The Power of Productivity

An Assessment of UK Firms and Factors Contributing to Productivity Enhancement

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Overview

The UK displays differing productivity across regions and lags all but one G7 country. This paper reviews available UK productivity data to present a backdrop of productivity in the UK and against G7 countries before depicting options to address firm-level productivity. The data depicts varied productivity results with some cities, counties and regions performing above or below the UK average. Following the presentation of available regional UK productivity results, subsequent sections in the paper address the opportunity to improve results at the firm-level: unlocking the power of productivity requires a more granular assessment at the level of the firm. Although local factors may influence some aspects of a firm's operation, ultimately, a firm's management practices are the key lever dictating its performance, irrespective of its location.[1] Figure 1 depicts the research approach utilised in this paper, with management practices integral to productivity enhancement, complemented by information and communications technology (ICT) and mobile technology, and flexible workforce practices.[2] Before these are explored, results from across the UK are presented to highlight the observed variability in productivity and the potential to improve this.

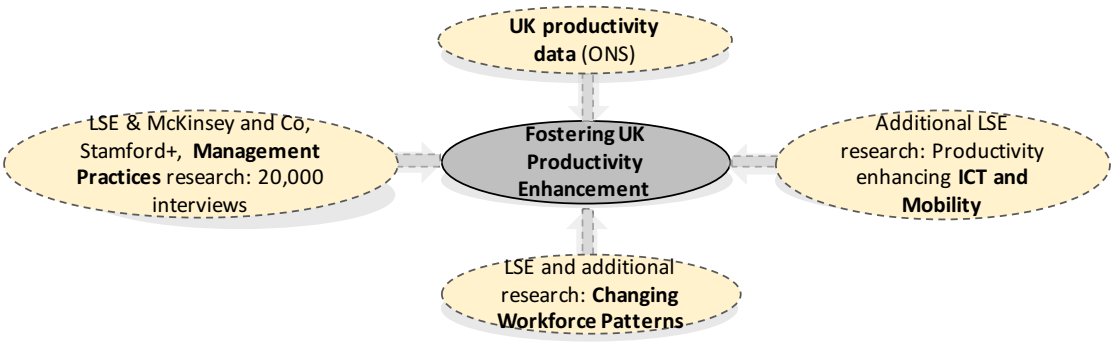


Figure 1: Research schema

Following this review, the role that management practices can play in firm-level productivity improvement is presented, drawing on over a decade of leading research by the LSE with McKinsey & Company, Stanford University, and more recently other participants, to assess management practices using a unique toolset developed and applied in 20,000 interviews with firm managers in 35 countries along with the analysis of firm accounts. Results have consistently shown a statistically significant correlation between good practices and firm performance: well-run companies are in general more productive, profitable, and have higher sales growth than those with inferior practices.[3] Utilising the conclusions reached from the extended management practices studies, three complementary threads have been included as facilitators to increasing a firm's performance: *management practices,* which represents the key enabling mode*; Information and Communications Technology (ICT)* and

[1] Bloom, N., Van Reenen, J. (2004). Management Practices, Work–Life Balance, and Productivity: A Review of Some Recent Evidence. Oxford Review of Economic Policy. Volume. 22 (4); pp: 457-482.

[2] Bloom, N et al. (2011). Management Practices Across Firms and Countries. Harvard Business Review. Working - Paper 12-052. December 09.

[3] Van Reenen, J et al. (2006) Management Practices, Work—Life Balance, and Productivity: A Review of Some Recent Evidence. Oxford Review of Economic Policy (Winter) 22 (4): pp: 457-482.

flexible workforce practices, that when combined with management practices can maximise potential productivity enhancement. This paper discusses how these elements can be applied more effectively by UK firms to optimise their productivity with the extended research confirming that it isn't *what* firms do that makes them productive; it's *how they do it:*[4] An approach for UK companies to assess their management practices, and how ICT can enable productivity to be 'unlocked', is provided.

Following a review of management practices, this paper addresses *flexible workforce practices* and the role that *technical factors* can play in unlocking productivity. The key conclusion summarized is that when supported by best management practices and enabling ICT, *flexible* work practices in the firm can result in greater employee well-being and motivation. This has been found to result in lower absenteeism and departures, which can reduce firm-costs: the estimated replacement cost of an employee in the UK is £30k, resulting in an annual cost to the economy of an estimated £4.1 billion.[5]

This report provides a starting point for identifying how the power of productivity can be unlocked in the firm. If undertaken successfully, 'the sum of the parts' can potentially result in a lift in productivity by as much as 20% [6] and in the process, result in better performing firms, content employees and regions with improved productivity. Although some operational improvements can be made faster, more structural results incorporating technological, organisational and workforce practices changes can take longer.

The key to unlocking the power of productivity most often already exists within the firm: finding it requires taking the first steps in this journey. The tools to enable better practices, appropriate technology adoption and flexible workforce engagement are all readily available. 'Time' may not be however.

[4] Ibid.
[5] http://www.hrreview.co.uk/hr-news/recruitment/it-costs-over-30k-to-replace-a-staff-member/50677
[6] Sadun, R., et al (2005). Information Technology and Productivity: It ain't what you do it's the way that you do I.T. EDS Innovation Research Programme Discussion Paper.

1. UK Productivity: Macro Environment and Regional Variations

1.1 What is Productivity?

Productivity indicates how well resources are being utilised.[7] It is commonly defined as *the ratio of a volume measure of output (goods and services) to a volume measure of input (labour and capital) used.*[8] Production measures *what* is produced whilst *productivity* is concerned with *how* it is produced.[9] The notion of productivity is a key driver of economic growth and competitiveness[10] providing essential performance measurement; international comparisons; the determination of capacity utilisation and living standards, and the forecasting of economic growth.[11] A country's ability to improve its standard of living over time depends largely on its ability to raise its output per worker.[12]

Labour productivity is one of the most widely used modes of productivity measurement. With labour costs comprising around two-thirds of the overall cost of production of UK economic output, this measure is an important indicator of economic performance.[13] Labour productivity measures output, as expressed in terms of Gross Domestic Product (GDP) Gross Value Added (GVA) (also known as 'whole economy output')[14] divided by labour inputs, utilising hours worked or employment level.[15] GVA is calculated using the *income approach,* and represents the total value of goods and services produced, minus the cost of producing those goods and services: it is a key component of GDP, reflecting the output of the economy.[16] At the overarching level, labour productivity can be expressed in equation form:

$$\textbf{Labour Productivity} \text{ (output per hour)} = \frac{\textbf{Output } \textit{[Gross Value Added (GVA)]}}{\textbf{Labour Input } \textit{[Total hours worked in the economy; workers, or jobs]}}$$

Figure 2: Labour productivity equation[17]

Numerous productivity indicators are compiled in the UK by the Office for National Statistics (ONS) across the three major sectors of *Production, Manufacturing* and *Services.* These include output per worker, output per job and hour worked, and GVA per job filled

[7] Koch, M.J., and and McGrath, R.G. (1996) Improving Labor Productivity: Human Resource Management Policies do Matter. *Strategic Management Journal*. Vol. 17, No. 5 (May); pp. 335-354.
[8] OECD (2001). Measuring productivity: OECD Manual. Measurement of aggregate and industry level growth https://www.oecd.org/std/productivity-stats/2352458.pdf
[9] Coelli, T.J, et al (2005) An Introduction to Efficiency and Productivity Analysis. Springer.
[10] Ibid.
[11] McCann, P. (2016). The UK Regional–National Economic Problem: Geography, globalization and governance. Routledge.
[12] House of Commons (2016). Productivity in the UK. Briefing Paper No 06492, May.
[13] ONS. Statistical Bulletin: Labour productivity Q2 2015. http://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/bulletins/labourproductivity/2015-10-01
[14] https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/bulletins/labourproductivity/jantomar2016
[15] Ibid.
[16] Department for Business Innovation and Skills (BIS) (2012). Commentary on Regional Economic Performance Indicators. September. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/16338/12-p162-commentary-on-regional-economic-performance-indicators.pdf
[17] ONS Statistical Bulletin. Regional Gross Value Added (Income Approach): December 2015. http://www.ons.gov.uk/economy/grossvalueaddedgva/bulletins/regionalgrossvalueaddedincomeapproach/december2015

and per hour worked. Unit labour costs are also collated as a marker of inflationary pressures in the economy.[18] Figure 3 depicts these labour productivity indicators.

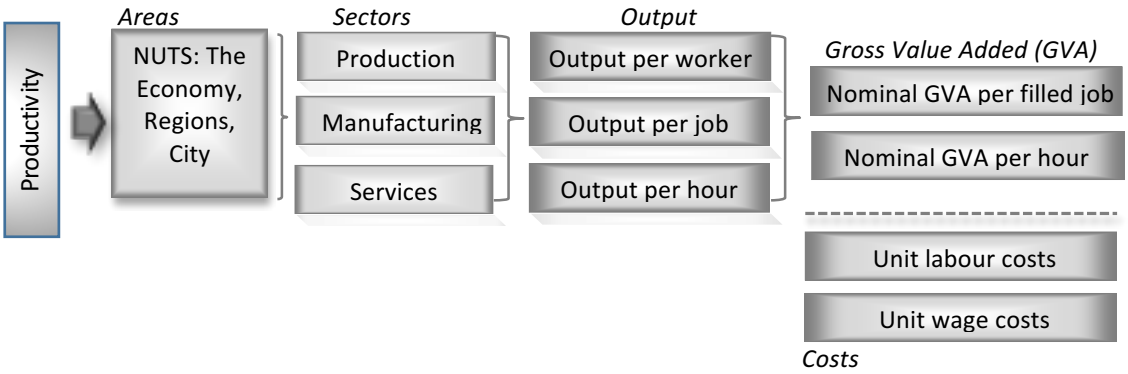


Figure 3: Major productivity categories for regional UK comparison

GVA per hour worked or GVA per job filled are the most relevant indicators when assessing regional economic performance. Of these measures, GVA per hour worked is recommended as it takes into consideration regional labour market structures and different working patterns, such as the mix of part-time and full-time workers, home workers and job shares.[19] This report utilises these two measures and others to outline productivity in the UK.

1.2 Measuring Productivity in the UK

Productivity indicators in the UK are compiled by the ONS using the Nomenclature of Territorial Units for Statistics (NUTS) and adopted throughout the EU since 2015.[20] This divides a country into NUTS segments, with population criteria defining the size of each. Four segments are utilised commencing at the macroeconomic level, denoted by NUTS-0, to NUTS-3, reflecting an individual city, with productivity data compiled for each of these by the ONS as depicted in Figure 4.

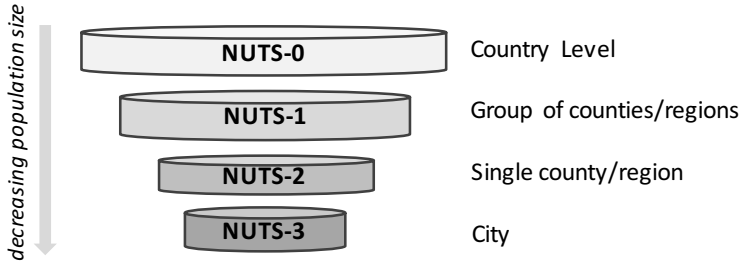


Figure 4: NUTS segmentation for productivity data
(Source: ONS)[21]

Thirteen NUTS-1,[22] 41 NUTS-2 and 169 NUTS-3[23] areas exist for the UK. The 13 NUTS-1 areas are depicted in Table 1.

[18] ONS Statistical Bulletin. Labour Productivity: Jan to Mar 2016. http://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/bulletins/labourproductivity/jantomar2016

[19] ONS. 2016. A Review of Regional and Sub-Regional Productivity Statistics. https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/articles/areviewofregionalandsubregionalproductivitystatistics/2016-04-06#note-on-gva-per-head

[20] https://www.destatis.de/Europa/EN/Methods/Classifications/OverviewClassification_NUTS.html

[21] Ibid

North East
North West
Yorkshire and the Humber
East Midlands
West Midlands
East of England
London
South East
South West
England
Wales
Scotland
Northern Ireland

Table 1: NUTS-1 areas in the UK
(Source: ONS)[24]

Table 2 provides an example of a NUTS-1 area cascaded into NUTS-2 and NUTS-3 areas as applied by the ONS to define regional productivity in the UK.

NUTS-Codes

Region	NUTS level	Code
United Kingdom	NUTS-0	UK
Yorkshire and the Humber	NUTS-1	UKE
West Yorkshire	NUTS-2	UKE4
Leeds	NUTS-3	UKE42

Table 2: Example of NUTS classification in the UK
(Source: ONS)[25]

This research examines NUTS-1-3 categories from the ONS to present regional productivity in the UK, as depicted in the methodology in figure 3 and summarised below in Figure 5.

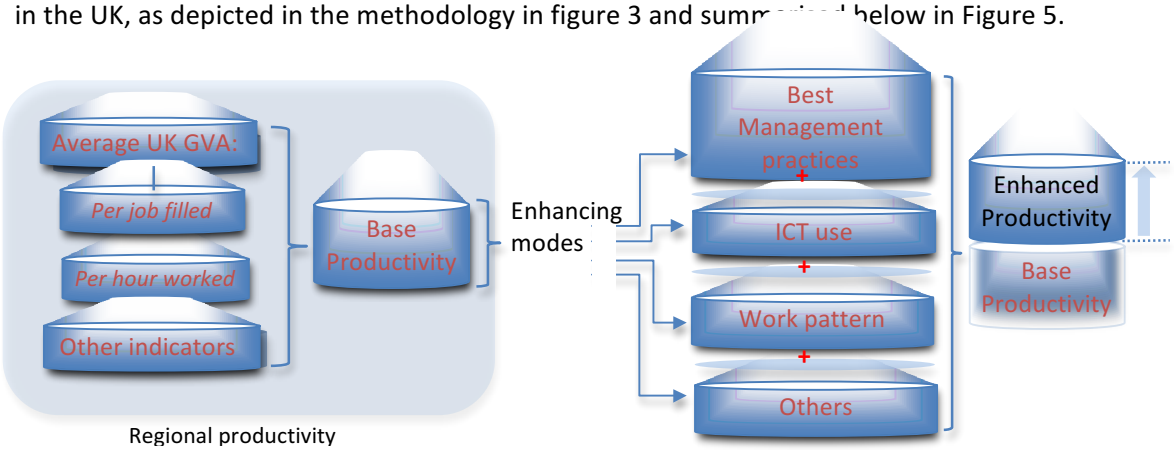


Figure 5: Regional productivity and enhancement modes

[22] ONS Dataset: Labour Productivity: Tables 1-10 and R1. https://www.ons.gov.uk/file?uri=/employmentandlabourmarket/peopleinwork/labourproductivity/datasets/labourproductivitytables110andr1/current/lprod01q12016unlinked.xls

[23] Subregional Productivity: Labour Productivity (GVA per hour worked and GVA per filled job) indices by UK NUTS2 and NUTS3 sub regions. https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/datasets/subregionalproductivitylabourproductivitygvaperhourworkedandgvaperfilledjobindicesbyuknuts2andnuts3subregions

[24] ONS Dataset: Labour Productivity. Op cit.

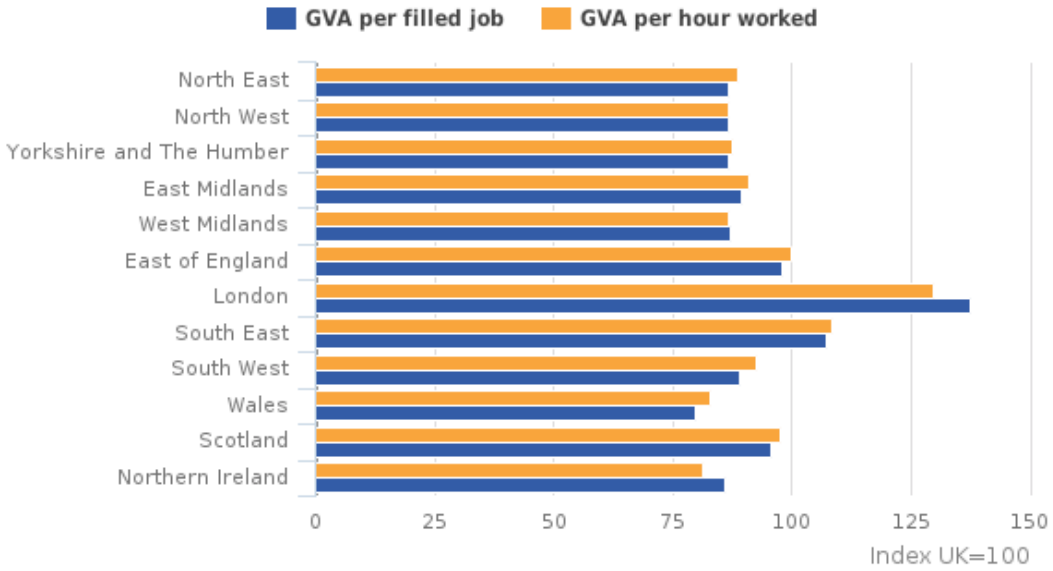
[25] Ibid.

Regional productivity data form the basis for the consolidation of LSE research and other research on productivity optimisation.

2. Regional Productivity in the UK

2.1 NUTS-1 (Regional areas/county groups) Level Productivity Variation

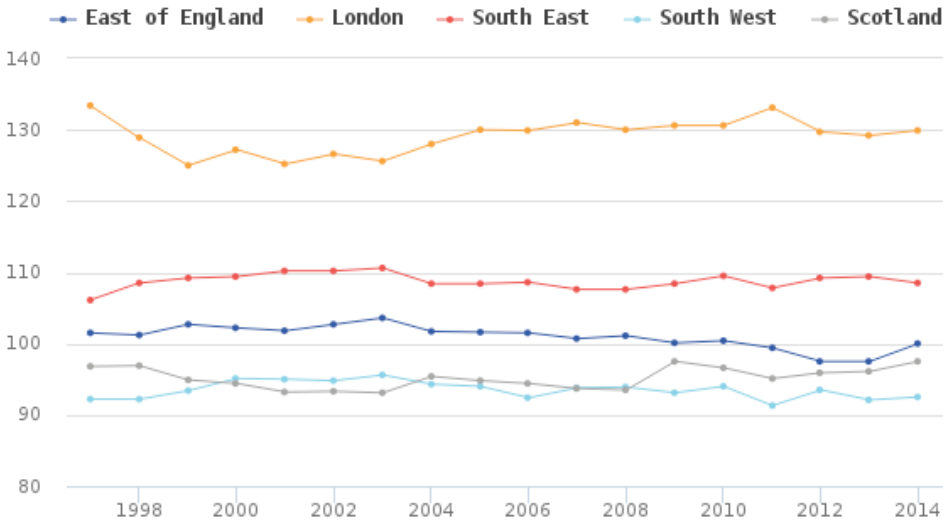
The UK displays regional variations in productivity.[26] At the NUTS-1 level (group of counties), this variation is evident when reviewing GVA per job filled and per hour, as presented in Graph 1 for the most recently available data in 2014.



