



Understanding value added per employee in six UK sectors: The insiders' view

Summary Report
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About the Enterprise Research Centre (ERC)

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Executive Summary

Background

The UK's productivity puzzle has attracted much attention which has focused on the growing gap in productivity between the UK and its key international competitors. Often denominated in terms of 'value added per employee' or 'value added per hour worked' - both measures of labour productivity - the UK's productivity slowdown has been longstanding but has been particularly notable during the post-recession period

Statistical analyses have emphasised that 'the vast majority of labour productivity growth weakness arises due to changes in productivity growth within detailed industry groups.' These variations in sectoral productivity trends since the recession provide the starting point and rationale for this report. What are the origins of these diverse trends? Are these the consequence of intra-firm issues linked to leadership and management or technology? Or are they linked to sector specific factors such as regulatory regimes or market competition?

Our approach is primarily qualitative and draws on the experience and knowledge of 'industry insiders' in six sectors – business leaders, analysts, commentators and policy-makers. Detailed conversations were held with over 80 informants across six sectors between February and April 2019. This type of qualitative approach is of value to both reflect the wide range and variety of influences on value added and how these influences have changed and continue to evolve.

Understanding value added per employee

It is important to recognise that there are many measures of 'productivity' and that this term is often confused with measures of efficiency. However, the most common, and the typical focus of politicians and policy makers is labour productivity or value added per employee. Each of the insider interviews therefore started with a focus on value added per employee. In most cases, however, this concept was either unfamiliar or had little meaning in the context in which interviewees were operating. Instead, interviewees tended to equate the term 'productivity' with measures of operating efficiency often linked to physical outputs or throughput.

In some sectors - insurance, pharmaceuticals - the term 'productivity' itself had very little resonance and was dismissed as meaningless by some industry insiders. In other contexts - banking, beverages - complex supply chains and/or organisational structures created the potential for highly efficient and much weaker business units to co-exist limiting the value of generalised measures of 'productivity' or value added.

The lack of recognition and use of the term 'productivity' and - in many cases - the lack of understanding of the notion of value added per employee suggests a marked disconnect between policy dialogue and business practice. However, this should not be interpreted as a lack of interest or commitment to improving efficiency in most of the companies interviewed and this is reflected in diverse sets of performance metrics which are discussed in each section below.

In our interviews the lack of understanding and awareness of value added on the part of many interviewees often made it difficult to have a meaningful conversation about this specific measure of productivity. Instead discussions often defaulted to a focus on measures of operational efficiency with little reference to their contribution to overall value added.

Internal and external influences on 'productivity'

Across each of the sectors productivity - or more accurately - efficiency was influenced by a mix of internal and external influences:

- In **Oil and Gas** the oil price plays a dominant role in shaping both returns and value added per employee. Other factors highlighted by industry insiders included technology (innovation), management/leadership skills, regulation, geography and geology. As the industry consists primarily of international firms other UK-specific influences relate to geography (geology) and regulation both of which are seen as increasingly negative.
- In **Beverages** the highly competitive nature of the sector means that there has been a long-term focus on operational efficiency. The added complexity of premiumisation makes further efficiency gains difficult. Regulation and regulatory changes (e.g. sugar tax, reduction of plastic packaging, deposit return) are seen as raising costs and potentially impacting on margins and productivity as are changes to employment legislation (e.g. pension contributions).
- In **Pharmaceuticals** notions of productivity (efficiency) are seen as relevant only to the manufacturing and logistics element of the supply chain with little concern for value added. Financial indicators of corporate outcomes combine with operational measures to define performance. Challenging technological and market activities define the opportunities for profit, while tax and regulatory policies shape the global distribution of pharma activity and shape the sector's contributions to national economies. Leadership and management quality is generally perceived as high with evidence of a strong industry culture of continuous improvement.
- In **Transport Equipment** notions of productivity differ between sub-sectors although in none of our discussions was this understood in terms of value added per employee. Market structures and volatility, contract length and supply chain relationships limit efficiency gains. Across the transport equipment sector recruitment and retainment of skilled staff was seen as a barrier to productivity improvement, an effect exacerbated by volatile demand. Business leaders with an engineering specialism and leadership capabilities are also in short supply.
- In **Banking** our insider interviews suggested little concern with value added. Competition and the innovation that accompanies it was seen as one of the most important drivers of operational efficiency. Competition is driving automation and digital adoption. Maintaining customer experience and satisfaction is also seen as important driving both cultural and technological change. Better training of staff alongside promotion was also seen as a potentially important influence on productivity. Tighter regulation - including increased capital requirements and personal liability - discourages innovation.
- In **Insurance**, competition from incumbents and new entrants was emphasised as a major spur to operational improvements in the sector. However, complacency and conservatism in the sector and firms' leadership were emphasised by respondents as a barrier to innovation and productivity improvement. Regulation was also seen as a key barrier to productivity improvement both through its direct impact on costs and compliance costs as well as its indirect effect through increased conservatism. Conversely, technology was seen by respondents as a positive driver of productivity although some firms were hampered by legacy systems which are incompatible with the needs of data analytics.

There was a general perception, with the exception of the Pharmaceuticals sector, that management and leadership capabilities were often limited, and that innovation was constrained by conservatism. In some sectors - most notably insurance - this conservatism was linked to the regulatory burden. Leadership and management training was seen as an important area for future development.

Technology was generally seen as an enabler of efficiency and growth although firms' willingness and ability to adopt new technologies could be limited both by funding difficulties where margins are low (Beverages), incompatible legacy systems (Banking, Insurance) and market and supply chain structures (Transport Equipment).

Competition was seen as intensive in most of the sectors considered and interpreted primarily as a driver of innovation. The benefits of innovation were quickly eroded, however, where 'me too' products were developed by competitors (Pharmaceuticals), innovations were copied reducing margins, or customers demanded related price changes (Beverages). The changing nature of competition - the hollowing out of markets - was also evident in a number of consumer-facing sectors (Pharmaceuticals, Beverages, Insurance) with an increasing distinction between low value products/services and more personalised, premium offerings. This 'premiumisation' was seen as having negative productivity effects.

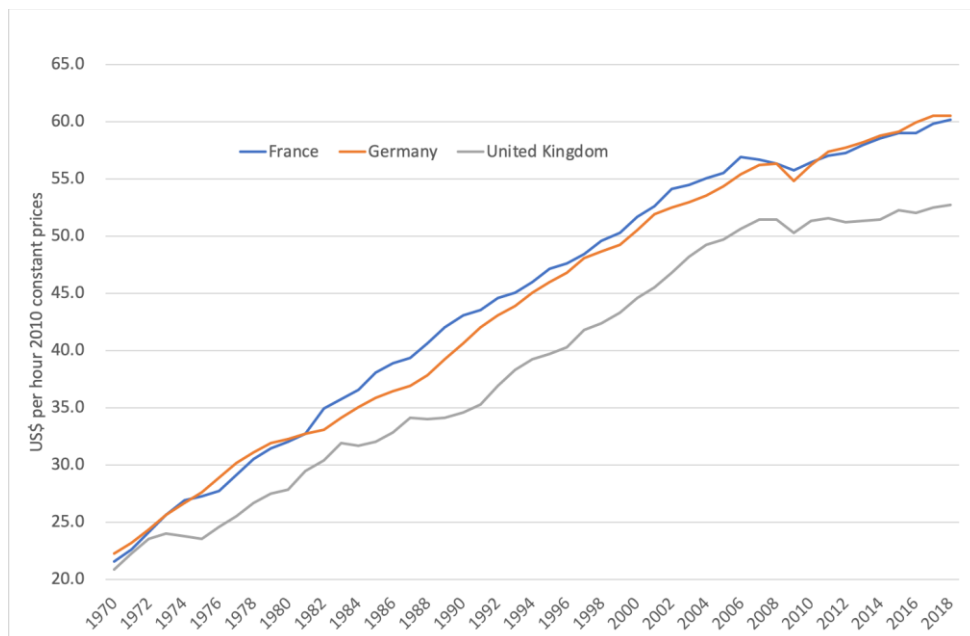
Regulation was also frequently cited as having significant costs. Costs of compliance were reportedly high, particularly where regulation changes repeatedly. Indirect effects - such as increased conservatism - may also result where firms face regulatory risk and/or managers face personal liability.

Section 1: Setting the context

1.1 Introduction

The UK's productivity puzzle has attracted much attention which has focussed on the growing gap in productivity between the UK and its key international competitors. Often denominated in terms of 'value added per employee' or 'value added per hour worked' - both measures of labour productivity - the UK's productivity slowdown has been longstanding but has been particularly notable during the post-recession period (Figure 1.1). While the productivity slowdown in the UK has been more marked than that in other G7 economies, several other Western economies have also experienced a decade or more of below trend productivity growth.

Figure 1.1: GVA per hour worked: UK, France and Germany



Notes: GDP per hour worked, US\$ constant 2010 PPPs. Source: OECD

Recent OECD research also emphasises the changing nature of the productivity distribution and the increasing gap between firms operating at the global productivity frontier and less productive 'laggards' or 'non-frontier firms'. Across the OECD the evidence suggests that over the last decade internationally focussed and trading 'frontier firms' have achieved labour productivity growth of around 3.5 per cent pa while more domestically focussed, 'non-frontier firms' (or 'laggards') have only achieved productivity growth of around 1.5 per cent pa¹.

¹ See OECD (2015) 'The Future of Productivity', Figure 11, p. 34.

International discussion of non-frontier firms echoes longstanding concerns in the UK about the ‘long-tail’ or ‘fat tail’ of low productivity firms².

At the heart of this call is the “productivity puzzle”. If one starts with a typical distribution of firms, then the most simplistic argument concerning productivity is that the mean is “too low”, such that we need to move the distribution to the right. However, in the absence of technological change, this is unlikely, so one needs to consider the shape of the distribution. In some recent analysis, Haldane (2017) asserted that the “problem” in the UK was in the tails of the distribution. One assertion is that the UK has a somewhat more skewed distribution say than Germany, with a large tail of firms who are underperforming, and as a result the mean performance for the UK is below that of Germany. Reasons for this we explore below.

However, we argue that one must extend this analysis further. It is assumed that within a given sample the distribution of firms follows something akin a normal distribution (Figure 1.2). However, the evidence suggests that the population of UK firms in terms of productivity is somewhat different from this.

