The future of productivity in food and drink manufacturing

Strategic Labour Market Intelligence Report

Terence Hogarth and Erika Kispeter

Institute for Employment Research, University of Warwick

Peter Glover

Senior Research Manager

UK Commission for Employment and Skills

February 2016

Foreword

In September 2015, UKCES commissioned a consortium of research organisations led by the Institute for Employment Studies (IES) and SQW to prepare a series of a series of strategic labour market intelligence reports on the challenges and opportunities for increasing productivity in four sectors and two cross-cutting themes.

The recent poor productivity performance of the UK economy, especially since the end of the recession of 2008-09, has become a major concern for economists and policy-makers. Unlike previous recessions, job losses were not as high as might have been expected[1] but real wages have declined, falling by an average of 1.7 per cent per year between 2008 and 2014.[2] Productivity growth too has been very modest: this has become known as the 'productivity puzzle'. As a consequence, the UK, which was already some way behind many other major developed economies on this measure, has fallen back even further. The overall level of productivity in the United States' economy is now 31 per cent higher than that of the UK, while Germany's is 28 per cent higher.[3]

A number of possible explanations have been put forward for this. Some commentators believe that businesses hoarded labour on relatively low wages rather than investing in capital, leading to stagnation in output per worker. Others have suggested risk aversion by financial institutions has reduced access to loans for investment. The result, it is argued, has been inefficiency in the allocation of resources in the economy, and an absence of the 'creative destruction' processes that can help drive up productivity.

One thing that is apparent from the data that exists on productivity is that it differs from sector to sector. In recent years, for example, there have been high levels of productivity growth in the transport equipment and administration/support sectors, but falls in productivity in the finance and the chemicals and pharmaceuticals sectors[4]. Any research or commentary on productivity needs to unpack some of the characteristics of sector productivity.

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[1] Unemployment rose from 1.62m in February 2008 to 2.68m in October 2011 on ONS data.
[2] Calculated by the Institute of Fiscal Studies based on ONS Annual Survey of Hours and Earnings. See http://www.ifs.org.uk/uploads/Presentations/Understanding%20the%20recession_230915/SMachin.pdf
[3] Figures from the Office for National Statistics for GDP per hour worked, 2013. Published at http://www.ons.gov.uk/ons/rel/icp/international-comparisons-of-productivity/2013---final-estimates/info-icp-feb-15.html
[4] Cook, J. Pledges, Puzzles and Policies: what's in store for innovation and enterprise?, Viewpoint Series, SQW, http://www.sqw.co.uk/files/5514/3359/6668/Innovation_policy_post-election_-_Viewpoint_final.pdf

In April 2015, Sir Charlie Mayfield, Chairman of the UK Commission for Employment and Skills (UKCES), set up the Productivity Leadership Group, a cross business group of senior leaders seeking to find practical ways to increase the productivity of British business. Business leaders came together in specific sectoral and cross cutting groups to focus on shared problems and opportunities (Manufacturing, Digitisation, Food and Drink, Measurement, Better Workplace Practices, Retail and Creative)[5].

In September 2015, UKCES commissioned a consortium of research organisations led by the Institute for Employment Studies (IES) and SQW to prepare a series of a series of strategic labour market intelligence reports on the challenges and opportunities for increasing productivity in four sectors and two cross-cutting themes (IES, SQW, the Institute for Employment Research (IER), and Cambridge Econometrics (CE)). The research consortium produced six papers:

1. Robin Brighton, Chris Gibbon and Sarah Brown, *Understanding the future of productivity in the creative industries*, SQW
2. Annette Cox, Graham Hay, Terence Hogarth, Graham Brown, *Productivity in the Retail Sector: Challenges and Opportunities*, IES
3. Anne Green, Terence Hogarth, Erika Kispeter, David Owen, *The future of productivity in manufacturing*, Institute for Employment Research, University of Warwick
4. Terence Hogarth and Erika Kispeter, *The future of productivity in food and drink manufacturing*, Institute for Employment Research, University of Warwick
5. David Mack-Smith, James Lewis, Mark Bradshaw, *State of Digitisation in UK Business*, SQW
6. Penny Tamkin and Ben Hicks, *The Relationship between UK Management and Leadership and Productivity*, IES.

We would like to thank the following UKCES colleagues for their assistance with the delivery of the project: Vicki Belt, Duncan Brown, Richard Garrett, Peter Glover, Hayley Limmer, Aoife Ni Luanaigh.

Penny Tamkin (IES), Michael Frearson (SQW), Susan Mackay (SQW)
Project leadership team

[5] The findings of this group have now been reported (see https://howgoodisyourbusinessreally.co.uk/)

The study reported here complements the work of the Business Leadership Group for **food and drink manufacturing** through an assessment of the factors driving productivity growth in the sector. In particular, it identifies the skills that the sector will increasingly need to acquire if the UK is to match productivity levels and growth in countries such as Germany, France and the Netherlands. The difficulty food and drink manufacturing faces is that the skills it needs to drive productivity growth – typically science, engineering, and technology related ones - are in high demand in other sectors too, and therefore it needs to identify how it can develop its own talent pipelines if it is to match performance levels in competitor countries.

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Tables and figures

Executive Summary

- The food and drink sector employs around 400,000 people and generates output of around £26bn each year. Although it is a relatively low productivity sector in comparison with other branches of manufacturing, its productivity performance has been relatively good over recent years.

- Food and drink products generate relatively low value added per unit of production. The volume of production, however, ensures that it is a mainstay of the UK economy. Whilst there are imperatives for the sector to improve its productivity performance, it is always likely to be a relatively low valued added sector.

- Rather than focussing on what it is required to ensure that it is a high productivity sector, there is a need to focus on whether there is a skills system in place that will ensure that the sector continues to improve its productivity performance. Given that the sector is an internationally traded one, it is important that productivity is at least on a par with the other leading producers in the world.

- It is possible to point to several critical skill sets for the sector:

    - strategic management skills required to ensure that the sector is one which remains competitive;

    - engineering skills required to service production systems; and

    - food technology skills used in the design and manufacture of new food and drink products, and ensuring that outputs meet required health and safety standards.

- The industry's critical skill needs are ones where demand tends to outstrip supply. In part this reflects the demand for people with STEM skills (c.f. engineering and food technology).

- Employers face risks in investing in engineering and food technology skills. If the employer is to take on the cost of training a person to Level 3 or above in engineering or food technology, the costs are likely to be substantial. Employers are unwilling to make the investments unless they are assured that they can appropriate the returns on that investment.

- Apprenticeships have proved one means of acquiring engineering skills. Employers however have developed the range of policies and practices that will allow them to retain the services of the apprentices they train. The Apprenticeship tends to develop a bond between employer and apprentice that results in the employee being reluctant to leave the employer that trained them.

- The supply of food technologists has been less readily solved. Food technologists tend to study full-time in FE and HE. In this way, it is the individual employee and the state that bear the risk of the training investment. The risk for the employer is whether sufficient people train in FE or HE and are then attracted to the food and drink sector when they complete their studies.

- Employers are increasingly developing links with FE and HE providers in order to develop more formal links in order to persuade more people to study food technology / food science. In this way the employer is increasing its investment in these skills in order to boost supply.

- There remains a potential catch-22 situation where employers are unwilling to invest in much sought after skills because they are concerned that they will not be able to appropriate the returns from investing in those skills. The evidence suggests that larger employers at least have been able to develop the talent pipelines – via Apprenticeships and links with FE and HE – that will serve them well in the future.

- What is much less clear is whether employer engagement will be sufficient to drive productivity growth. This relates to the fact that many employers in the sector are small to medium-sized enterprises where the capacity to invest in talent pipelines is much more constrained than it is for the larger employers.

- The above point suggests that there may be a need for collective measures to ensure that the skills needs of the sector as a whole are met. In other words, that there is a talent pipeline for the sector as a whole rather than just for selected companies that have the acumen and resources to develop them.

- It is perhaps worth reiterating that the sector is an important one. Not just with reference to the number of people it employs but also from the perspective of food security and health and safety.

1 Productivity growth in the UK

Chapter Summary

- This chapter sets the broader context for understanding the future of productivity in the food and drink sector.
- The UK has experienced a slowdown in labour productivity since the global financial crisis, though this is less manifest in food and drink compared with manufacturing more generally.
- Whilst the slowdown in productivity growth may have slowed the pace of employment contraction, this cannot be sustained over the longer-term.
- Employers will need to secure productivity or efficiency gains in order to sustain their position in a global food and drink market.

1.1 The productivity puzzle

In common with most western economies, the UK has experienced both a slowdown in long run output growth and labour productivity in the period following the global financial crisis in 2007/8. This may reflect a cyclical adjustment, albeit a prolonged one, to what proved to be a particularly deep recession. Relatively weak productivity growth is seen to have resulted from:

- firms hoarding workers and skills in an attempt to avoid the costs of recruiting skilled workers during the recovery phase;
- weak investment in capital per worker – resulting from firms being cautious about investing in new technology and a reluctance of the banks to lend money to business;
- relatively strong growth in low skill, low productivity employment in the immediate.

These were seen to be cyclical problems that would begin to disappear as growth accelerated (Barnett et al., 2014). More pessimistically, some commentators have pointed to what may be a longer run structural adjustment in western economies bringing about a new secular stagnation (Summers, 2014). This means that the recent prolonged period of weak output growth is more than just a hangover from the global economic crisis. While there are multifarious causes, attention has focused upon (Gordon, 2012; Eichengreen, 2014):

- weak technical progress;
- falling aggregate demand (individuals are saving rather than spending and firms are unwilling to invest even at near zero interest rates);
- slowing total factor productivity because of lack of insufficient investments in infrastructure, education and training;
- a failure to recover pre-recession growth rates because the supply-side loses some of its productive potential due to relatively high levels of unemployment.

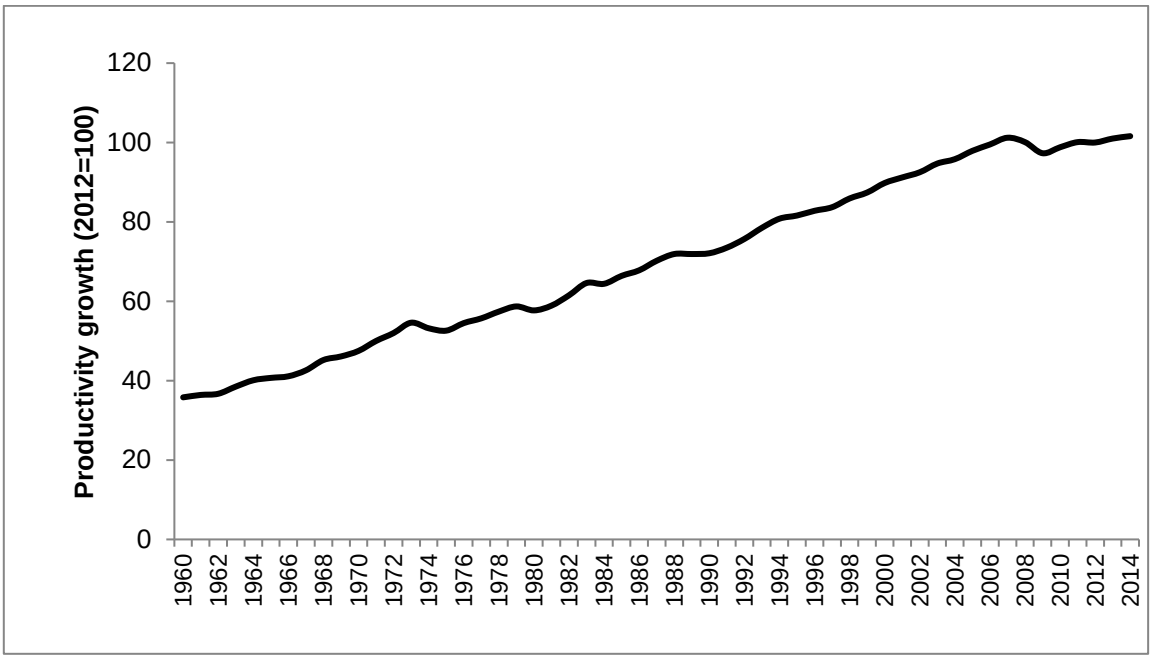
Although the diagnoses derive from analysis of the US economy, and are not without contention, they serve to illustrate the multiplicity of factors that are might underlie the recent performance of many western economies.

It is perhaps also worth noting that there are a range of measurement issues related to measuring productivity: not least the capacity to measure the value of outputs generated by the IT revolution (Mokyr, 2014); and being able to accurately count hours of work (the denominator for measures of productivity) in economies where an individual's hours of work can be flexible.

1.2 UK productivity

In the pre-2007 period the UK economy experienced relatively strong productivity growth and was able to close the productivity gap it had long experienced with many of its main competitor countries. Figure 1.1 shows the long run trend in productivity measured by output per hour worked. It shows how over the most recent past productivity growth has flattened out. It is estimated that between 1979 and 2007 productivity grew at around 2.3 a year, but between 2017 and 2014 the growth rate was -0.1 per cent, with the result that by 2014, productivity was 17 per cent lower than it would have been had growth continued at 2.3 per cent a year (Dolphin and Hatfield, 2015).