Graph 1: Labour productivity by NUTS 1 region or country, 2014
Source: ONS[27]

GVA hours per filled job and per hour worked in 2014 were higher than the UK average in London (30% higher) and the South East (9% higher) and lower than the UK average in other areas.[28] In Wales and Northern Ireland productivity was 17% and 19% below the UK average respectively, whilst in Scotland, productivity was 2% below the UK average. The remaining regions had productivity levels between 9 to 13% below the UK average.[29] The results are relatively constant over time, with Graph 2 depicting productivity over a seven-year period from 2007-2014 for the most productive regions.

[26] Ibid.
[27] ONS. A Review of Regional and Sub-Regional Productivity Statistics. April 2016. https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/articles/areviewofregionalandsubregionalproductivitystatistics/2016-04-06#local-enterprise-partnerships-and-city-regions
[28] Ibid.
[29] Ibid.

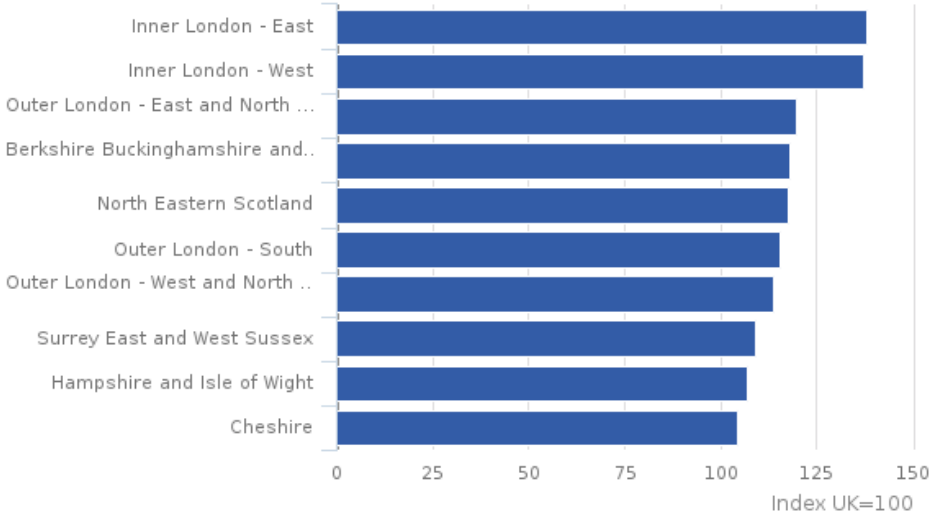


Graph 2: UK NUTS 1 regions and countries with highest GVA per hour worked, 1997 to 2014
Source: ONS[30]

The higher productivity growth of London was driven by a 38% increase in productivity hours, with its share of UK GVA increasing from 18.9% to 22.5% from 1997 to 2014.[31]

2.2 NUTS-2 (Single counties): Regional Variation

All five NUTS-2 regions in the Greater London area were among the 10 most productive in the UK in terms of GVA per hour worked, with productivity levels above the UK average. Inner London East showed the highest productivity level, with a GVA per hour worked around 38% higher than the UK average. This was followed by Inner London West with a marginally smaller productivity level. Only two other regions achieved GVA per hour worked above the UK average between 1997-2014: East of England and the South East. The variation between areas can be reviewed at the NUTS-2 level. Graph 3 reflects the GVA per hour worked for the top 10 areas in NUTS-2.

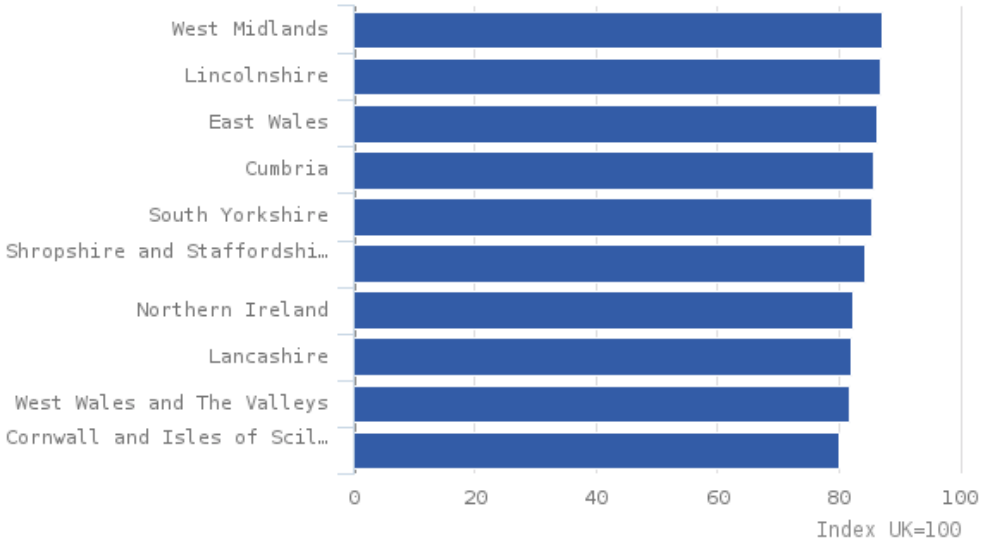


Graph 3: GVA per hour worked - highest ranking UK NUTS 2 sub-regions, 2014
Source: ONS[32]

[30] ONS. A Review of Regional and Sub-Regional Productivity Statistics. April 2016. https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/articles/areviewofregionalandsubregionalproductivitystatistics/2016-04-06#local-enterprise-partnerships-and-city-regions

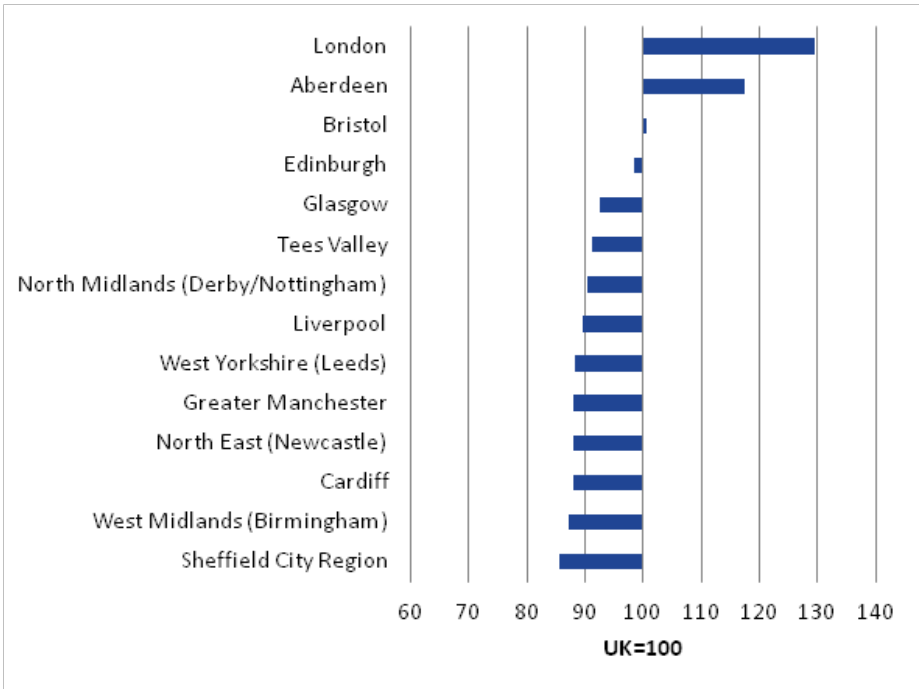
[31] Ibid.

In contrast, Graph 4 depicts the 10 NUTS-2 areas with the lowest productivity with this ranging from 12% to 20% lower than the national average.



Graph 4: GVA per hour worked - lowest ranking UK NUTS 2 sub-regions, 2014
Source: ONS[33]

Although the lower ranked areas are predominantly located in rural areas, urban areas are represented including South Yorkshire and West Midlands. Selected cities across the NUTS sub regions reinforce the disparate productivity picture for the UK, as depicted in Graph 5.



Graph 5: GVA per hour worked – Selected Cities 2014
Source: ONS[34]

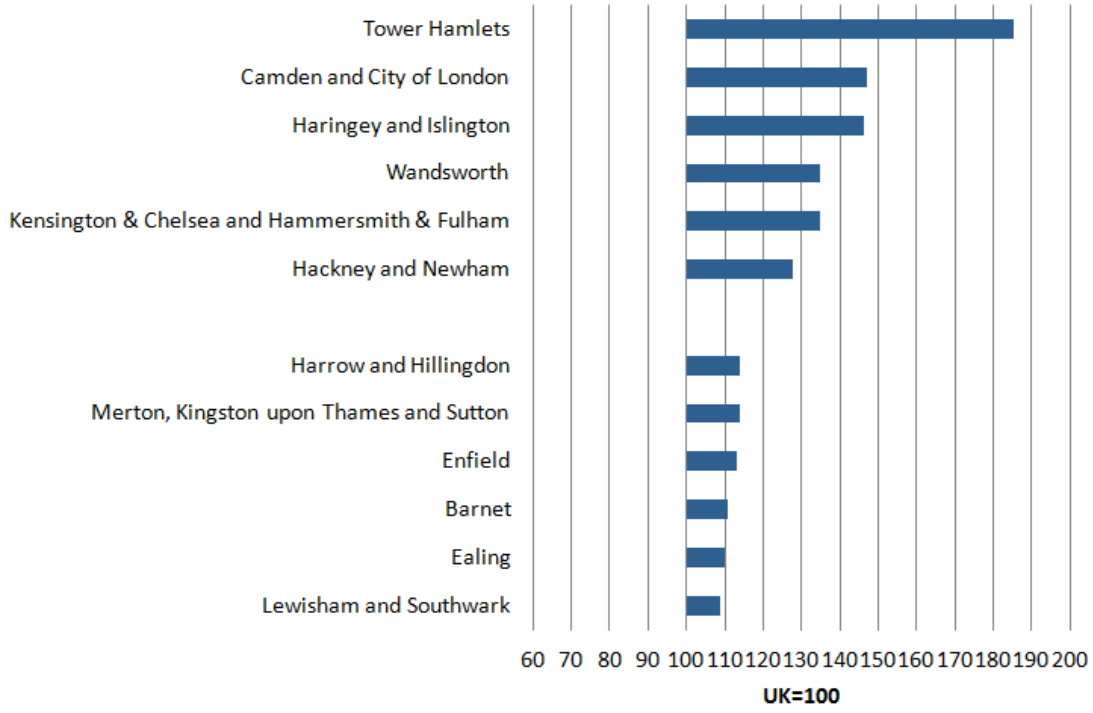
[32] ONS. A Review of Regional and Sub-Regional Productivity Statistics. April 2016. https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/articles/areviewofregionalandsubregionalproductivitystatistics/2016-04-06#local-enterprise-partnerships-and-city-regions

[33] ONS. A Review of Regional and Sub-Regional Productivity Statistics. April 2016. https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/articles/areviewofregionalandsubregionalproductivitystatistics/2016-04-06#local-enterprise-partnerships-and-city-regions

London exhibits the highest labour productivity in the UK, at 30% above the national average in 2014, followed by Aberdeen with 17% higher than the national average and Bristol at around the national average. Other major cities display labour productivity 7-14% lower than the national average.

2.3 NUTS-3 (Cities) Regional Productivity: Getting Granular

Productivity measures at the most granular level are represented by NUTS-3 measures, with nominal GVA per hour worked utilised by the ONS for England, Scotland and Wales. For England, 4 regions are assessed: Greater London, South of England, Midlands, North of England. Graph 6 depicts the productivity for London, with all sub regions displaying productivity levels above the UK average. The most productive sub region was Tower Hamlets (which incorporates the Canary Wharf financial district), followed by Camden and the City of London, with productivity levels of 85% and 43% above the UK average respectively, with these two sub regions the most productive in the UK. From the total 168 NUTS-3 sub regions, 48 had a GVA per hour worked above the UK average, with just under 50% of this number located in London.

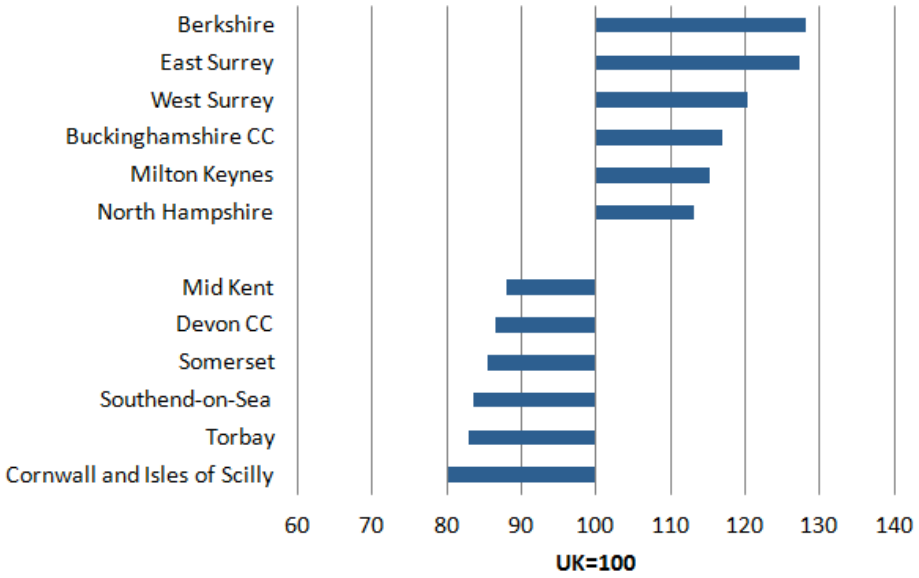


Graph 6: NUTS-3 GVA per hour worked London
Source: ONS[35]

[34] ONS. Sub-Regional Productivity March 2016. http://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/articles/subregionalproductivity/march2016

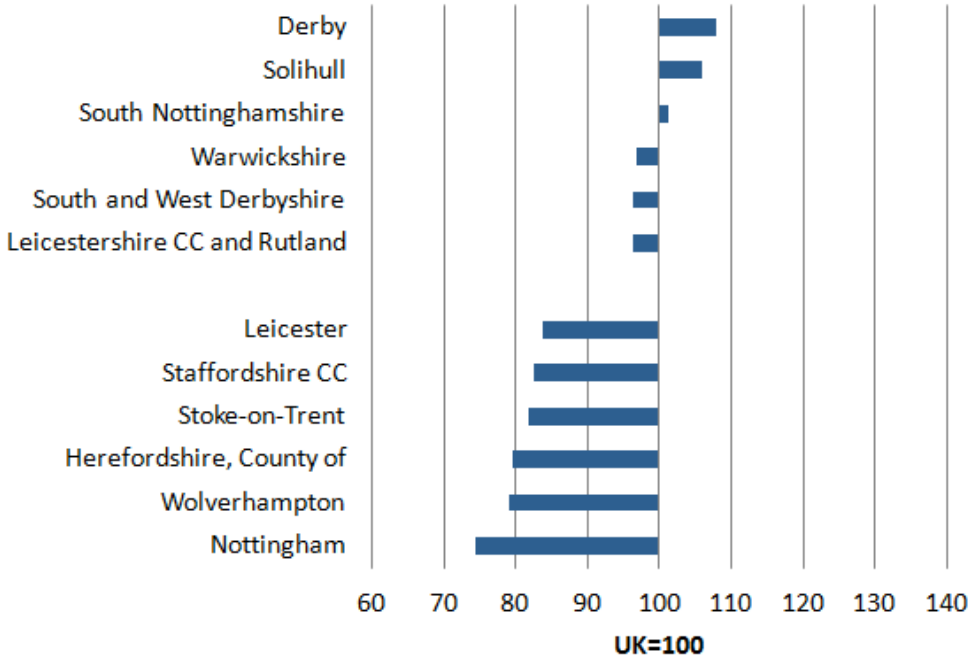
[35] ONS. Sub-Regional Productivity March 2016. http://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/articles/subregionalproductivity/march2016

The South of England displayed productivity levels that exceed the UK average for the majority of sub regions, as depicted in Graph 7.



Graph 7: NUTS-3 GVA per hour worked South of England
Source: ONS[36]

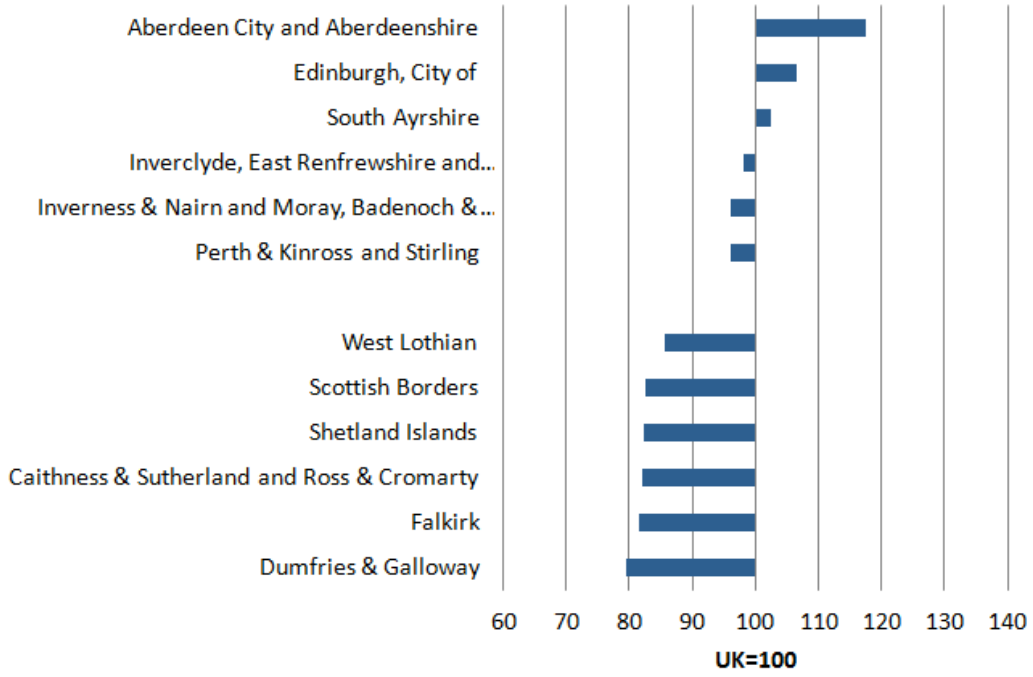
Almost 40% of the sub regions (6 regions) exceeded the UK average for productivity, with the lowest level of productivity concentrated in Cornwall and the Isles of Scilly, marginally ahead of Torbay and Southend on Sea. In contrast, the Midlands has three sub regions with productivity greater than the UK average as depicted in Graph 8.