Figure 1.2: Productivity Distributions

Figure 1

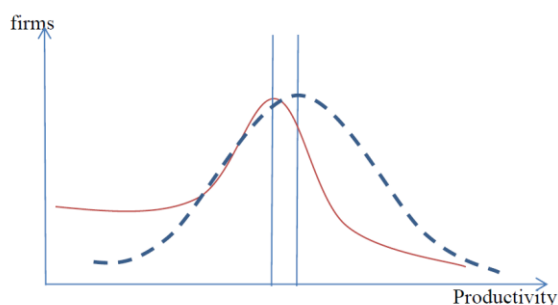
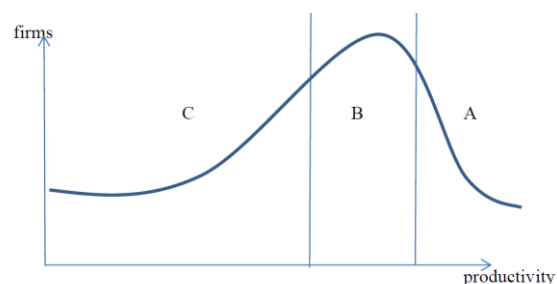


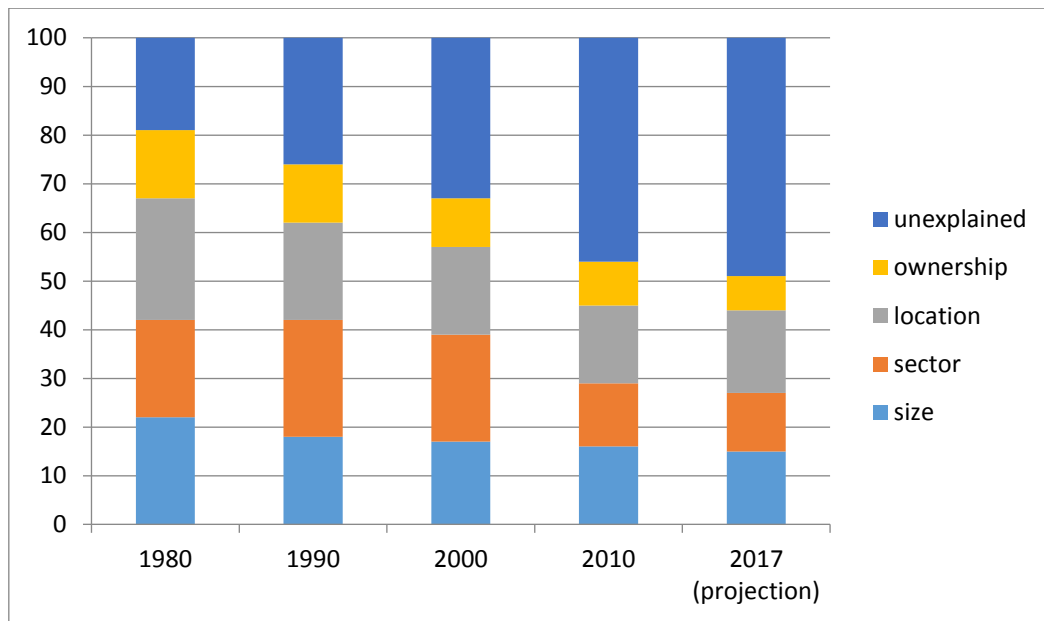
Figure 2



Traditionally a very high proportion of the variance in firm level productivity could be explained by just four variables, size, location, sector and whether the firm is foreign owned. OECD data, across all OECD regions and sectors however reveal that this historical relationship is breaking down (Figure 1.3).

² See <https://www.bankofengland.co.uk/-/media/boe/files/speech/2018/the-uks-productivity-problem-hub-no-spokes-speech-by-andy-haldane>.

Figure 1.3: Structural explanations of productivity



Source: Authors' analysis of Orbis data

In other words, factors which helped explain productivity differences in the past are becoming less and less relevant. This becomes even more severe when one seeks to explain productivity growth.

Potential explanations for the general slowdown in productivity growth in Western economies, and the particularly marked slowdown in the UK, are numerous. In seeking to explain the international slowdown in productivity growth, the OECD tends to emphasise a failure of technology diffusion from frontier firms to their less productive counterparts. Hence (OECD, 2015, p. 3-4):

'... the gap between those global leaders and the rest has increased over time, and especially so in the services sector. This implies that knowledge diffusion should not to be taken for granted. Future growth will largely depend on our ability to revive the diffusion machine, both within and across countries³.

UK-focussed research which has sought to explain the stagnation in productivity, post-recession, reaches diverse conclusions reflecting between-sector rigidities in resource re-allocation, within-sector competitiveness and/or intra-firm factors such as management and leadership. At the intra-firm level, evidence of the positive relationship between management and leadership quality and productivity is persuasive as is that between investment and productivity (Ollivaud et al. 2016). Evidence of gaps in management and leadership quality

³ OECD (2015), p. 3-4 also suggests that boosting knowledge and digital diffusion may have other advantages too in terms of more inclusive growth: 'Reviving the diffusion machine will also promote inclusive growth. The rise in wage inequality largely reflects the increasing dispersion in average wages paid across firms'.

and investment levels between the UK and main our international competitors is also clear (Bloom and Van Reenen, 2018; Bloom et al. 2012; Bloom and Van Reenen, 2007).

1.2 Sectoral perspectives on the productivity puzzle

Recent sectoral analyses have provided a more detailed perspective on the nature of the UK productivity puzzle by considering separately the impact of within-sector and between-sector effects. Riley et al. (2018) examine pre and post-recession productivity growth across a range of different levels of industrial aggregation and conclude that 'the vast majority of labour productivity growth weakness arises due to changes in productivity growth within detailed industry groups' (Riley et al. 2018, p. 27). This leads them to conclude that '... the stagnation in productivity remains widespread across detailed industry groups, pointing to the importance of macroeconomic or economy-wide explanations for the puzzle' (p. 4). They also demonstrate, however, sectoral productivity trends in the UK vary markedly also suggesting the potential for significant sector-specific influences on labour productivity.

In particular Riley et al. (2018) suggest that the most marked slowdown in labour productivity growth is evident in those sectors which experienced the strongest productivity growth prior to the recession. Their analysis also suggests that more than half of the labour productivity gap is accounted for by five sectors: telecommunications, finance, mining and quarrying, electricity and gas, pharmaceuticals and computer programming. Other sectors have either maintained or significantly increased labour productivity over the last decade.

These variations in sectoral productivity trends since the recession provide the starting point and rationale for this report. What are the origins of these diverse trends? Are these the consequence of intra-firm issues linked to leadership and management or technology? Or, sector specific factors such as regulatory regimes or market competition?

Our analysis focuses on six business sectors which have experienced very different trends in productivity growth over the post-recession period. These are:

- **Extraction of crude petroleum & gas (SIC 06)** this sector includes around 2,400 firms with the dominant players in the UK being Royal Dutch Shell and BP plc. GVA per employee in this sector has declined markedly over the post-recession period.
- **Beverages (SIC 11)** this sector includes the manufacture of both alcoholic and soft drinks and includes around 4,800 companies in the UK. There are around 12 companies in the sector with turnover in excess of £1bn including Diageo plc, Coca-Cola Europe, Britvic plc, and Marston's plc. Detailed information on value added per employee in Beverages alone is not available on a comparative basis but labour productivity growth in the broader Food, Beverages and Tobacco sector has kept pace with that of our international competitors in recent years.
- **Manufacture of pharmaceutical products (SIC 21)** includes around 1,700 companies in the UK engaged in the manufacture of proprietary and generic pharmaceuticals. Around 12 companies have turnover of £1bn plus with the four largest players being GlaxoSmithKline, AstraZeneca, Shire and Smith and Nephew. Here, UK labour productivity has increased more sharply than that in other European economies during the post-recession period.
- **Manufacture of other transport (SIC 30)** includes the manufacture and sale of air, rail and marine transport equipment. In the UK the sector includes around 3,800 companies, of which around 12 have turnover in excess of £1bn. The dominant players are BAE Systems, Rolls Royce, GKN and Airbus. Labour productivity in this sector

remains broadly in line with that in Germany and Italy but is significantly lower than that in France.

- **Financial Service Activities, Except Insurance and Pension Funding (SIC 64)** includes around 88,000 UK firms dominated by the high street and investment banks. OECD figures suggest that in this broad sector labour productivity in the UK is higher and has grown faster than that in other European economies since the recession.
- **Insurance, Reinsurance & Pensions (SIC 65)** includes around 32,000 businesses in the UK undertaking a wide range of insurance, trading and advisory roles. Around thirty companies have turnover in excess of £1bn. Labour productivity in this sector in the UK is broadly similar to that in other large European economies.

Our approach is primarily qualitative and draws on the experience and knowledge of industry insiders in each sector - consisting of business leaders, analysts, commentators and policymakers. Detailed conversations were held with over 80 informants across the six sectors between February and April 2019 (Box 1). In each sector discussions focussed on the key determinants of sectoral labour productivity or value added per employee. A distinction was made between external influences (e.g. markets, competition, regulation) and internal factors (e.g. management, investment etc.).

We also explored the perceived relevance of 'productivity' to participants in both semantic and measurement terms. We asked in particular whether firms used the term 'productivity' as part of their strategic conversations and, if so, how it was measured. Where productivity was not part of firms' vocabulary, we identified other indicators of competitiveness and business performance.

Box 1: Research approach and methodology

Initial quantitative analysis for the six sectors used publicly available data from Eurostat, OECD and Orbis (provided by Bureau van Dijk). Qualitative analysis was undertaken using a semi-structured discussion guide along with related participant information and consent sheets. Interviews were conducted between December 2018 and March 2019. With participants' permission interviews were recorded and subsequently transcribed or notes taken during the interview were transcribed immediately afterwards. Interviews were conducted either face-to-face or by telephone and typically lasted between 40 and 60 minutes.

Participants were approached for interview on a strategic basis with the aim of getting a range of perspectives on the development of productivity in each sector. An academic lead with experience of prior research provided initial leads in each sector. These contacts were supplemented using internet-research, referrals and on-line sources such as LinkedIn in each sector to provide a broad range of perspectives. Interviews included representatives of firms along with industry analysts (including regulators and policymakers) and business representative groups. In sectors where it was considered important because of the structure of the sector (e.g. Beverages), both larger and smaller firms were interviewed to ensure factors affecting productivity were adequately captured. Some sectors - particularly Pharmaceuticals - proved challenging due (according to some potential informants) to preparations for issues related to Brexit.