Figure 1.1 Output per hour worked 1960-2014 (2012 = 100)

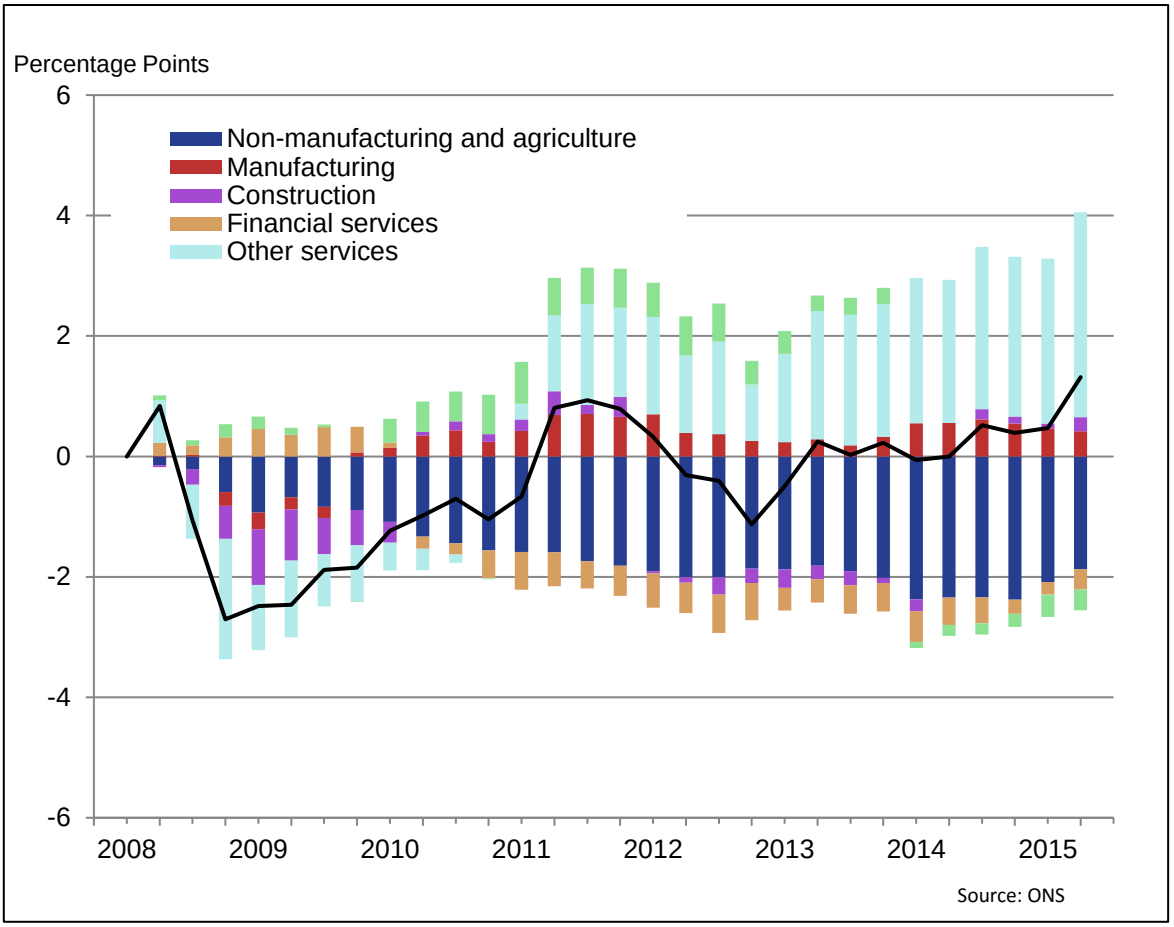


Source: ONS output per hour worked series

Labour productivity is the ratio between output (value added) and labour inputs. The latest ONS statistics for 2015Q2 suggest that recent growth in productivity has been driven by increases in value added and a small decrease in hours worked. In Q2, 2015 productivity was on the increase - output per hour was the highest ever recorded - but remained 15 per cent below an extrapolation based on the trend prior to the economic downturn (ONS, 2015).

There is a strong industry component to productivity growth (see Figure 1.2). In particular, the service sector – other services excluding financial services - appears to be the driver of growth. In the period since Q4 2012, the non-manufacturing production and agriculture sector has contributed close to zero to productivity, whereas the other sectors have added around 3 per cent to productivity.

Figure 1.2 Cumulative Contributions to Quarter on Quarter Growth of Whole Economy Output per Hour



Source: ONS Productivity Statistics Q2 2015

Historically, the manufacturing sector has been a driver of productivity growth within economies. Potentially employers in the manufacturing sector have more scope to increase labour productivity by substituting labour with machinery and by outsourcing various activities including low-value elements of the production process. Parts of the service sector, such as the education and the arts, cannot achieve these types of productivity gain or at least not to the same extent (for example, an orchestra cannot increase its productivity by playing faster or by, for instance, outsourcing the string section to a lower-cost ensemble) (Baumol and Bowen, 1966). But these sectors are in competition with the ones realising productivity gains, for labour (and skills) and, accordingly, pay wages at least equal to them.[6] Manufacturing is able to offset the potential for wage-push inflation by continually raising its productivity levels (and, consequently, reducing the size of its workforce).[7] Within the manufacturing sector performance has been variable as shown in Table 1.1.

[6] Clearly parts of the service sector have through the introduction of information and communication technologies have been able to realise substantial labour productivity improvements over recent years.
[7] It is apparent from the ONS analysis that parts of the service sector have been able to realise these type of productivity gains too.

Table 1.1 Productivity per hour in manufacturing industries

		Food, beverages & tobacco	Textiles, wearing apparel & leather	Wood & paper products, & printing	Chemicals, Pharmaceuticals	Rubber, plastics & non-metallic minerals	Basic metals & metal products	Computer products, Electrical equipment	Machinery & equipment	Transport equipment	Coke & refined petroleum, Other manufacturing
Divisions		10-12	13-15	16-18	20-21	22-23	24-25	26-27	28	29-30	19,31-33
Level (£)	2012	30.1	27.2	23.0	77.1	24.2	23.3	32.5	31.0	37.0	31.8
Index (2012=100)	2014	101.4	91.6	104.6	105.6	108.7	96.0	97.5	93.1	107.9	105.7
Percentage change	Q1 to Q2 2015	-0.8	-0.1	-3.9	1.8	-1.9	4.6	-1.5	-3.5	-1.1	-0.4

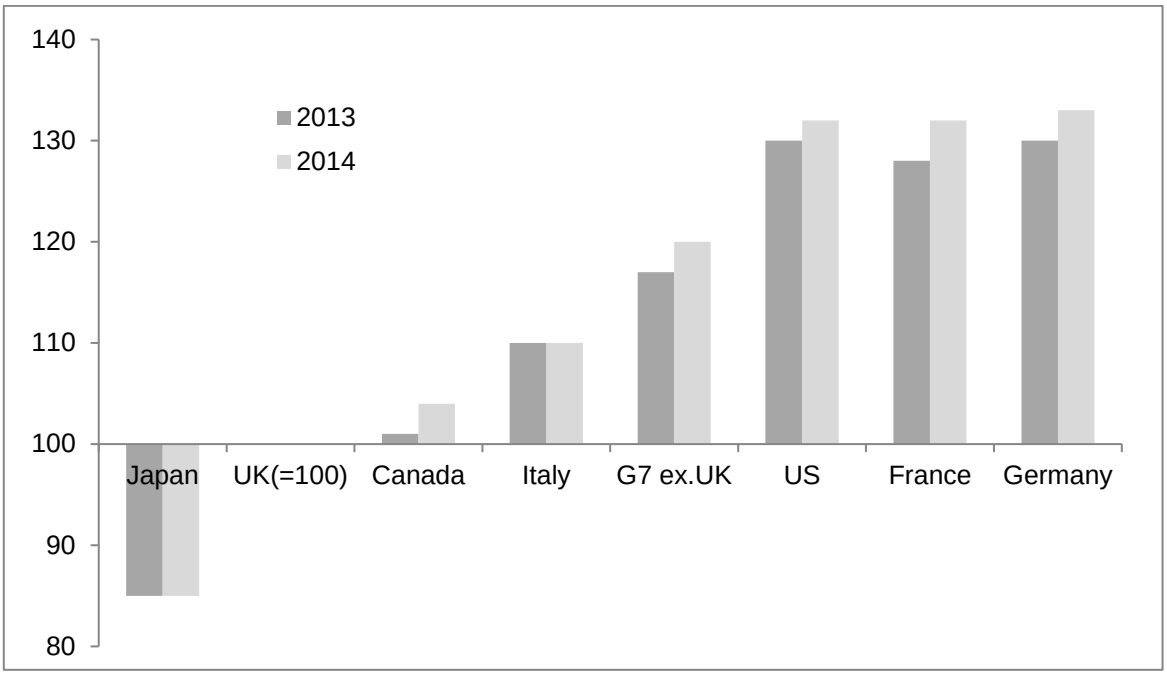
Source: ONS Productivity Statistics Q2 2015

The highest levels of productivity, measured in output per hour in chemical and pharmaceuticals but productivity growth has been relatively modest in this sector. In contrast, rubber & plastics, and transport equipment both record more modest levels of productivity per hour, but much higher levels of growth. The food and drink sector – one that is considered to have low levels of technological intensity - shows more modest levels of output per job. As will be explained in the following chapters, productivity growth in the food and drink sector has been relatively high compared with the economy as a whole.

1.3 International productivity trends

Productivity needs to be seen from an international as well as domestic perspective. Figure 1.3 shows UK productivity per hour compared with G7 countries. Productivity compares relatively poorly with many G7 countries (lower than that of the rest of the G7 by 20 percentage points).

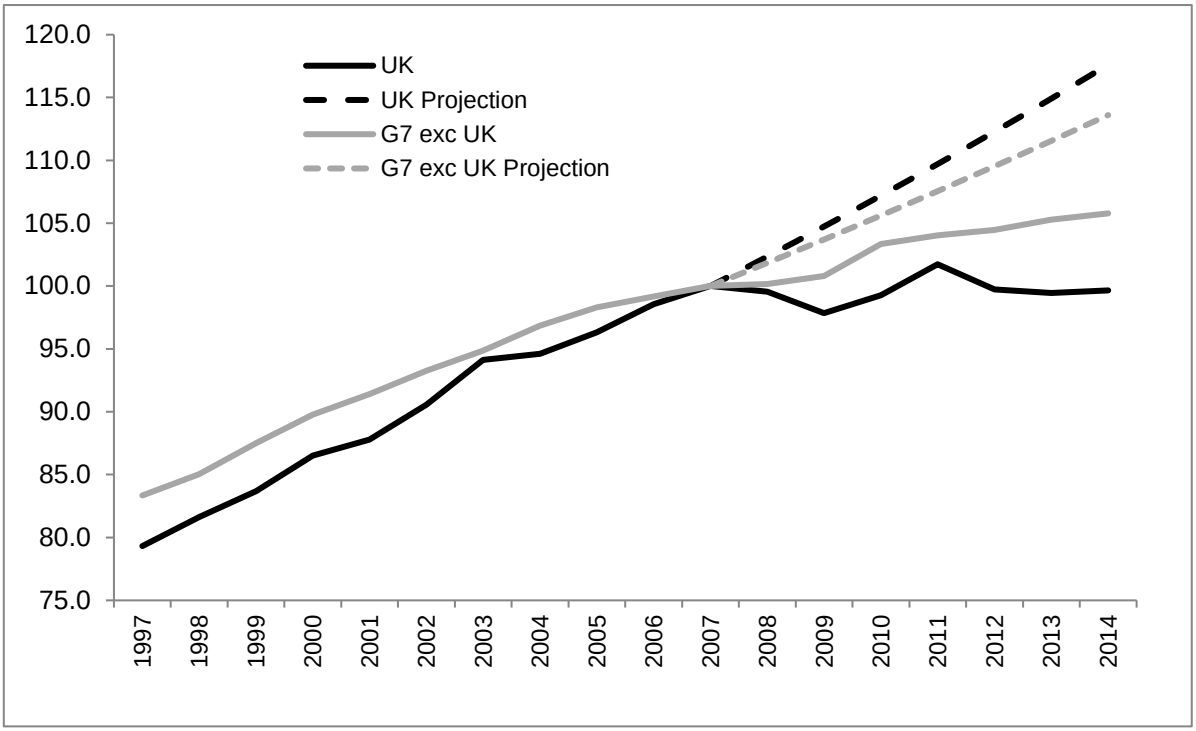
Figure 1.3 Productivity comparisons with selected G7 countries (UK = 100)



Source: ONS Productivity Statistics Q2 2015

Figure 1.4 provides a further comparison to show how productivity per hour has changed over time in selected countries. It also shows ONS's estimate of the gap between actual productivity and that projected had productivity continued to grow at is pre-recession level. As a result of relatively strong productivity growth in the period before 2007, the productivity gap is larger in the UK than in the G7 (18 per cent in the UK versus 8 per cent in the G7).

Figure 1.4 Constant price GDP per hour worked, actuals and projections (2007 = 100)



Source: ONS Productivity Statistics Q2 2015

1.4 Understanding the role of human capital in raising productivity levels

The study is about understanding the relationship human capital development can make to productivity improvements in the food and drink industry. Some consideration needs to be given to how the development of human capital can affect productivity and how that development can take place. If one accepts that the quality of human capital will have an impact on productivity, the question becomes one of identifying how employers can be persuaded to increase their investments in human capital.

The human capital model specifies that in relation to transferable skills, employers will not be willing to fund such training because they will not be able to recoup the costs of its provision. The wage paid to the persons whilst training will need to be set a level which effectively compensates for the costs of their training and reduced productive capacity. If the employer amasses a net training cost at the end of the training period, there will be no way, in perfectly competitive labour market, of recouping that cost. To do so would require the employer to pay a wage below the marginal productivity of the employee (Hogarth and Gambin, 2016). Because the employer that had not provided training will be able to pay a wage equal to the marginal productivity of the employee, the employee in the training company will move to the non-training company where wages are higher.