Graph 8: NUTS-3 GVA per hour worked North of England
Source: ONS[37]

[36] ONS. Sub-Regional Productivity March 2016. http://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/articles/subregionalproductivity/march2016

Only three sub regions display productivity above the UK average: Derby, Solihull and South Nottinghamshire, at 8%, 6% and 2% respectively. The distribution of sub regions registering productivity of between 25% lower than the UK average was similar to the distribution for the South of England. A marginally higher proportion depicted a lower productivity than the South of England. This trend was also mirrored in the productivity of Scotland, with only three sub regions displaying productivity above the UK average for Aberdeen City and Aberdeenshire, Edinburgh and South Ayrshire of 17%, 5% and 3% respectively. Graph 9 depicts this distribution.

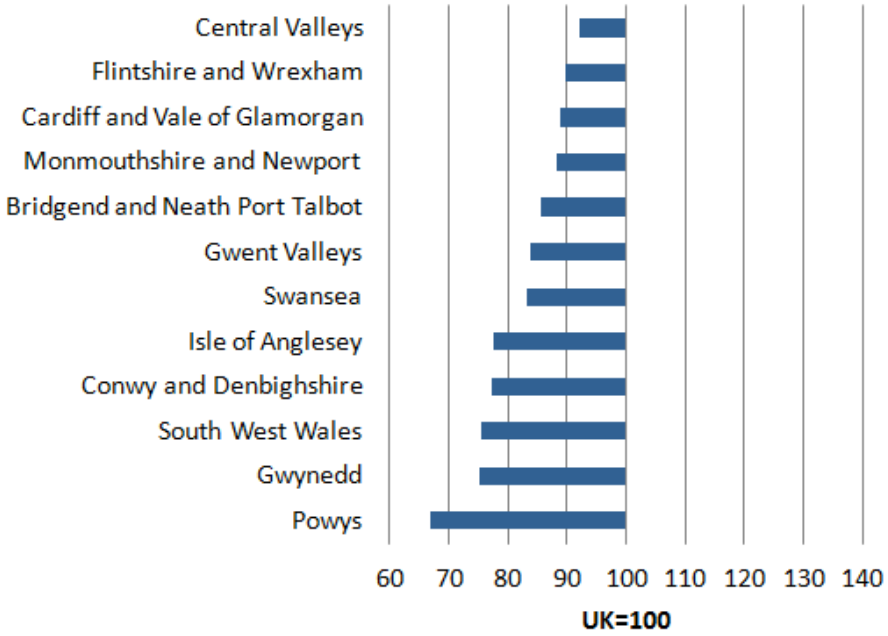


Graph 9: NUTS-3 GVA per hour worked North of Scotland
Source: ONS[38]

In contrast to all other NUTS-3 regions, Wales depicts productivity lower than the UK average for all sub regions, ranging from 8% lower for the Central Valley to 33% lower for Powys, as displayed in Graph 10.

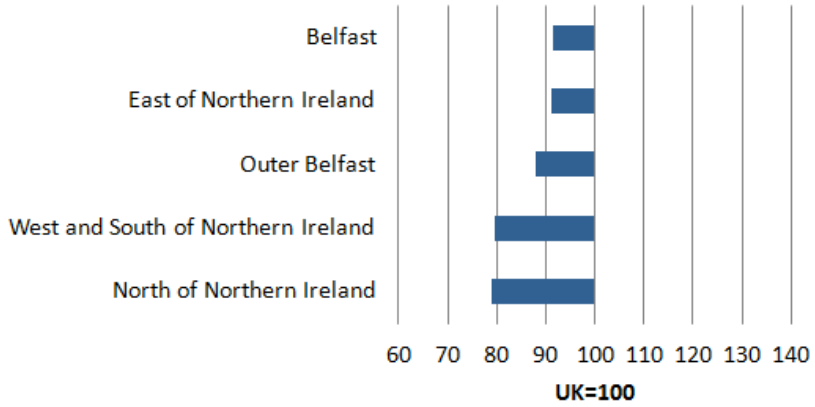
[37] ONS. Sub-Regional Productivity March 2016. http://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/articles/subregionalproductivity/march2016

[38] ONS. Sub-Regional Productivity March 2016. http://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/articles/subregionalproductivity/march2016



Graph 10: NUTS-3 GVA per hour worked North of Wales.
Source: ONS[39]

The final NUTS-3 region to be compared is Northern Ireland, with this area displaying a similar trend to Wales: all sub-regions displayed productivity levels lower than the UK average, as depicted in Graph 11.

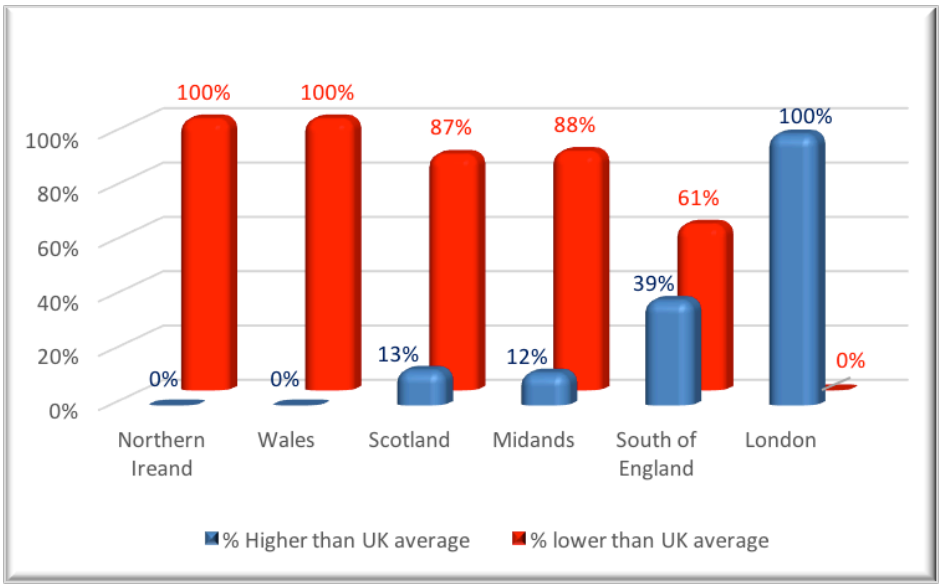


Graph 11: NUTS-3 GVA per job filled Ireland.
Source: ONS[40]

The most productive region in Northern Ireland was Belfast, which displayed productivity levels of 8% lower than the UK average, increasing to 20% lower for the North of Northern Ireland. A comparison of the NUTS-3 regions indicates the relative differences in productivity between regional areas for sub regions above and below the UK productivity average, as displayed in Graph 12.

[39] ONS. Sub-Regional Productivity March 2016. http://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/articles/subregionalproductivity/march2016

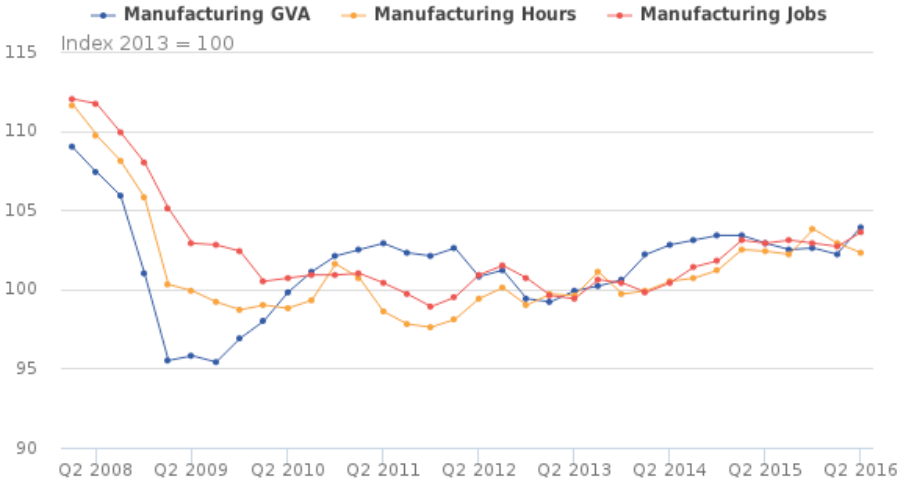
[40] ONS. Sub-Regional Productivity March 2016. http://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/articles/subregionalproductivity/march2016



Graph 12: NUTS-3 GVA per hour worked comparison: above and below UK average
Source: Research Team consolidation of data from ONS[41]

2.4 Manufacturing Versus Services Productivity

At an aggregate level, UK productivity varies between Manufacturing and Services. NUTS-3 provides blended data from both areas for GVA, hours worked and employment ('jobs'). In the case of manufacturing productivity, Graph 13 depicts the initial decline in productivity between 2008 and 2009. This situation had reversed by Q2 2011, when all sub-industries displayed positive results and productivity was 6.6% higher than in Q1 2008. A 'see-saw' has been observed since mid-2011 however, with rises and falls observed, with the latest data in 2016 indicating a rise in manufacturing jobs and GVA.

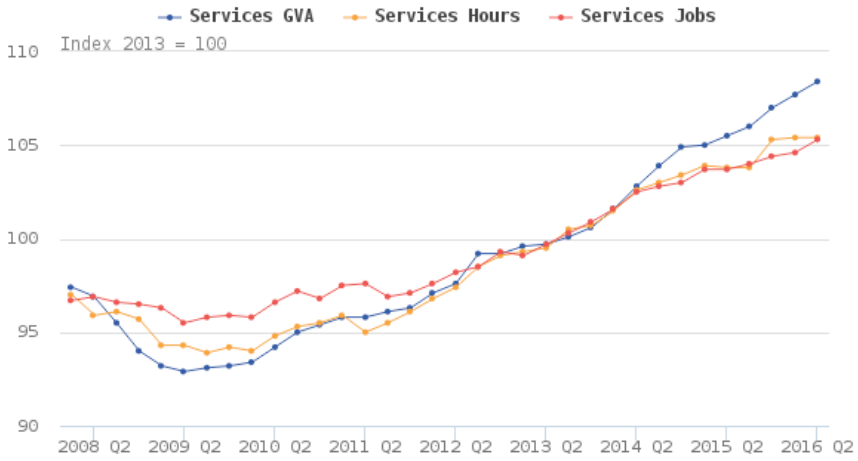


Graph 13: Manufacturing productivity measures
Source: ONS[42]

The same criteria are utilised to define productivity for Services, depicted in Graph 14.

[41] https://www.ons.gov.uk/methodology/geography/ukgeographies/eurostat#relationship-of-nuts-areas-to-uk-administrative-geographies

[42] https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/bulletins/labourproductivity/aprtojune2016#manufacturing-labour-productivity-measures

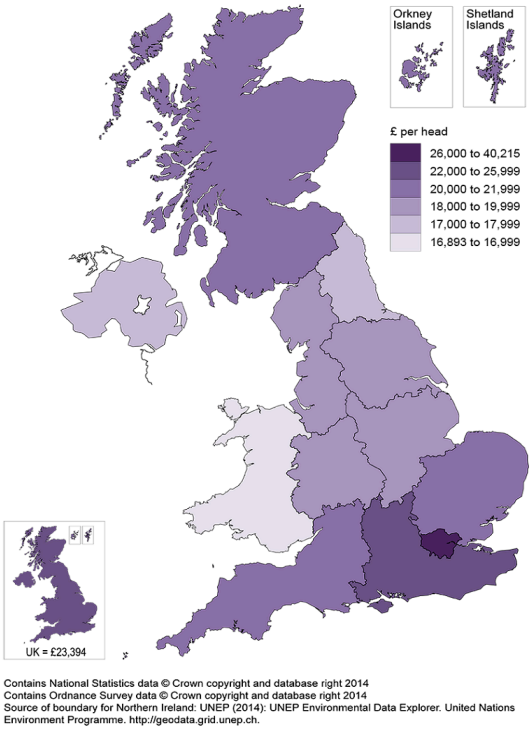


Graph 14: Services productivity measures
Source: ONS[43]

Productivity has improved in Services across all three indicators, although these initially trended downwards between 2008-2009, before picking up in Q3. In 2015, growth occurred in these and eight of the 11 service industries the Government utilises for 'Services productivity', with an overall upturn occurring.

2.5 Comparing Regions of Different Size

GVA per head provides a comparison of results based on population. It divides GVA in millions (£) by the population of a region to give GVA per head in pounds. This provides a mode for comparing regions of different sizes but is not a measure of regional productivity as this method utilises the entire population to derive GVA per head, including segments of the population who are not economically active. GVA per head provides an additional means of comparing regions of different size. Map 1 depicts the UK NUTS-1 GVA per region as segmented by the ONS. Regions in darker colour indicate higher GVA per head, with London indicating the highest share of GVA per head, at over 22%, followed by the South East at almost 15%, and the lowest share from Northern Ireland at just over 2 %.[44]



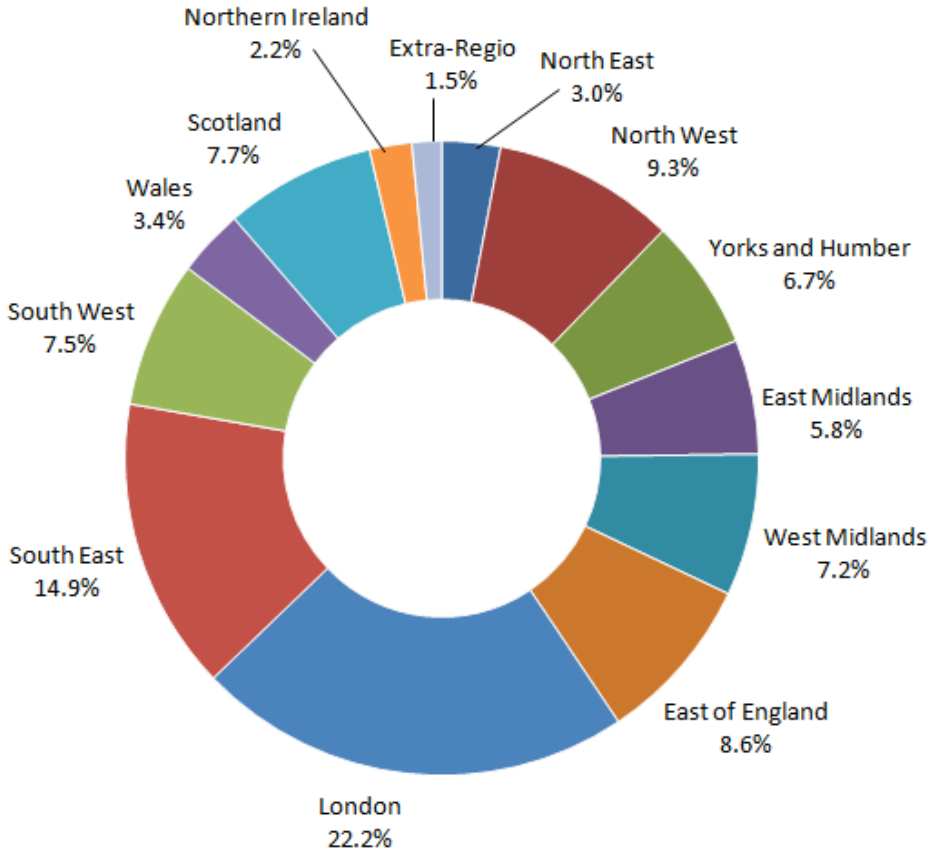
Map 1: Regional GVA per head by NUTS1 2013 (Source: ONS[45])

[43] https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/bulletins/labourproductivity/aprtojune2016#manufacturing-labour-productivity-measures
[44] Regional Gross Value Added (Income Approach): December 2015

The map indicates that a concentration of higher GVA per head exists in the South, with this decreasing in some Northern areas. Key regional GVA per head indicators are:

- London's GVA per head was £42,666 in 2014: the highest in the UK.
- Wales' GVA per head was £17.573: the lowest in the UK.
- Greater London displayed the highest GVA per head growth rates, at 7.4%.
- Only one UK region displayed a decrease in GVA per head in 2014: Cornwall and Isles of Scilly with 0.1% fall.

Graph 15 summarises the proportion of GVA per head by region of the UK total.

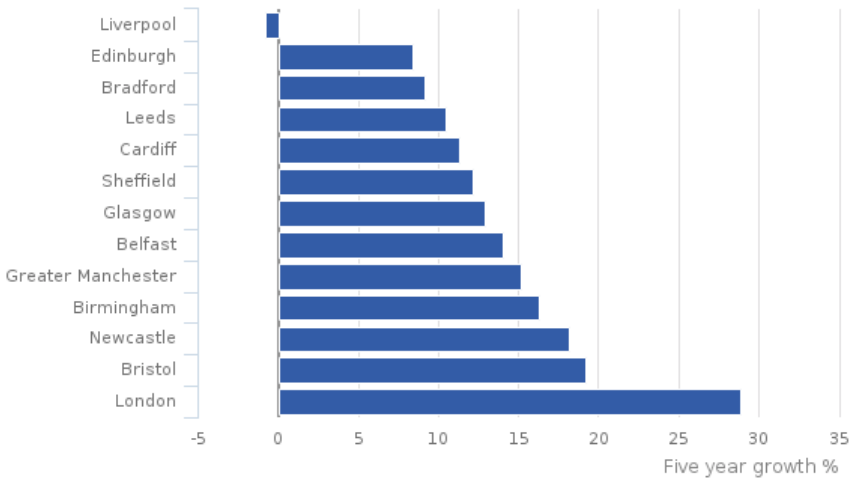


Graph 15: NUTS1 percentage share of UK GVA, 2013
Source: ONS[46]

2.6 Growth in Productivity across the UK: Regional Variation by Major Cities

Productivity change has shown a mixed picture across the UK. Between 2009-2014 total GVA grew for all major capital cities except for Liverpool. Graph 16 depicts the total GVA for 13 major capital cities across UK regions.

[45]ONS (2014): Regional Gross Value Added. http://www.ons.gov.uk/economy/grossvalueaddedgva/bulletins/regionalgrossvalueaddedincomeapproach/2014-12-10
[46]Ibid



Graph 16: Major capital city GVA growth 2009-2014
Source: ONS[47]

London has led the productivity growth, with around 28% growth, followed by Bristol with 18%; Newcastle with 17%, and Edinburgh with 8%. Growth for each of these regions was driven by varying sub-industries and their relative net growth with some variations observed as some sub-segments contracted, but with others growing at a greater rate, resulting in an overall positive growth in productivity. Table 3 summarises the major sub-industries and the contributing growth in each of the 13 major cities: 2009-2014.