1.3 Report structure

The central focus of this report is insiders' view of the balance between the internal and external drivers of value added in each of the six sectors considered. The report is structured as follows:

- Section 2 provides a brief overview of the six sectors in the wider UK and European and G7 economies.
- Section 3 provides an overview of the key productivity trends and insiders' perspectives on productivity derived from interviews in each sector⁴.
- Section 4 identifies cross-cutting themes, considers the balance between internal and external drivers of productivity and considers policy implications.

⁴ A detailed summary of the interviews in each sector is available on request from the editors.

Section 2: Productivity trends in the six study sectors

2.1 Introduction

Gross value added per employee varies significantly between country and sector. It can also vary significantly through time. This section provides an overview of comparative trends in value added per employee in the six sectors which are the focus of this report. To sit alongside our analysis of productivity we also report an analysis of exporting performance by these sectors, as a measure of international competitiveness. There is a large literature in the areas of international economics, international business, and analysis of place-based performance, which acknowledges the correlation at the firm level between exporting and productivity (and indeed innovation), though the literature is somewhat less precise about the direction of causality. One needs however to bear in mind that one may not need to be “productive” per se in order to export. For example, a firm may be in a niche area, or hold a particularly valuable patent that facilitates international competitiveness, which is unrelated to price competitiveness. In such situations, the firm’s market power, however narrow the market niche would still be expected to boost GVA / head. This illustrates why exporting and productivity go together.

2.2 Sectoral size and structure of the six sectors

Industry shares of value added in the UK have changed relatively slowly over recent decades, with the main trend being the steady decline in the contribution of manufacturing (Table 2.1). The effects of changing industrial composition on aggregate trends in productivity (value added per employee) have been examined by several different studies with differing results. Riley et al (2018) focussed purely on the UK business sector (excluding real estate) note that:

‘the negative effects of re-allocation on market sector productivity growth were *sustained* after the financial crisis so that the restructuring of the market sector across more detailed industry groups, in contrast to restructuring across broad industry sectors does not deepen the UK labour productivity puzzle. Indeed, this aligns better with some firm-level studies. Nonetheless, the vast majority of labour productivity growth weakness arises due to changes in productivity growth within detailed industry groups’ (Riley et al. 2018, p. 27).

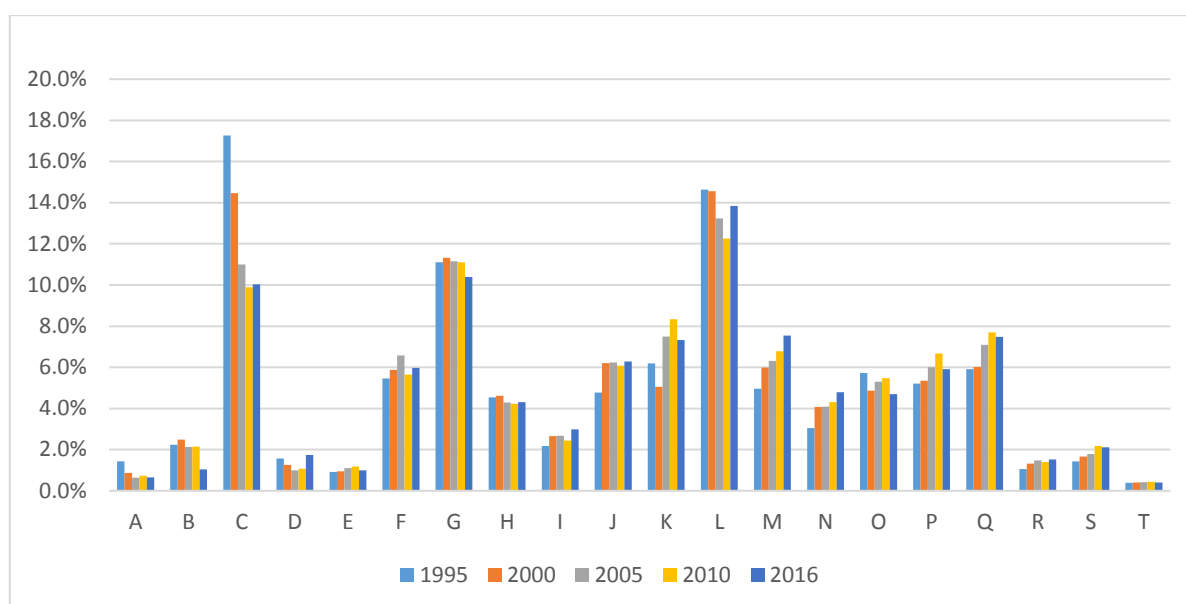
Adopting a broader perspective, which includes the real estate sector, an analysis published by the ONS suggests, however, that around a third of the UK productivity puzzle can be accounted for by compositional changes in the economy (Kirchherr, 2018). Here, our focus is on the market sector primarily and the conclusions of Riley et al. (2018) are therefore perhaps most relevant, i.e. that *within* rather than *between*-sector changes have been most significant in creating the productivity gap. The extent and variability of these within sector productivity changes are reported in Figure 2.1.

Table 2.1: Industry percentage shares of GVA: UK, 1995-2016

	1995	2000	2005	2010	2016
A: Agriculture, forestry and fishing	1.4	0.9	0.6	0.7	0.7
B: Mining and quarrying	2.2	2.5	2.1	2.1	1.0
C: Manufacturing	17.3	14.5	11.0	9.9	10.0
D: Electricity, gas, steam and air conditioning supply	1.6	1.3	1.0	1.1	1.7
E: Water supply, sewerage, waste management and remediation activities	0.9	0.9	1.1	1.2	1.0
F: Construction	5.5	5.9	6.6	5.6	6.0
G: Wholesale and retail trade, repair of motor vehicles and motorcycles	11.1	11.3	11.2	11.1	10.4
H: Transportation and storage	4.5	4.6	4.3	4.2	4.3
I: Accommodation and food service activities	2.2	2.7	2.7	2.4	3.0
J: Information and communication	4.8	6.2	6.2	6.1	6.3
K: Financial and insurance activities	6.2	5.1	7.5	8.3	7.3
L: Real estate activities	14.6	14.5	13.2	12.3	13.8
M: Professional, scientific and technical activities	5.0	6.0	6.3	6.8	7.5
N: Administrative and support service activities	3.0	4.1	4.1	4.3	4.8
O: Public administration and defence, compulsory social security	5.7	4.9	5.3	5.5	4.7
P: Education	5.2	5.4	6.0	6.7	5.9
Q: Human health and social work activities	5.9	6.0	7.1	7.7	7.5
R: Arts, entertainment and recreation	1.1	1.3	1.5	1.4	1.5
S: Other service activities	1.4	1.7	1.8	2.2	2.1
T: Act. of HH as employers	0.4	0.4	0.4	0.4	0.4

Source: ONS

Figure 2.1: Growth in GVA per employee by sector, 1995-2016



Notes: Sectors are referred to by their Division Indicators, e.g. A is Agriculture, Fishing and Forestry. See Table 2.1 for full sectoral descriptions. Source: ONS

In terms of their contribution to GDP, the most significant of these sectors is Banking which accounted for 4.3 per cent of GDP in 2016 (Table 2.2). OECD figures also suggest that the Banking sector contributes more in terms of GDP than in all other G7 countries except Canada. Like Banking, Insurance has also grown in importance in the UK over the 2000 to 2016 period, accounting for 1.7 per cent of GDP in 2016. Mining and energy - including Oil and Gas - and Food and Beverages have both declined in importance in terms of their contribution to GDP since 2000 (Table 2.2).

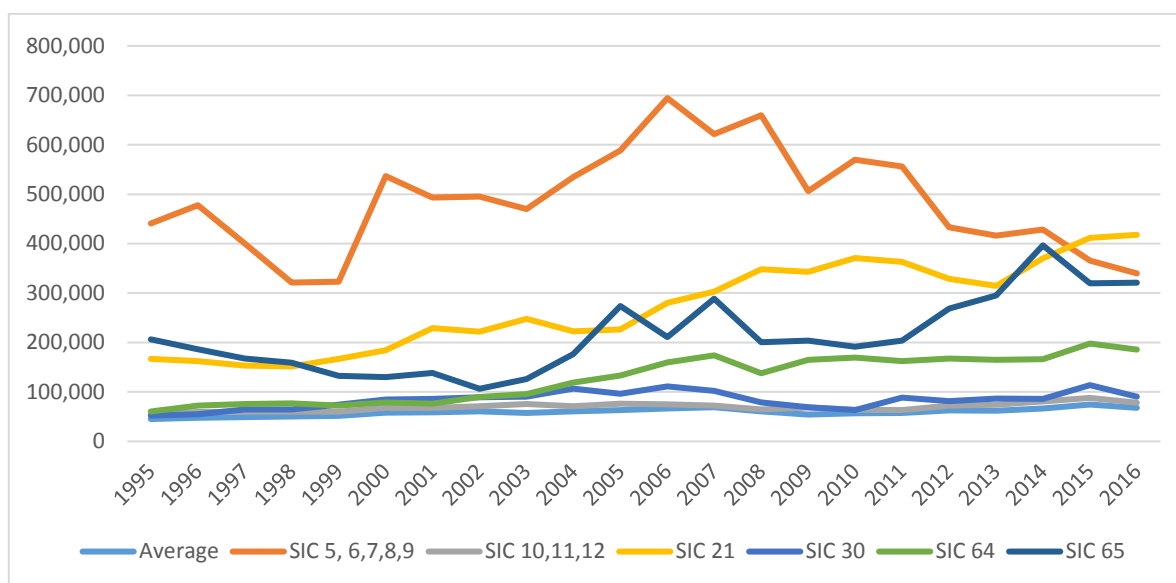
Table 2.2: Share of total GVA by sectors across countries

SIC	Mining, energy		Food and beverages		Pharma.		Transport equipment		Banking etc.		Insurance etc.	
	SIC 05-09		SIC 10-12		SIC21		SIC30		SIC64		SIC65	
	2000	2016	2000	2016	2000	2016	2000	2016	2000	2016	2000	2016
UK	2.5	1.0	2.1	1.5	0.7	0.8	0.7	0.6	3.1	4.3	1.1	1.7
US	1.1	1.4	1.5	1.5	0.8	1.0	0.7	0.7	4.6	4.3	2.8	3.4
Canada	8.4	8.4	1.8	1.6	0.3	0.3	0.6	0.7	5.5	5.3	1.3	1.1
Germany	0.3	0.1	1.9	1.7	0.7	0.9	0.4	0.6	2.8	2.4	1.0	0.9
France	0.1	0.1	2.6	2.3	0.8	0.6	0.6	0.8	2.9	2.8	0.6	0.4
Italy	0.6	0.2	1.9	1.8	0.6	0.6	0.6	0.5	3.9	3.5	0.2	0.7
Japan	0.1	0.1	2.7	2.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Source: OECD

Comparing GVA per employee (Euro) worked across the six study sectors in the UK (or at least the closest available aggregates) emphasises the industrial contrasts (Figure 2.2)⁵. GVA per employee in the extractive sectors - including oil and gas - has been consistently above that in other sectors, although the margin between this sector and others has declined sharply since 2007/08. GVA per hour in Pharmaceuticals (21) has risen consistently throughout the last decade as has that in Banking (65). Consistently lower levels of GVA per employee are recorded in the other focal sectors: Other Financial Services (64) and manufacturing (10-12).