The question then becomes one of identifying how the training employer can retain the employee who has been trained where there is a net cost to the employer at the end of the training period. It is known, for instance, that many companies that train engineers at Level 2 or Level 3 encounter a substantial net cost of training at the end of the formal training period. They are able to recoup that cost because they essentially develop a bond between employer and employee. Often it is the very fact that the employer has trained the employee that deepens the bond and allows the employer to recoup their training costs in a way that the human capital model does not explicitly acknowledge (Gambin and Hogarth, 2015; Gambin et al., 2010).

One of the ways in which the risk facing employers investing in training has been provided has been reduced is through the employer ownership of skills. By being able to increasingly tailor the provision of publicly funded training programmes to employer needs, the employer is better placed to ensure that the skills provided – be it those in the FE or HE sector – meet their needs. Employer routed funding will also provide employers will also ensure that training meets their needs too. This does not necessarily affect the propensity of the employer, other things being equal, of investing in transferable skills, but it does remove the potential barrier to training that arises where employers feel that existing provision does not match their needs (Hogarth et al., 2014).

The conceptual framework for the study is based on understanding how employer are able to develop the bond between employer and employee that will allow employers to recoup their training investments, and how willing and able the employer is to take advantage of the flexibility afforded employers to tailor public training programmes to their needs.

1.5 Conclusion

This short chapter has provided an overview of productivity performance in the UK based mainly on analysis of output per hour worked. The analysis illustrates the way in which long run productivity growth has stalled in the UK following the global financial crisis in 2007. In some respects, unfavourable comparisons with other countries – e.g. the gap between actual versus projected pre-2007 productivity growth - result from the relatively strong growth the UK experienced prior to 2007 which was sufficient to close much of the gap with competitor countries. It is apparent, however, that other countries have experienced stronger productivity growth since 2007.

The data also points to differences between industries within the UK. Much productivity growth has been driven by the service sector other than financial services. Within the manufacturing sector it is apparent that growth varies between sub-sectors. The food and drink sector, that forms the focus of this report, records relatively low levels of output per hour compared with other manufacturing sub-sectors, but has recorded above average productivity growth (whereas some other sub-sectors have recorded below average growth). In the remainder of this report an exploration is provided of the factors that explain observed productivity trends in food and drink. In doing so, it touches upon many of the factors outlined in the introduction to this chapter.

2 The food and drink manufacturing sector in the UK

Chapter Summary

- Output is valued at around £26bn a year. Around 400,000 people are employed in the food and drink sector.
- Because the demand for food is relatively inelastic, employment is less sensitive to the economic cycle compared with other manufacturing sectors.
- The food sector accounts for the largest part of the overall sector by output and employment, though growth in value-added has been strongest in the drinks sector.
- Analysis of productivity growth demonstrates that skills have played an important role in improving productivity relative to countries such as Germany.

2.1 Introduction

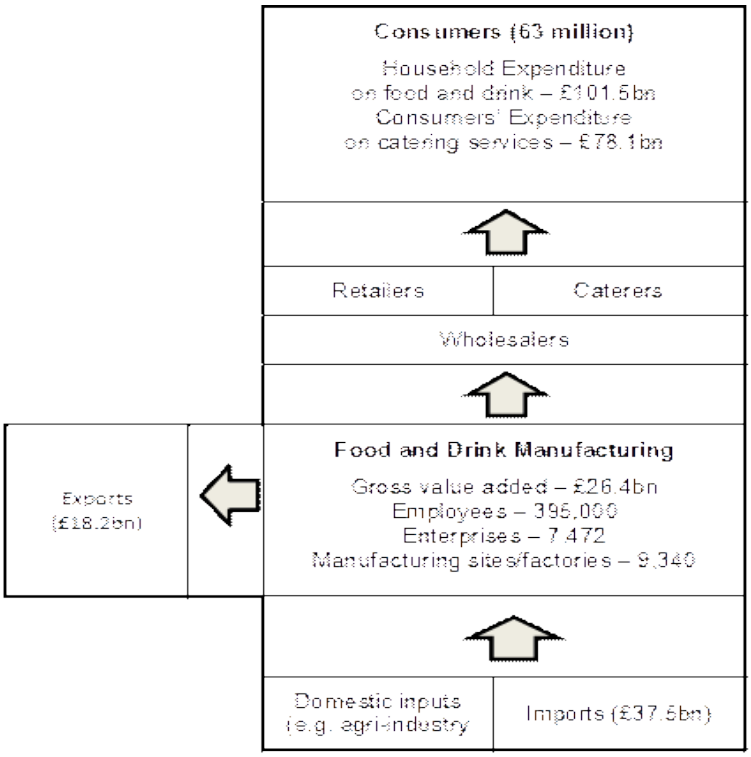
The Standard Industrial Classification (2007) provides a summary of the activities undertaken in the food and drink industry. It defines the industry as follows:

10	**Manufacture of food products**	
	10.1	Processing and preserving of meat and production of meat products
	10.2	Processing and preserving of fish, crustaceans and molluscs
	10.3	Processing and preserving of fruit and vegetables
	10.4	Manufacture of vegetable and animal oils and fats
	10.5	Manufacture of dairy products
	10.6	Manufacture of grain mill products, starches and starch products
	10.7	Manufacture of bakery and farinaceous products
	10.8	Manufacture of other food products
	10.9	Manufacture of prepared animal feeds

11	**Manufacture of beverages**	
	11.0	Manufacture of beverages
		11.01 Distilling, rectifying and blending of spirits
		11.02 Manufacture of wine from grape
		11.03 Manufacture of cider and other fruit wines
		11.04 Manufacture of other non-distilled fermented beverages
		11.05 Manufacture of beer
		11.06 Manufacture of malt
		11.07 Manufacture of soft drinks; production of mineral waters and other bottled waters

A broad definition of the food and drink sector includes the supply chain, 'from farm to fork': the upstream farmers, growers and breeders of the 'raw materials', and the downstream distribution groups and retailers, which are the principal routes to the end consumers. Definitions within the sector are not always clear-cut. Depending on the product there has been scope for vertical integration between suppliers of ingredients and product manufacturers and also between manufacturers, distributors and retailers (Rigby, 2015). Figure 2.1 outlines the broad structure of the sector indicating the backward and forward linkages to the industry.

Figure 2.1 The food and drink chain

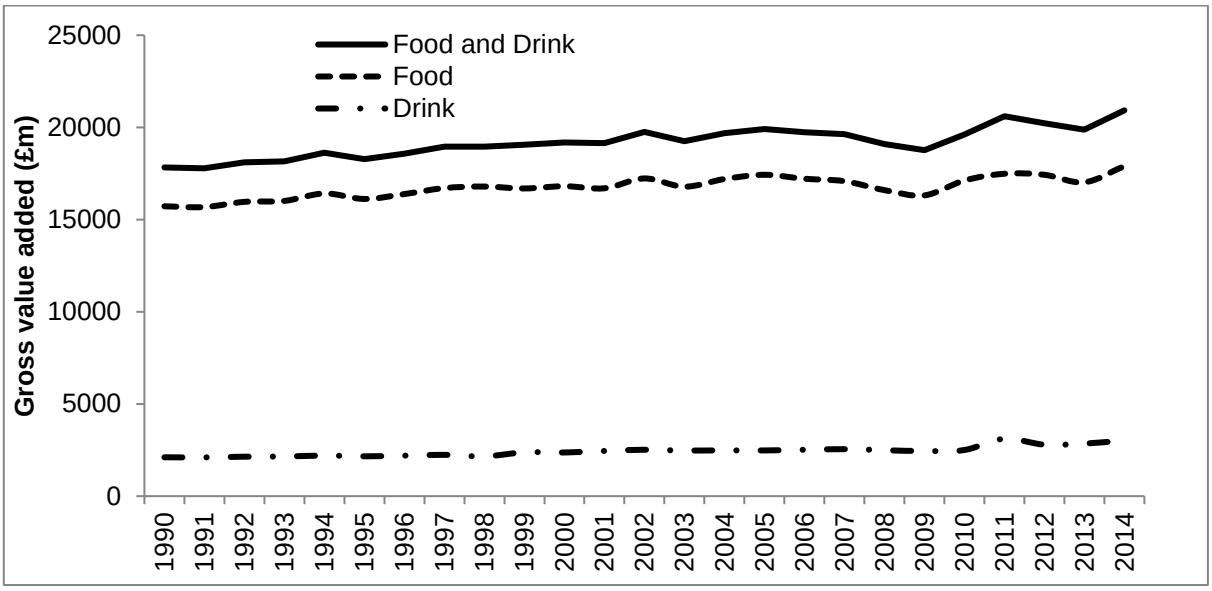


Source: DEFRA Food and Drink Statistics

2.2 Trends in Output, Employment and Productivity

As shown in Figure 2.1 gross value added in food and drink manufacturing is estimated to be around £26bn (2013). The food sector is by the largest component of the sector accounting for around 85 per cent of output. Figure 2.2 shows the trend in output over time in constant prices. Between 1990 and 2014, gross value added increased by 17 per cent but this masks substantial variation between food (where growth was 14 per cent) and drink (where growth was 43 per cent).

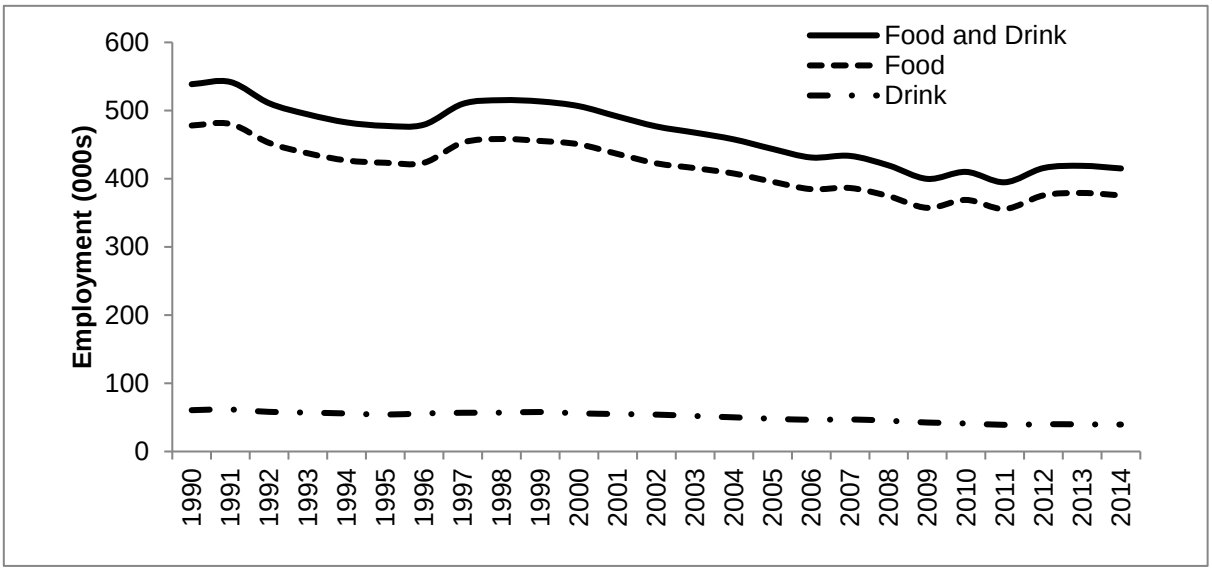
Figure 2.2 Gross value-added in the food and drink industry, 1990-2014 (constant prices)



Source: Cambridge Econometrics

The trend in employment is shown in Figure 2.3. It shows a trend that is observable across the manufacturing sector as a whole; that of a steady fall in employment – by around 23 per cent between 1990 and 2014 (Wilson and Hogarth, 2013). The fall in employment, however, has been lower than in manufacturing as a whole (employment fell by 21 per cent in food, drink and tobacco between 2000 and 2014 compared with 35 per cent in manufacturing as a whole). With respect to employment food and drink is the largest sub-sector in manufacturing accounting for around 10 per cent of all manufacturing employment in the UK.

Figure 2.3 Employment in the food and drink industry, 1990-2014

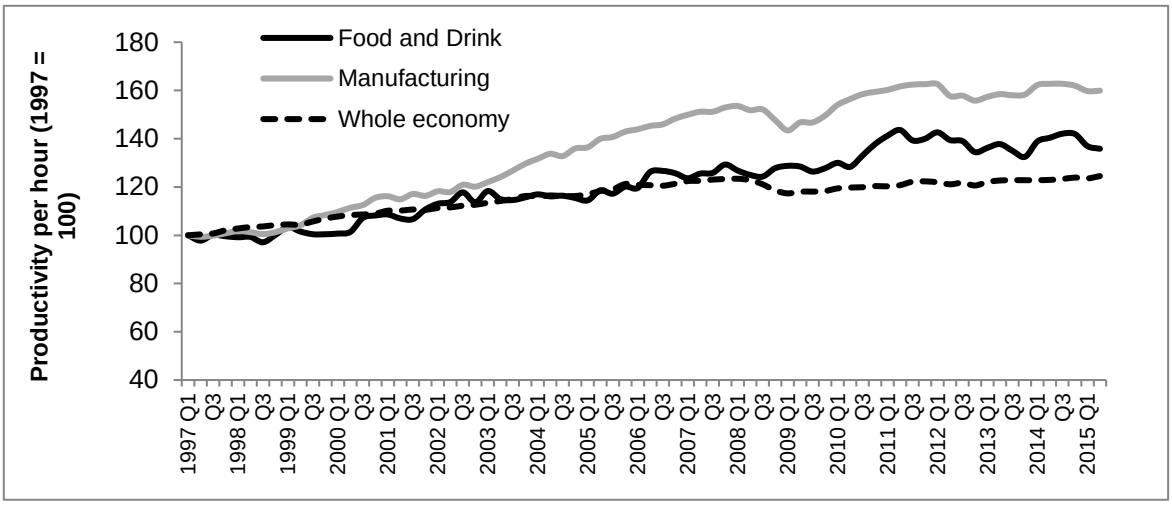


Source: Cambridge Econometrics

Rising levels of outputs and decreasing employment is reflected in the productivity trend in the industry as outlined in Figure 2.3. Productivity has increased at a faster rate than in the economy as a whole but lower than in the manufacturing sector. The observed trend can be explained, at least in part, with reference to the amount of restructuring and product change that has taken place over recent years in response to the demand from the retail sector for lower prices but also greater product differentiation (Food and Drink Federation, 2008). At the same time consumer expenditure on food and drink has increased, not least because of consumer preferences for convenience food and increased eating out. This would appear to have brought about relatively strong growth over the late 1990s and early 2000s. The impact of the 2007 economic crisis has also been less adverse compared with manufacturing as a whole given that the demand for food is less elastic than for other manufactured goods.