Region	Growth 2009-2014 (%)	Industries
Liverpool	-0.8	Real Estate (41.7%); Information and Communication (39.5%). Manufacturing (-52.2%); Finance (-30.2%); Public Services (-8.4%).
Edinburgh	8.4	Recreation and Other Services (45.6%); Real Estate (36.8%); Professional and Business Support Services (24.2%); Finance (-12.5%); Mining and Utilities (-0.5%); Manufacturing (1.9%).
Bradford	9.2	Construction (35.3%); Mining and Utilities (25.3%); Real Estate (22.1%); Finance (-18.5%) and Distribution, Transport, Accommodation and Food (-4.4%).
Leeds	10.5	Real estate (35.7%); Professional and business support services (26.3%); Manufacturing (22.6%). Mining and utilities (-17.8%); Finance (-8.4%).
Cardiff	11.3	Real Estate (48.1%); Recreation and Other Services (46.7%); Relatively Small Agriculture Industry (75.0%). Information and Communication (-7.2%) and Manufacturing (-4.3%); Public Services (2.4%).
Sheffield	12.2	Information and communication (55.2%); Distribution, transport, accommodation and food (29.3%); Construction (25.5%). Finance (-31.0%); Public services (0.5%); Recreation and other services (2.5%).
Glasgow	12.9	Real estate (38.8%); Finance (26.7%); Distribution, transport, accommodation and food (18.6%); Relatively Small Agriculture Industry (128.6%). Professional and Business Support Services (-1.6%).
Belfast	14.1	Mining and Utilities (82.8%); Recreation and Other Services (38.9%); Distribution, Transport, Accommodation and Food (35.5%); Construction (22.4%). Public services (2.0%); Manufacturing (2.8%) and Finance (2.8%), all of which failed to keep pace with inflation at 9.1%.
Greater Mar	15.2	Professional Services (52.8%); Real Estate (38.0%); Electricity and gas (54.0%); Entertainment and Recreation (38.6%). Finance (-4.7%); Information and Communication (5.9%); Public administration (4.6%); Education (3.2%).
Birmingham	16.3	Recreation (75%); Real Estate (40.4%); Professional and Business Services (27.9%); Construction (27.6%); Manufacturing (24.3%); Finance (-19.9%); Mining and Utilities (-8.0%)
Newcastle	18.2	Real estate (40.5%); Distribution, transport, accommodation and food (34.8%); Manufacturing (31.5%); Finance (2%). Mining and utilities (-54.2%).
Bristol	19.2	Manufacturing (81.0%); Real Estate (62.2%); Agriculture (37.5%); Construction (33.4%). Finance (-13.1%).
London	28.9	Real estate (81.7%); Accommodation & food service (45.5%); Business support services (42.9%); Construction (42.8%); Healthcare (6.3%).

Source: ONS, https://www.ons.gov.uk/economy/grossvalueaddedgva/articles/londonleadsukcitiesineconomicrecovery/2015-12-09

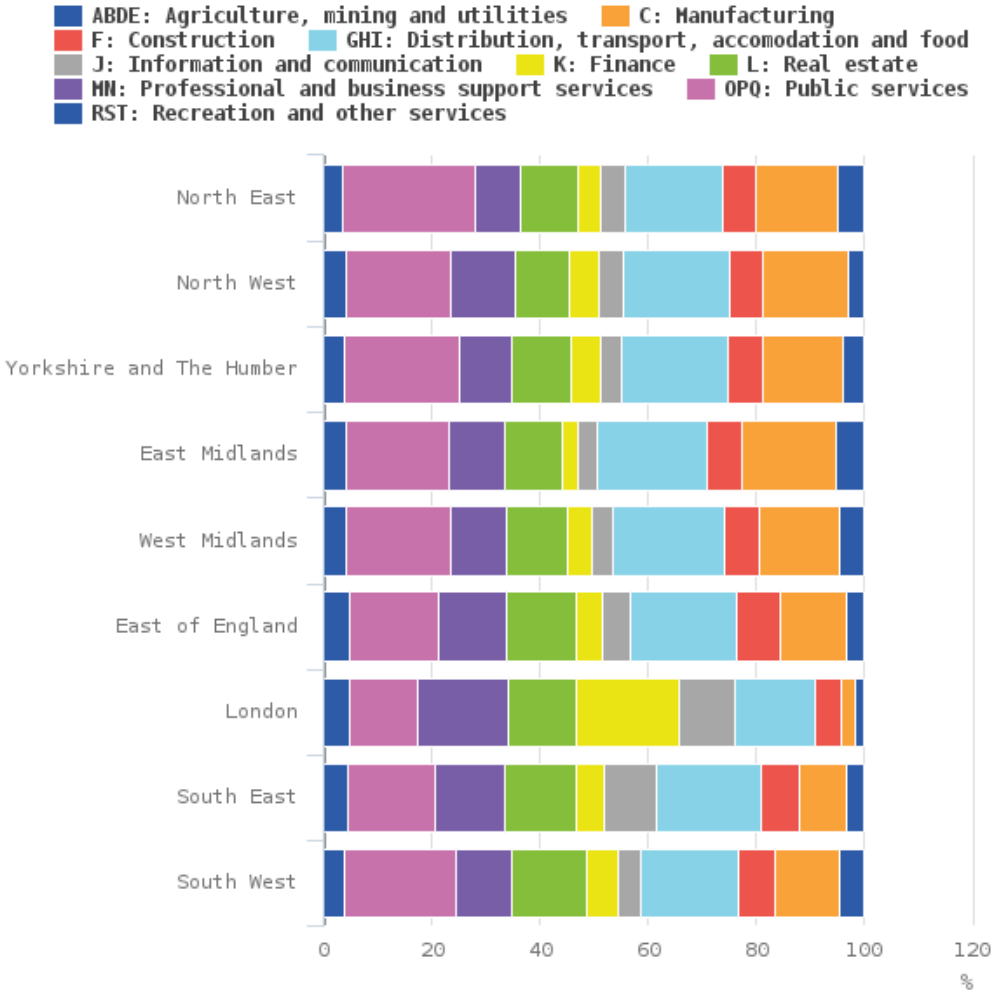
Table 3: Productivity growth by region and sub-industries

[47] http://www.ons.gov.uk/economy/grossvalueaddedgva/articles/londonleadsukcitiesineconomicrecovery/2015-12-09

The major capital cities' GVA reflects both local factors as well as national influences.[48] This theme will be explored in the subsequent section of this paper. Key variations between the regions include:

- London has the highest total GVA contribution from Finance of any region.
- London also has the highest contribution from Professional and Business Support Services, and Information and Communication, marginally ahead of the South East, but the lowest contribution from Manufacturing; Construction; Agriculture, Mining and Utilities, and Public Services, of any other region.
- The North East displayed the highest contribution from Public Services.

The productivity 'snapshot' provided by both the regional (NUTS-1) data and for the capital cities depicts the variation in total GVA. Considerable debate and research has occurred on the UK's productivity. This paper reviews contributing factors to productivity improvement from leading research from the LSE and other sources, to define options for best practices with some further discussion of further potential contributing factors to regional variations in productivity.

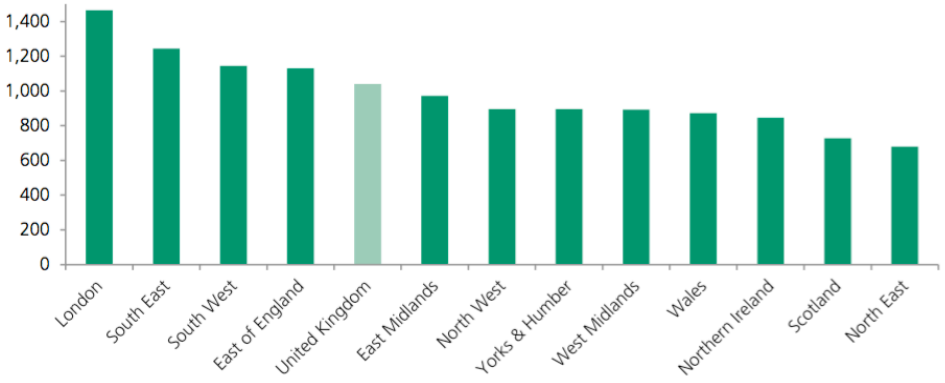


Graph 17: Composition of industries underpinning total GVA in NUTS-1 regions, 2014
Source: ONS[49]

[48] Body, M, et al., (2005). Regional productivity differentials: explaining the gap." *Discussion Papers* 515.

2.7 UK Business Distribution

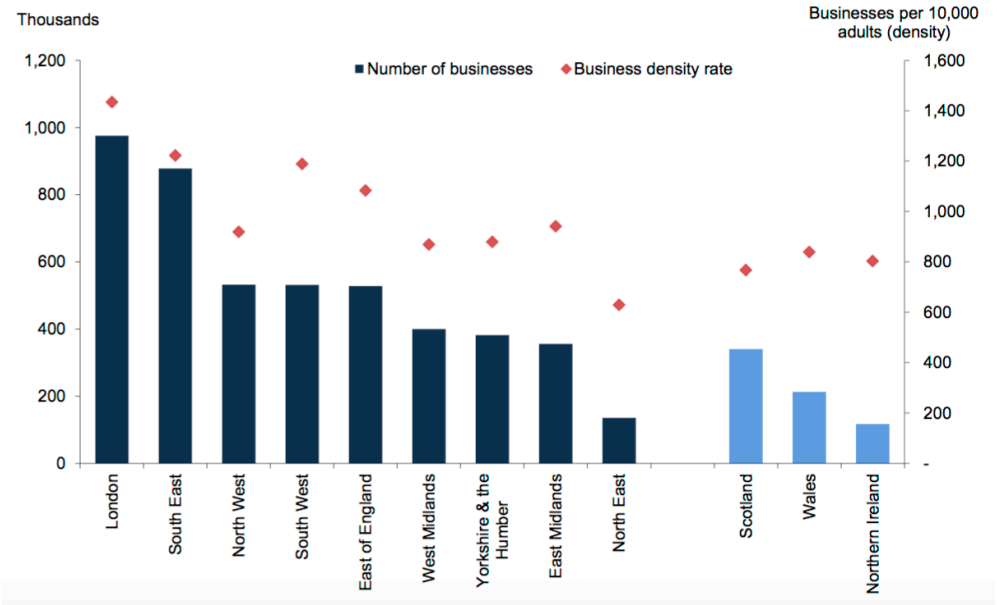
Small to medium enterprises (SMEs) account for 99.3% of all private sector businesses; employ 15.6 million people (60% of all private sector employment), and generate £1.8 trillion in revenues (47% of all private sector revenues).[50] In contrast, Medium UK business comprise 0.6% of the total number of business, and Large firms 0.1%, but they account for 12 and 40% of total employment respectively, and 14 and 53% of total turnover.[51] Graph 18 depicts UK businesses per head of population showing the uneven distribution across territories. London contains the highest density at 1,464 businesses per 10,000 residents, versus 679 businesses in the North East, the lowest density.



Graph 18: Number of businesses per 10,000 resident adults, 2016

Source: House of Commons Briefing Paper No 06152, 26 October 2016.

Graph 19 depicts the distribution of per capita businesses against the absolute number.



Graph 19. Number of businesses and business density rate in the private sector by English region and UK country (beginning of 2015)

Source: Department of Business Innovation and Skills. Statistical Release. Business Population Estimates 2015.[52]

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[49] ONS, (2015). Statistical Bulletin. Gross Value Added Income Approach, December.

[50] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/467443/bpe_2015_statistical_release.pdf

[51] Ibid.

[52] Ibid.

The distribution of firms is skewed to London and the South East; followed by a group comprising the North, South and East of England; a further group comprising West Midlands, Yorkshire and the Humber and East Midlands, and the North East. Several observations can be made from the regional productivity results: (i) lower productivity was observed in many of the regions with lower business density (GVA per hour worked) and vice versa; (ii) many of these regions display lower proximity to 'economic mass'. There is a potential to enhance productivity through reduced journey times:

1. Estimates indicate that a 10% reduction in average journey times throughout the UK could raise productivity by 1.12%.[53]
2. This ranges from a maximum of 2.22 for the East of England; 1.73% for West Midlands; 1.66% for East Midlands; 1.57 % for Wales; 1.55% for Scotland; 1.45% for Yorkshire and Humberside.

In contrast London would benefit by an estimated maximum 1.08% reflecting its already high density. The benefit is greatest where access to cities increases the most.[54] This raises socioeconomic considerations for long term infrastructure and transport investment.

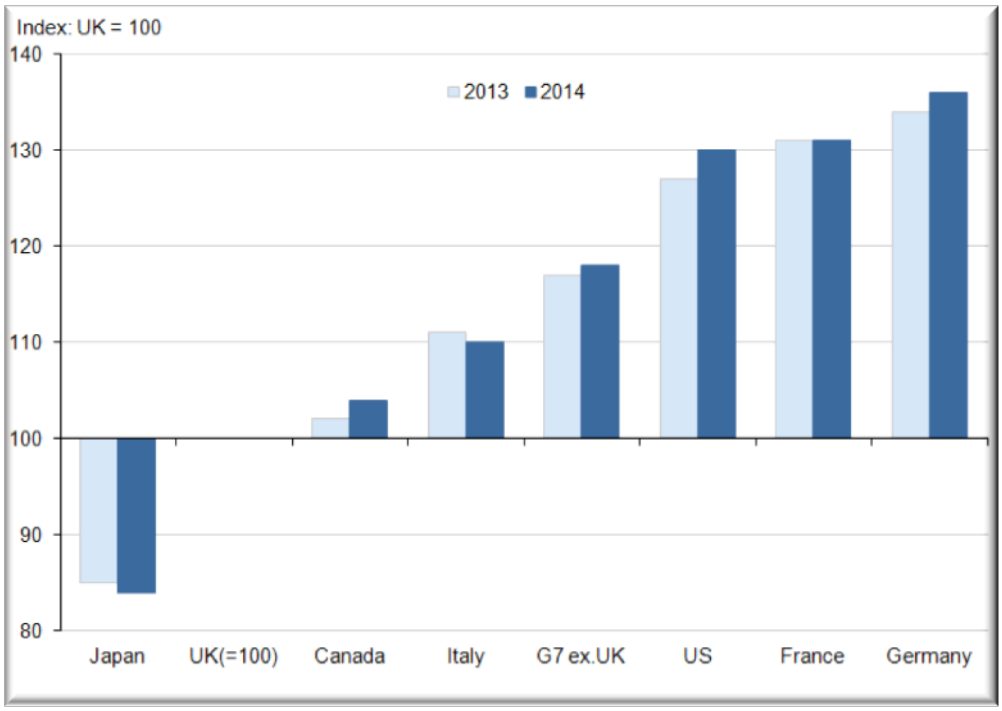
2.8 Productivity: How Does the UK Compare?

The global banking crisis of 2008 precipitated what has become known as the 'Great Recession' across developed countries. The UK's two decades of consistent economic growth leading up to this event were extinguished almost 'instantly', with output per hour staying 0.4% below the pre-recession level of 2007.[55] Labour productivity in the UK was 15-16% lower than where it would have been had the recession not occurred, equating to a productivity gap of around 6% for the rest of the G7 countries: Canada, France, Germany, Great Britain, Italy, Japan, and the United States.[56] Both output per hour and output per worker have not shown significant improvement since 2007, in contrast to the US, where they have grown and are around 7% higher than in 2007.[57] Only one third of the variation in labour productivity is suggested as being attributable to the reallocation of factors of production to more productive sectors, executed through the movement of labour and the entry and exit of firms.[58]

UK firms show a higher sensitivity to the availability of finance than firms in many other European countries:[59] An increased cost of finance can lead to the substitution of labour for capital, driving reduced labour productivity growth. Although this is a contributing factor to lower productivity, it is not the primary reason for this. *Firm behaviour* has been identified as the primary factor in contributing to lower productivity after the recession.[60] Post-

[53] Rice, P., and Venables, T., (2004) op cit.
[54] Ibid.
[55] Bryson, A., and Forth, J., (2015). The UK's Productivity Puzzle. Occasional Paper 45. Centre for Economic Performance. London School of Economics and Political Science.
[56] Ibid.
[57] Office for National Statistics (ONS). (2015). International Comparisons of Productivity: Final Estimates, 2013. ONS Statistical Bulletin. February.
[58] Bryson, A., and Forth, J (2015). Op cit.
[59] Bond, S., et al. (2003). Financial Factors and Investment in Belgium, France, Germany and the United Kingdom: A Comparison Using Company Panel Data. Review of Economic and Statistics. Vol. 85; pp. 153-165.
[60] Riley, R., et al. (2014). The Financial Crisis, Bank Lending and UK Productivity: Sectoral and Firm-level Evidence. National Institute Economic Review. No. 228: R17-R34.

recession 'cleansing' (the entry and exit of firms) has also not been found to be a primary contributing factor to lower productivity:[61] Evidence from Japan indicates that within-firm factors were the primary cause for weak productivity growth versus an absence of the cleansing effects of recession. Graph 20 provides a comparison of productivity measured by GDP per hours worked across G7 countries.

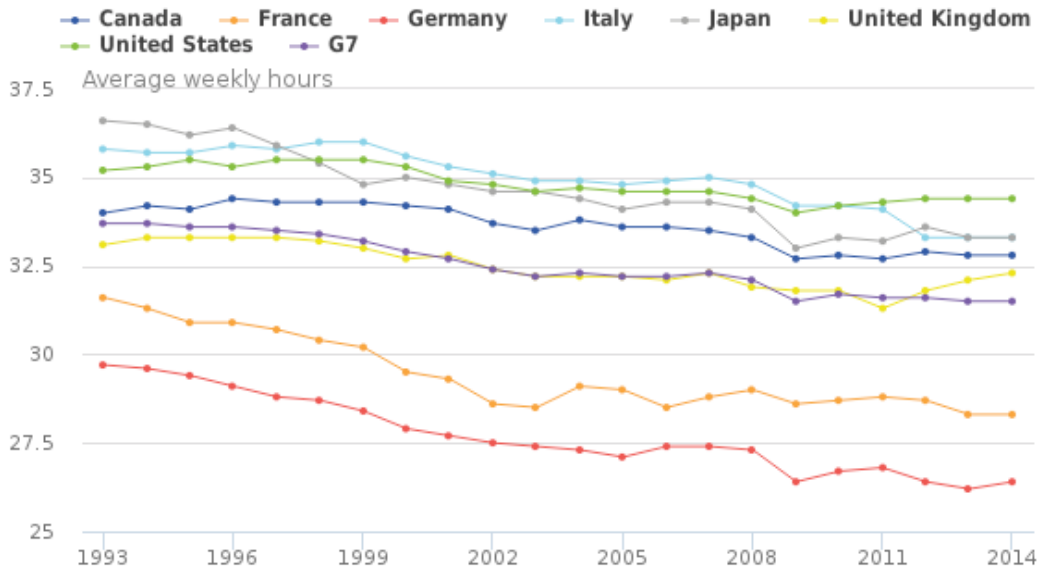


Graph 20 Comparison of GDP per hour worked between the UK and other G7 countries
Source: ONS[62]

The UK illustrates lower productivity than all countries except for Japan. It lags Germany by 36%, and the US and France by around 30%. It is also 10% lower than Italy and 4% lower than Canada. Graph 21 provides further data on the varying hours worked between countries.