Figure 2.2: GVA per employee by sector: UK, 1995-2016, Euro pa



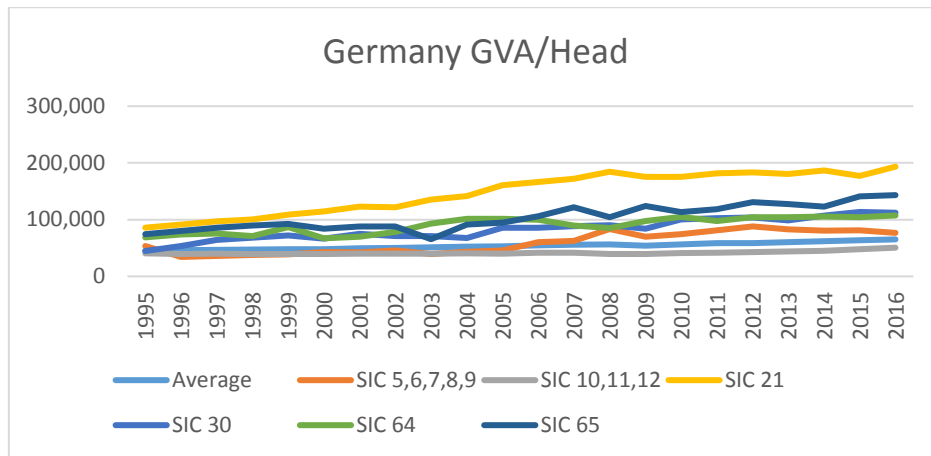
Note: SIC codes as follows: SIC 05-09, Mining and Energy; SIC 10-12, Food and Beverages; SIC 21 Pharmaceuticals; SIC 30 Transport Equipment; SIC 64 Banking etc; SIC 65 Insurance etc. **Source:** OECD

The historical importance of Oil and Gas in the UK means the profile of sectoral GVA per employee is rather different in other major EU economies. In both Germany (Figure 2.3a) and France (Figure 2.3b) GVA per employee in Pharmaceuticals (21) is significantly higher than that in all of the other sectors considered here. This margin is consistent and growing. Italy suggests a rather different pattern with, as in the UK, the highest rates of productivity in the extractive sectors over much of the 1995-2016 period (Figure 2.3c).

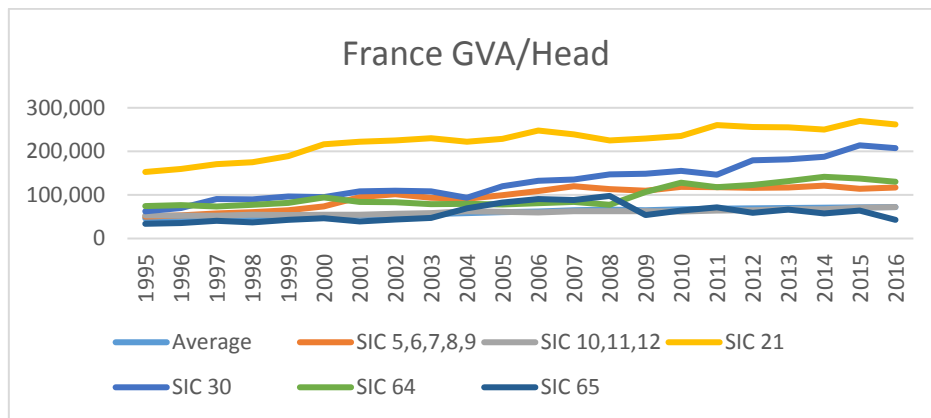
⁵ Data presented here are in nominal terms no adjustment for inflation. We adopt this approach given the potential importance of competition from abroad which may reduce prices rather than reducing output.

Figure 2.3: GVA per employee by sector: Europe, 1995-2016, Euro

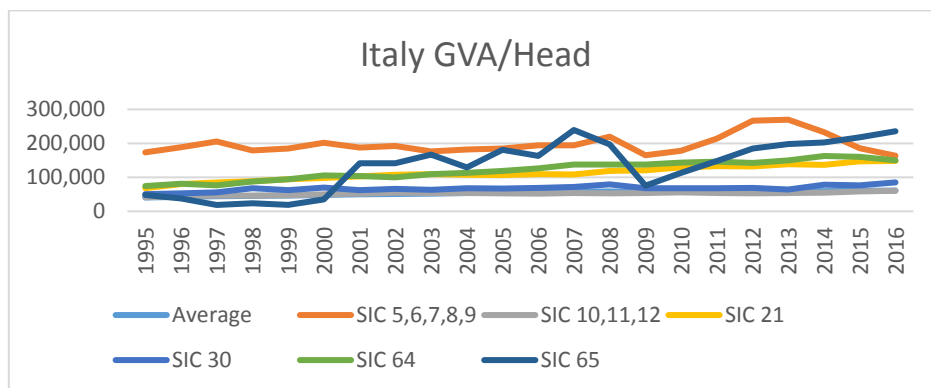
(a) Germany



(b) France



(c) Italy



Note: SIC codes as follows: SIC 05-09, Mining and Energy; SIC 10-12, Food and Beverages; SIC 21 Pharmaceuticals; SIC 30 Transport Equipment; SIC 64 Banking etc; SIC 65 Insurance etc. **Source:** OECD

Section 3: Insider perspectives on labour productivity

2.1 Introduction

Quantitative perspectives on productivity are helpful in providing a consistent and comparative picture across sectors and time-periods. However, quantitative analyses are often less valuable in helping us to understand 'why' particular trends develop and how different factors interact. Here, a qualitative approach is of value to both reflect the wide range and variety of influences on productivity and how these influences have changed and are changing. This Section draws together some of the key cross-cutting observations from our insider interviews. More detailed reports on each of the individual sectors are included in Sections 4-9.

Each of the insider interviews started with a focus on labour productivity or value added per employee. In most cases, however, this concept was either unfamiliar or had little meaning in the context in which interviewees were operating. Instead, interviewees tended to equate the term 'productivity' with measures of operating efficiency often linked to physical outputs or throughput. In some sectors - insurance, pharmaceuticals - the term 'productivity' had very little resonance and was dismissed as meaningless by a number of insiders. In other contexts - banking, beverages - complex supply chains and/or organisational structures created the potential for highly efficient and much weaker business units to co-exist, limiting the value of generalised 'productivity' measures.

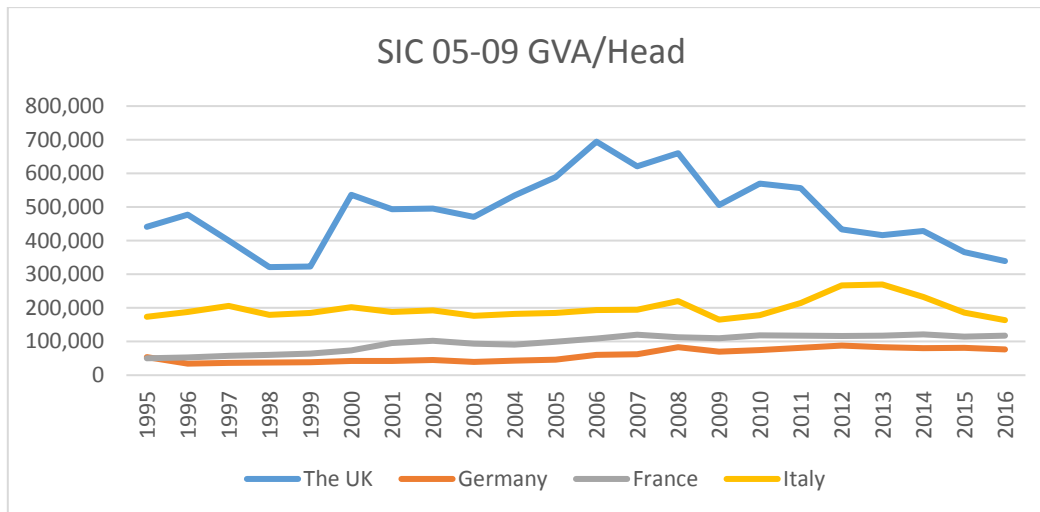
Measures of 'productivity' therefore differ markedly between sectors with most firms of any scale capturing a number of operational metrics alongside accounting indicators of financial performance. These are captured in detail in each of the sectoral accounts in Sections 4-9. Neither the operational metrics, nor financial indicators were typically seen as having any direct relationship to labour productivity. Indeed, in some sectors - notably banking and pharmaceuticals - the importance of labour productivity was explicitly downplayed by respondents. A trade association in the banking sector commented for example, that in terms of competitiveness that a 'bigger driver than labour productivity, would be capital productivity ... banks are heavily capital intensive in the sense that your lending book depends on billions worth of supporting capital'. Respondents in other sectors - notably Oil and Gas and pharmaceuticals - suggested that while 'productivity' (i.e. efficiency) is an influence on returns, external factors such as product prices are more critical.

The lack of engagement or familiarity of most respondents with productivity measured as value added per employee influenced the nature of our interview discussions. In most cases, interviews focussed on a more generalised notion of 'productivity' or productive efficiency which was interpreted rather differently in each sector. Discussion of the internal and external drivers of 'productivity' therefore generally relates to a broader notion of productivity than labour productivity per se. This also applies to our consideration of the drivers and inhibitors of productivity growth and change.

3.2 Oil and Gas

GVA per employee in the UK in the broadly defined extractive sector which includes Oil and Gas has been consistently above that in the other major EU economies since 1995. GVA per employee in the UK peaked in the pre-recession period and has declined steadily since that point (Figure 2.4). Levels of GVA per employee in this sector in the UK remain almost twice as high as those in the other major EU economies.