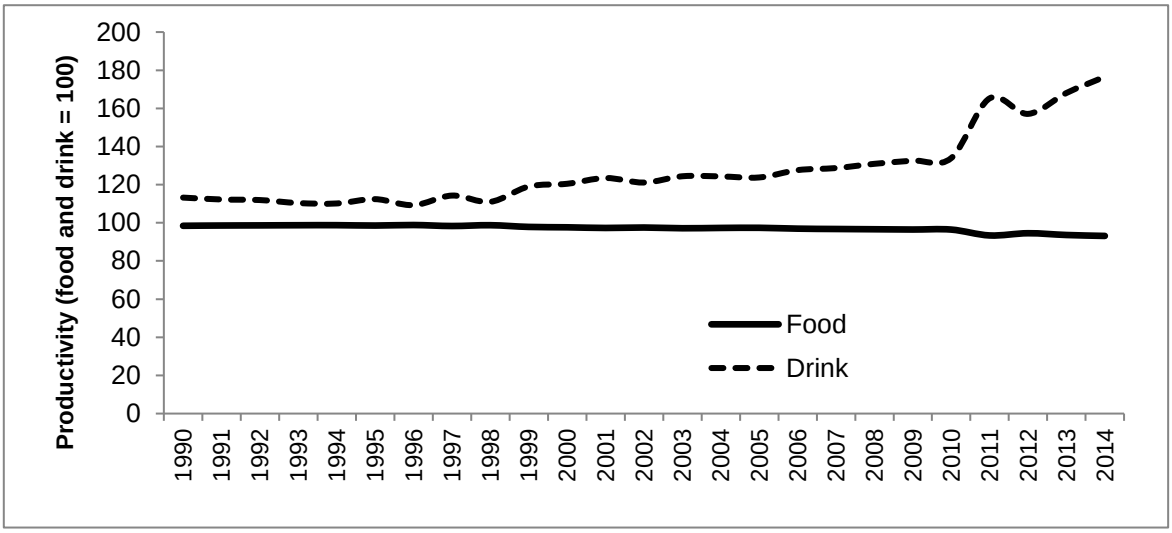
This tends to mask changes within the food and drink sector where productivity growth has been much stronger in drinks than in food (see Figure 2.4). Arguably the demand for drink is more elastic than for food such that one would expect output and productivity to show more of a growth after the recent recession.

Figure 2.3 Output per hour in the food and drink industry, 1997-2015



Source: ONS Productivity Statistics

Figure 2.4 Productivity in the food and drink industry, 1990-2014



Source: Cambridge Econometrics; own calculations

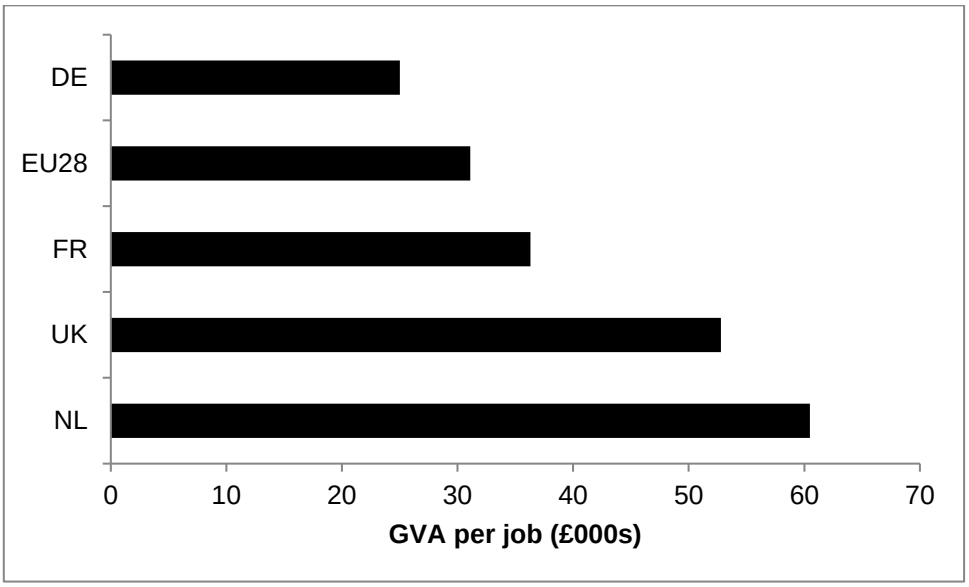
2.3 Multi-factor productivity in the food and drink sector

It is not just the trend in the UK which is of interest. There is also a need to compare how the industry in the UK compares with other countries. The UK is a relatively open economy with large flows of imports and exports. The food and drink industry is no different in this regard as indicated in Figure 2.1 which showed that the industry is dependent upon imports and exports.[8] It is also an industry where there a large number of international multi-nationals that a have a degree of choice where they locate their production (37 per cent of food and drink manufacturers in the UK are foreign owned compared with, for example,

[8] The value of imports is greater than the value of exports in each of the broad categories of food, feed and drink except 'Beverages' which had a trade surplus of £1.27 billion in 2014, largely due to exports of Scotch Whisky.

18 per cent in the Netherlands). Figure 2.5 provides a snapshot of the UK's relative productivity position compared with the average situation in the European Union (EU28) and selected relatively high productivity countries in the EU. It shows that the UK compares relatively well with European competitors.

Figure 2.5 Gross value-added per job in the EU, 2013

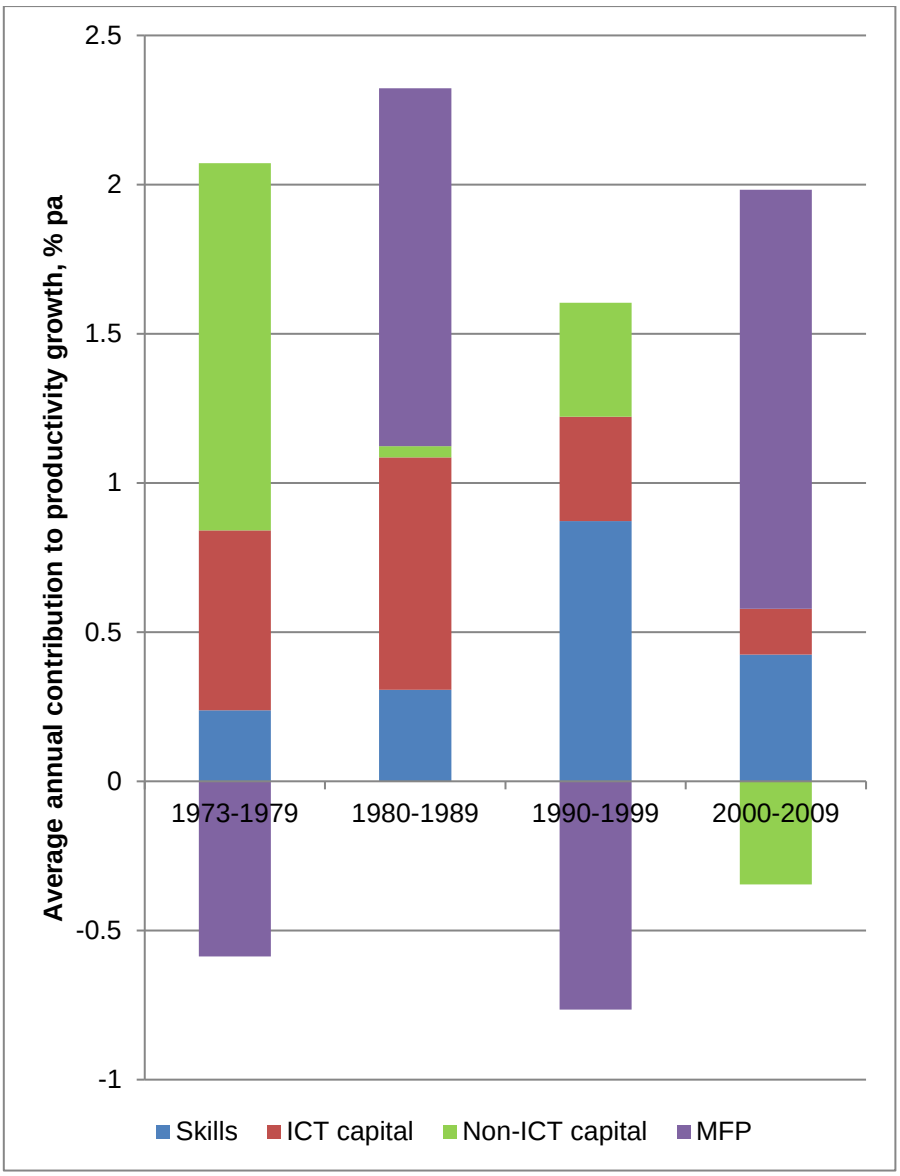


Source: Cambridge Econometrics

The key issue to address is why productivity levels vary between countries in the international food and drink sector. It may reflect differential levels of investment (if one country has invested more in automation one would expect, other things being equal, this to be reflected in relatively high levels of productivity). Similarly, if a country employs relatively high levels of human capital again one might expect this to be reflected in its productivity levels. In practice, it is often the combination of factors– e.g. innovation, investment, human capital, etc. – and the way they interact with one another that drives productivity growth. This is referred to as multifactor productivity growth. It reflects the efficiency with which we use and integrate the inputs of capital equipment and workers' skills. The UK Commission has undertaken detailed analysis of multifactor productivity (MFP) in the food and drink sector and this is heavily drawn on below to show how the UK sector compares with other countries.

The UK Commission's analysis, using a growth accounting approach, is able to control for a number of factors that are likely to determine productivity growth: labour composition' (more educated workers), capital deepening' (workers with more and better equipment), and MFP (businesses being better at integrating workers, skills, and equipment). The results shown in Figure 2.6 reveal that productivity growth was driven by skills (labour composition) over the 1990s and MFP during the 2000s. It is tempting to conclude, though this would be speculative, that the investments in skills, alongside investments in new plant machinery and equipment, put in place the components that bring about improved MFP.

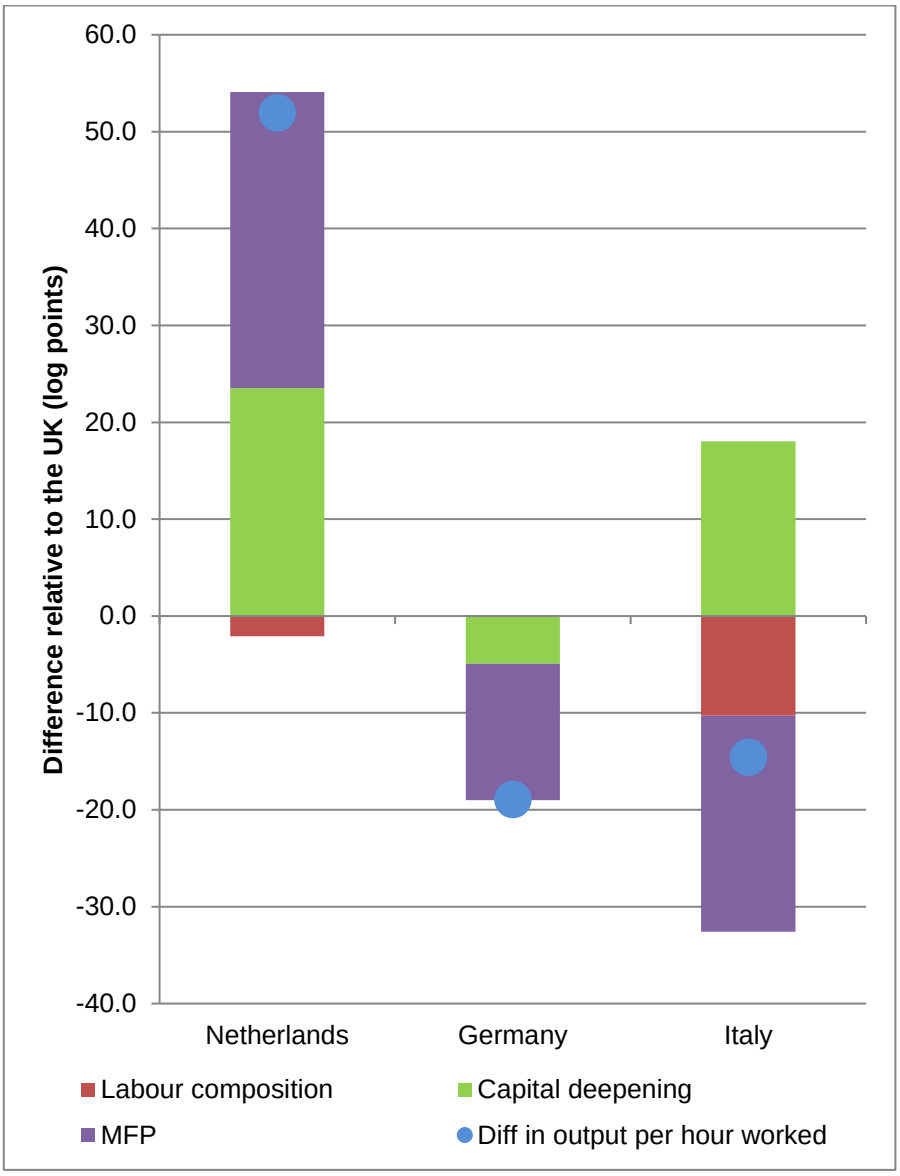
Figure 2.6 UK Commission analysis of the determinants of productivity growth in the UK food and drink sector 1979 - 2009



Source: UKCES analysis of EU KLEMS data for UK Food products, beverages and tobacco (ISIC r4 10-12).