[61] Griffin, N., and Odaki, K. (2009). Reallocation and productivity growth in Japan: Revisiting the lost decade of the 1990s. Journal of Productivity Analysis. V3; pp: 125-136.

[62] ONS. International Comparisons of Productivity - Final Estimates: 2014. http://www.ons.gov.uk/economy/economicoutputandproductivity/productivitymeasures/bulletins/internationalcomparisonsofproductivityfinalestimates/2014



Graph 21: Comparison of average weekly hours worked per G7 country
Source: ONS[63]

In 2014, US workers worked the most hours per week, followed by Japan, Canada, and the UK. An overall downwards trend can be observed across countries for hours worked, with the UK displaying a marginal rise. Compared with the G7 the UK:[64]

- has the second lowest GDP per hour worked;
- ranks second lowest for productivity growth since 2007;
- lags in productivity compared with the economies of the US, Germany, France and Italy in all *sub-sectors* and particularly in manufacturing;
- lags the productivity of France, Italy and the US in financial services;
- lags in in output per hour behind France, Germany and the US for private non-financial services.

An assessment of firm-specific factors can provide insight into elements that can improve productivity, with three areas that could contribute to this: (1) management practices; (2) use of technology; (3) flexible workforce practices.[65] In addition, research has indicated that some other contributing factors could also exist such as firm-location, but ultimately, a firm's management practices are the key lever to improving productivity.[66] These factors will be reviewed in this paper to identify areas that have the potential to improve a firm's productivity. Research has indicated that well-run firms perform better irrespective where they are located.[67]

[63] Ibid.
[64] Ibid.
[65] Bloom, N., and Van Reenen, N. (2007). Measuring and Explaining Management practices across firms and nations. Quarterly Journal of Economics. Vol: 122(4); pp: 1351-1408.
[66] Rice, P., and Venables, A.J., (2004). Spatial Determinants of Productivity: Analysis for the Regions of Great Britain. CEP Discussion Paper No 642. Centre for Economic Performance. London School of Economics and Political Science.
[67] Bloom et al, (2007). Op cit.

2.9 UK Regional Productivity Variations: Government Intervention Initiatives

The UK's disparate productivity performance between regions has been reviewed in UK Parliament[68] and been the subject of Government plans to address.[69] To stimulate productivity and attempt to create a more balanced scenario, 15 productivity-enhancing initiatives have been defined for the long term as well as the near term ('dynamic'):[70]

Long term investment:

(1) Cutting corporation tax to 18% by 2020
(2) Investment and savings incentives to stimulate business investment
(3) Upgrade UK skills, which have been identified as an area of weakness and impediment to productivity (see below)
(4) Improving access to universities to enhance skills and providing greater opportunity for institutions to define fees and other variables
(5) Addressing the transport system with additional investment in infrastructure and the appointment of additional individuals to oversee areas
(6) Create investment opportunities for low carbon-energy and review business and consumer energy bills
(7) Continue expansion of digital infrastructure with improved speeds to the consumer and for businesses including fixed and mobile
(8) Deliver £6.9 billion on science capital and establish commercialisation centres and foster university collaborative facilities

Dynamic Economy:

(9) Improving planning freedom to stimulate greater housing investment
(10) Reducing welfare cost and introduce higher pay
(11) Increase employment and reduce disability employment gap
(12) Continue to reform financial services through regulatory and industry engagement
(13) Open various markets up further through reduced administration
(14) Focus on stimulating exports further
(15) Rebalancing North-South economic imbalance through £13 billion investment in 'Northern Powerhouse'

Many of these initiatives seek to address several factors believed to contribute to regional productivity variations captured within NUTS-3 data.[71]

The variations in productivity across UK regions depicted in the earlier portion of this report could be driven by the three effects depicted in Figure 6.

[68] HM Treasury. Fixing the foundations: Creating a more prosperous nation. July 2015.
[69] House of Commons Business, Innovation and Skills Committee: The Government's Productivity Plan. Second Report of Session 2015–16.
[70] HM Treasury. Fixing the foundations: Creating a more prosperous nation. July 2015.
[71] Rice, P., and Venables, J. (2004). Op cit.

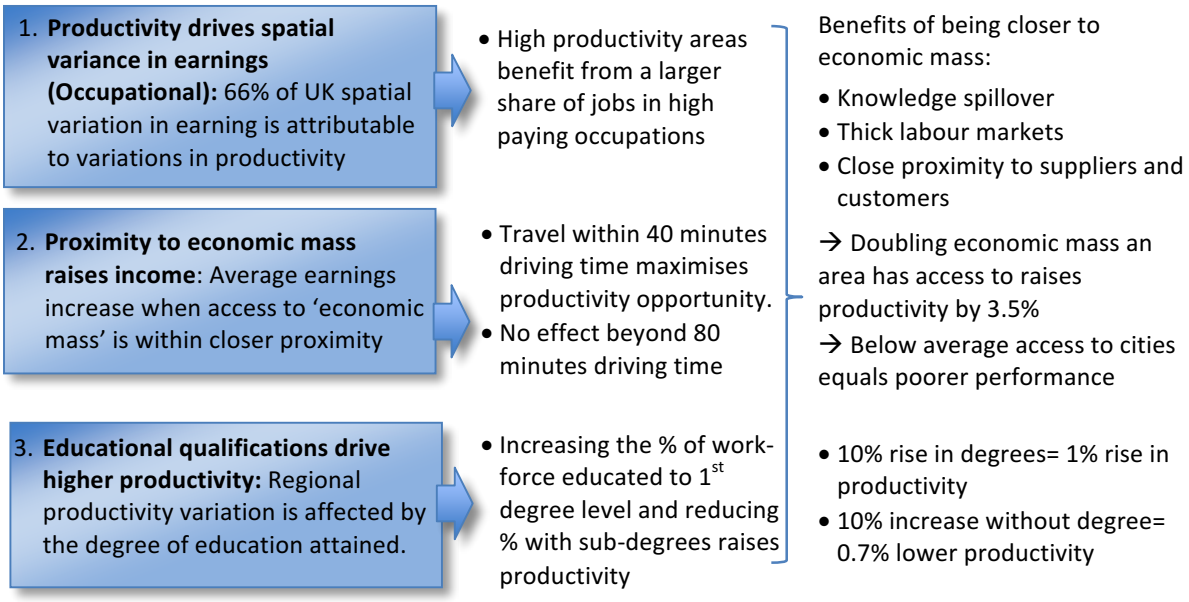


Figure 6: Effect contributing to regional productivity variations
Source: Rice, P., and Venables, (2004)[72]

The three effects depicted as potentially contributing to regional productivity variation include:

(1) Already productive areas influence earnings through the creation and attraction of higher paying jobs, often requiring greater skills and complexity- this creates further demand;
(2) Proximity to larger cities, or areas with a concentration of facilities ('economic mass') can raise income and productivity, with the density of activity having been shown to have a positive effect on productivity;
(3) The mix of education in the population, with a higher proportion of the working population having degrees increasing productivity.[73]

Research indicates that benefits also exist in firms being closer to 'clustered' cities, or locations of concentrated industries in terms of knowledge transfer between individuals and organisations to foster productivity and innovation.[74] Estimates are that a 10% reduction in average journey times in the UK could raise productivity by 1.2% to 2.4% depending on the density of the areas.[75] Below average access to cities has been estimated to be a contributing factor to the poorer performance of regions of Scotland, Wales, the South West and North East.[76] A trend towards more flexible working practices could assist in overcoming some challenges of distance, with some Government digital initiatives also aimed at upgrading digital skills.[77]

[72] Ibid.
[73] Ibid.
[74] Muro, M., and Katz, B., (2010). The New 'Cluster Moment': How Regional Innovation Clusters Can Foster the Next Economy, in *Entrepreneurship and Global Competitiveness in Regional Economies*; Chapter 5; pp:93-141. Emerald.
[75] Rice, P., and Venables, J. (2004). Op cit.
[76] Rice, P., and Venables, J. (2004). Productivity: understanding regional differences. CEP Discussion Paper 162. Centre for Economic Performance. London School of Economics and Political Science.
[77] http://www.gov.scot/Resource/0044/00448804.pdf

The options available to diminish some of the productivity variations highlighted are *structural* and potentially are affected by Government policies outlined in this section both for longer term growth and in a dynamic capacity. Managers dictate location and undertake recruitment to attain the required mix of skills and qualifications for the organisation, whilst individuals make choices on where to work, commuting, and the education they attain. Such decisions are often complex and ensconced within broader social, financial, and other considerations. Firms and individuals may directly factor mass proximity into their decisions or in other cases, this is a secondary factor.

3. Firm Specific Factors: Defining Granular Productivity Enhancing Opportunities

Firm-specific factors have been shown to enhance productivity.[78] Three areas have been reviewed in the last sections of this report, and the opportunities to enhance productivity presented, based on applied research that has occurred. In some cases, the results obtained have been statistically significant: adoption of attributes, such as good management practices, have shown a statistically significant correlation with firm performance.[79] In other words, *better performing firms are better run*. The three areas outlined in Figure 7 will be reviewed in the subsequent sections of this report to define opportunities that can enhance firm level productivity: management practices; changing workforce practices; ICT and mobility.

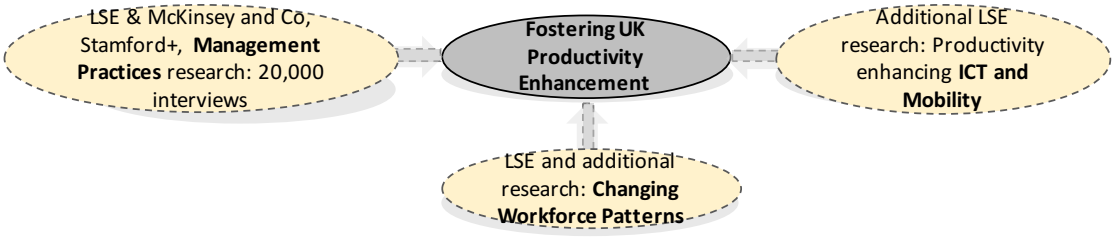


Figure 7: Reviewing firm-level areas to enhance productivity

Whilst a 'one size fits all' model for productivity enhancement does not exist, firms can adopt a range of practices and strategies that maximise the potential for success in their specific environment and competitive scenario.

4. Management Practices: The 'Lever' for Firm-Level Productivity Enhancement

4.1 Defining Management Practices

"Human factors are more likely to cause failure than hardware and software deficiencies."

Howland, 2000

The term 'management practices' lacks a concrete definition. The concept can best be reviewed as an amalgamation of its two principal parts:

> "Management":[80] *the process of leading and directing all or part of an organisation through the deployment and manipulation of resources.*
>
> "Practice":[81] *the actual application of a plan or method, as opposed to the theories relating to it*.

The notion of management practices is broad, but can, at a fundamental level, be defined as *what an organisation's managers do: how they plan, deliver, and utilise the firm's assets, both human and capital.* Managers are 'influencers' in the use of the firm's assets with research highlighting that, "top executives vary considerably in their management styles….raising questions as to why managers may behave so differently in apparently similar

[78] Ibid.
[79] Bloom, N., and Van Reenen, N. (2010). Why Do Management Practices Differ across Firms and Countries? Journal of Economic Perspectives. Vol: 24(1); pp: Pages 203–224.
[80] en.wikipedia.org/wiki/Management
[81] http://www.askoxford.com/concise_oed/practice?view=uk

economic environments."[82] Firms achieving better performance have been found to be better governed in general, with managers also often receiving higher compensation as an incentive to maximise performance.[83] The firm's CEO/Manager plays a crucial role in driving the firm's performance, strategy, and setting 'acceptable practices'.[84] No two managers are alike, with CEOs/Managers interpreting the same environment differently, and these interpretations leading to the development of specific policies and actions. These differences ultimately affect organisational performance.[85] Management practices are more than the attributes of top managers however; over time they form part of the organisational structure and behaviour of the firm and adopted in the organisation.[86]

Managerial practices can be *strategic* and include business plans; vision statements; memos; technology plans; memos and presentations (ibid), or they can be *operational.*[87] They can include a broad range of activities including: HR practices; Production practices; Financial practices; other functional practices (Marketing; Operational; others). Appropriate and well-executed practices are particularly relevant for UK managers considering slower growth in the UK - following the recent recession and the UK's lagging G7 position in productivity, as outlined in the previous sections of this report.

The ability of managers to embrace and adapt to new technology; engage in innovation, and address processes and elements, can improve their competitive position and productivity.[88] The main inhibitors for the exploitation of new technologies most often appear to be a lack of knowledge, poor management skills and qualifications for both entrepreneurs and employees.[89] Adopting best practices in the firm is arguably the most influential and relevant means of improving its productivity and positioning it for long-term success.[90] UK Regions reflect a heterogeneous mix of firms operating within each, representing the sectors defined earlier in this report. With UK productivity 18 % below the average of the other G7 countries, representing the largest productivity gap since 1991 when the ONS data series began[91], the adoption of best practices management could help to address this shortfall.

4.2 Establishing Best Practices

"A large number of firms are extremely badly managed with ineffective monitoring, targets and incentives. We present compelling evidence that better managerial practices are significantly associated with higher productivity."

Bloom et al, 2005.

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[82] Bertrand, M., and Schoar, A. (2003). Managing with Style: The Effect of Managers on Firm Policies. Quarterly Journal of Economics. Vol:118(4); pp: 1169-1208.
[83] Ibid.
[84] Lefebvre, L.A., Lefebvre, L., Mason, R., (1997). The Influence Prism in SMEs: The power of CEOs Perceptions on Technology Policy and Its Organisational Impacts, Management Science. Volume. 43(6)
[85] Ibid.
[86] Bloom, N., et al, (2005). Op cit.
[87] Suitaris, V. (2001). Strategic Influences of Technological Innovation in Greece. British Journal of Management. Volume12; pp: 131-147.
[88] Chesbrough, H. (2006). Open Business Models: How to Thrive In The New Innovation Landscape. HBS.
[89] Buhalis, D., Deimezi, Q., (2003). IT Penetration and E-commerce: Developments in Greece, Electronic Markets. Volume 13(4); pp309-324.
[90] Bloom, N., and Van Reenen, J. (2010). Why Do Management Practices Differ across Firms and Countries? The Journal of Economic Perspectives: Vol: 24(1); pp: 203-224.
[91] House of Commons Library, (2016). Productivity in the UK. Briefing Paper. Number 06492, October.

A gap existed in the definition and exploration of firm-level management practices that addressed the query: *does management matter?* Leading research, commenced in 2002[92], continues to assess this, with results confirming a statistically significant correlation between good management practices and firm performance with 20,000 interviews undertaken with firms in 35 countries in four sectors.[93] This utilised a toolkit to assess management practices across key areas that affect firm performance developed by McKinsey and Co for use exclusively in the LSE study. Additional studies were also undertaken on a smaller sample of firms via site visits and interviews of managers in Production, HR, Technology and shop-floor workers, to provide deeper investigations.

The results also indicated a statistically significant relationship between management practices and firm performance.[94] This dual approach and extensive work remain the only empirical investigation at this scale and breadth to assess key factors contributing to firm productivity.[95] These best practices are in general agnostic of firm location and can be applied across geographies and sectors.

4.3 Addressing Management Practices to Optimise Firm-Level Productivity

A firm's management practices drive the crafting and execution of strategies that can maximise productivity.[96] 'Bad practices' corrected can transform a business and escalate its productivity.[97] The applicability of the LSE-McKinsey research and its utilisation in over 20,000 instances in 35 countries is replete with examples of managers who have reviewed their business and improved performance by addressing four 'straightforward' practices in operations, performance, targets and talent:

- Operation Management*: How effectively have modern management techniques been introduced in the company: why were these modern processes introduced, for how long have these practices been in place, how are other departments of the company, outside of the company, involved in implementing these processes?*
- *Performance monitoring: How well does the performance monitoring system inform managers and their employees' of their day-to-day operations: how do processes and attitudes are screened, how meaningful are metrics in relation to how frequently they are measured and reviewed, to what degree the detection of different levels of process-based performance leads to adequate and consequential process?*
- *Target setting: How tightly are targets linked to the company's wider objectives: are targets covering a sufficiently broad set of metrics, how strongly are short and long term targets connected, how well are they cascaded down and clarified to workers?*

[92] This study is being undertaken by the LSE's Centre for Economic Performance, a leading interdisciplinary European economics research center, in collaboration with McKinsey and Co and remains the leading research on management practices at firm-level globally, commencing in 2002 and contributed to since that time both in expansion to 35 countries and in assessing firms from four sectors.
[93] Bloom, N., et al. (2005). Op Cit.
[94] Grous, A. (2011). Grous, A. (2011). LSE mimeo.
[95] The methodology, sample set, questionnaires and other elements are available at: http://worldmanagementsurvey.org
[96] Bender, S., et al. (2016). Management Practices, Workforce Selection and Productivity. CEP Discussion Paper No 1416. Centre for Economic Performance. London School of Economics and Political Science.
[97] https://hbr.org/2012/10/the-radical-beauty-of-three-si

- *Talent management*: *How are people managed: to what degree is people management emphasized within the company, how careful are hiring policies, how closely are pay and promotions linked to the ability and effort of employees, how are under-performers dealt with, and how are best-performers retained?*

A total of 18 sub-areas have been defined across these practices and provide the opportunity to review and address a firm's operation. The initial and predominant management practices approach that commenced over a decade ago has been developed to assess a manufacturing/production driven environment. This has also been adapted to cover *retail, hospitals* and *schools*. The fundamental four practices underpinning these are the same however, with variations occurring in the 18 sub-areas to adapt them for relevance. Table 4 defines the manufacturing/production focused approach to assess management practices that forms the core approach.

Manufacturing/Production Firm	
Operations Management	
Modern techniques	What modern or lean practices have been adopted? Best practices*: All major aspects of modern/lean manufacturing have been introduced (Just-in-time, automation, flexible manpower, support systems, attitudes and behaviour) in a formal way*
Rationale for adoption	What factors led to their adoption? Best practices: Modern (lean) manufacturing techniques were introduced to enable us to meet our business objectives (including costs)
Performance Monitoring	
Process documentation	How are problems exposed and corrected? Best practices: Exposing problems in a structured way is integral to individuals' responsibilities and resolution occurs as a part of normal business processes rather than by extraordinary effort/teams
Performance tracking	What kind of indicators are used for performance tracking? Best practices: Performance is continuously tracked and communicated, both formally and informally, to all staff using a range of visual management tools.
Performance review	How do you review these performance indicators? Best practices: Performance is continually reviewed, based on indicators tracked. All aspects are followed up ensure continuous improvement. Results are communicated to all staff
Performance dialogue	How do you review these performance indicators? Best practices: Regular review/performance conversations focus on problem solving and addressing root causes. Purpose, agenda and follow-up steps are clear to all. Meetings are an opportunity for constructive feedback and coaching.
Consequence management	What would happen if a follow up plan agreed during one of your meetings were not enacted? Best practices: A failure to achieve agreed targets drives retraining in identified areas of weakness or moving individuals to where their skills are appropriate
Target Setting	
Type of target	What targets are set for the company? Best practices: Goals are a balance of financial and non-financial targets.

