Swindon and Wiltshire	11	
West of England	15		Derby, Derbyshire, Nottingham, Notts.	10	
Oxfordshire	15		Enterprise M3	10	
Coast to Capital	14		Liverpool City Region	10	
Leeds City Region	14		Greater Lincolnshire	10	
Dorset	14		Lancashire	10	
Coventry and Warwickshire	14		Heart of the South West	9	
Black Country	13		Stoke-on-Trent and Staffordshire	9	
North East	13		Leicester and Leicestershire	8	
Sheffield City Region	13				
Hertfordshire	13				
Buckinghamshire	13				
Greater Manchester	13				
Greater Birmingham and Solihull	13				

**Figure 5: Percentage of firms undertaking design investment for innovation
by local economic area
(% firms)**



3.3 Collaboration for innovation

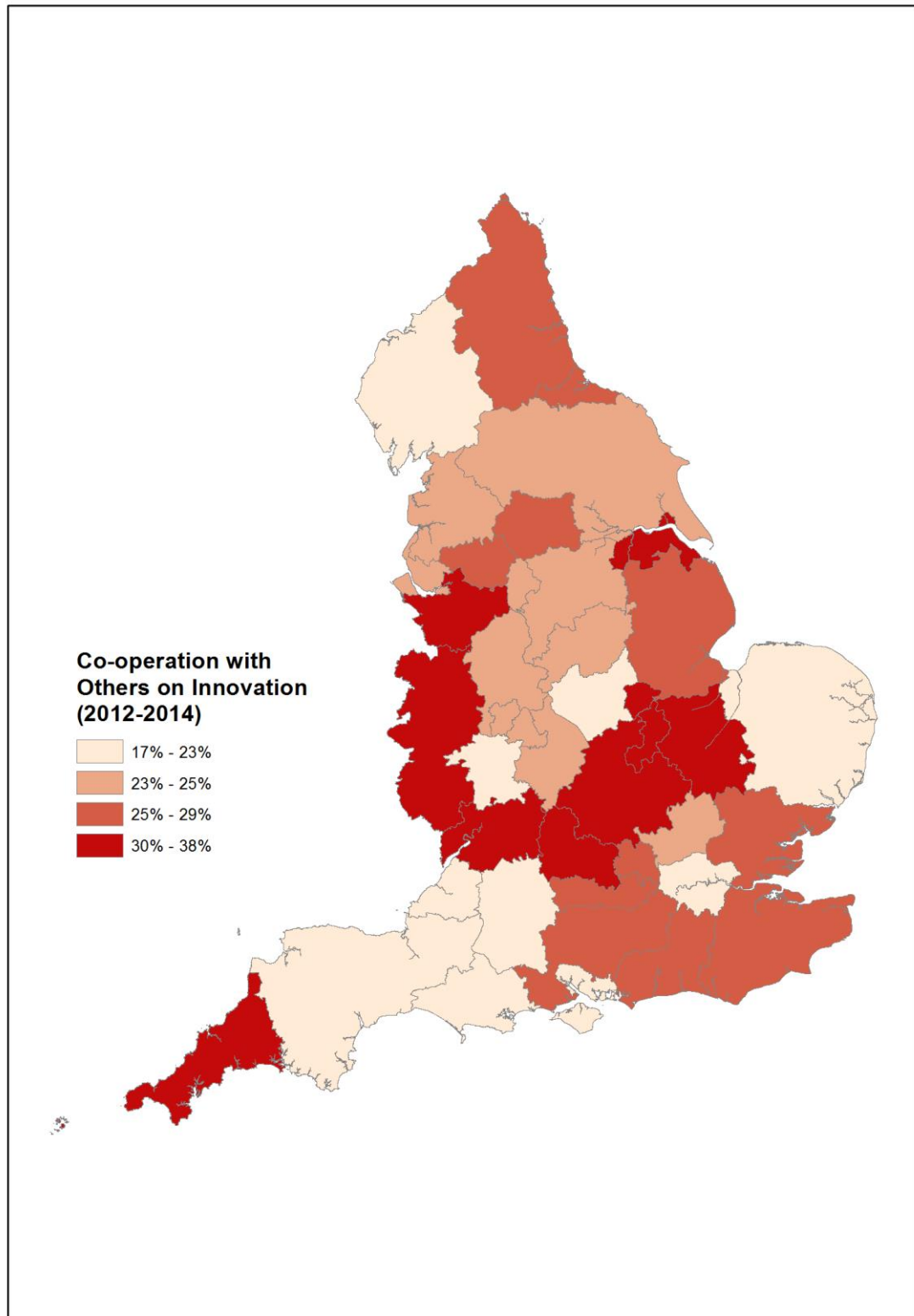
Notions of open, partnering or networked innovation have received considerable recent attention with the research literature suggesting that collaboration can deliver significant benefits for innovating firms. High levels of collaboration by firms in a locality can also help improve knowledge diffusion and ensure that firms maximise the potential of any innovative opportunities. Here, we report a metric based on the percentage of firms in any local economic area which were collaborating for innovation during the period 2012 to 2014. Collaboration need not have been continuous over this period and partners were not necessarily local. The metric simply records whether innovating firms worked with other partners on their innovation activity over this period.

Before considering this benchmark it is worth noting that here issues around sample size in some local areas become more important. Information is only available on collaboration for those firms which did undertake some form of innovative activity during the 2012 to 2014 period. This said, several local areas which perform strongly on other organisational and innovation metrics also perform well here. There is also a strong correlation (0.55) between the R&D and collaboration benchmarks and the benchmarks on collaboration and work re-organisation (0.61).