Figure 2.7 presents the results of the UK Commission's analysis of MFP in the UK compared with other countries in 2009. While most of the differences are accounted for by MFP and capital, it is apparent that the UK's relative strength is its skills base.

Figure 2.7 UK Commission analysis of the UK's relative productivity standing with NL, IT, and DE: output per hour in 2009



Source: Source: UKCES analysis of EU KLEMS data, using WIOD SEA for labour shares, 2009, ISIC r4 10-12

2.4 The importance of the food and drink industry

The evidence presented above reveals that the food and drink industry is a relatively large one with respect to both the gross value added and the number of people employed, and that compared with other EU countries, it is a relatively productive one. This is important for a number of reasons:

- it makes a significant contribution to UK GDP and provides employment for around 400,000 people;
- it demonstrates the relative gains to be had from locating production in the UK (given the relatively strong showing on internationally comparable productivity indicators);
- it ensures that the cost of food and drink is affordable to the population (given the impact of productivity gains on prices);
- it reinforces the food security (in that the industry is well placed to meet domestic demand for food).

The next section looks in more detail at the drivers of productivity in the food and drink industry and the contribution, in particular, of skills development in raising productivity.

3 Factors facilitating and inhibiting productivity growth

Chapter Summary

- Compared with the manufacturing sector as a whole, the food and drink sector is a low-valued added one.
- There are, however, many profitable high performing companies in the sector. The key issue for the sector is to have in place those policies and practices relating to skills that will sustain them.
- Although investment levels are relatively low, there is evidence of innovation in the sector related to bringing to market new products.
- The relatively large number of employers with few employees does limit the extent to which investment and the take up of high performance work practices takes place.

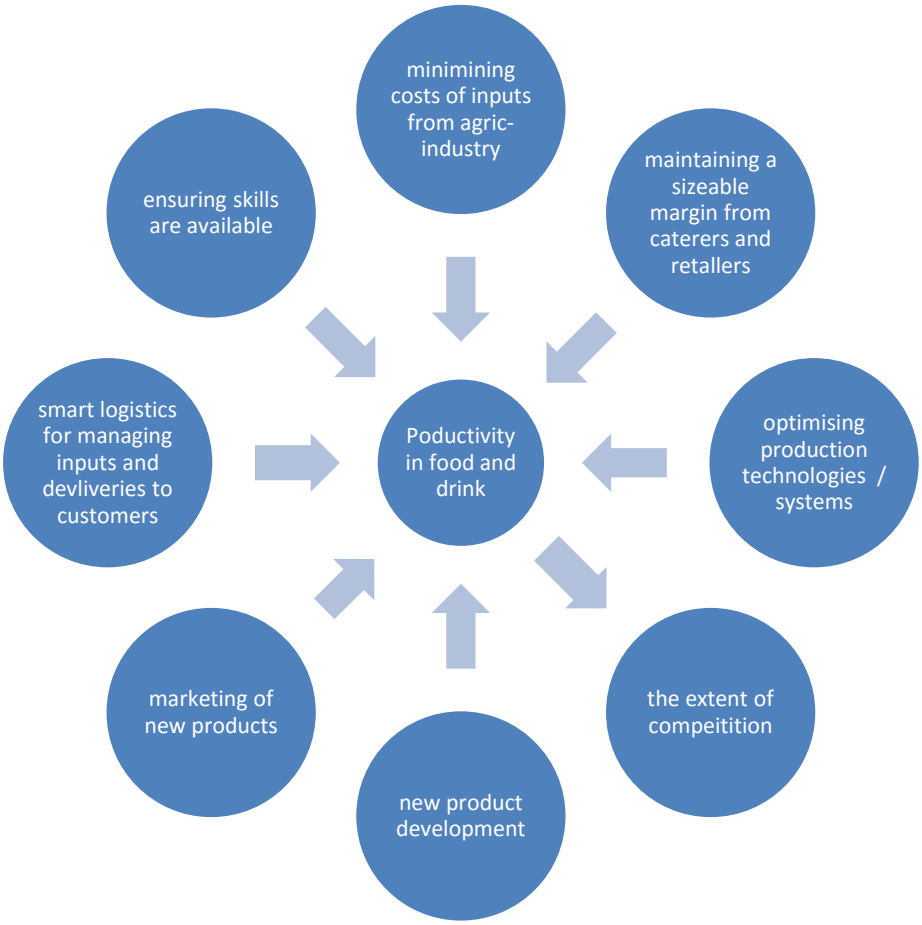
3.1 Realising productivity gains in the food and drink industry

In order to consider the factors that are likely to facilitate productivity growth in the food and drink industry it is useful to develop a conceptual framework to shape the discussion. Productivity gains will be realised in the workplace, so there is a need to understand how productivity might be considered from a workplace perspective. If one starts with the product - either food or drink – than one is trying to assess the value-added (or gross margin in management accounts) generated by a particular product and, in aggregate, the overall operating surplus generated in the workplace. To some extent the margin will be determined by the nature of the product (some products are inherently high value), the extent to which other manufacturers are producing the same or similar products, and the extent to which producers can extract a relatively high rent from their product (e.g. from adept marketing and product placement). Being able to have one's product stand out in the market in order to generate a relatively high margin is dependent upon innovation in both product development and being able to effectively market that product in order to realise a relatively high margin. It is also dependent upon having production facilities in place that will allow minimise production costs. Automation, in particular, can produce the economies of scale to increase the efficiency with which food and drink is produced.

In looking at the productivity within an industry, there is also a need to consider the forward and backward linkages of an industry. This can reveal much about who appropriates the gains to be obtained from increasing productivity. In the food and drink sector, the backward linkages – as indicated in Figure 2.1 – are to the agri-industry, and the forward linkages to the retail and catering industries.

In Figure 3.1, the way in which productivity gains might be realised, is schematically outlined. In aggregate, the way in which these activities take place will correspond with a firms' product market strategy. Key to successfully developing the product market strategy is that of possessing the skills, in the first instance, to develop the strategy in a way which will yield a relatively high margin, and ensuring that all of the requisite skills are in place to realise the product market strategy in practice. As will be explained in greater detail below, this needs to be considered dynamically where new products and processes are constantly being developed or modified over time in order to maintain competitiveness.

Figure 3.1 Bringing about productivity gains in the food and drink industry



There are undoubtedly high value food and drink products – e.g. Chateau Petrus, beluga caviar, the Shepherd Loaf,[9] etc., - but for the most part food and drink products are of relatively low value produced in large volumes. In their analysis of the engineering sector, Davis et al. (2002) drew attention to importance of understanding skill demand in relation to product lifecycles. Davis *et al.* (2002) outlined how many products have a tendency to migrate from being relatively high value, low volume products to becoming commodities over time (see Table 3.1). The example provided by the authors to indicate the pace with which products could migrate from one product market position to another was mobile phones. Over the course of a few years mobiles went from being expensive items (super-value goods) to must-have commodities (though still technically complex products).

Table 3.1: Product lifecycles

		Product complexity	
Market Demand	Uncertain	**Super-value goods** (e.g. aerospace)	**Fashion products** (requiring fast response to capture market)
	Certain – predictable	**Consumer durables** (e.g. cars)	**Commodities**

Source: Davis et al. (2002)

Davis *et al.* explained how skill needs at all levels of the organisation changed as products shifted their position over the lifecycle – from the emphasis upon design and development and small-volume production of super-value goods (such as aeroplanes) to the need to be able to manage mass production systems in the case of commodities (see Table 3.2). Manufacturers may choose to remain with a given product, in which case they need to adapt their production processes and deployment of skills as it changes its product market position, or look to develop the next range of higher value-added products.

[9] http://www.telegraph.co.uk/foodanddrink/foodanddrinknews/7812571/The-21-loaf-of-bread.html

Table 3.2: Product lifecycles and skill needs

		Product complexity	
Market Demand	Uncertain	• Project management • Research & development • Product design skills • Craft production skills	• Marketing • Logistics • Craft production skills
	Certain – predictable	• Team working • Manufacturing system design • Cell manufacturing	• Cost control • Manufacturing system design • Plant maintenance • Logistics • Operatives

Source: Davis et al. (2002)

The food and drink sector is for the most part rooted in the commodity quadrant, but it is clear that companies have successfully operated in that sector, generating year-on-year productivity gains, which is ultimately converted into profitability. To some extent one observes an innovation process that sees the development of new products, often undertaken by smaller producers operating in niche markets that become increasingly commodified. But one also observes innovation in the commodity sector too as new products are developed and new materials are used (e.g. the use of insects as a source of protein) in order to satiate consumer tastes, alongside the introduction of new production processes to generate efficiency gains.

At a meta-level, the evolution of the food and drink industry has been described with reference to a series of revolutions:

- Food 1.0 was simple cultivation;
- Food 2.0 was built on mechanisation and manufacturing;
- Food 3.0 was the product of advanced technology processing, and genetics; and
- Food 4.0 – the emerging food revolution – is where the nine billion people around the world must be fed safely, sustainably, affordably, and securely.

The Food 4.0 revolution is likely to be knowledge-intensive, collaborative and integrative – it may be built on big data, nano-technologies, genomics, and communications technologies (Divine et al, 2015). This is all rather grandiose, but it does illustrate the way in which engineering advances coupled to developments in life-sciences, has and will continue to have, a transformative impact on the food and drink manufacturing. The trend toward Food 4.0 also highlights the importance of human skills as increasingly complex technologies can only be utilised successfully by highly skilled workers.

3.2 Driving up demand and pushing down costs

In looking at productivity, there is a need to consider in the first instance how food and drink manufacturers are able to drive up the demand for their products whilst, at the same time, driving down their costs (e.g. through automation). As will be seen, the demand for food and drink is sensitive to cost.

On average, around 11 per cent of all household spending is on food. Total consumer expenditure on food, drink and catering has increased by 0.9 per cent in 2014 to £198 billion, expenditure on food - including non-alcoholic drinks - fell for the first time in ten years, by 1.5 per cent to £94 billon. Price is increasingly important in driving product choice, with 36 per cent of shoppers naming it as the most important factor and 90 per cent of shoppers listing it within their top five influences (Scaife et al, 2015, IGD ShopperVista 2014).

The industry has been innovative in bringing new products to market and consumers appear to have a taste for new products: for example, over 1,500 new food and drink products were introduced each quarter from the beginning of 2008 to 2010 (Institute for Manufacturing, 2010). The industry spends around £430m a year on R&D, with around £240m of this funded by foreign owned multinationals, with most of it oriented towards applied research. This amounts to around 2 per cent of total R&D expenditure in the UK (which is higher than the 1.6 per cent of overall GVA the food and drink industry accounts for). Innovation can take various forms. For example, 'ethical' food and drink (including organic, fair-trade, free range and freedom foods) is one area where producers have brought new products to market. The market for ethical products was £8.4 billion in 2013, 8.5 per cent of all household food sales. Sales of ethical produce have increased year on year since 2007, despite the economic downturn (Scaife et al, 2015, data from Ethical Consumer Market Report 2014, Ethical Consumer Research Association).

The industry has a trade deficit. So there is potential to increase domestic demand by either reducing imports and / or increasing exports. Considerable efforts have been made to increase exports. In general, there is seen to be a mutually reinforcing relationship between export activity and firm competitiveness (BIS, 2010; Mason, 2011).

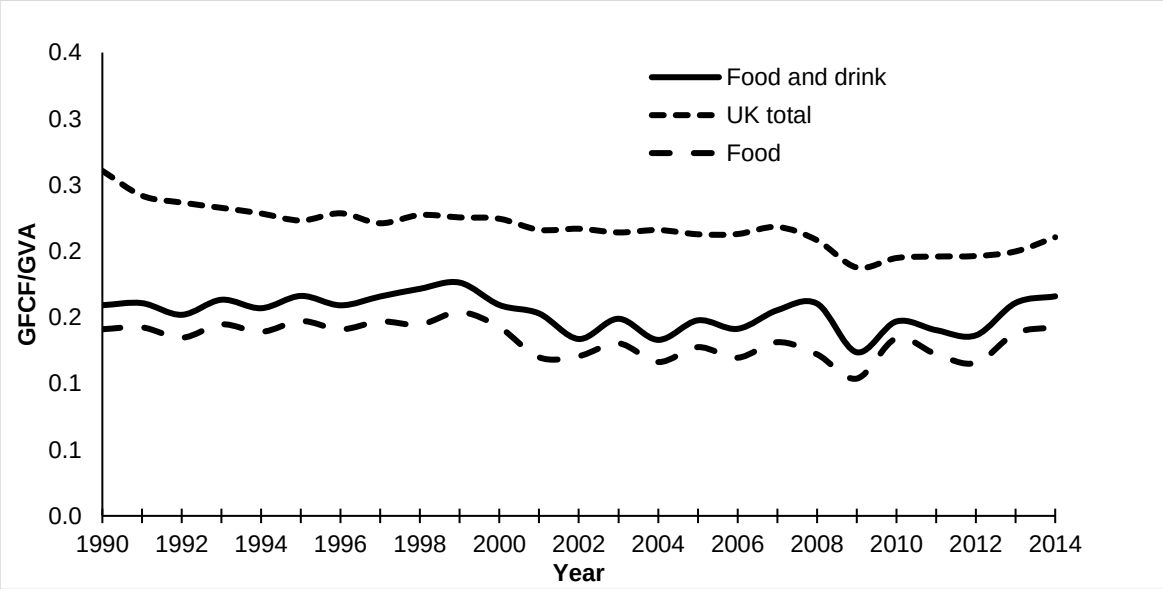
The evidence indicates that for the most part, SMEs are not export-oriented. A study that looked at the agri-food industry found that: "The characteristics of export active agri-food SMEs were similar to export active SMEs across all sectors: larger businesses; higher turnover; older more established enterprises; and, businesses defined as being innovative or intellectual property (IP) active. Within the agri-food sector those businesses operating in the manufacture of food or beverages were also more likely to be export active. The research findings clearly demonstrate that: less than 10 per cent of agri-food businesses are export active; over half of export non-active businesses indicated that no form of assistance would help them consider trading internationally; 46 per cent indicated that the business was too small or that they were not interested (not mutually exclusive) in exporting" (SERIO, 2011). This points to the formidable barriers that stand in the way of SMEs in the food and drink industry becoming more export oriented and the importance of management being able to develop product market strategies that optimises the markets available for their firms' products.