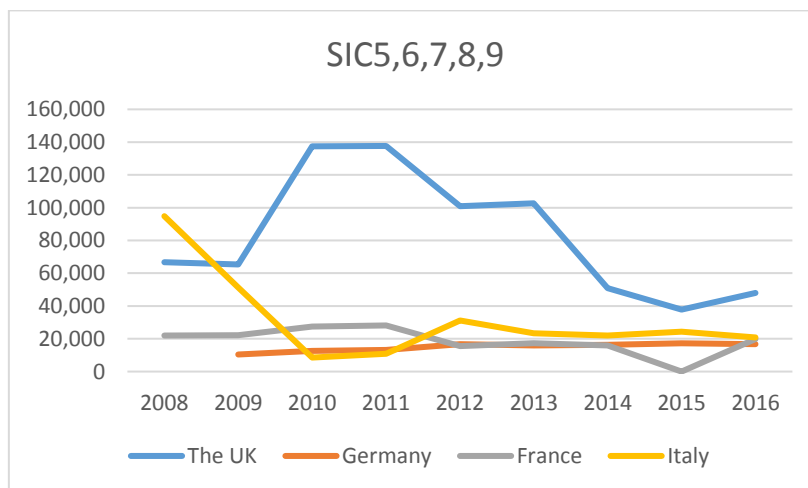
Figure 2.4: GVA per employee: Extractive including Oil and Gas



Source: OECD

The fall in GVA per employee in Oil and Gas coincides with a fall in export intensity (export sales per employee) in the UK sector since 2010. In 2010 exports were around Euro 140,000 pa but have since more than halved (Figure 2.5).

Figure 2.5: Exports per employee: Extractive including Oil and Gas



Source: OECD

A telling comparison can also be made with GVA in the Norwegian oil and gas sector. Although markedly higher than that in the UK, this also peaked (at Euro 1,600,000 pa) in 2006 and has since also halved to around Euro 800,000pa. The common trend in productivity across the UK and Norway reflects the dominance of the oil price in shaping productivity in this sector. Moreover, oil prices are largely outside the control of UK producers with past price crashes having significant implications for viability, investment and innovation.

Our discussions with industry insiders made it clear that 'productivity' is not a widely used or well-understood term in the UK upstream oil and gas sector. Rather there is a common concern with the narrower concept of 'efficiency' and in practice these two notions are often inappropriately conflated. Also, as the sector is not labour but capital intensive, what firms measure in general terms is how efficiently they deploy capital. The standard measure is the Return on Average Capital Employed alongside more operational indicators such as the cost per meter of drilling or meters drilled per day.

The oil price plays a dominant role in shaping both returns and value added per employee. Other factors highlighted by industry insiders included technology (innovation), management/leadership skills, regulation, geography and geology. As the industry consists primarily of international firms only geography (geology) and regulation are UK specific.

- Innovation is important in the sector, but difficult operating conditions and high risks lead to risk aversion particularly when margins are lower as at present. Some respondents talked about a 'race to be second' in applying new technologies.
- Management and leadership skills are variable, and training tends to be technical rather than managerial. Larger firms report cultural resistance to change compounded by issues with skills and recruitment.
- Regulation is seen as heavy in the UK with an on-going stream of new regulations. The need for regulation is appreciated but changes in regulation mean *'it's become very difficult, it's much more regulation and a cost burden in the UK'*.
- Challenging operating conditions in the North Sea are exacerbated by low oil prices.

Given the oil price, new technologies and innovation have played a role in shaping productivity across the industry. Improvements in operational efficiency - such as those measured by cost per meter of drilling or meters drilled per day - will increase margins and hence value added per employee. However, interviewees talked about increasing regulation and increasingly challenging operating conditions in the North Sea as reducing margins and productivity.

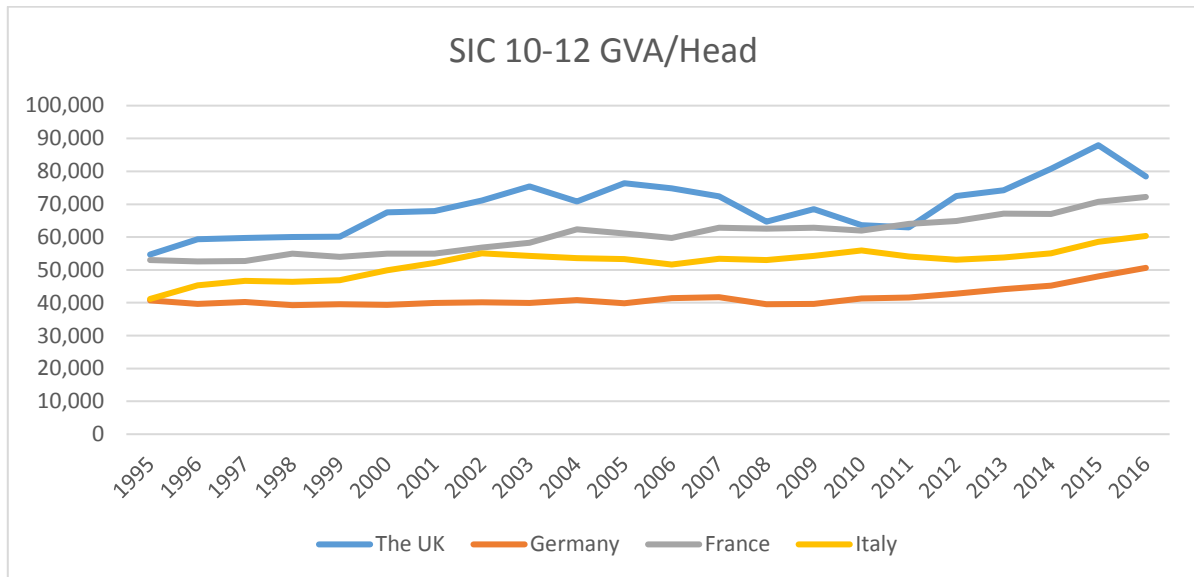
Looking ahead, one fact is undisputed: it will be increasingly difficult to operate successfully in the North Sea. The maturity of existing oil and gas fields and the need to go into more marginal areas will most likely reduce productivity further in years to come.

3.3 Beverages

Comparable data on GVA per employee in beverages specifically is not available. In the more broadly defined food, beverages and tobacco manufacturing sector GVA per employee in the UK grew from 1995-2002, declined marginally from 2002-2011, and has since grown relatively sharply. From around Euro 55,000 in 1995, value added per employee is now around Euro 80,000 pa. GVA per employee has been consistently above that in the other major European economies over the majority of the period since 1995 (Figure 2.5).

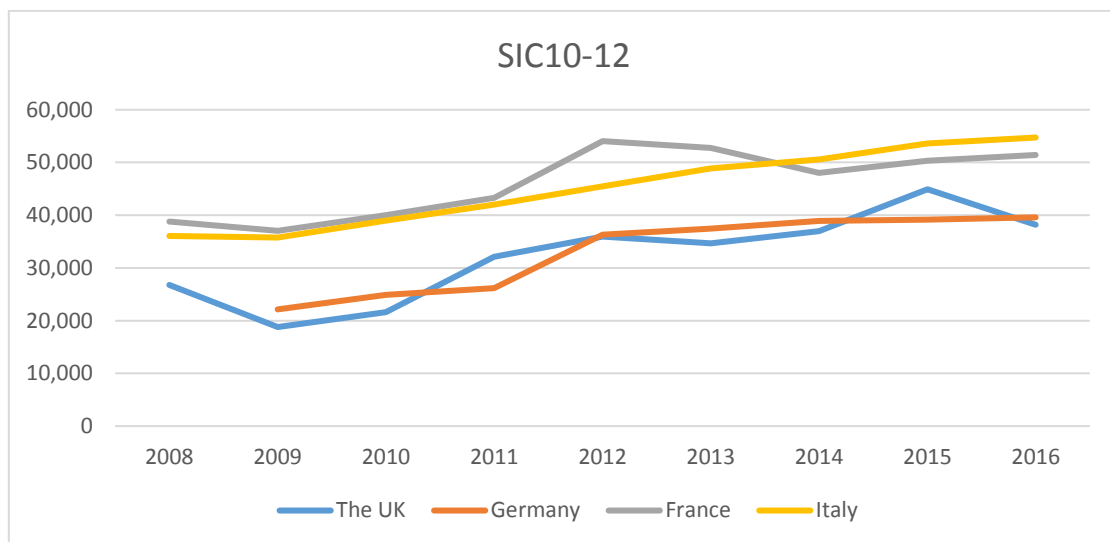
Export sales per employee in the UK food, beverages and tobacco sector is similar to that in Germany and has followed a similar trend over the last decade. The French and Italian sectors have significantly higher export intensity per employee (c. Euro 50,000 pa compared to c. Euro 30,000 in the UK). Trends in VA per employee in the sector closely mirror those of export intensity over the last decade: a recovery from 2010-15 and a marginal fall back in 2015-16. Exchange rates fluctuations were cited by some interviewees as having impacted negatively on margins with clear implications for value added.

Figure 2.6: GVA per employee: Food, beverages manufacture



Source: OECD

Figure 2.7: Export sales per employee: Food, beverages manufacture



Our discussions with insiders highlighted that few businesses in the industry actually use the term 'productivity' and almost none understood the term 'value-added'. Respondents identified a broad range of measures associated with productivity, however, dominated by measures

related to financial performance and internal processes. Financial measures focused on the traditional measures relating to sales, market share, revenue, margin, profitability, working capital, and liquidity. These measures tend to be externally facing to investors and have limited connection to productivity and GVA/employee.

The internal process measures were predominantly associated with different aspects of the efficiency of the organisations manufacturing processes. They related to labour, asset and resource efficiency with separate measures for throughput and costs. The labour efficiency measures in particular had parallels to the broader concept of GVA/employee as they focused on output/ employee. Asset efficiency also had a range of measures, but the common thread was Overall Equipment Efficiency (OEE) which is a standard measure used across all manufacturing industries.

Markets trends are seen as increasingly important in shaping sectoral productivity with increasing competition and a stronger focus on smaller batch, premium products in some segments and cost pressure in others. This has increased product complexity. *'Complexity kills productivity'* as one producer commented. As a result, operational changes are seen as helping firms remain competitive rather than generate new competitive advantage. Organisational responses have involved investment, the development of organisational capability and strategic direction.