**Table 6: Collaboration for innovation by local economic area
(% of innovating firms)**

LEP	% firms		LEP	% firms	
	%				
Humber	39		York, North Yorks and East Riding	25	
Cheshire and Warrington	36		Black Country	25	
Cornwall and Isles of Scilly	36		Derby, Derbyshire, Nottingham, Notts.	25	
Gtr Cambridge, Gtr Peterborough	35		Liverpool City Region	25	
Northamptonshire	33		Sheffield City Region	24	
The Marches	33		Coventry and Warwickshire	24	
Gloucestershire	31		Lancashire	24	
South East Midlands	30		Stoke-on-Trent and Staffordshire	24	
Oxfordshire	30		Hertfordshire	24	
Leeds City Region	29		New Anglia	24	
Buckinghamshire	29		London	23	
Tees Valley	29		Worcestershire	23	
Enterprise M3	27		Cumbria	22	
Thames Valley Berkshire	27		Solent	22	
North East	27		West of England	22	
South East	26		Dorset	20	
Coast to Capital	26		Leicester and Leicestershire	19	
Greater Lincolnshire	26		Heart of the South West	18	
Greater Manchester	26		Swindon and Wiltshire	17	
Greater Birmingham and Solihull	25				

**Figure 6: Collaboration for innovation by local economic area
(% of firms)**



4. INNOVATION OUTCOMES AND SALES

4.1 Product and Service Innovation

The ability to successfully introduce new or improved products and services is a key aspect of firms' innovation capability. Previous research studies have strongly linked new product innovation to both growth and productivity improvements. This metric measures the percentage of enterprises in each locality introducing either a new or significantly improved product or service during the three-year period from 2012 to 2014. The higher the percentage the more firms in any locality are engaging with innovation with its potential growth and productivity benefits.

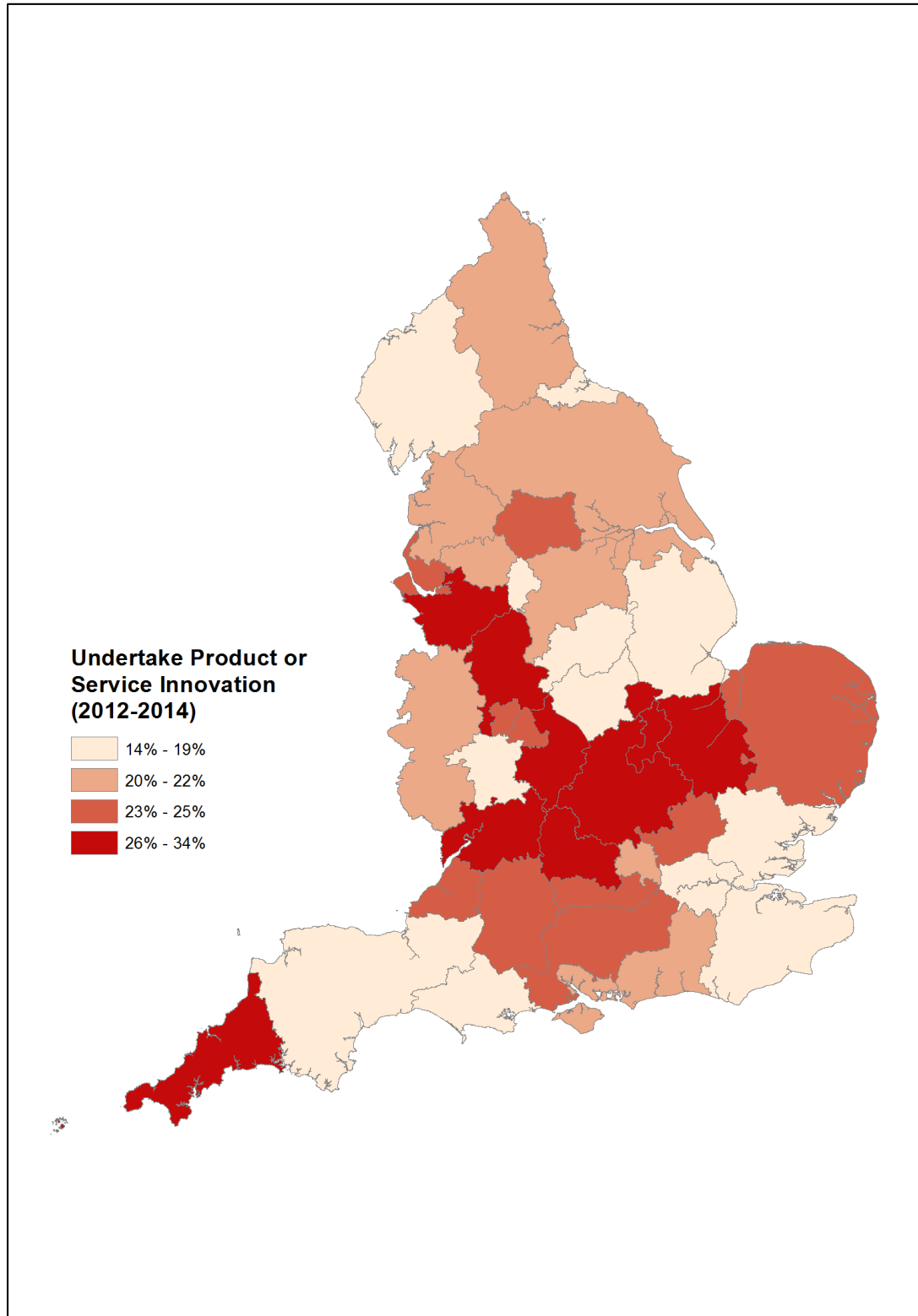
Differences in the levels of this metric between local areas will reflect both the innovativeness of local firms and to some extent the structure of local industries. For example, high-tech industries, or those where there is a high degree of competition, may have higher levels of innovative activity. Similarly, as larger firms are typically more likely to introduce new or improved products or services in any given period, those local areas where there is a preponderance of larger firms are likely to perform well on this benchmark.