	Senior managers believe the non-financial targets are often more inspiring and challenging than financials alone (e.g. 60% market share by 2003)
Interconnection of goals	What is the motivation behind your goals and how are they cascaded down to the individual workers? Best practices: Corporate goals focus on shareholder value. They increase in specificity as they cascade through business units ultimately defining individual performance expectations.
Time Horizon	What kind of time scale are you looking at with your targets? Are your goals set independently of each other? Best practices: Long term goals are translated into specific short term targets so that short term targets become a "staircase" to reach long term goals
Goals are stretching	How tough are your targets? Do you feel pushed by them? Best practices: Goals are genuinely demanding for all divisions. They are grounded in solid, solid economic rationale
Clarity of goals and measurement	If your staff were asked about individual targets, what would they say? Best practices: Long term goals are translated into specific short term targets so that short term targets become a "staircase" to reach long term goals
Talent Management	
Instilling a talent mindset	How do senior managers show that attracting and developing talent is a top priority in your company? Best practices: Senior managers are evaluated and held accountable on the strength of the talent pool they actively build
Building a high performance culture	How does your appraisal/reward system work? Best practices: We strive to outperform the competitors by providing ambitious stretch targets with clear performance related accountability and rewards
Making room for talent	If you had a worker who could or would not do his/her job what would the company do? Best practices: Long term goals are translated into specific short term targets so that short term targets become a "staircase" to reach long term goals
Developing talent	How would you identify and develop your star performers? Best practices: Long term goals are translated into specific short term targets so that short term targets become a "staircase" to reach long term goals
Creating a distinctive employee value proposition	What makes it distinctive to work at your company as opposed to your competitors? Best practices: We provide a unique value proposition to encourage talented people join our company above our competitors
Retaining talent	If you had a star performer who wanted to leave what would the company do? Best practices: We do whatever it takes to retain our talent.

Source: LSE-McKinsey Management Matters Survey. Also available online[98]

Table 4: Management practices check-list for manufacturing/production businesses

This approach is valid across organisational types including corporates, large firms, small to medium enterprises and has been tested across 20,000 interviews in multiple countries.

[98] http://worldmanagementsurvey.org/benchmark-your-organization/benchmark-your-manufacturing-firm/

4.4 Why Does Management Matter?

Identifying, correcting and utilising better management practices have been shown to be effective in improving firm performance.[99] Extensive research and the real-world application of principles to improve management practices since 2002 has confirmed the potential results available to firms that can manage better:[100]

- Defects reduced by 50%;
- Inventory reduced by 20%;
- Output raised by 10%;
- Firms that improve practices by 1 point in the review of their operations correlate with significant potential performance improvements:
  - 23% higher productivity
  - 14% higher market capitalisation
  - 1.4% higher annual sales growth rate

The improved results from enhanced management practices carry numerous organisational benefits:

- *Staff retention*: Rewarding and retaining good employees has a positive impact on the firm, with the average financial impact of the loss of an employee estimated to be £30k, comprised of a loss of output (£25k) and the logistical cost of absorbing a new worker (£5k).[101] Labour turnover was estimated to cost the UK economy £4.1bn in 2013.[102]
- *Inventory management*: Reducing the firm's inventory, accounts outstanding, and cash conversion cycle improves the firm's value and profitability.[103] Addressing practices surrounding this area can generate rapid results for the firm.
- *Faster and more accurate production:* Applying simple lean and modern streamlining principles and consolidating teams to improve local workflows can produce rapid gains within three weeks to two months. More complicated issues that require longer data collection and analysis can take six to eighteen months.[104] The benefits can be dramatic, with Ford in the US increasing productivity by 30% of front axles for its trucks and SUV's that resulted in an additional $2 billion in profit.[105]
- *Linking strategy with delivery.* A continuous review and improvement process to set appropriate targets and 'extend' the firm's managers and employees to deliver can sustain profitability and productivity.[106] Results have found that productivity is

[99] https://hbr.org/2012/10/the-radical-beauty-of-three-si
[100] Ibid.
[101] Oxford Economics-Unum. (2014). The Cost of Brain Drain.
[102] Ibid.
[103] Garcia-Turel, P., J., and Martinez-Solano, P. (2007). Effects of working capital management on SME profitability. International Journal of Managerial Finance. Vol: 3(2); pp.164 – 177.
[104] Taj S., and Berro, L. (2006). Application of constrained management and lean manufacturing in developing best practices for productivity improvement in an auto-assembly plant. International Journal of Productivity and Performance Management. Vol. 55(3/4); pp. 332–345.
[105] Robinson, R. (1999). Welcome to OR territory OR/MS Today. August; pp. 40-3.
[106] McAdam, R., and Bailie, B. (2002). Business performance measures and alignment impact on strategy. International Journal of Operations & Production Management. Vol: 22(9); pp. 972–996.

optimised when targets are explicitly included in strategic/business plans and utilised subsequently within the firm and linked back to this.[107]

A 'plan of action' of enhancing productivity by firms in the UK could include:

1. Review the management practices defined in this paper.
2. Use them as a guide to assess where the firm is positioned and consider options to address where practices appear to be divergent to this.
3. Undertake self-analysis based on these management practices with benchmarks and options to self-assess a firm's management practices. The 'World Management Survey' is the first cross-country, cross-industry dataset built to measure the quality of management practices in establishments. It assesses sub-themes for each practice and provides a score for the firm including feedback, to assist in identifying areas that could require focus.[108]
4. Use a secondary self-analysis tool such as the *Ready Business Indicator*, developed by Vodafone UK, to benchmark 'business readiness' in line with digital transformation and identify areas for potential focus.[109]
5. Address areas required with both firm resources and others where management requires additional expertise.

The above provides an expedient, tested approach to quickly addressing and quantifying the quality of firm practices. If utilised as a guide, benefits can accrue as has been shown on numerous occasions internationally.

4.5 Complacency is not an Option

Adopting best practices management should not be left to 'crisis' scenarios or when economic or other pressure occurs. Organisations need to periodically re-structure and re-align to respond to market changes: research indicates that organisations that believe that their current configuration will permit them to survive through any future scenarios are organisations that are unlikely to see the future. [110] Managers should never become so comfortable in accommodating their current external environment that they can't alter to respond to environmental changes.[111] Attempting to change too late can result in the firm's demise.[112]

Leading research across the EU has shown that current investment in a firm's innovations and IT will have a direct bearing on future competiveness: firms that are 'thrivers' are those that invest in best practices and IT throughout the business cycle.[113] In particular, firms that are constantly assessing their performance, their environment and forecasting future issues

[107] Ibid.
[108] http://worldmanagementsurvey.org/benchmark-your-organization/
[109] http://readybusiness.vodafone.co.uk
[110] Ulen, T. (2010) Responding to change: internal and external factors in organizational success. Journal of Institutional Economics. Vol: 6(1): pp: 133–137
[111] Ibid.
[112] Posner, R. (2004), *Catastrophe: Risk and Response*, New York: Oxford University Press.
[113] http://www.businesswire.com/news/home/20090901005446/en/Important-Research-Innovators-Beating-Recession-Pulling-Competitors

are those with the highest potential to survive.[114] 'Thrivers' are twice as likely to succeed in obtaining a fast ROI and reinvest cost savings into IT innovation and efficiency. Recessions and other external shocks present an opportunity, with these companies prepared in the face of downturns to respond and survive.

Results indicate that while 52% of these types of 'thriver' businesses may have been impacted by the recession, only 28% have observed a decrease in sales.[115] These types of businesses are much more likely to survive negative shocks and adverse conditions than those that are 'Hiders', that have not adjusted any key elements ahead of this, or 'Survivors'- firms that may make it through such conditions but cannot adjust to them long term and do not eventually survive.

UK businesses face continued challenges from a range of issues: EU-driven political and legal changes; economic conditions including any softening of demand; cyber-security and data-centric challenges; altering workforce practices; government legislation on pension and other workforce requirements; working cashflow and access to funds; and others. Firms whose managers are engaged in their business and continuously seek to maximise performance and productivity stand the highest chance of making it through negative cycles with the factors required to survive and prosper. Family owned firms have shown negative results in adjusting to changes compared to other firm types and with greater resistance to change and negative productivity: instilling best management practices and technology adoption in these firm types can have particularly positive potential benefits, but applies as a principal across all firm types.[116]

4.6 Managing for Growth

Best-practice facilitates management attention being targeted to key development activities across all business ownership types. Research indicated that the improvement of management practices was achieved by managers in several ways[117]:

- Firm managers working at capacity undertook a two-fold strategy: (1) delegated tasks initially and focused on firm expansion via exporting or nationally; and (2) after a further period, employed additional resources who undertook dedicated export duties or new channel and related opportunities, supported by the additional business growth;
- Sought export assistance from Government agencies about exporting;
- Partnered with additional organisations from the outset to distribute goods without further resource recruitment, with some additional duties being undertaken by firm managers and/or further delegation.

[114] Ibid.
[115] Ibid.
[116] Ward, J., L. (1997). Growing the Family Business: Special Challenges and Best Practices. Family Business Review. Vol: 10(4); pp: 323–337.
[117] LSE Research across 50 firms for Management Matters: 2009-2012.

5. Information and Communications Technology

"Business success increasingly depends on the organization's ability to fuse the power of IT into the fabric of business processes and business networks. The continuously growing importance of IT requires organisations to integrate IT decisions within their common planning and decision-making processes at all organizations levels."

Van der Zee and De Jong, (1999).[118]

5.1 ICT Adoption Factors

"Evidence has shown that effective deployment of ICT, or the failure to do so, are determinants of productivity growth far more important than ICT expenditure. In order to get the most out of their ICT, companies will have to make sophisticated use of ICT and manage the process of change required to embed technology in the company organisation."

Van Zoest, (2003).[119]

Information and Communications Technology ('ICT') has the potential to be a major transformative tool for productivity in the firm.[120] The relationship between ICT investment and firm performance can be complex and multifaceted, and moderated amongst other factors by company strategy and managerial practices.[121] Nine out of ten SMEs in OECD countries are equipped with computers and eight out of ten have Internet penetration.[122]

Access to and use of ICT can permit SMEs to become or remain profitable, exploit their intellectual property and empower their employees to utilise technology 'on the move' or with greater functionality than in the past.[123] SMEs with high productivity growth are more likely to adopt a greater numbers of advanced ICTs and for these to be used to foster innovation and productivity.[124] All three firm types utilise ICT to varying degrees, with a number of factors increasing as firm size increases: sophistication of technology utilised including security, infrastructure, functionality ; integration with Enterprise systems; analytics and reporting, and other attributes.[125]

As iterated throughout this paper, the key leverage to maximizing the power of ICT to foster productivity is *management practices:* whilst ICT and management practices are complementary, the latter is the lever for increases in productivity. Firms with better practices are more productive, profitable, and have higher sales growth than those with

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[118] Van der Zee, J.T.M. and De Jong, B. (1999). Alignment is not enough: integrating business and information technology with the balanced business scorecard. Journal of Management Information Systems. Volume 16(2); pp: 137–156.

[119] Van Zoest, A., (2000). UK Businesses and ICTs: Where is the Productivity Growth?

[120] Brynjolfsson, E., and Hitt, L. M. (2003). Computing Productivity: Firm-Level Evidence. MIT Sloan Working Paper 4210-01, Sloan School of Management, eBusiness@MIT Working Paper 139; June.

[121] Rondeau, P.J., et al. (2006). How involvement, IS management effectiveness, and end-user computing impact IS performance in manufacturing firms. Information & Management. Vol:43(1; pp 93-107.

[122] OECD (2004), ICT, E-Business and SMEs

[123] Stroeken, J. (2001). The adoption of IT by SMEs: The Dutch case. Journal of Enterprising Culture. Volume: 9(1); pp: 129-152.

[124] Higón, D., A., (2012). The impact of ICT on innovation activities: Evidence for UK SMEs. International Small Business Journal. Vol.30(6); pp.684-699.

[125] Hollenstein, H. (2004). Determinants of the adoption of Information and Communication Technologies (ICT): An empirical analysis based on firm-level data for the Swiss business sector. Structural Change and Economic Dynamics. Vol: 15(3); pp: 315–342.

'worse' practices.[126] Figure 8 depicts results indicating that ICT adopted with better management practices achieves 20% productivity improvement compared to only a 2% uplift when technology is adopted with poor practices.[127]

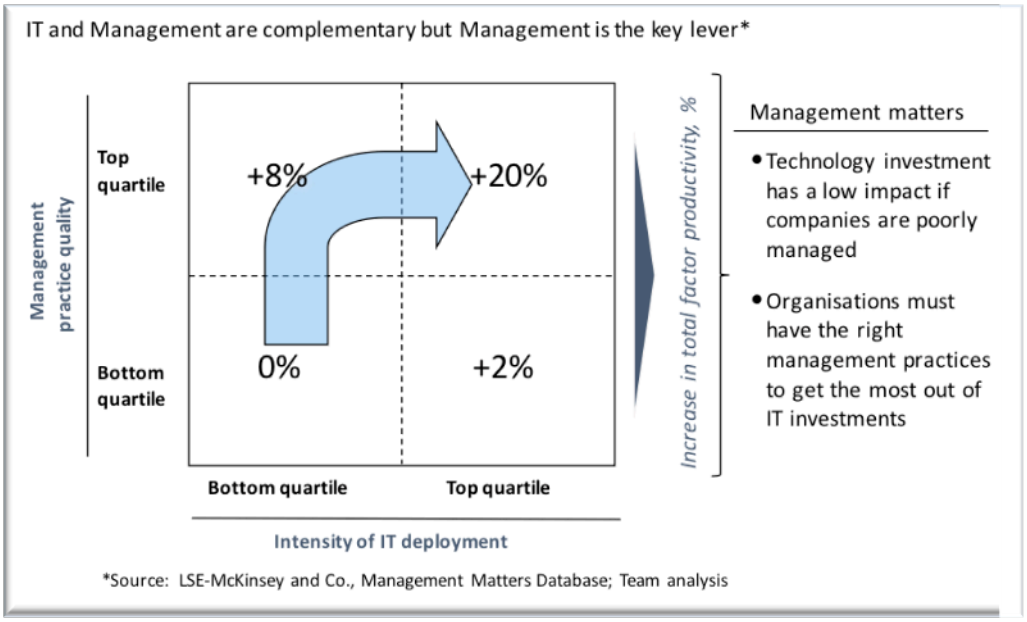

Figure 8: Management practices and ICT adoption complementarity

Firms which adopt organisational changes and introduce ICT display a higher frequency of productivity improvement and higher rates of innovation.[128] The adoption of ICT by firms has been linked to several benefits, enhanced when this occurs with good practices:[129]

- Productivity enhancement;[130]
- Greater innovation;[131]
- Process improvement;[132]
- Flexible organisational structures. [133]

Complementary investments in skills, organisational change and innovation are also viewed as instrumental in facilitating the successful use of ICT, and affecting firm performance.[134] Without these supporting elements, the economic impact of ICT may be limited.[135]

[126] Van Reenen, J et al. (2006) Management Practices, Work—Life Balance, and Productivity: A Review of Some Recent Evidence. Oxford Review of Economic Policy (Winter) 22 (4): pp: 457-482.
[127] Dorgan, S. J., and Dowdy, J. J. (2004). When IT Lifts Productivity. McKinsey Quarterly; 4.
[128] Brynjolfsson, E., and Hitt, L. (2000). Beyond Computation: Information Technology, Organization Transformation and Business Performance. Journal of Economic Perspectives; Vol: 14; pp: 23-48.
[129] Mundlak, Y. (1961). Empirical Production Function Free of Management Bias. Journal of Farm Economics. Volume 43(1); pp: 44-56.
[130] Morikawa, M. (2004). Information technology and the performance of Japanese SMEs. Small Business Economics. Vol: 23(3); pp: 171–177.
[131] Koellinger., P. (2008). The relationship between technology, innovation, and firm performance- Empirical evidence from e-business in Europe. Research Policy. Vol: 37; pp: 1317–1329.
[132] Ibid.
[133] Gera, S., and Gu, W., (2004). The effect of organisational innovation and information technology on firm performance. International Productivity Monitor; No. 9.
[134] James, J. A. Bhalla. (1994). Flexible Specialization, New Technologies and Future Industrialization in Developing Countries. Futures. July/August.
[135] OECD, (2004). The Economic Impact of ICT: Measurement, Evidence and Implications, Paris.

Ultimately, the key factor believed to affect technology adoption and productivity is 'managerial quality' delivered by both the CEO/Manager and middle managers, with practices forming part of the organisational structure and 'behaviour' of the firm that evolves over time with successive leaders.[136] Competition, organisational practices and other strategies influence the value of ICT investments and internal work organisation,[137] with ineffective monitoring, a lack of any or appropriate target setting and incentives, resulting in lower productivity and inefficient use of ICT, irrespective of location.[138]

5.3 Changing Socioeconomic Drivers

Organisations and individuals have a plethora of communications options available to them for work, social tasks, and a blurring of the line between the two. Organisations can today adopt a narrower number of technology options and still enhance productivity, with this particularly applicable to SMEs and sole traders. As firms increase in complexity, size and geographical disbursement, additional components are often observed such as Enterprise applications for data, security, email, and other areas, facilitated by mobile broadband in particular.[139]

Individuals are now working and living in an era where fixed telephone lines are becoming less relevant; mobile interactive, entertainment and work tasks are becoming ingrained as 'normal', and personal devices such as smartphones, tablets and laptops have become ubiquitous.[140] The new generation of Millennial and Generation Z employees in the work place are citizens of the most diverse and sophisticated media, computer and mobile environment ever[141] and far surpass the experience of Baby Boomers (Generation X).[142] This is having a significant impact on how businesses adopt and use ICT.

Four fifths of organisations also believe that digital transformation will be critical to their organisation within two years, and over 90% of employees believe it is the correct approach.[143] Managers in larger firms are becoming more aware that emerging technologies like social media and mobile commerce require a different culture and skills than utilised in the past:[144]

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[136] Syverson, C. (2004a). Market Structure and Productivity: A concrete example. Journal of Political Economy. 112(6); pp: 1181-1222.