- Investments in increasing automation, planning and decision systems have contributed to efficiency and productivity. Integration across the supply-chain remains challenging
- Organisational capabilities have been enhanced (e.g. TPM) accompanied by concerns around technician and managerial skills.
- More consideration is also being given to the supply chain design, and the position and scope of manufacturing assets.

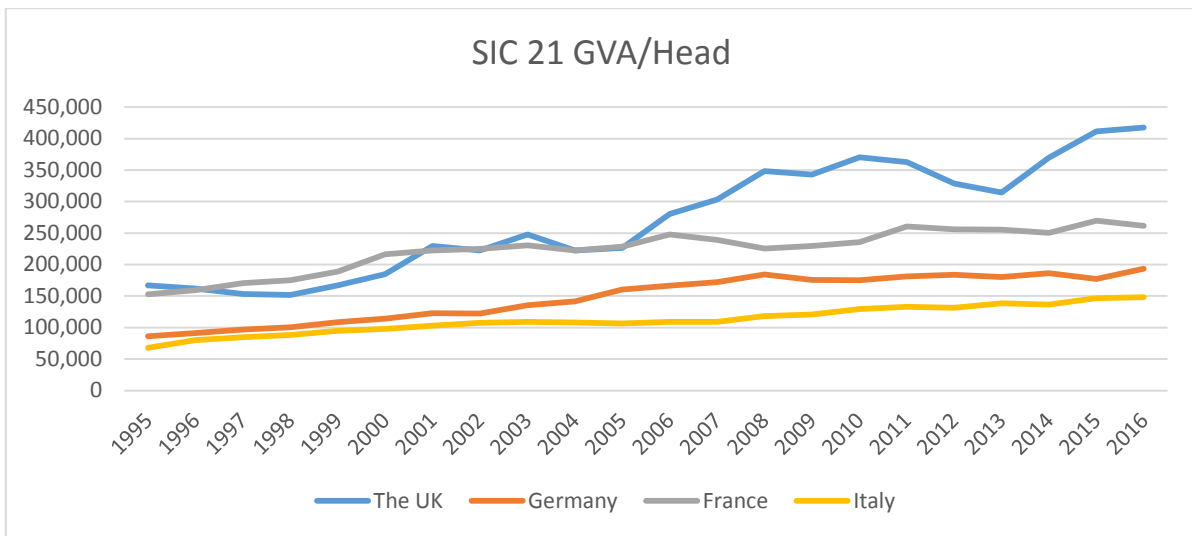
Regulation and regulatory changes (e.g. sugar tax, reduction of plastic packaging, deposit return) are seen as raising costs and potentially impacting on margins and productivity as are changes to employment legislation (e.g. pension contributions).

Overall, the highly competitive nature of the Beverages sector means that there has been a long-term focus on operational efficiency, and the added complexity of premiumisation makes further efficiency gains difficult. There is a sense that the sector may be nearing 'peak productivity', as *the 'efficiencies are already so high it is not worth the money to fight for another one percent'*.

3.4 Pharmaceuticals

GVA per employee in the Pharmaceuticals sector is readily identifiable in international comparative statistics (Figure 2.6). GVA per employee in this sector was similar to that in France from 1995-2006, and consistently above that in Germany and Italy. Productivity in this sector in the UK has risen more rapidly than that in other major EU economies over the post-2006 period - including the recessionary period - and is now nearly twice as high as that in France (Figure 2.7).

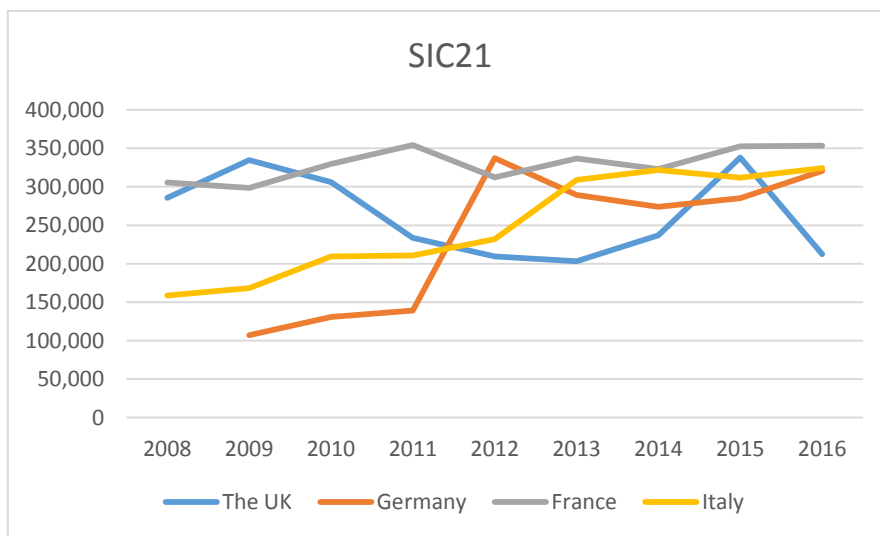
Figure 2.7: GVA per employee: Pharmaceuticals



Source: OECD

Perhaps surprisingly, export intensity in Pharmaceuticals in the UK is similar to that in France, Germany and Italy although the trend has been somewhat different in the post-recession period (Figure 2.8). Italy and Germany in particular have seen a sharp increase in export intensity in the sector in the post-recession period and now have higher export intensity than the UK.

Figure 2.8: Exports per employee: Pharmaceuticals



Source: OECD

Our insider interviews made it clear that value added per employee is rarely considered in the pharmaceuticals sector. One respondent commented:

'We talk about sales and customer impact and feedback. The term productivity is mentioned very infrequently at exec level.'

The industry view is that productivity is an irrelevance where there are multiple value-added steps which may be located in a number of different countries.

Technology challenges - patent expiry, declining R&D productivity - and challenging market conditions have contributed to substantial structural change in the sector through mergers and acquisition. Maximising value from any drug portfolio depends primarily on how selling prices are set and how elements of the value chain are distributed internationally. International tax regimes are a strong driver of location decisions and business performance. This drives a wedge between firm-level financial metrics - a number of which were used across the sector - and GVA per employee in any particular country.

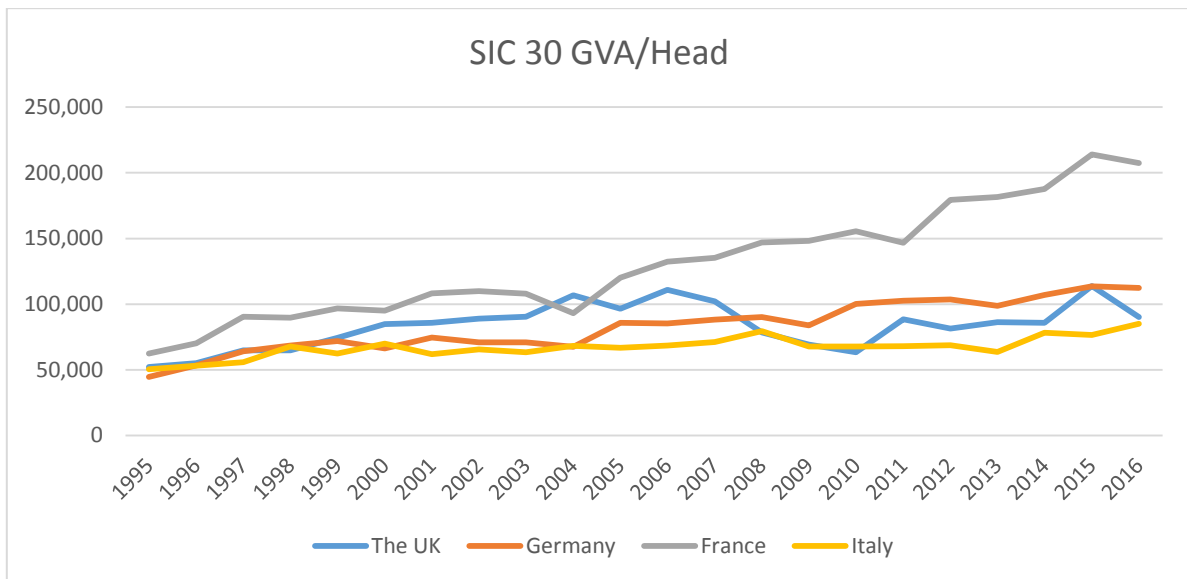
There is a recognition that in manufacturing and logistics operational efficiency was important and a wide range of labour and asset efficiency and throughput measures were used. These link closely to productivity measures for that specific location and element of the value chain. Two internal factors were universally acknowledged as drivers of productivity across manufacturing and warehousing operations: automation and new technologies and continuous improvement. Leadership and management quality were generally perceived as high with evidence of a strong industry culture of continuous improvement.

Inhibitors to productivity improvement were seen to be primarily outside the firm. Pricing pressures are reducing margins and the potential for investment. Pressures arise from reference and value-based pricing, the rising expectations and power of patients, declining government healthcare spends and the emergence of price modelling such as QALY to assess the value for money of medical interventions. Pricing has also been impacted by market entries and a focus on 'me too' products which has reduced price premiums. For the future, technology shifts towards personalised medicine pose new productivity challenges as *'all this leads to inefficiency all the way through the value chain'*.

3.5 Transport Equipment

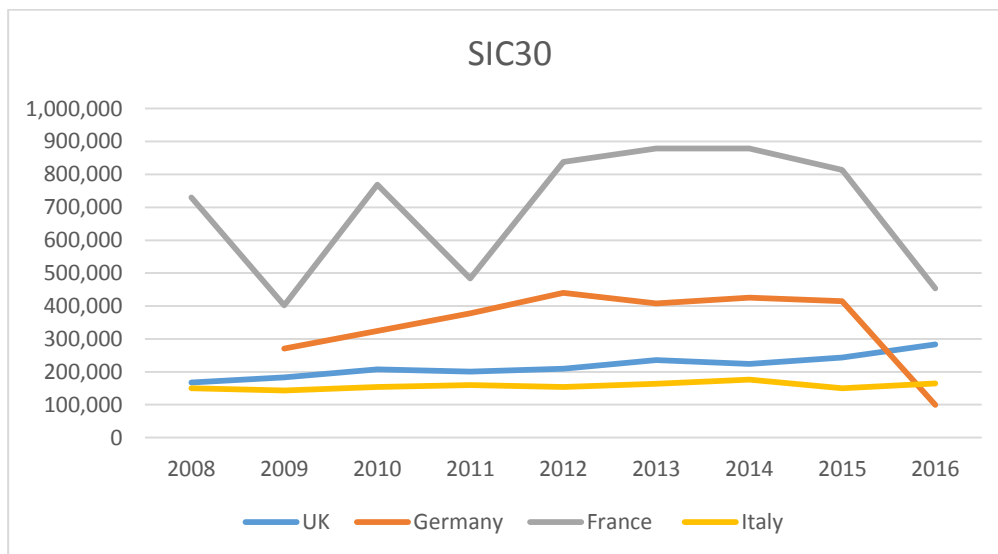
GVA per employee in Transport Equipment increased at a relatively similar rate over the 1995-2005 period in France, Germany, Italy and the UK. Since 2005 GVA per employee in France has pulled away from the other three countries (Figure 2.7). GVA per employee in the UK at around Euro 120,000 pa is now marginally higher than that in Germany and Italy but significantly lower than that in France (c. Euro 210,000 pa). Export intensity is also significantly higher in France than in Germany, Italy or the UK with export sales of around Euro 800,000 per employee year compared to around Euro 300,000 per employee year in the UK.