As in our 2015 benchmarks, some of the highest levels of product and service innovation activity are recorded in the 'Golden Triangle' and along the M4 Corridor with most surrounding areas also having relatively high levels of innovative activity. Lower levels of product and service innovation are generally associated with more peripheral and coastal areas although Cornwall and the Isles of Scilly perform well on this metric. For some areas there is a stable picture: 27 per cent of firms reported product or service innovation in Oxfordshire in 2015 compared to 28 per cent in the current analysis. Other areas exhibit more volatility with, for example, the proportion of innovators in York and North Yorks. increasing from 12 per cent in 2015 to 21 per cent here.

**Table 7: The proportion of firms undertaking product or service innovation
(% of firms)**

LEP	% firms		LEP	% firms	
South East Midlands	34		York, North Yorks and East Riding	21	
Northamptonshire	32		Humber	21	
Cornwall and Isles of Scilly	29		North East	21	
Oxfordshire	28		Sheffield City Region	21	
Gtr Cambridge, Gtr Peterborough	27		The Marches	20	
Coventry and Warwickshire	26		Coast to Capital	20	
Gloucestershire	26		Lancashire	19	
Stoke-on-Trent and Staffordshire	26		Solent	19	
Cheshire and Warrington	26		Greater Manchester	19	
Enterprise M3	25		South East	19	
West of England	24		Worcestershire	19	
Hertfordshire	24		Derby, Derbyshire, Nottingham, Notts.	18	
Liverpool City Region	24		London	18	
Greater Birmingham and Solihull	23		Tees Valley	18	
New Anglia	23		Dorset	17	
Leeds City Region	23		Greater Lincolnshire	17	
Swindon and Wiltshire	23		Heart of the South West	16	
Thames Valley Berkshire	23		Cumbria	16	
Black Country	22		Leicester and Leicestershire	14	
Buckinghamshire	22				

**Figure 7: Product and Service Innovation by Local Area
(% firms)**



4.2 New to the market innovation

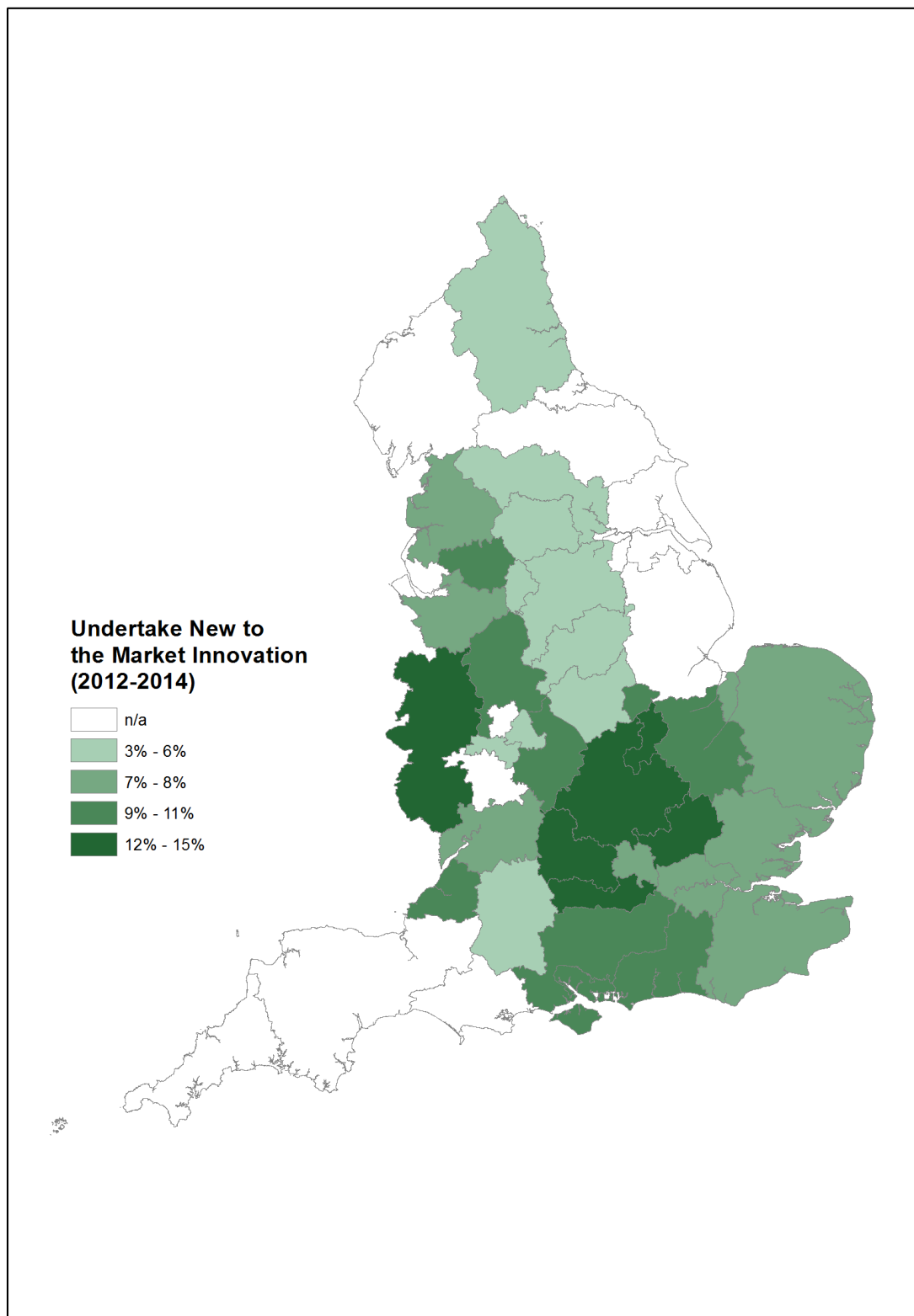
The previous metric provided an indication of the extent of innovation in products and services across the whole population of firms within each locality. Innovations vary in nature, however, with a usual distinction being 'new to the market' or 'new to the firm'. It is generally thought that more radical 'new to the market' innovations might generate higher returns although these are offset by the potential for higher risks. This metric provides an indication of the percentage of firms which reported introducing new to the market innovations (either products or services) during the 2012 to 2014 period. As this proportion is relatively small the benchmark is unavailable for some more rural areas due to confidentiality constraints.