[137] Brynjolfsson, E., Hitt, L. M. (1995). Information technology as a factor of production: The role of differences among firms. Economic Innovation of New Technology. Volume 3(3); pp: 183-199.

[138] Black, S. and Lynch, L. (2001). How to Compete: The Impact of Workplace Practices and Information Technology on Productivity. Review of Economics and Statistics Volume 83(3); pp. 434-445.

[139] Ciprinan, A, et al (2011). The Proceedings of the International Conference: Marketing - From Information to Decision; pp: 21-35.

[140] Akman, I., and Rehan, M (2016). Examination of factors influencing employees' adoption of mobile commerce and services in Turkey, Economic Research-Ekonomska Istraživanja; Vol 29(1); pp: 770-781.

[141] Gupta, O., Gulati, G. (2014). Psycho-analysis of Mobile applications usage among Generation Z Teens. International Journal on Global Business Management and Research. August; pp 80-95.

[142] http://socialmarketing.org/archives/generations-xy-z-and-the-others/

[143] MIT Sloane Management Review (2013). Research Report: Embarking Digital Technology. A New Strategic Imperative.

[144] Ibid.

5.4 Enhancing Productivity with ICT

Both firms and individuals can adopt ICT to enhance their productivity. The range of ICT available to firms is significant and involves both external and internal components and drivers. Figure 9 depicts the consolidated environment in which applications and technology are implemented.

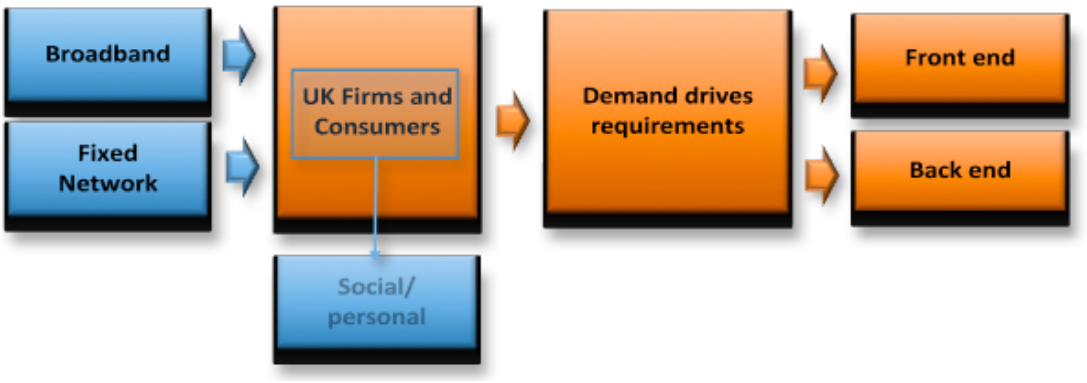


Figure 9: Impinging communication factors drive both front and back end selections

Firms can select from fixed and mobile technology components to meet their business requirements. Before reviewing the ICT available, it is relevant to outline the enabling networks across mobile broadband; fixed superfast broadband and internet access. The most 'disruptive' of these continues to be mobile broadband – driven by the continuing roll out of 4G services.[145] The growth of fixed and mobile broadband in the UK continues, although rural areas are still at some disadvantage to denser urban areas for higher speed 4G: around half of UK premises are covered, but this increases to 88% for 3G and 93% for 2G, as depicted in table 5. Coverage is continuing to grow across the UK.

	Percentage of premises covered				
Technology (coverage threshold)	**Scotland**	**England**	**Wales**	**NI**	**Whole of UK**
2G (-81dBm)	90%	94%	84%	83%	93%
3G (-100dBm)	79%	91%	67%	73%	88%
4G (-115dBm)	37%	50%	20%	0%	46%

Table 5: Outdoor mobile coverage from all UK operators
Source: OFCOM, Connected Nations 2015, p8.[146]

The age of the smartphone has arrived, with OFCOM data[147] indicating that:

- Smartphones have overtaken laptops as an internet user's principal device
- Two hours per day are spent on smartphones, twice as long as laptops and PCs
- 4G subscribers surged from 67% to 39.5 million over 2015

[145] Basole, R., C. (2008). Enterprise mobility: Researching a new paradigm. Information Knowledge Systems Management. Vol: (7)1,2; pp. 1-7.
[146] https://www.ofcom.org.uk/__data/assets/pdf_file/0028/69634/connected_nations2015.pdf
[147] Ofcom, (2015). Communications Market Report.

- Increase across data-driven activities: online shopping; TV; messaging; face-to-face and voice calls; video and picture sharing and others.

The availability of superfast broadband to premises is a further enabler of businesses adopting productivity enhancing ICT, and basic telephone service. This has also been increasing, with 83% of the UK having access to 63Mbit/s, up from 75% in 2013, as indicated in table 6.

	Coverage of superfast broadband, premises		Average download speed of superfast broadband	
	2015	2014	2015	2014
UK	83%	75%	63Mbit/s	54Mbit/s
England	84%	77%	63Mbit/s	56Mbit/s
Northern Ireland	77%	77%	56Mbit/s	50Mbit/s
Scotland	73%	61%	67Mbit/s	54Mbit/s
Wales	79%	55%	59Mbit/s	52Mbit/s

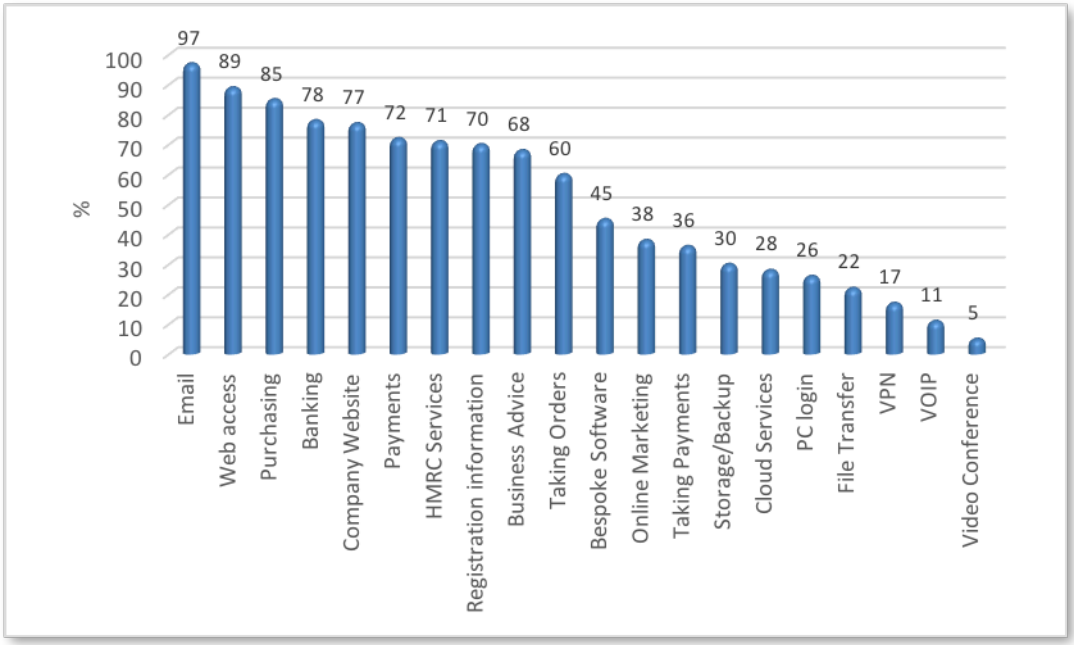
Table 6: Coverage of superfast broadband coverage
Source: OFCOM, Connected Nations 2015, p16.[148]

Around 27% of UK businesses have taken up superfast broadband in the UK (8 million).[149] An additional 22% have not taken this up, yielding a total potential figure of around half of all UK businesses.[150] The speed of superfast broadband rollout to some rural and urban areas is a topic of debate, with the Government targeting 95 per cent penetration of the UK by December 2017 and the provision of basic access of 2 Mbps for all from December 2015.[151] The UK Culture Secretary has stated that reaching the final five per cent in rural areas would be 'challenging', but has concurrently indicated that, "the benefits of superfast broadband are clear from increasing productivity and economic growth to transforming family entertainment at home…We hope to find ways in which those benefits can be brought to even more people."[152] Ofcom, the UK's communications regulator, has published conclusions from a strategic review of digital communications in the UK, including a demand that BT provide assistance to rivals by permitting them access to its infrastructure to lay fibre amongst others.[153]

Increased broadband penetration, coupled with high speeds and business adoption, are integral to the adoption of many services by individuals and firms alike and can improve productivity.[154] Firms utilise a broad range of technology services that reflect firm type, size,

[148] https://www.ofcom.org.uk/__data/assets/pdf_file/0028/69634/connected_nations2015.pdf
[149] Ibid.
[150] Ibid.
[151] https://www.gov.uk/guidance/broadband-delivery-uk
[152] http://www.telegraph.co.uk/news/2016/05/05/ministers-halt-automatic-broadband-roll-out-for-rural-families-b/
[153] https://www.ofcom.org.uk/__data/assets/pdf_file/0016/50416/dcr-statement.pdf
[154] Colombo, G., M., and Croce, A. (2013) ICT services and small businesses' productivity gains: An analysis of the adoption of broadband Internet technology. Information Economics and Policy. Vol: 25(3); pp:171–189.

location, and other factors. Graph 22 depicts the principal services that UK businesses utilise ICT for in descending order of use, with email the most prevalent. Some of these are enabled by broadband whilst others reflect a broad array of business services.

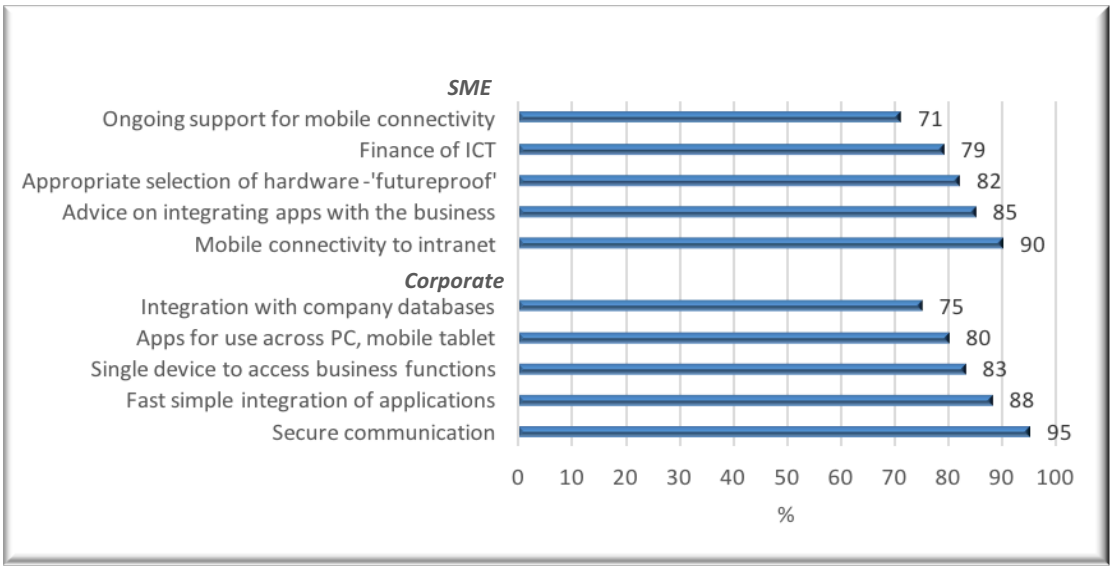


Graph 22: Use of applications by UK SMEs
Source: Broadband Stakeholder Group (2015); Ofcom, 2014.[155]

5.5 A Portfolio of Options

The UK is second to the US in terms of ICT assets as a percentage of gross fixed capital formation, at 20% versus 25% respectively.[156] Firm-level research and case study work within the management practices stream across a sample of around 50 firms to date has indicated several areas of concern related to ICT adoption by managers in Corporates and SMEs. Graph 23 depicts the top five for each of these two firm types. The priority for corporate managers was the security of data accessed externally by employees, whilst for SME Managers, connectivity to their intranet from a mobile device was the most pressing ICT-related priority.

[155] Ofcom. (2014) SME experience of communications services – a research report. October 16, and: Broadband Stakeholder Group, (2015). The broadband requirements of small businesses in the UK. August. *A blended rate for application use by both small and larger SMEs was utilised drawing on data for both to define this chart.*
[156] Miller, B., and Atjinson, R. (2014). Raising European Productivity Growth Through ICT.



Graph 23: Top five areas identified by Corporate & SME managers and employees for ICT adoption
Source: LSE research

Additional research has indicated that around 50% of British business managers and public sector managers do not feel that their business will be able to address key challenges over the next five years.[157] The use of digital technology is however seen as key enabling mode to assist with change, with You Gov data from a survey of 1,110 British managers indicated that the top five uses of digital were perceived as being:

- Delivering higher quality customer service (74%)
- Providing higher quality products and services (72%)
- Providing value for money (65%)
- Cost control (65%)
- Profitable delivery, and generating a return for investors (53%)

The key challenge however is *execution:* firms often don't adopt readily available and cost-effective ICT or digital measures. Research indicates two primary reasons that this occurs:

(1) 75% of firm managers, particularly in SMEs, are not aware of the technology and digital options that can facilitate productivity enhancement;
(2) amongst managers who are aware of some options, over two-thirds were not aware where they could seek assistance from, with the majority believing that this required 'expensive consultants', or 'hiring an IT manager', with neither option cost-effective for the majority of smaller firms.[158]

5.6 Making the Right Call

ICT adoption by firms reflects their decision maker's management practices. Considerable research has identified several ways in which productivity is being enhanced across the private and public sector, including emergency services and law enforcement. The following

[157] You Gov Survey, commissioned by Vodafone UK,of 1,130 managers, undertaken online 16-23 September 2015. http://mediacentre.vodafone.co.uk/pressrelease/millions-of-british-businesses-dont-feel-ready-to-deal-with-the-future-of-digital-technology/
[158] LSE Research for Management Matters. 50 firm sub-sample from primary sample.

reflect a number of potential areas of ICT adoption that Public Sector, Corporates, Large Firms and SMEs can undertake to enhance productivity.

5.6.1 Mobile Broadband: Case study - Police and Emergency Services[159]

The socioeconomic impact of the adoption of mobile broadband by emergency services including Police and Ambulance can be significant. This calls for a step-change from today's use of narrower data, with the potential to both become more efficient with a smaller number of police officers on the beat following budgetary reductions in some areas and for ambulance services, in the ability to reduce fatalities due a lack of real-time, accurate data on patient history available.[160]

The transformative effect of mission critical mobile broadband has the power to effect change both at the front and back end of Police and Emergency Services. Estimates are that the adoption of mobile broadband by Police in the UK with end-to-end changes could result in a 10% productivity uplift reflected by an improved ability to undertake *intervention* in scenarios where otherwise this is not occurring.[161] This would equate to a £1 billion benefit to the economy annually. Examples of ICT boosting productivity in the UK are already occurring:

- Wiltshire Police's mobile and remote working solution that is estimated to have resulted in a 10% productivity increase: the equivalent of adding 89 officers but without the £4 million annual cost.[162]
- British Transport Police also experienced a similar productivity increase following a similar implementation.[163]
- Estimates for UK Traffic Police indicate that productivity improvements from equipping Traffic Police with mobile broadband with the appropriate access tools (tablets/laptops) and integration with back-office elements to permit a 'mobile office' with real time access to required data, could deliver socioeconomic benefits of £520m per annum.[164]

In the US, similar austerity challenges have resulted in Police Forces adopting mobile broadband communications to increase the presence of first responders. An example is the City of Altoona in Pennsylvania, which like other many US Police Forces sought to empower officers to work more effectively and faster, with similar Police Forces in neighbouring areas achieving an efficiency improvement from wireless broadband by at least 10 percent.[165] This Police Force exceeded the objective, providing access to critical data information sources and the ability to upload field reports directly.

The benefits of mobile broadband have wide applicability across the public and private sector.

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[159] Grous, A. (2013). Socioeconomic Value of Mission Critical Mobile Applications for Public Safety in the UK. LSE. http://www.lse.ac.uk/businessAndConsultancy/LSEEnterprise/pdf/tetraReport.pdf

[160] Ibid.

[161] Ibid. Calculations and estimates of this are provided in the report.

[162] http://www.straighttalkonline.com/cio-articles/going-mobile-wiltshire ; and Policing Plan for Wiltshire 2012/13.

[163] http://www.straighttalkonline.com/cio-articles/going-mobile-wiltshire

[164] Grous, A. (2013). Op cit.

[165] http://business.motorolasolutions.com/publicsafety/pdfs/Altoona_CS_FINAL.pdf

5.7 ICT and Connectivity: Wider Use and Benefits

The benefits of ICT connectivity to the firm are numerous and enable efficiencies across the activity chain for many:[166]

- *E- commerce:* Firms display a mixed picture in the adoption of e-commerce permitting them to trade electronically with suppliers. This area is believed to represent an opportunity for growth with primary research indicating a varied scenario depending on firm size as depicted in table 7:

		No Investment				Investment			
Firm type	% of firms without e-commerce	Unsuitable to firm's process	Lack of internal resources	High costs	Safety concern of transaction	% of firms with e-commerce	Adequate investment	Inadequate Investment	Low but increasing investment
SME	22%	67%	17%	17%		13%	33%		66%
Large Firm	17%	75%	25%			26%	33%	17%	50%
Very Large Firm	0%					22%	80%		20%
Total	39%					61%			

Table 7: adoption of e-commerce to facilitate transactions between firms and suppliers
Source: LSE research 2006-2011.

- *Linking with Suppliers:* Six principal types of ICT have been identified for communication between firms and their suppliers.[167] Table 8 summarises the utilisation of these by firms from primary research.

	% of firms adopting		
Communication Mode	High	Medium	Low
Meetings	70%	13%	17%
Telephone	83%	17%	
Fax	4%	78%	26%
E-mail	91%	9%	
Videoconferencing			26%
Integration bteween softwareware applications		22%	52%
CAD sharing			17%

Table 8: Communication modes with suppliers and firm adoption.
Source: LSE research 2006-2011.

Meetings and the telephone are utilised to a high degree by firms, whilst a minority utilise facsimile to a high degree. This was primarily due to the substitution effect from email, with almost all firms utilising email to a high degree. Over three quarters of firms utilised faxing to a medium degree with email continuing to erode this, and the expectation that within a further 24-36 months, this mode will be reduced significantly. The opportunity exists for continued adoption of ICT to substitute for some of these modes and to enhance delivery of information.