Figure 2.9: GVA per employee: Transport Equipment



Source: OECD

Figure 2.10: Export sales per employee: Transport Equipment



Notions of productivity differ between sub-sectors although in none of our discussions was this understood in terms of value added per employee. In shipbuilding and rail, productivity was seen as an irrelevant metric with delivery time seen as a more crucial strategic driver. In aerospace productivity was led by the primes with a significant gap to many smaller UK suppliers. Here too, meeting delivery schedules was often seen as more important than productivity per se. Where productivity was discussed it was often conflated with measures of process efficiency. Some respondents also suggested that: *'The way that productivity goals are transmitted to the shop floor and other departments is variable it has to be said and there may be room for articulating that in a different way.'*

These priorities carry over into the measurement of activity. The aerospace sector's focus is on delivery; rail doesn't measure productivity given the structural characteristics of the industry (i.e. highly asset intensive); and the marine sector is dominated by warship construction and maintenance (where the focus will be delivery and cost). No respondent in this sector mentioned GVA as a measure of productivity and those that discussed productivity were describing efficiency. Without any related accounting for resource costs this type of measure has only an indirect link to value added measures.

The structure of supply chains in aerospace and customer priorities in marine and rail shape firms' priorities in terms of productivity or efficiency improvement. In some sectors - aerospace, rail - creating capacity to meet order opportunities was seen as critical and outweighed concerns about productivity; other sectors such as marine there is currently over-capacity. This means that productivity/efficiency initiatives are generally reactive rather than driven by any innate ambition to improve productivity performance.

Inhibitors to productivity growth were seen as both internal and external to the firm:

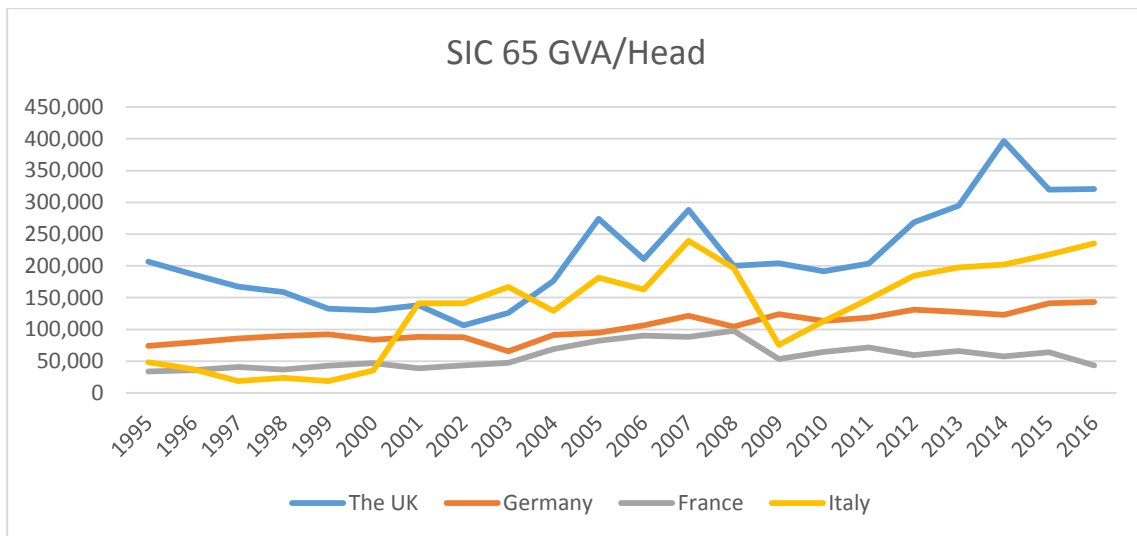
- In aerospace, lock-in to long contracts and related regulatory processes and costs can reduce the incentives for innovation. 'Long-term contracts can breed complacency, or if not complacency, behaviours that are fine on day one of the contract but towards the end of year ten are still the same as day one.'
- Other industries, such as ship building, are focused on survival rather than driving productivity gains. In Marine, volatile and uncertain demand engenders short-termism and militates against strategic, necessarily longer term, efforts to improve productivity.

Across the transport equipment sector recruitment and retainment of skilled staff was seen as a barrier to productivity improvement, an effect exacerbated by volatile demand. Business leaders with an engineering specialism and leadership capabilities are also in short supply. Some positive effects of public support on productivity were noted in Scotland and Northern Ireland.

3.6 Banking

GVA per employee in this sector in the UK has increased steadily since 2002 and despite some recession effect is now considerably higher than that in the other major European economies. In this sector GVA per employee at around Euro 320,000 pa is now twice that in Germany and around 1.5 times as high as that in Italy (Figure 2.9). OECD figures provide export intensity data for a broad banking and other financial services sector (including insurance). For this broader sector, export intensity in the UK, although volatile, is significantly higher than that in France, Germany or Italy.

Figure 2.13: GVA per employee: Banking



Source: OECD

Our insider interviews suggested little concern with value added by people in banking. Instead there was a focus at corporate level on cost: income ratios and on more operational metrics for individual business units. Typical was the comment that: *“There’s always a drive to improve the cost income ratio, and one of the ways in which that’s done is making sure that you’re deploying the right number of staff, you’re looking for efficiencies in terms of the way that the business is organised.”* Such efficiencies may influence value added per employee by increasing margins or by shifting the balance of employment towards better paid (if fewer) jobs.

Competition and the innovation that accompanies it was seen as one of the most important drivers of productivity (or operational efficiency). Competition is driving automation and digital adoption. Maintaining customer experience and satisfaction is also seen as important driving both cultural and technological change. Better training of staff alongside promotion was also seen as a potentially important influence on productivity.

Respondents identified a number of inhibitors to productivity improvement: internal factors such as approaches to leadership and innovation, legacy systems and organisational culture; and external factors linked primarily to regulation:

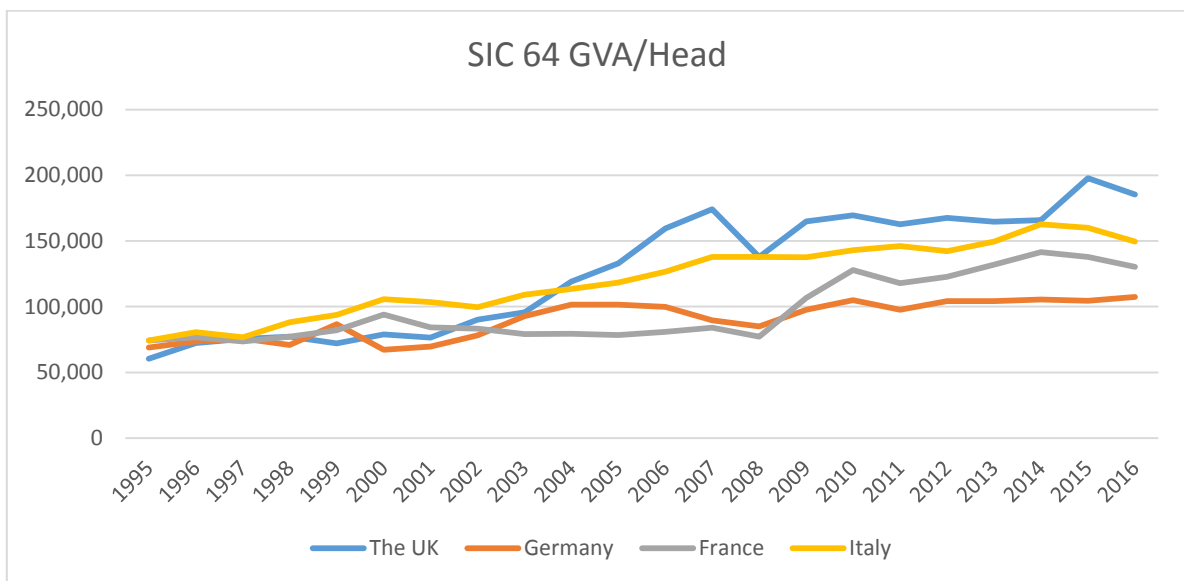
- The evolution of incumbent banks limits their potential and inclination towards interoperability, cooperation and communication both internally and with third parties. This applies less to new entrants.
- The costs and risks (financial and reputational) discourage innovation particularly given regulatory and stock market pressures. Legacy infrastructure may also restrict innovation particularly among incumbents.
- Tighter regulation - including increased capital requirements and personal liability - have increased the cost of risk. Ensuring compliance with changing legislation is also a significant cost.

The increasing role of innovation, AI, blockchain as well as the introduction of Open Banking is expected to be transformational in the coming years. Furthermore, the potential entries of tech giants such as Google, Amazon, Facebook and Apple pose the biggest threat for the businesses in banking.