To understand this benchmark it is useful first to consider the situation on one specific area. Take Oxfordshire, for example, where 28 per cent of firms reported undertaking some product or service innovation between 2012 and 2014 (Table 7). Over the same period 15 per cent of firms in Oxfordshire (around half of all innovating firms) reported undertaking new-to-the-market innovation (Table 8), the highest proportion of any local area. Areas such as Greater Manchester had both lower levels of overall innovation (19 per cent of firms, Table 7) and new-to-the-market innovation (8 per cent, Table 8). More generally, five of the ten best performing local areas in terms of new-to-the-market innovation, were also in the ten best performing areas in terms of their overall innovation performance.

Table 8: New to the market product and service innovation by Local Area (% firms)

LEP	% firms		LEP	% firms	
	%				
Oxfordshire	15		New Anglia	8	
The Marches	14		South East	8	
South East Midlands	13		Buckinghamshire	8	
Northamptonshire	13		London	8	
Hertfordshire	13		Lancashire	7	
Thames Valley Berkshire	11		Cheshire and Warrington	7	
Coast to Capital	11		Gloucestershire	7	
Gtr Cambridge, Gtr Peterborough	11		Leeds City Region	7	
Coventry and Warwickshire	11		Swindon and Wiltshire	7	
Enterprise M3	10		Sheffield City Region	7	
Stoke-on-Trent and Staffordshire	10		Greater Birmingham and Solihull	7	
West of England	10		North East	7	
Solent	9		Leicester and Leicestershire	6	
Greater Manchester	8		Derby, Derbyshire, Nottingham, Notts.	5	