The above has outlined some of the issues related to driving up demand. There is also a need to consider how costs can be reduced. Labour costs are one of the principal costs faced by producers. Automation provides one means of driving down labour costs and there is a lot of evidence suggesting that automation is being used to drive up productivity. Unlike many other manufacturing countries food and drink manufacturers have less scope to outsource certain production activities to low labour cost countries. From his survey of employers, Rigby (2015) reported that:

- around half of companies increasing their investment in process automation;
- automation being seen as the key to removing labour content – over 90 per cent of respondents saw UK wage costs as a significant factor driving the industry towards greater automation;
- pressures around hygiene and uniformity of product make food and drink manufacturing a prime candidate for increasing automation;
- businesses seeing more scope to integrate their producer operations with those of supermarkets and other retailers.

The survey also points to investment in automation requiring in, the first instance, a long-term vision and with a degree of business certainty. This was seen to be improving. Figure 3.2 shows that investment in food and drink is at relatively low levels compared with the economy as a whole (Gross fixed capital formation as percentage of gross valued added). In part, this is because there are many small producers, some of which are producing artisanal products on a small-scale, where it is not economically feasible to introduce automation. Even amongst some of the larger manufacturers some are reluctant to automate production processes. One of Rigby's respondents, for example, commented: "Labour is 90 per cent of the cost, but humans are the most flexible machinery you can get and robots really can't match them until you get to super high speeds. New products are often going to be manual because it's one way of being agile and getting going quickly. Your profit margin may not be so good, but it gets you there quickly" (Rigby, p.14). This view was echoed by one of the companies interviewed for this study. It specialised in artisanal bread and pastries: they viewed their trained and experienced workers as key to their ability to deliver orders at short notice and emphasised that they can automate "only up to the point of facilitating production; there is no automation to reduce headcount of workers" (Interview 3).

Figure 3.2 Investment levels in food and drink, 1990-2014



Source: Office of National Statistics

Looking more generally at technical innovation in the sector, a number of barriers have been identified:

- obtaining funding for technical innovation;
- a shortage of appropriately skilled staff;

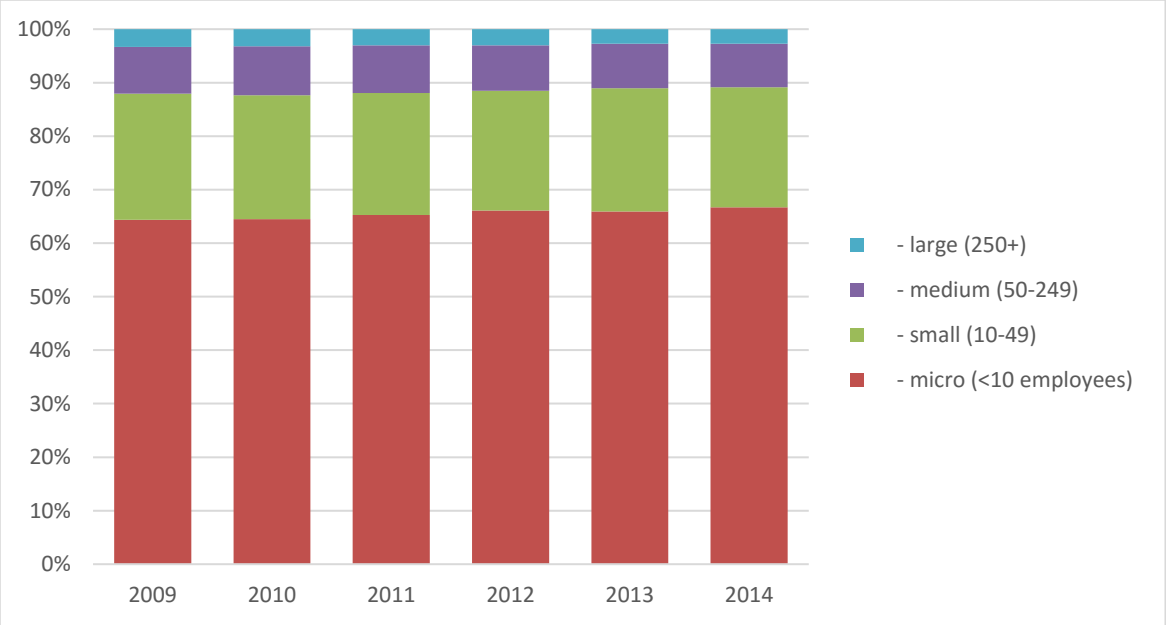
- internal priorities and culture – for example the focus on short term goals at the expense of longer term or more disruptive technical innovations; and
- improving collaboration within the supply chain.

Drivers to improve efficiency in both manufacturing and supply chains are closely associated with the need to reduce costs in response to tightening margins. Improving energy and process efficiency focuses on reducing costs by minimising processing steps and increasing throughput to reduce energy consumption. Efforts here are hampered by the significant capital outlay required for new process technology, which is beyond the reach of many SMEs. In addition, the UK is not an international leader in food process technology, though there are pockets of excellence (Arthur D. Little, 2013). Automation and the introduction of new technologies increase the need to train / re-train employees, adding to the initial cost of the technological upgrade. Organisational changes may also become necessary in the wake of introducing new production technologies, for example the job of 'technical operator' was created at an establishment which had invested in cutting edge production lines (Interview 6).

3.3 Business Size and Ownership

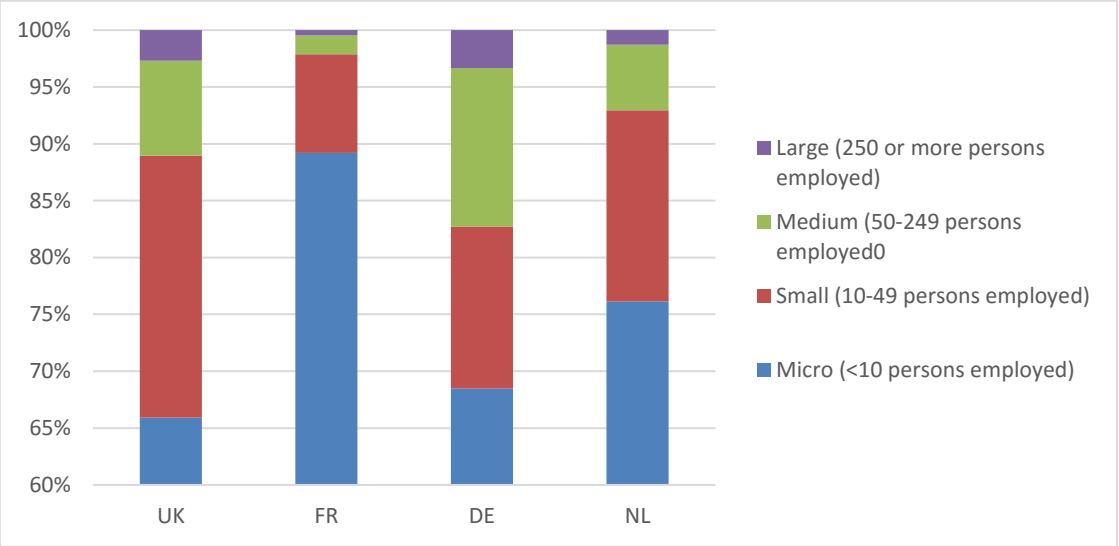
Automation provides a basis for increasing productivity, but the food and drink industry comprises many micro-enterprises as Figure 3.3 indicate, and, as noted above, this is often a barrier to more automation being introduced and would appear to be a constraint on export activity. Additionally, it would appear to act as a constraint on staff development. It has been observed that SMEs in the industry often need support to help people learn how to innovate and secure new business. But SMEs are often pressurised to produce specific items at short notice and therefore find it difficult to bring all their staff to the right level of training required to improve their business (Jassi et al., 2011). According to Bloom et al. (2011), there is a correlation between business size and the perceived lack of managerial skills: larger firms are significantly less constrained by the scarcity of skilled managers and management knowledge. Another aspect of the effect of business size and ownership was highlighted by Moore and Folkerson (2015) who investigated firm-level determinants of non-labour productivity and found that smaller companies were less likely to engage in sustainable practices as they often lacked the internal skills to take advantage of opportunities outside of their core business, or the scale to make external assistance worthwhile.

Figure 3.3 Business sizes within the Food and Drink industry



The problems alluded to above resulting from the size structure of the industry may be more acute in the UK than in key competitor countries. As Figure 3.4 demonstrates the UK has proportionately more small workplaces than found in countries such as Germany or the Netherlands.

Figure 3.4 Business sizes within the Food and Drink industry – international comparisons

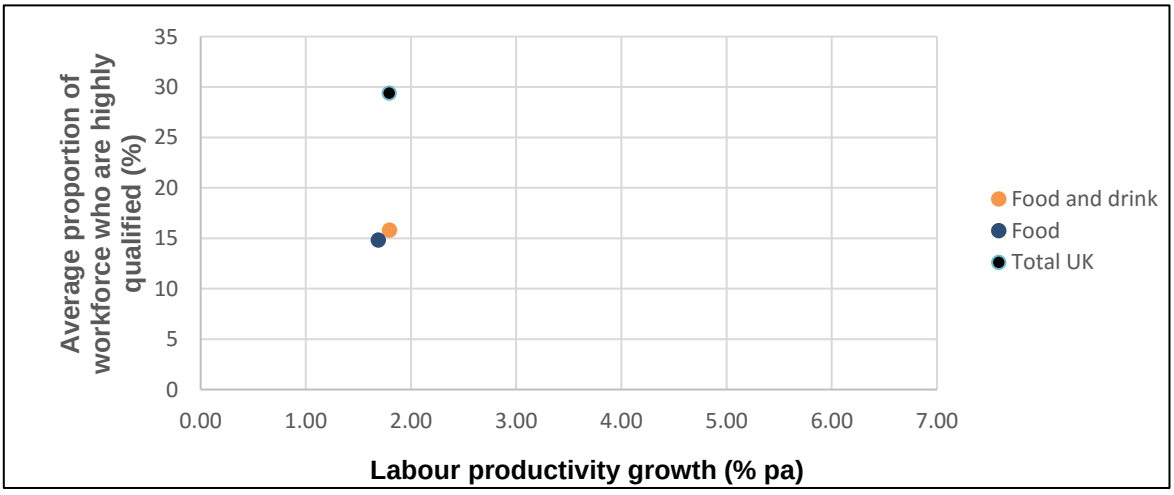


Brown (2014) found that smaller workplaces which could be characterised as 'developers' and 'trainers' based on information collected about them in the Employers and Skills Survey 2013 were more likely to be led from outside the UK. The high profile of international influence perhaps reflects the finding that multinational workplaces tended to be better managed (Bloom and Reenen, 2010). There is strong evidence for the link between the quality of management and firm performance, including productivity (see for example Bradley *et al.*,2012; McBain *et al.*, 2012). Homkes (2014) identified a number of barriers to improving leadership and management practices in the UK, including the lack of a future focus in UK manufacturing firms' approach to leadership and management and 'short termism', that is, a tendency to consider leadership and management capacity within a short term view. This is especially true for smaller or resource-constrained firms, which often focus on immediate needs rather than capacity building.

3.4 Skill demand and productivity growth

Is skill a constraint on productivity? At face value there is no clear evidence that productivity growth is constrained by skills supply. The food and drink sector succeeds in achieving the same levels of productivity growth as the economy as a whole, albeit with a workforce that is less highly qualified (see Figure 3.5). In many respects, skill demand is derived from the product market strategies. The issue of skills is discussed in greater detail in the next chapter.

Figure 3.5 Proportion of workforce who are highly qualified, vs labour productivity growth, 2008-2013



3.5 Conclusion

This chapter has provided a tour d'horizon of various trends in the food and drink industry that are germane to productivity. It is a sector that is engaged in the production of relatively low value products, often manufactured in relatively small workplaces. Levels of investment are relatively low compared with the economy as a whole, but despite this the evidence points to strong levels of product and process innovation as the industry responds to the demands of retailers and consumers. This, at least in part, will explain the relatively strong productivity growth the sector has experienced over recent year (as outlined in Chapter 2). The next chapter looks at skills in greater detail and their role in ensuring that productivity growth continues to be positive.

4 Skills, talent pipelines and productivity

Chapter Summary

- Employers have developed talent pipelines in relation to critical skill sets such as engineers and food technologists.
- The key issue to address is how employers assess the risk attached to investing in these skills.
- Where employers are concerned that the risk of not being able to appropriate the return on investing in an engineer of a food technologist, then that investment will not be forthcoming.