- *Mobile workforce*: One of the most significant areas of opportunity for enhancing productivity is the continued mobilisation of the workforce.[168] The enhanced adoption of digital and mobile technology by organisations is driven largely by social

[166] Kleijnen, J., P., C. (1982). Quantifying the benefits of information systems. Department of Business and Economics. Tilburg University (Katholieke Hogeschool Tilburg). 5000 LE Tilburg, Netherlands.
[167] Chiarvesioa, M., Di Mariab, E., Micellib, S. (2004). From local networks of SMEs to virtual districts? Evidence from recent trends in Italy. Research Policy. Volume 33; pp: 1509–1528.
[168] Teodoro, B., et al (2014). The motivations and experiences of the on-demand mobile workforce Proceedings of the 17th ACM conference on Computer supported cooperative work & social computing; pp: 236-247.

factors: the occurrence of dual-career couples;[169] growth in single parent families; millennials joining the workforce and an increase in the involvement of men in child care.[170] With 54% of UK workers able to work remotely,[171] organisations are increasingly required to facilitate this with: device access; secure log-in; integration with back-office solutions; usage policies; monitoring and surveillance of data exchanges, and other factors. Data breaches in particular can have a negative effect on shareholder value with firms needing to address security and monitoring when larger; this is less of an issue for smaller firms but is still a factor.[172]

The utilisation of mobile broadband; digital connectivity; B2B opportunities; remote working, and other ICT-enabled areas of activity will continue to gain importance for enterprises. Enabling these securely, efficiently and expediently can benefit both the firm and the employee. Research indicates that 61% of employees now use their home broadband service to access work applications, and that 24% use a mobile data connection via their smartphone, tablet or laptop with broadband dongle.[173] This trend is expected to continue to grow as penetration of these enabling technologies increases and organisations recognise the benefits accruing to employees and firm-productivity alike.

6. Flexible Workforce Practices

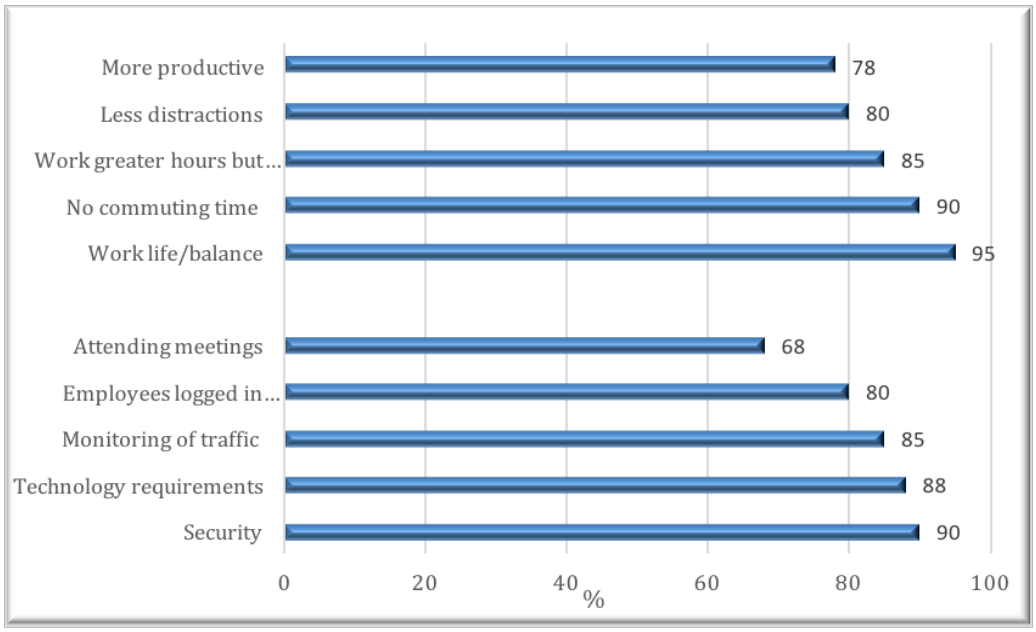
6.1 An Evolving Workplace

Today's workforce is *different.* It reflects the interplay between technology and changing social values and work practices.[174] These have caused greater work-family struggle as families strive to balance the two.[175] Organisations are increasingly introducing flexible workplace practices (FWP) both as a means of addressing this, in addition to a response to economic pressure to reduce costs including office space and operating costs.[176] Studies reveal that more than two-thirds of workers who utilise FWP indicate that working flexibly enables them to work more intently, exercising greater intensive and extensive effort.[177]

Additional firm-level research[178] has indicated that employers' enthusiasm for FWP is often balanced by a more 'cautious' approach from employers who seek to ensure key elements

[169] Gordon, C., et al. (2015). Flexible Small Firms? Why Some Small Firms Facilitate the Use of Flexible Workplace Policies. Canadian Journal of Sociology. Vol.40(1); pp.1-24.
[170] Marshall, K. (2006). Converging gender roles. *Perspectives on Labour and Income.* Vol7(7); pp5-17.
[171] https://yougov.co.uk/news/2015/10/20/30-uk-office-workers-are-more-productive-when-work/
[172] Gatzlaff,K., M., and McCullough, K., A. (2010). The Effect of Data Breaches on Shareholder Wealth. Risk Management and Insurance Review. Vol: (13)1; pp:161–83.
[173] Morar research of 8,000 firms in 10 countries: http://www.vodafone.com/business/global-enterprise/vodafone-study-75-percent-of-global-companies-leverage-flexible-working-policies-2016-02-08
[174] Gordon, C., et al. (2015). Flexible Small Firms? Why Some Small Firms Facilitate the Use of Flexible Workplace Policies. Canadian Journal of Sociology. Vol.40(1); pp.1-24.
[175] Gordon, C. (2014). Flexible Workplace Practices: Employees' Experiences in Small IT Firms. Relations Industrielles/ Industrial Relations. Vol(69)4; pp766-784.
[176] Vance, C.M., and Paik, Y. (2015). Managing a Global Workforce. Routledge.
[177] Kelliher, C., and Anderson, D. (2010). Doing more with less? Flexible working practices and the intensification of work. *Human Relations.* Vol 63(1); pp 83-106.
[178] LSE Research within 20 firms for this study from discussions with COOs, CFOs, CEO, and HR Heads, and from management practices studies 2007-2016 including other managers and employees from 50 organisations in total from 4 regions: UK, US, EU, AsiaPac/India.

are addressed. Graph 24 depicts the top five benefits flagged by employees and the top five factors flagged by employers when implementing a work from home (WFH) strategy.



Graph 24: Top five working-from-home issue from employers and employees.
Source: LSE research 2012-2016.[179]

The primary factor driving employees to seek WFH, where it is not mandated by an organisation, is work-life balance, with over 95% of employees sampled indicating this. The results are congruent with other research that highlights the priority of this consideration for many including younger workers.[180] Millennials present opportunities and challenges: they are digitally very active; rapidly broadcast their views, moods and emotions online; believe that 'they can do anything'; have the most accelerated life-cycle expectations of any segment; and are the most proficient with multiple digital tools.[181] The lack of commuting time, greater productivity and fewer distractions, all comprise benefits cited by employees for FWP.[182]

The concerns of employers were around security (90 %); technological requirements (88%); monitoring of data, emails, and other information being exchanged between the firm and remote worker (85%) despite acknowledgement by many that a "logged in employee is like he/she is here"; and the requirement to ensure the employee is 'visible' when logged in and working (80%), with challenges perceived in scheduling meetings when attendance is required in person (68%).

Because of these socially spurred changes, a complementary level of technological change has been occurring as organisations adopt 'empowering' options that enable employees to

[179] Ibid
[180] McDonald, & Hite. (2008). The next generation of career success: Implications for HRD. *Advances in Developing Human Resources.* Vol: 10(1); pp: 86-103.
[181] Ibid.
[182] Nicklin, J.M., et al., (2010). Flexible work arrangements, job satisfaction, and turnover intentions: the mediating role of work-to-family enrichment. Journal of Psychology. Vol: 144(1): pp:61-81.

access Enterprise elements agnostic of location.[183] The 'always on' organisation is meeting the 'always available' digital generation, with potential benefits accruing to both if this union is managed appropriately. With over half of the UK population able to work remotely, organisations have been addressing the organisational, cultural and technical impediments to working from anywhere, with resulting an estimated 4 million people out of a working population of 30 million now doing so.[184]

6.2 Benefits of Flexible Workforce Practices

Flexible workforce practices have been shown to generate a number of benefits for employees that can lead to: high employee satisfaction; job satisfaction;[185] work-life enhancements; and improved personal and organisational efficiency in the process.[186] Productivity can be linked to employees 'feeling more content';[187] 'happier' and improving their well-being.[188] Collectively, these factors have been shown to increase employee productivity by 10-12%,[189] when facilitated by appropriate management practices.[190] A further benefit cited for the greater use of flexible working practices is *reduced absenteeism* due to employee happiness and job satisfaction.[191] The currently estimated cost of £30k to replace a UK worker (£25k for loss of output and £5k cost of a new worker) equals £4.13 billion per annum to the UK economy[192], with some of this cost reduced through greater retention of employees.

Flexibility has been found to be a key facilitator 'enriching' the employee who in turn can direct a positive influence in the organisation and carry this over to their personal lives and in the process, display a lower absenteeism and turnover.[193] An overarching organisational component of flexible working practices is the culture created the organisation has an interest in the well-being of its employees[194] and is inclusive.[195] In 2012, the Government launched its 'Anywhere Working' initiative before the London Olympics which provided case studies and advice on homeworking.

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[183] Suprateek, S. et al (2012). Managing employees' use of mobile technologies to minimize work-life balance impacts. MIS Quarterly Executive. Vol 11(4); pp.143-157.
[184] Carbon Trust. (2015). Homeworking: helping businesses cut costs and reduce their carbon footprint.
[185] Bockerman, P., and Ilmakunnas, P. (2012). The Job Satisfaction-Productivity Nexus: A Study Using Matched Survey and Register Data. Industrial & Labor Relations; Vol 65(2); pp 244-262.
[186] Shah, A. (2014). Internal Marketing's Effects on Employee Satisfaction, Productivity, Product Quality, Consumer Satisfaction and Firm Performance. American Journal of Management. Vol(14)4; pp: 33-39.
[187] Van der Voordt, T, J, M. (2004). Productivity and employee satisfaction in flexible workplaces. Journal of Corporate Real Estate. Vol: 6(2); pp: 133-148.
[188] Oswald, A.J., et al. (2014). Happiness and Productivity. Journal of Labor Economics. Vol: 33(4); pp: 789-822.
[189] Ibid.
[190] Harjo, E.B., et al (2012). The Impact of Management Practices on Passion, Intellectual Capital, Engagement, and Performance of Employees. European Conference on Intellectual Capital: 86-XIV.
[191] Balmforth, K., and Gardner, D. (2006). Conflict and facilitation between work and family: Realizing the outcomes for organizations. New Zealand Journal of Psychology. Vol: 35(2); pp: https://www.carbontrust.com/media/507270/ctc830-homeworking.pdf 69–76.
[192] Oxford Economics. (2014). The Cost of Brain Drain-Understanding the financial impact of staff turnover.
[193] Wayne, J. H., et al. (2007). Work–Family Facilitation: A theoretical explanation and model of primary antecedents and consequences. Human Resource Management Review. Vol: 17; pp: 63–76.
[194] Grover, S. L., and Crooker, K. J. (1995). Who appreciates family-responsive human resource policies: The impact of family-friendly policies on the organizational attachment of parents and nonparents. Personnel Psychology. Vol: 48; pp: 271–289.
[195] Ryan, A., M., and Kossek, E., E. (2008). Work–life policy implementation: Breaking down or creating barriers to inclusiveness? Human Resource Management. Vol: *47*; pp:295–310.

Combined with other initiatives aimed at reducing energy costs for homeowners, such as reduced commuting, lower office space and less energy consumption, it has been estimated that the conversion of a further 4 million UK employees to engage in working from home could save over 3 million tonnes of carbon emissions per annum and reduce costs by £3 billion in the process.[196]

Survey results on flexible working practices from 8,000 firms in 10 countries covering SMEs, Public Sector and multinational corporates in 2015 indicated several performance-related benefits of flexible working practices:[197]

- 61% of respondents said their company's profits increased
- 83% reported an improvement in productivity;
- 58% believed that their organisation's reputation had benefits positively from flexible working practices.

Additionally, teamwork was reported to have improved in 61 percent of US organisations adopting flexible practices, with 60% of US employees indicating that these had improved work-life balance. Employees in 77% of these organizations also indicated that morale had increased because of flexible working practices.[198]

6.3 Adopting Flexible Workforce Practices: Technological Enablers for Productivity

When the appropriate conditions are present to foster flexible working practices, productivity and other organisational attributes such as employee job satisfaction; happiness; enthusiasm can improve.[199] Some technologies permit engagement to be established for remote flexible work (*primary* enabling components) whilst others facilitate the required firm-level controls (*secondary components* such as; security; integration, and others).[200] Primary factors are embedded in three technologies that permit *Connecting, Communicating* and *Collaborating:*[201]

(i) ***Connecting***: Three principal enabling technologies area available for remote working:
[1] Broadband: Several broadband options are available, with this access mode being a key enabler for connectivity to other functionality:

1. Broadband: *89% of UK households had internet access in 2016,*[202] *Greater speeds provide enhanced working ability, with slower speeds in some areas, or a lack of connectivity impeding the ability to utilise fixed broadband.*[203]
2. Mobile: *Smartphone penetration is 76%.*[204]
3. *Other technologies area available but used to a lesser degree: Satellite.*

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[196] https://www.carbontrust.com/media/507270/ctc830-homeworking.pdf
[197] Morar Research: http://www.vodafone.com/business/global-enterprise/vodafone-study-75-percent-of-global-companies-leverage-flexible-working-policies-2016-02-08
[198] Ibid.
[199] Black, S., and Lynch, L., M. (2006). How to Compete: The Impact of Workplace Practices and Information Technology on Productivity. The Review of Economics and Statistics. Vol. 83(3); pp: 434-445.
[200] http://www.ariadne.ac.uk/issue57/guy
[201] Ibid.
[202] http://www.ons.gov.uk/peoplepopulationandcommunity/householdcharacteristics/homeinternetandsocialmediausage/bulletins/internetaccesshouseholdsandindividuals/2016#household-internet-access
[203] http://www.ippr.org/files/publications/pdf/unbuffering-business_Oct2016.pdf?noredirect=1
[204] http://www.mobilenewscwp.co.uk/2016/03/10/gfk-uk-smartphone-market-is-bucking-the-trend/

[2] Virtual Private Network: Requires a connection, and establishes the connecting device as an extension of the network being connected to.

[3] Wireless: Wi-Fi access also provides the ability for network access.

(ii) ***Communicating Technologies***: Multiple modes of communicating exist:

1. Email
2. Telephony
3. Online Chat
4. Virtual Meetings
5. File Transfer
6. Voice over Internet Protocol (VOIP)

(iii) ***Collaboration Technologies***: Numerous modes of communicating exist:

1. Wikis
2. Social Networking e.g. Facebook (workplace version)
3. Shared Applications e.g. Collaborative dynamic networks including Office 365, Yammer, Google Docs, and Webchat

To be successful, these factors need to be embedded in a wider organisational environment that offers workers and the firm several elements:

- Support: 24x7 often for employees facing IT or access or related issues
- Security: Numerous security considerations need to be factored in enabling remote access such as firewalls; encryption; best-practices password policies and others that can be readily and easily applied including by individuals and SMEs.
- Integration: The organisation, large or small, must successfully integrate its communication technologies to the degree required to effect access that permits employees to undertake their roles seamlessly whilst providing the appropriate tracking, reporting, database elements (to validate users and maintain active repositories of their status), and other functions.

Conclusion

The UK is characterised by differing productivity across regions. Whilst it is difficult to provide specific contributory explanations region by region, research has highlighted some broader elements that could affect regional productivity variations including access to large cities, commuting times and skills. These provide a backdrop to more granular factors that are agnostic of location: how individual firms are run. This is the key that can unlock the potential of assets and in the process, enhance productivity.

As outlined throughout this report, productivity has the power to transform. The UK's lagging productivity to G7 and other European countries offers an opportunity to make incremental changes at both the micro and macro level, assisted by policy, and improve how firms operate. Research spanning a decade of development, collaboration between leading management-study organisations, and firm-level investigation in 35 countries and 20,000 interviews with firm managers, has provided one of the only benchmarks for codifying good management practices and the opportunity for firms to review and address shortfalls.

Management practices are one component of the journey to unlocking the power of productivity within the firm: they are the *lever.* Technology adoption is a further enabling mode that if spurred by good practices can maximise the productive potential within the firm. It is not isolated from its socioeconomic environment however: its employees' outlook and work ethic reflects social and technical influencing factors. The advent of the internet, digital, and mobile technologies has disrupted previous work-life paradigms and ushered a new generation of expectations, technology adoption and outlook. Organisations have been responding with more flexible working practices that utilise connecting, communicating and collaborative technologies.

Three steps to unlocking productivity:

(1) Enhancing management practices: The productivity-enhancing benefits of management practices can increase firm productivity both when applied alone, but in an optimal manner when addressed with technology adoption

(2) Increased adoption of ICT: The use of ICT to enhance productivity, and in particular, mobile broadband connectivity via 3G and 4G both for Enterprise access and for SME and sole trader use 'in the field' is a key area of opportunity for UK businesses. Social and technological changes continue to spur a digitally aware and mobile workforce and consumers alike who can adopt a step-change in Enterprise functionality.[205] This extends to the public sector where the adoption of 'connected-ICT' via mobile broadband amongst Police and Emergency Services has been ushering new levels of productivity.[206]

(3) Workforce flexibility: When combined with facilitating elements such as management practices (empowering worker flexibility) and remote digital and mobile services and applications, flexible workforce can improve personal work-life balance, create 'happier' employees and improve organisational productivity.[207]

[205] Lee, S.B., et al. (2016) Technostress from mobile communication and its impact on quality of life and productivity. Total Quality Management & Business Excellence. Vol:(27)7-8; pp: 775-790.

[206] http://www.gsma.com/spectrum/wp-content/uploads/2014/09/Impact_of_Mobile_Broadband_in_Egypt_v100.pdf

[207] Shah, A. (2014). Internal Marketing's Effects on Employee Satisfaction, Productivity, Product Quality, Consumer Satisfaction and Firm Performance. American Journal of Management. Vol(14)4; pp: 33-39.

Maximising the power of productivity requires alignment between key components: management practices; technology; flexible working arrangements. Location can provide additional factors for consideration at the regional level but ultimately, research has confirmed that productivity enhancement must start with *how* things are done to address *why* they might not be optimal. Businesses face a climate of unprecedented change – from demographic shifts with the multi-generational workforce, to increasing technological change and a fast-evolving business and consumer landscape. Assessment of a firm's management practices leading to a regular cycle of review, coupled with how the firm is integrating technology and workforce management policies, is critical to optimising performance.

The key to unlocking the power of productivity may be less of a 'key' and more of a 'combination number'.