**Figure 8: New to the market innovation by innovating firms
(% of firms)**



4.3 Sales of innovative products/services

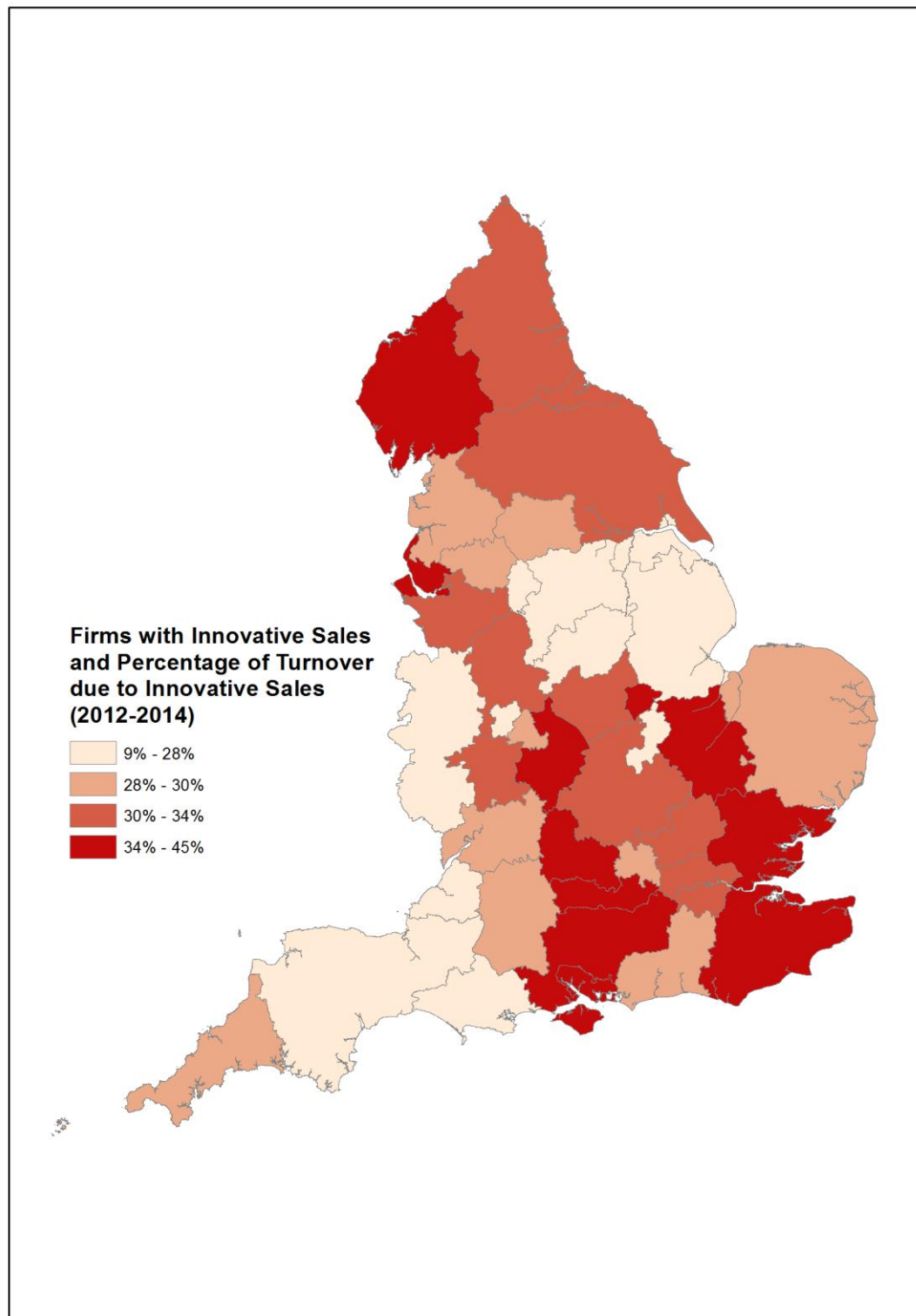
Previous benchmarks have related to the engagement of firms in each local area with aspects of innovation. In other words, they provide an indication of the extent of innovative activity in the population of firms. This benchmark, relating to the proportion of innovating firms' sales which are derived from innovative products or services, is different in providing a measure of the short-term success of firms' innovation. The benchmark is measured as the average proportion of firms' sales derived from innovative products or services (i.e. new or significantly improved) and introduced during the previous three years. The metric is based on the proportion of innovative sales over the year prior to the survey and relates only to innovating firms.

A number of local areas which perform well on this benchmark (Table 9) also perform well in terms of the proportion of innovating firms and new-to-the-market innovation. The implication is that in those areas where the proportion of innovating firms and new to the market innovators is relatively high, local firms are also relatively successful innovators.

**Table 9: Sales of innovative products and services by Local Area
(% sales of innovating firms)**

LEP	Mean % sales		LEP	Mean % sales	
Oxfordshire	45		Coast to Capital	31	
Coventry and Warwickshire	41		Gloucestershire	31	
Gtr Cambridge, Gtr Peterborough	39		Swindon and Wiltshire	30	
Cumbria	39		Cornwall and Isles of Scilly	30	
Thames Valley Berkshire	38		New Anglia	30	
Enterprise M3	36		Lancashire	29	
Liverpool City Region	36		Greater Manchester	29	
South East	36		Leeds City Region	29	
Solent	35		Greater Birmingham and Solihull	29	
North East	34		Greater Lincolnshire	29	
London	34		Northamptonshire	28	
South East Midlands	33		Dorset	26	
Leicester and Leicestershire	33		Sheffield City Region	24	
Tees Valley	32		The Marches	22	
Hertfordshire	31		Black Country	22	
Cheshire and Warrington	31		Heart of the South West	22	
Stoke-on-Trent and Staffordshire	31		West of England	22	
York, North Yorks and East Riding	31		Derby, Derbyshire, Nottingham, Notts.	21	
Worcestershire	31		Humber	9	
Buckinghamshire	31				