  There is evidence that employers are beginning to develop the means of being able to appropriate the returns on any investment but there has to be some concern whether the current skill equilibrium is sufficiently high.

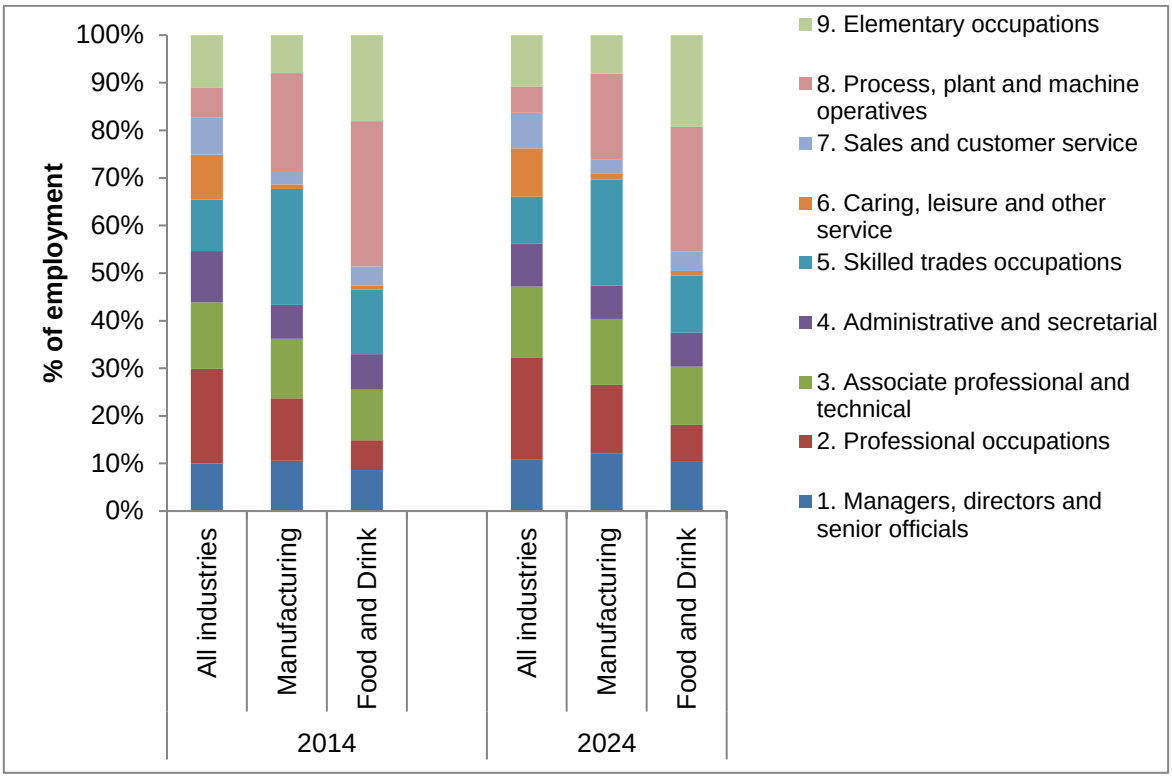
4.1 Introduction

The previous chapter has provided evidence on those factors that have facilitated or hindered productivity growth in the food and drink sector. Mention was made of skills, but this is an issue that needs to be considered in some detail given that shortages of key staff in the sector are seen to be potentially inhibiting improved organisational performance. Evidence is presented on the skill structure of employment in food and drink, how this has changed over time and is likely to change over the medium-term. In addition evidence is provided of the way in which certain skills are seen to be of critical importance in relation to organisational performance and how employers have sought to ensure that they have an adequate supply of those skills.

4.2 Skills demand

If one looks at the current and projected future occupational structure of the food and drink industry it is apparent that it has a relatively high demand for people to work in (a) process and machine operative and (b) elementary occupations (see Figure 4.1). In other words, the relative level of skill required in the industry is relatively modest: in both 2014 and 2024 the percentage of employment accounted for by these two occupations is a little under 50 per cent.

Figure 4.1 Current and projected employment structure in food and drink



Source: Working Futures

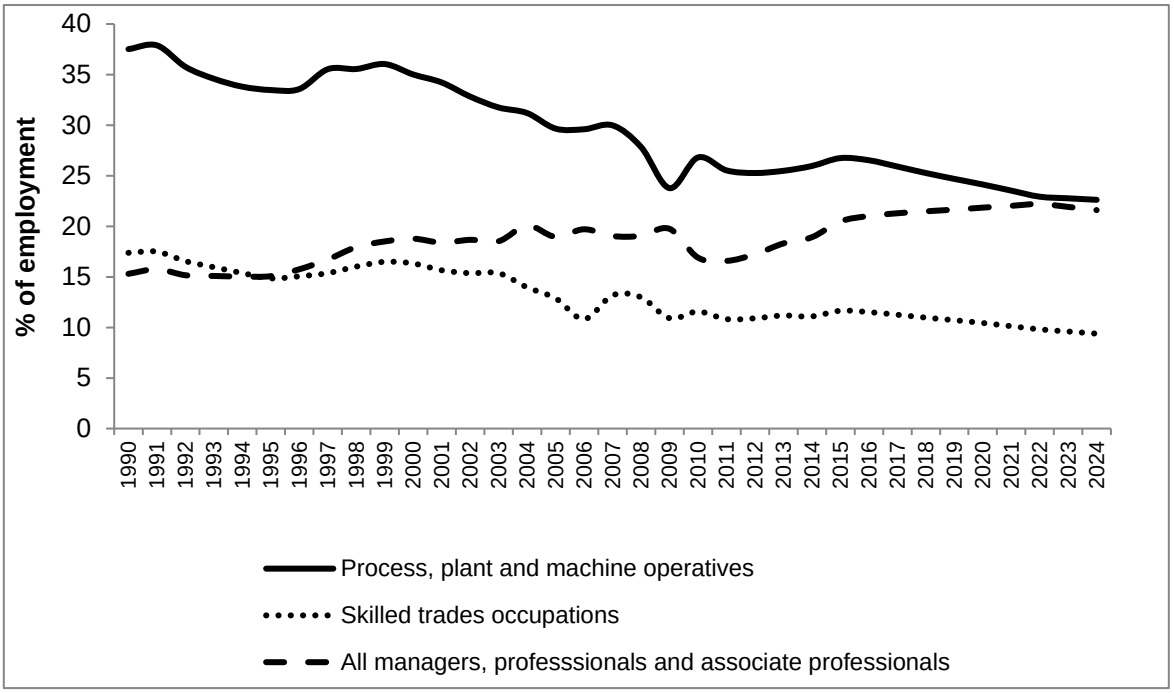
A more detailed look at the skill structure of employment is provided in Table 4.1. It shows the dependence of the industry upon people employed as Process, plant and machine operatives (27 per cent of all employment in the sector in 2014). This reinforces the fact that the industry is, relatively, not a high skill one. If, however, consideration is given to the changing structure of occupational employment, then it becomes apparent that the skill intensity of the industry shows signs of increasing (see Figure 4.2). It shows that as a percentage of overall employment the share accounted for by process plant and machinery operatives has been declining and the share accounted for by higher level occupations (managers, professionals, and associate professionals) has been increasing.

Table 4.1 Detailed structure of employment in the food, drink and tobacco sector, 2014

	2014	
	Level	**% of employment**
All occupations in food and drink industry	419872	100
Managers, directors and senior officials	**34271**	**8**
11 Corporate managers and directors	29263	7
12 Other managers and proprietors	5007	1
Professional occupations	**23387**	**6**
21 Science, research, engineering and technology professionals	13475	3
22 Health professionals	1726	0
23 Teaching and educational professionals	1981	0
24 Business, media and public service professionals	6206	1
Associate professional occupations	**44155**	**11**
31 Science, engineering and technology associate professionals	14545	3
32 Health and social care associate professionals	440	0
33 Protective service occupations	1406	0
34 Culture, media and sports occupations	1170	0
35 Business and public service associate professionals	26594	6
Administrative and secretarial	**28404**	**7**
41 Administrative occupations	26181	6
42 Secretarial and related occupations	2223	1
Skilled trades occupations	**59686**	**14**
51 Skilled agricultural and related trades	1206	0
52 Skilled metal, electrical and electronic trades	22342	5
53 Skilled construction and building trades	7488	2
54 Textiles, printing and other skilled trades	28649	7
Caring, leisure and other service	**3373**	**1**
61 Caring personal service occupations	1794	0
62 Leisure, travel and related personal service occupations	1580	0
Sales and customer service	**15467**	**4**
71 Sales occupations	11126	3
72 Customer service occupations	4341	1
Process, plant and machine operatives	**139720**	**33**
81 Process, plant and machine operatives	114859	27
82 Transport and mobile machine drivers and operatives	24861	6
Elementary occupations	**71408**	**17**
91 Elementary trades and related occupations	37614	9
92 Elementary administration and service occupations	33795	8

Source: Working Futures

Figure 4.1 Changing occupational structure of employment, past and projected future trends



Source: Working Futures

The above commentary can give a misleading impression. If one looks at the level of replacement demand in the food and drink industry, then it is apparent that there will be a relatively large number of job openings for people to work in relatively high and low skill occupations. In the period between 2014 and 2024, as a consequence of the changing occupational structure of the industry and the number of people who are likely to exit the industry because, for example, retirement, there will a relatively large number of jobs that will need to be filled (see Table 4.2). Key occupations where there are relatively high replacement demands include process, plant and machinery operatives, but also associate professionals which includes occupations such as science, engineering and technology associate professionals).

Table 4.2 Net requirements by occupation in food and drink, 2014-2024 (000s)

	Replacement demand	Net requirement
Managers, directors and senior officials	14	20
Professional occupations	9	13
Associate professional and technical	16	21
Administrative and secretarial	12	12
Skilled trades occupations	21	12
Caring, leisure and other service	2	2
Sales and customer service	6	6
Process, plant and machine operatives	48	30
Elementary occupations	29	32
All occupations	157	148

Source: Working Futures

Being able to recruit people to some of the jobs where replacement demands are likely to be high may present a challenge to some employers. In their survey of 500 undergraduates studying a range of subjects across the UK and 154 recent entrants to the agriculture and food sector, Hughes et al. (2015) found that:

- a key priority is to reach undergraduates on degree programmes that are not specifically linked to agriculture and food;
- higher salaries might be needed; and
- a need for conversion courses that can help people from a wide range of starting points to adapt to the food economy, not merely those who already have a background in science or technology (n.b. the Food and Drink Federation, Sheffield Hallam University and the National Skills Academy for Food & Drink have created the UK's first Food Engineering Degree).

The industry is seen as a low wage one and it is the case that there are many low wage jobs in the industry. The industry's reliance on migrant workers is seen to reinforce the industry's image as a low skill, low wage one despite the fact that many jobs – including those filled by migrant workers – are relatively high skill ones (Jassi, et al. 2011). The industry is seen to struggle to recruit people into high skilled occupations and the problems it has encountered recruiting sufficient food science technologists is long standing (GFK NOP, 2007, Jassi et al, 2011).

New skill demands are also arising in the industry. The industry is viewing sustainability largely from a perspective of cost saving and may not be as aware of the longer term issues around food sustainability that will affect production (Jassi et al., 2011). There will be an emerging skills need as the consultancy-led approach to sustainability leads to the need to widen workforce skills. For example the installation of new equipment or plant may be undertaken by consultants whereas the upkeep, engineering and maintenance will require new skills. The skills needs are not yet clear in the industry and therefore there is both low demand and limited supply of training related to sustainability. To date, activity is largely in response to retailers' specific sustainability initiatives. Businesses currently find it difficult to articulate their demand for environmental and sustainability skills; therefore it is difficult to agree on which technologies will be available to tackle some of the issues.

4.3 Skills supply

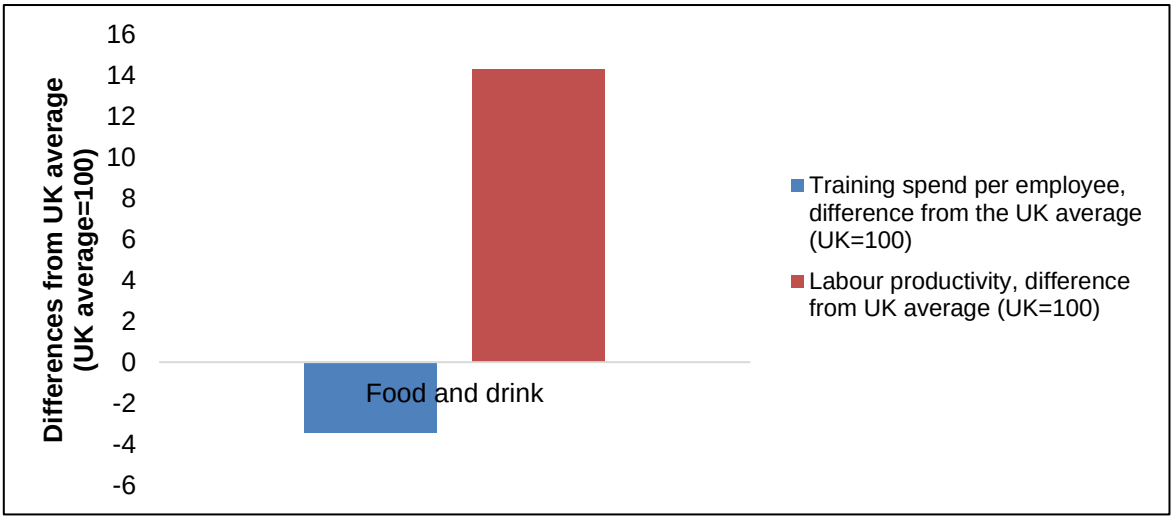
A brief summary of skills supply is provided below in Table 4.3. It is notable that the training spend per employee is lower in food and drink than in manufacturing, especially compared to high value manufacturing. A similar situation arises in relation to the percentage of workplaces with apprenticeships. Figure 4.2 shows that training spend is below the UK average, but productivity is higher.