3.7 Insurance

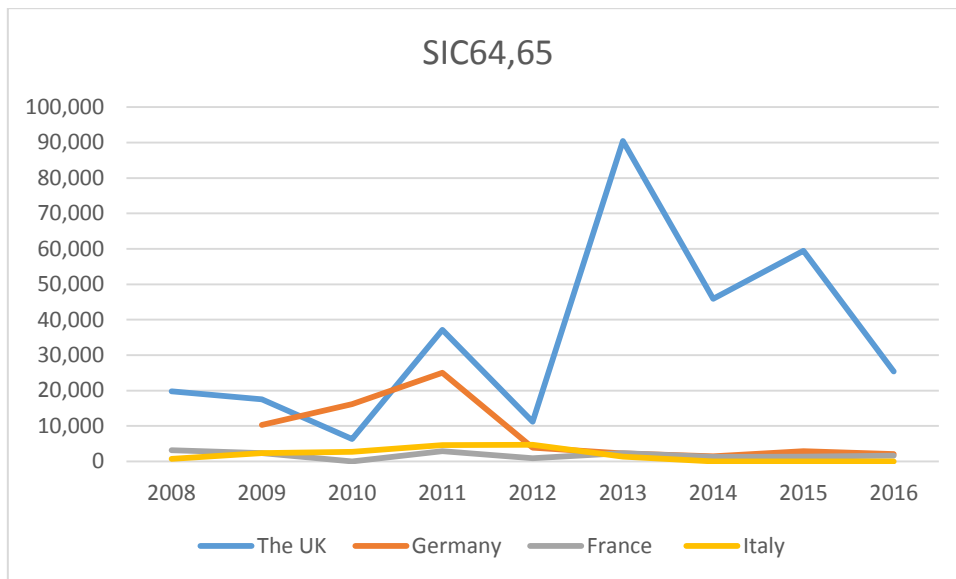
Comparable figures on GVA per employee are not available for insurance specifically but only for the slightly broader 'Other Financial Services' sector which also includes pension funds. In this sector GVA per employee has increased steadily in the UK, France, Germany and Italy since 1995 reaching around Euro 180,000 pa in the UK by 2016 (Figure 2.8). Productivity in the UK has been above that in France, Germany and Italy during the post-recession period. Specific data on export intensity in insurance is also lacking but broader aggregates emphasise the relatively high export intensity of UK financial services (Figure 2.12).

Figure 2.11: GVA per employee: Other financial services including Insurance



Source: OECD

Figure 2.12: Export sales per employee: Financial services



The lack of recognition of value added per employee as a practical measure of productivity noted in other sectors was also evident across the insurance sector. Typical was the comment from a Medium-sized under-writer who commented: *'productivity - it's something I don't really think about, if the truth be known'*. Rather than measuring productivity, performance measures tend to be more operational and short-term with a focus on net promoter scores, renewal retention etc. Operational - throughput - measures were also important and have clearer links to GVA per employee. As in banking digital technologies are expected to reduce head counts and have the potential to raise earnings per employee.

Competition from incumbents and new entrants was emphasised as a major spur to operational improvements in the sector. However, complacency and conservatism in the sector and firms' leadership were emphasised by respondents as a barrier to innovation and productivity improvement. Regulation was also seen as a key barrier to productivity improvement both through its direct impact on costs and compliance costs as well as its indirect effect through increased conservatism. Conversely, technology was seen by respondents as a positive driver of productivity although some firms were hampered by legacy systems which are incompatible with the needs of data analytics.

Looking forward the sector faces the potential for significant disruption due to the introduction of use-based insurance products enabled by IOT connectivity and the potential entry into the market of data aggregators such as Amazon and Google and more personalised insurance policies.

Section 4: Cross-cutting themes and implications

4.1 Understanding 'productivity'

None of the business insiders in any sector reported using value added per employee as a measure of performance in their business. Where the term 'productivity' is used it is generally conflated with narrower concepts and measures of operational efficiency across all or a segment of a business. In Oil and Gas, for example, one insider commented:

'They don't really talk much about productivity, you know, as a concept. But they talk in very general terms about efficiency and reducing cost, but they don't really use the word productivity, and they certainly don't have a kind of a technical kind of led, or a technical assessment.' [Public Institution]

In Beverages, few businesses use the term 'productivity' and almost none used the term value-added per employee or understood the term 'gross value-added'. Value added per employee is also rarely considered in the pharmaceuticals sector. One respondent commented: *'We talk about sales and customer impact and feedback. The term productivity is mentioned very infrequently at exec level.'*

Similar perspectives were also evident in the Transport Equipment sector. One respondent from the rail sector stated:

'[Thinking about] productivity is almost completely unknown. There was a review of the rail industry by Nicola Shaw three or four years ago and that led to a commission to NSAR to look at productivity, and the word efficiency was lightly used, but productivity is not particularly widely used.'

Commentary was similar in Banking and Insurance with one bank commenting that 'There's not really a very sophisticated understanding of productivity within the whole sector.' And, in insurance,

'Productivity. It's not a term used in the sector. it certainly isn't a metric that is used by individual insurers very often and it's not metric that is used by industry lead bodies either' [Industry Body]

The lack of recognition and use of the term 'productivity' and - in many cases - the lack of understanding of the notion of value added per employee suggests a marked disconnect between policy dialogue and business practice. The lack of use of strict productivity metrics may have a number of origins:

- 'Productivity' (value added per employee) may be seen as a longer-term measure while firms' operational focus is often on metrics which are measurable in real time;
- 'Productivity' may also be seen as something which is outside the control of the business (see below); efficiency on the other hand is something over which the firm has firmer control;
- In some contexts, neither productivity nor efficiency may be important performance metrics. In some Transport companies, for example, meeting delivery schedules and/or completing work within fixed shut-down times were the dominant driver for resource allocation.

However, this should not be interpreted as a lack of interest or commitment to improving efficiency in the majority of companies interviewed and this is reflected in diverse sets of performance metrics.

4.2 Measuring performance

Measures of performance differ markedly between sectors with financial indicators - profitability, return on capital - typically combined with more operational indicators. No attempt is made by firms to estimate value added either in total or per employee. Many of the more operational measures used by firms capture aspects of value added - efficiency for example - but fewer capture the related revenues of products/services or the associated costs. The range of measures used, however, does serve to highlight the limitations of value added measures and the potential for complementary indicators. In the Oil and Gas sector, for example:

'Our general metrics are around cost and value of the barrels that we've either got in the ground or we've produced, that's what we use as our metrics'. [Oil Company]

Here, the 'cost and value' metrics clearly link strongly to value added but the resource measures lie outside the measurement of value added (although there may arguably be a link through price). More interesting is the suggestion of the value of complementary measures of natural capital or resources - clearly relevant in extractive industries but also potentially important for sustainability in other sectors. This was also reflected in other sectors (e.g. Beverages, Table 5.1) in terms of metrics relating to energy and water use.

Operational measures of efficiency typically relate to labour efficiency, asset efficiency and resource efficiency as well as overall cost indicators. These measures relate directly to the cost element of value added although a link to revenue implications was infrequently made. Operational measures were complemented in some cases by other indicators of organisational achievement related to employee engagement, innovation outcomes, and customer satisfaction and retention. None of these are captured directly by value added measures although each may, of course, have implications for longer-term productivity. In some sectors, however, neither efficiency nor productivity were a primary concern with a respondent from within the rail sector stating:

'Rail's being measured on other things to be honest. So, rail's been measured on safety and reliability and performance and the financial aspect of being formerly secondary particularly on the infrastructure side.'

Firms also referred to the difficulties of accurately measuring performance, and potentially, the value of different indicators for different parts of the company. One bank commented:

'I would say that [the measuring of success in each department of the bank] is fairly different and separate, but our overall target is a profitability target and so everything that, the different elements that the bank do is driving towards that kind of framework rather than using productivity.' (Incumbent Bank)

Different success metrics were also evident at different points in sectoral value chains, net promoter scores for insurers for example compared to renewal retention for insurance brokers. The link from either metric to value added is indirect.

4.3 Internal and external drivers of productivity

Across each of the sectors productivity - or more accurately - efficiency was influenced by a mix of internal and external factors. There was a general perception, with the exception of the Pharmaceuticals sector, that management and leadership capabilities were often limited, and that innovation was limited by conservatism. Leadership and management training were seen as an important area for future development. Technology was generally seen as an enabler of productivity growth although firms' willingness and ability to adopt new technologies could be limited both by funding difficulties where margins are low (Beverages) and incompatible legacy systems (Banking, Insurance).

Competition was seen as intensive in most of the sectors considered and interpreted primarily as a driver of innovation. The benefits of innovation were quickly eroded, however, where 'me too' products were developed by competitors (Pharmaceuticals), innovations were copied reducing margins, or customers demanded related price changes (Beverages). The changing nature of competition - the hollowing out of markets - was also evident in a number of consumer-facing sectors (Pharmaceuticals, Beverages, Insurance) with an increasing distinction between low value products/services and more personalised, premium offerings.

Regulation was also frequently cited as having significant productivity costs. Costs of compliance were reportedly high, particularly where regulation changes repeatedly. Indirect effects - such as increased conservatism - may also result where firms face regulatory risk and/or managers face personal liability.

4.4 Implications

The disconnect in expression and understanding of 'productivity' as value added per employee between policymakers and C-suite (senior executives) poses significant communication challenges. Policymakers hearing discussion of a 'productivity gap' are likely to associate this with disparities in firms' ability to create value added. Our analysis suggests that in some sectors such disparities may reflect a mix of both internal and external factors. Internal factors may include leadership and management but also issues around technology adoption and use. External issues may relate to international market competition as well as regulation.

Our interviews suggest that firms hearing discussion of a 'productivity gap' seem more likely to associate this with a more narrowly based deficit in operational efficiency. Lower levels of operational efficiency are likely to be one element of any gap in value added per employee but are only part of the story. Equal levels of operational efficiency may, for example, be consistent with lower levels of value added where product unit values vary. Understanding 'productivity' in terms of operational efficiency also focuses attention on factors internal to the firm and distracts attention from potential eco-system or external influences. This can narrow the debate on the drivers of value added focussing attention disproportionately on issues such as leadership and management while under-emphasising the importance of external productivity drivers.

In large part the disconnect between policy and C-suite understandings of 'productivity' reflects individuals' professional priorities: for economic policymakers enabling wealth creation is paramount; for business leaders maximising shareholder value is a priority. However, the disconnect in perspectives creates challenges for communication particularly where policy is being developed in order to address any productivity (value added) deficit. For example, industry-led interventions to support productivity improvement may be inclined to focus on

internal factors while paying less attention to the impact of the wider business environment. More generally, discussion of the 'long tail' of low productivity firms in the UK may potentially be mis-interpreted as the UK having disproportionately more low efficiency businesses.

Our insider interviews also emphasise the diverse - and sectorally specific - range of external influences on value added per employee. For example, in Oil and Gas the oil price dominates, in parts of the Transport Equipment sector firms' key deliverables relate to delivery schedules rather than maximising profits or minimising costs. In Pharmaceuticals patent lives are key but the international tax landscape is also important in shaping where profits are earned and therefore value added (apparently) generated. Each of these examples emphasises the importance of external productivity drivers alongside internal factors which may shape efficiency. Improvements in UK leadership and management can therefore play an important part, but only part, of any solution to the UK's productivity problem.

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