**Figure 9: Sales of innovative products and services by Local Area
(% sales of innovating firms)**



4.4 Process innovation

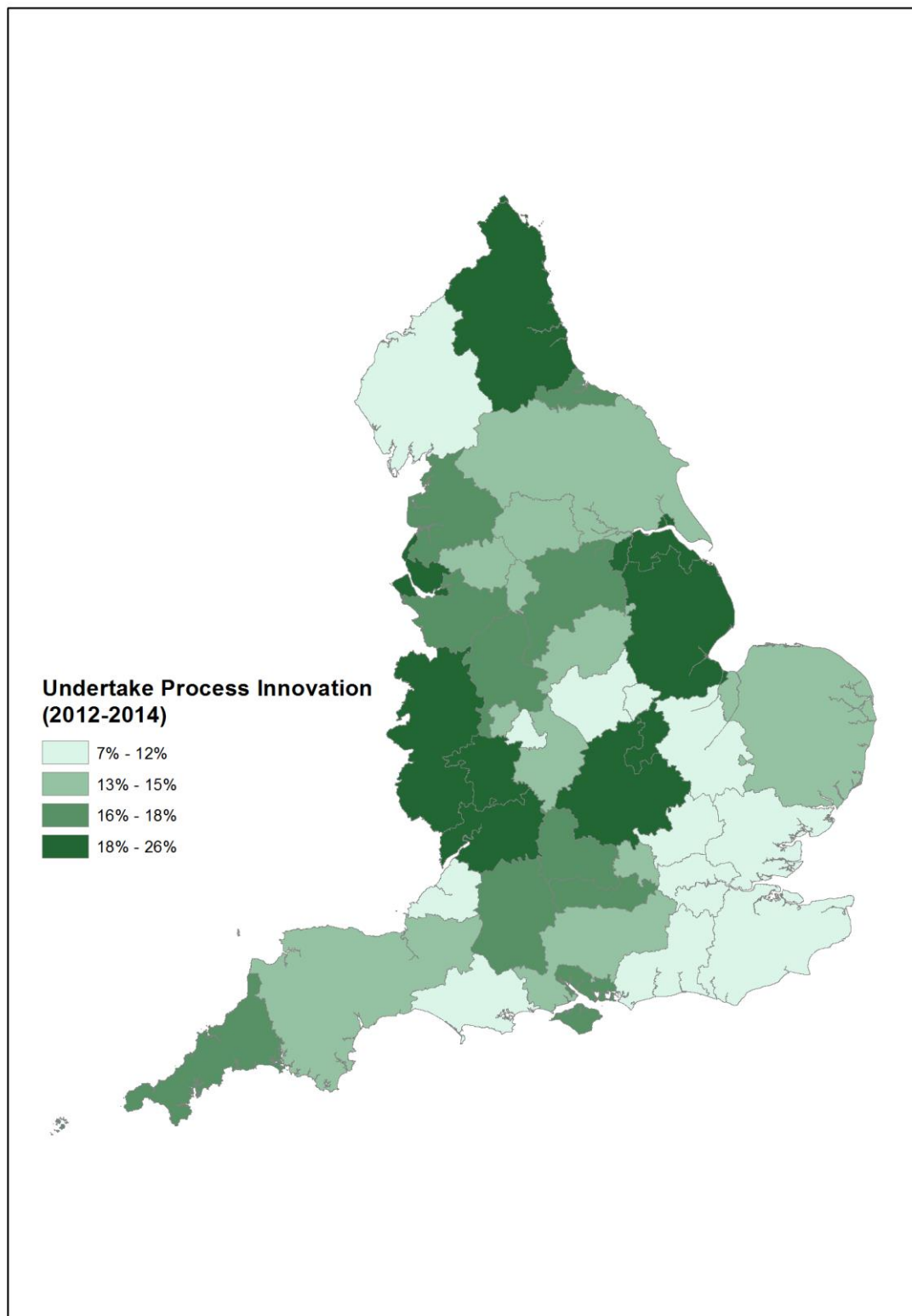
Alongside product and service innovation it is usual to measure firms' innovation in manufacturing or business processes. Either type of innovation may provide advantages in terms of flexibility, productivity or cost saving. Process changes have also been linked by previous research to quality improvements and firms' improved ability to develop new product and service innovations. The metric we report here is similar in nature to that for product or service change and relates to the percentage of firms in each local area introducing new or significantly improved processes during the 2012 to 2014 period.

Overall, the proportion of firms reporting that they undertook process change is a little lower than that for product or service innovation (Figure 2). The geography of process innovation is more diverse than that of product and service innovation, however, with some of the leading areas in terms of product/service innovation performing less well on this benchmark (e.g. Oxfordshire, Greater Cambridge). There is, however, a positive correlation between product/service innovation and process change (0.28) but a stronger relationship between process change and collaboration (0.52).

**Table 10: Process innovation by local economic area
(% of firms)**

LEP	% firms		LEP	% firms	
Humber	26		Buckinghamshire	16	
Gloucestershire	23		York, North Yorks and East Riding	16	
Greater Lincolnshire	21		Black Country	15	
The Marches	21		Leeds City Region	15	
Worcestershire	20		Coventry and Warwickshire	15	
North East	19		Enterprise M3	14	
Liverpool City Region	19		Heart of the South West	14	
South East Midlands	19		Greater Manchester	14	
Northamptonshire	19		Derby, Derbyshire, Nottingham, Notts.	14	
Lancashire	18		Greater Birmingham and Solihull	13	
Sheffield City Region	18		Gtr Cambridge and Gtr Peterborough	13	
Cheshire and Warrington	18		London	12	
Stoke-on-Trent and Staffordshire	17		Hertfordshire	11	
Thames Valley Berkshire	17		South East	11	
Tees Valley	17		Dorset	10	
Solent	17		Coast to Capital	10	
Oxfordshire	16		Leicester and Leicestershire	10	
Cornwall and Isles of Scilly	16		West of England	9	
Swindon and Wiltshire	16		Cumbria	8	
New Anglia	16				

**Figure 10: Process innovation by local economic area
(% of innovating firms)**



5. CONCLUSIONS

Innovation is important as it both contributes to productivity and provides the basis for business growth through the development of new export market opportunities. Research has also linked innovation positively to resilience: innovating firms are more likely to be able to adjust when market conditions become more challenging. The benchmarks we report here, based on a new analysis of the UK Innovation Survey 2015, provide an indication of the distribution of innovation activity across local areas in England. For the first time, we report local benchmarks covering aspects of organisational and marketing innovation alongside more standard metrics relating to product and service innovation and collaboration.

Our analysis suggests three key results:

- Reflecting the results of our earlier analysis of the 2013 UK Innovation Survey, we find a concentration of relatively high levels of product and service innovation and new-to-the market innovation in an arc of local economic areas in the South and East Midlands and along the M4 corridor. Albeit with some variation, these areas are characterised by high proportions of innovating firms, a high incidence of new-to-the-market innovation, and relatively high levels of revenue from innovation. Outside this area, Cheshire and Warrington also performs well on a number of metrics.
- We observe a rather different geography in terms of process innovation with higher levels of process innovation activity in some Northern and peripheral areas where product/service innovation is less common.
- Our new benchmarks for organisational innovation also suggest a rather different geography to that of product/service and process innovation. Organisational innovation seems particularly prevalent in Cheshire and Warrington and in several more rural areas.

Our analysis highlights the diversity of innovation activity across the UK. Some local areas are marked by strengths in organisational innovation but weaker elsewhere; others exhibit higher levels of collaborative behaviour and R&D. Both suggests the value of differentiated local innovation strategies which can build on existing strengths and remedy weaknesses.

Two important caveats need to be borne in mind when considering these results. First, as mentioned previously, the level of innovative activity in a locality will depend both on the type of business activity in the area as well as the innovativeness of individual firms. High levels of innovative activity in Oxfordshire and Greater Cambridge and Peterborough will therefore reflect both factors.

Second, it is also important to remember that our benchmarks are based on survey data. This inevitably means that our results are subject to some measurement error although the general picture we observe in 2012 to 2014 is reassuringly similar to that for earlier periods. In future, if more precise local benchmarks are desired, larger surveys or different analytical approaches will be needed.

Finally, while our benchmarks provide an overview of the geography of innovation across England they also raise questions about ‘why’ this pattern

arises. Addressing this question is likely to require more detailed statistical and institutional analyses of the drivers of innovation at the local level. Only in this way will we be clear about the impact and effectiveness of different elements of the business eco-system on local innovation outcomes.

Annex 1: Methodological notes

The metrics reported here are derived primarily from the UK Innovation Survey (UKIS) wave 9 – UKIS 2015 - covering the period 2012 to 2014. The survey covered enterprises with 10 or more employees in sections C-K of the Standard Industrial Classification (SIC) 2007 and therefore omits primary sectors. The survey was conducted between February and November 2015 and valid responses were received from 15,091 enterprises across the UK, a response rate of 51 per cent¹.

Two main steps have been necessary to develop local innovation benchmarks from the original survey data file. First, postcodes on the UKIS are matched to the UK postcode directory in order to link individual observations to local areas. Benchmarks are reported for 39 local economic areas in England to allow comparability with our 2013 analysis.

Second, as the UKIS is a structured survey with higher sampling rates among larger firms it is also necessary to weight observations to ensure that the results are representative of each local area. To do this we profiled the population of firms in each local area using the 2015 Business Structures Database and then developed new weights to gross observations in each local area to the local firm population. Weights for each local economic area were developed to reflect three broad sectors and four enterprise size bands. Where firms were located in an area covered by more than one LEP they are included in the benchmark for each overlapping LEP.

Two further points are worth making in relation to the local innovation benchmarks presented here. This is secondary analysis – using the UKIS survey for a purpose for which it was not originally intended – and the results must therefore be considered in this light. In particular, the UKIS was originally structured to be representative of Government Office regions in England (rather than Local Economic Areas). We are therefore extending the use of the data beyond its original design in undertaking this analysis. Having said this, it turns out that (un-weighted) observation numbers for most LEAs (except some of the smaller rural LEAs) are reasonable and that the resulting weights are very similar across LEAs (see Table A1). Nonetheless the use of survey data suggests that all of our estimates are subject to sampling error and we report 95 per cent margins of error in Table A2 for each Local Economic Area and metric. Table A3 reports the correlations between metrics. Second, before release for publication, data have also been checked for ‘disclosure’, i.e. the ability of an interested party to identify any individual business from published data. This results in a small number of results which are unavailable particularly for rural LEAs where the number of firms undertaking innovation is relatively small.

¹ See Headline findings from the UK Innovation Survey 2015 available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/506953/bis-16-134-uk-innovation-survey-2015.pdf.

Data acknowledgement

The statistical data used here is from the Office of National Statistics (ONS) and is Crown copyright and reproduced with the permission of the controller of HMSO and Queens Printer for Scotland. The use of the ONS statistical data in this work does not imply the endorsement of the ONS in relation to the interpretation or analysis of the statistical data. The analysis upon which this paper is based uses research datasets which may not exactly reproduce National Statistics aggregates.

**Table A1: Unweighted sample numbers by Local Economic Area
(no of firms)**

Black Country	234	Leicester and Leicestershire	228
Buckinghamshire	134	Liverpool City Region	240
Cheshire and Warrington	213	London	2643
Coast to Capital	391	New Anglia	316
Cornwall and Isles of Scilly	131	North East	327
Coventry and Warwickshire	185	Northamptonshire	157
Cumbria	122	Oxfordshire	159
Derby, Derbyshire, Notts, Nottinghamshire	417	Sheffield City Region	243
Dorset	165	Solent	238
Enterprise M3	379	South East	860
Gloucestershire	152	South East Midlands	203
Greater Birmingham and Solihull	390	Stoke-on-Trent and Staffordshire	144
Greater Lincolnshire	208	Swindon and Wiltshire	139
Greater Manchester	589	Tees Valley	104
Gtr Cambridge and Gtr Peterborough	326	Thames Valley Berkshire	225
Heart of the South West	358	The Marches	141
Hertfordshire	275	West of England	244
Humber	137	Worcestershire	77
Lancashire	315	York, North Yorkshire and East Riding	88
Leeds City Region	637		

Source: UKIS 2015, ERC Analysis

Table A2: Margins of error by LEA and metric

	Business Practices	Work Org.	Market-ing	R&D	Design	Coop-eration	Product/Service Innov.	Radical Innov	Innov. Sales	Process innov
Black Country	5.9	5.1	4.7	4.9	4.4	5.6	5.3		5.4	4.7
Buckinghamshire	8.2	6.4	6.6	6.8	5.7	7.7	7.0	4.6	7.9	6.2
Cheshire and Warr.	6.6	6.1	6.0	6.3	5.4	6.5	5.9	3.5	6.3	5.2
Coast to Capital	4.6	4.1	4.0	3.9	3.5	4.4	4.0	3.1	4.6	3.0
Cornwall and Isles	7.8	7.8	7.1	7.2	5.6	8.3	7.9		8.0	6.4
Coventry etc.	6.7	6.2	5.7	6.2	5.0	6.2	6.4	4.6	7.2	5.1
Cumbria	7.7	7.5	6.6	5.8		7.4	6.6		8.7	4.8
Derby, Derbyshire,	4.4	3.5	3.5	4.0	3.0	4.2	3.7	2.2	4.0	3.3
Dorset	6.9	5.8	5.7	6.0	5.3	6.2	5.8		6.7	4.6
Enterprise M3	4.0	3.9	4.0	4.2	3.1	4.5	4.4	3.1	4.9	3.5
Gloucestershire	6.9	6.7	6.1	7.1		7.4	7.0	4.1	7.4	6.7
Greater Birmingham	4.6	3.9	3.6	3.2	3.3	4.3	4.2	2.5	4.5	3.4
Greater Cambridge	6.3	6.0	5.6	6.3	5.4	6.5	6.1	4.3	6.7	4.6
Greater Lincolnshire	3.5	3.5	2.7	3.0	2.4	3.6	3.0		3.7	3.3
Greater Manchester	4.9	4.2	4.0	4.2	3.7	4.8	4.3	3.0	5.0	3.8
Heart of the SW	4.7	3.7	3.8	3.7	3.0	4.0	3.9		4.3	3.6
Hertfordshire	5.0	4.7	4.3	4.7	4.0	5.1	5.1	3.9	5.5	3.8
Humber	7.3	7.6	6.0	6.6	6.1	8.2	6.9		4.8	7.4
Lancashire	4.8	4.4	4.0	4.3	3.3	4.8	4.4	2.9	5.1	4.3
Leeds City Region	3.5	3.2	2.9	3.3	2.7	3.6	3.3	2.0	3.6	2.8
Leicester	4.9	4.2	4.5	4.5	3.6	5.2	4.5	3.1	6.1	3.8
Liverpool City Region	5.9	4.9	4.6	5.4	3.8	5.5	5.4		6.1	5.0
London	1.7	1.6	1.5	1.5	1.3	1.6	1.5	1.0	1.8	1.2
New Anglia	5.3	4.3	4.2	4.4	3.6	4.7	4.7	3.1	5.1	4.1
North East	4.9	4.6	3.9	4.5	3.7	4.8	4.5	2.7	5.2	4.3
Northamptonshire	7.1	7.1	6.4	6.8	6.2	7.4	7.4	5.3	7.1	6.2
Oxfordshire	7.2	6.7	6.9	7.1	5.6	7.2	7.1	5.7	7.8	5.8
Sheffield City Region	5.9	5.3	4.7	4.9	4.3	5.5	5.2	3.2	5.4	4.9
Solent	5.5	4.9	4.9	4.9	4.7	5.3	5.1	3.7	6.1	4.8
South East	3.0	2.7	2.6	2.5	2.1	3.0	2.7	1.9	3.2	2.1
South East Midlands	6.5	6.1	5.5	6.0	5.5	6.4	6.6	4.7	6.5	5.4
Stoke-on-Trent	7.5	6.1	6.1	6.6	4.7	7.0	7.2	4.9	7.6	6.3
Swindon	7.4	6.2	5.3	6.2	5.2	6.3	7.0	4.2	7.7	6.1
Tees Valley	8.2	7.9	7.7	7.3	6.1	8.8	7.5		9.1	7.3
Thames Valley	5.9	5.8	5.3	5.5	4.9	5.8	5.5	4.2	6.4	5.0
The Marches	7.8	6.9	6.1	6.2	5.4	7.8	6.7	5.7	7.0	6.7
West of England	6.0	5.5	4.9	4.9	4.5	5.2	5.4	3.8	5.2	3.6
Worcestershire	10.5	8.4	8.8	8.9		9.5	8.9		10.4	9.0
York, North Yorks	9.2	9.0	8.0	8.4		9.1	8.7		9.8	7.6

Table A3: Correlations between metrics

	Business Practices	Work Org.	Marketing	R&D	Design	Cooperation	Product Innov.	Radical Innov	Innov. Sales	Process
Business practices	1.00									
Work Organisation	0.50	1.00								
Marketing	0.43	0.68	1.00							
R&D	0.35	0.67	0.78	1.00						
Design	0.50	0.83	0.67	0.68	1.00					
Cooperation	0.50	0.66	0.69	0.71	0.67	1.00				
Product/service innov	0.36	0.64	0.51	0.64	0.66	0.52	1.00			
Radical innovation	0.12	0.52	0.51	0.43	0.45	0.43	0.64	1.00		
Innovative sales	-0.20	0.20	0.45	0.45	0.20	0.13	0.26	0.36	1.00	
Process innovation	0.31	0.31	0.09	0.31	0.25	0.40	0.39	0.19	-0.03	1.00

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