Table 4.3 Indicators of training supply, 2013/14

	Training spend per employee, compared to the UK average (UK=100)	% of employers with staff currently on apprenticeships	% establishments where HE / school / college leavers poorly prepared for work	Labour productivity, compared to UK average (UK=100)
Food and drink	96.6	10.2	0.8	114.3
Manufacturing	97.5	14.5	1.3	132.4
High value manufacturing	150.0	17.6	2.1	270.3

Source: Employers Skills Survey 2013 / Employer Perspectives Survey 2014

Figure 4.2 Training spend per employee and labour productivity, as differences from the national average, 2013



Companies interviewed as part of the study indicated their approaches to on-the-job training. Some held the view that 'people issues' and training in particular drove their establishment's growth in productivity. These companies had comprehensive training programmes: one manufacturer has recently introduced a modular training programme for shop floor workers, while the other one has invested in a tailor made course for supervisors to ensure that organisational change was carried out successfully. Respondents from two further organisations reported that operatives were 'cross trained' through job rotation. Training and job enrichment were seen as motivating for employees and as contributing to building employee engagement.

Engineers were reported as 'critical' for the production process of almost all the establishments interviewed. Recruiting and retaining multi-skilled (electro-mechanical) engineers is a problem for some companies, as an interviewee indicated: *"[they come from] a limited pool and they can pick a job easily, so they tend to move around a lot, for higher pay"*. Four out of the six interviewed organisations have, or were planning to introduce, apprenticeships for engineers. One organisation reported encouraging engineers to acquire new skills: *"Recently we've been rolling out multi-skilled engineer positions . . . and offered an added increment in the salary to those who are certified electrical engineers. We support their training and certification – they are on a training contract."*. It was noted that the ongoing training of engineers is costly, so there has to be a demand in the business.

One of our interviewees echoed the concern of industry bodies[10] that the food and drink industry had an 'image problem':

> *There's a lot of advertising [attracting young people into the] automotive [industry] but young people leaving school don't realise what they can do in the food and drink industry. We try to plug the gap by going into schools and talking to them about what an apprenticeship is. (Interview 6)*

Food technologists / food scientists were also reported as hard to recruit staff by some of the interviewed companies. One of them was planning to introduce a programme for training technologists, while another one has a good relationship with a University through which they can obtain technologists with the required skills. There was some concern that there was an absolute shortage of food technologists being produced in the higher education sector. In future Apprenticeships might be used to generate food technologists.

Two interviewees mentioned difficulties in recruiting managers, and one of the companies is trying to solve the problem by co-operating with local universities and offering work experience / placement for undergraduate students.

4.4 Skill mismatches

The incidence of skill shortages, for example, is higher in the high value manufacturing sector than in food and drink. It is also apparent that high value manufacturers are less likely to face internal skill gaps which may suggest that they invest more in the development of existing employees (see Table 4.4).

Table 4.4 Skill gaps and shortages in the food and drink sector

	Skill gaps per 1000 employment	% of employers with skill gaps	Skill shortage vacancies per 1000 employment	Labour productivity, compared to UK average (UK=100)
Food and drink	51.9	21.3	1.3	114.3
Manufacturing	58.4	17.6	4.8	132.4
High value manufacturing	44.5	18.2	11.1	270.3

[10] http://www.foodmanufacture.co.uk/People/Industry-takes-action-to-fill-skills-gap

4.5 Developing the talent pipeline

Table 4.5 reveals that the percentage of workplaces with high value product market strategies is lower in food and drink than in the manufacturing sector.

Table 4.5 Incidence of high performance working in food and drink, 2013

	Incidence of high performance working practices	Incidence of high or very high product market strategies	Labour productivity (UK=100)
Food and drink	**10.6**	**45.4**	**114.3**
Manufacturing	8.8	49.5	132.4
High value manufacturing	10.2	58.6	270.3

There is a growing field of research which attributes the UK productivity puzzle to the lack of attention to what happens in the workplaces (Keep, 2013; Sissons, 2014 and Wakeling *et al.,* 2015). It is posited, though the evidence is indicative, that the UK's productivity problem can only be solved by focusing on employment relations and following a bottom-up approach: unlocking employee potential not only through training, but also job design, better communication and involvement, a stronger focus on employee wellbeing and pay. It is suggested that the employee voice and partnerships between management and trade unions / consultative committees are key factors to building good employment relations which, in turn, will yield productivity gains. In fact these are arguments are rather old and can be found in the published findings from the Hawthorn Experiments from the 1920s. The key is to persuade employees to engage in a process of organisational change on the shopfloor that will provide productivity gains as the example in the panel below reveals. It is also apparent that skill shortages can hamper this process (see panel).

Employer Case Study: Large food manufacturer

The company is the UK subsidiary of a global food manufacturer. Despite strong competition, the business has been expanding: new and prestigious customers have been secured. Even though the cost of raw materials has been increasing, due to the large scale production the company did not have to raise prices. Future plans include more automation, with the aim of speeding up the production process.

The main factor, however, improving productivity is not automation but the reorganisation of work on the shop floor. Labour turnover among production workers was very high about a year ago: experienced operatives with reasonable English language skills can easily find a better paid or slightly slower paced factory job in the city where the company is located. Another barrier to productivity growth was the inability and / or reluctance of different nationalities on the shop floor to communicate. A recently recruited production manager has introduced the system of job rotation and now all operatives are trained to do a number of different jobs on different production lines. This makes their everyday work more interesting and motivating for workers and has encouraged them to interact with those from different national / language groups.

The issue of skill shortages impeding change that will bring about productivity improvements was also mentioned by another employer interviewed as part of the current study.

Employer Case Study: Large food manufacturer

The company is the UK subsidiary of a global company. The business is expanding, both in the UK and globally: to secure their position in the highly competitive environment new products are constantly developed and the core brands are further diversified. The two main approaches to improving efficiencies taken by the company are increased automation and a strong focus on lean production. The company employs a dedicated Production, Technology and Development manager and a group of 'lean facilitators' aim to improve production processes and minimise the down time of machines. Further productivity growth is hindered by the difficulties in recruiting and retaining maintenance technicians and engineering staff: according to our interviewee there is a "limited pool of these people and their skills in demand, so they can pick a job easily and they tend to move around a lot". To overcome this problem, the company has taken on engineering apprentices and started its own food technologist programme. A certain managerial skill set is also hard to recruit, which has prompted to company to offer 'work placement' opportunities to undergraduates on business courses at the local University, hoping that in a few years' time they can overcome the skills shortage in this area.

The importance attached to engineering staff and food technologists was also mentioned by another large manufacturer which had begun to develop its own talent pipeline for food technologists (see panel).

Employer Case Study: Large food manufacturer

The employer has historically been able to meet its skill needs by paying relatively high wages to its staff. This resulted in relatively low levels of labour turnover which has served the establishment well. Competitive pressures, however, has meant that over time wage rates are no longer much above those of other local employers who have a demand for the same types of worker. The employer still regards its overall employment offer as being good compared with competitors and providing training plays a role in the overall package that looks to retain people.

Where the employer has struggled is in relation to recruiting food technologists. It is the only employer in the vicinity that has a demand for food technologists; there are some agricultural sites that have food technologists but they tend not to have the wider range of food technology skills the employer requires. In order to improve the supply of this group of workers, it has developed a relationship with not too distant local university to look at how it can improve its supply of food technologists. With the introduction of the Apprenticeship Levy, which is likely to result in the firm paying a substantial amount, it is also at the early stages of thinking about how Apprenticeships might become a new entry route in food technology.

The examples above are drawn from large food producers. Arguably these are better placed, given their resources, to develop their talent pipelines. It is apparent, however, that medium sized businesses have been able to develop this approach too (see panel).

Employer Case Study: Medium sized beverage manufacturer

The company has been growing steadily from a small family-run business: their output increased rapidly over the past five years and they are now exporting to around the world. Recruiting and retaining production workers has never been a problem as they are one of the few employers in a rural area and they are generally perceived as a decent employer.

The company has recently invested in a new production line and further upgrades in the production technology are planned for 2016, thus production and management processes have been in flux. The developments have been somewhat hindered by supervisors' "reluctance to change their mind set", which has reinforced the management's commitment to continuous investment in staff development and training.

Engineers and food technologists are seen by the management as critical to the success of the company. Recruiting multi-skilled engineers has proven difficult, partly because these professionals do not consider a small rural beverage producer an attractive workplace. Attempts to recruit graduates from a local University and to attract apprentices have been unsuccessful, and so the management has resorted to growing their own talent and training engineers from their existing staff. A similar approach has been taken with food technologists: although it is easier to recruit skilled and experienced professional than it is with engineers, ambitious operatives are encouraged to train and move up the career ladder.

The evidence provided above indicates the extent to which employers were hampered in their attempts to improve productivity because of skill shortages – principally for engineers and food technologists. It is also apparent, though the data are highly indicative, that the talent pipelines that companies had developed were of their own making. Whilst the talent pipelines had been developed – or were being developed – there was a sense in which employers were cautious about their investments in training and development. They had to be sure that there was a demand for the skills in the business and that should they develop those skills, through Apprenticeships for instance, that they would be able to appropriate those skills for the business (i.e. the trained employee would not leave soon after being trained). This tended to bring about a degree of risk aversion in making those investments.

4.6 Conclusion

The evidence provided above shows that skill intensity of employment is increasing. That said, the main skill demand is for people to work as plant, machinery, and assembly operatives. Looking to the future, the demand for people to work in the occupation will be large given the level of replacement demand resulting from people leaving the occupation (mainly due to retirement). The skills which are seen as critical to the sector are those related to developing product market strategies (i.e. developing the next range of products and the processes to produce them), engineers involved in the maintenance of production systems, and food technologists who have an important role to play in designing new products and ensuring production processes are safe. It is apparent that there are skill shortages for engineers and food technologists. The indicative evidence provided by employers interviewed as part of the study is that these shortages are constraint on improving business performance. This is evidenced in the fact that they had developed their own talent pipelines to produce these skills either in-house or in collaboration with external training providers (e.g. HE institutions). There is a degree of risk aversion to making investments: employers need to be convinced about the volume of internal business demand over the medium-term for those skills and should they invest in them that they will be able to retain them in the business. The catch-22 situation is essentially one of being cautious about investing in those skills that are in short-supply because the more skills are in short-supply the more likely that employees will move between companies in order to maximise their employment preferences.

5 Conclusion

Chapter Summary

- The sector is particularly dependent upon engineering and food technology skills. These are the skills / occupations to which employers are most likely to respond that they have difficulty recruiting and retaining staff.
- Employers have developed – and are continuing to do so – the means to increase the supply of people with engineering and food technology skills.
- Employers, however, need to be convinced that they can obtain a return, or recoup the cost on training investment, before they are willing to make what will be relatively substantial training investments.

  The evidence points to employers developing talent pipelines but they are concerned that shortages of key skills persist.

At a macro-economic level there is a productivity puzzle as outlined in Chapter 1. As one delves down to the sectoral and workplace levels, the factors that facilitate or exacerbate productivity growth become much clearer. The conceptual framework used in the study places an emphasis on understanding the employer's rationale for investing in skills. Where there is an internal business demand for a particular skill and there is a degree of assurance that the employer will be able to recoup the investment on any skill development, then that skill development will take place. It is indicative evidence that employers in the food and drink sector are not always assured that they will be able to recoup any investment in training people as, for instance, food technologists or engineers.

The level at which skills demand is pitched also needs to be addressed. Where employers have developed relatively high level product market strategies then they are more likely to make investments in skills alongside investments in R&D, new products, and new processes. In contrast, where product market strategies are set a relatively low level – e.g. concentrated on serving the domestic or even local market – then those investments are less likely to be forthcoming. Whatever sector of the market an organisation is operating in, it will require the skill sets that will make that position sustainable.

The food and drink sector is essentially a low value-added sector. That said, within the sector there are segments of relatively high value-added production related to, for example, premium drinks (e.g. scotch whiskey) and the preparation of convenience foods / ready-made meals. There are also segments of relatively automated production processes that place a premium on those skills that allow relatively productive production systems to operate. In particular, in more large-scale, automated systems there is an emphasis placed on the importance of engineering skills (e.g. related to maintenance of production systems) and food technologists (i.e. those involved in the design of new products and ensuring that production systems are safe).

The evidence points to employers experiencing some difficulty securing a supply of engineers and food technologists. To some extent this reflects a wider national problem relating to the supply of STEM skills and the demand for these skills across a range of industries. The supply of these skills is potentially stymied by the risks employers perceive in making substantial investments in engineering and science and skills. Gambin and Hogarth (2016), for instance, showed that an employer potentially faces a net cost of around £40,000 in training someone to completion of a Level 3 Apprenticeship in engineering. Employers need to be assured that they will be able to secure a return on that investment if they are to even consider engaging in this form of training. If there are local shortages of a specific skill – e.g. food technologists – employers are wary of making the investment in case the person they train at their cost eventually goes to work for another employer.

There is evidence that employers have sought to effectively manage this risk. There are at least two elements to this:

i. having in place those policies and practices that will effectively develop a bond or lock between employee and the employer that trained them. This typically relates to having career structures, further career development, etc.; and

ii. being able to cost-effectively develop the skills that are required by the firm.

If the employer is to make a substantial investment in training, for instance, a food technologists then it is essential that (i) is in place to ensure that that investment is protected. Alternatively, or as well as, employers can look to offset some of the costs of training; for example, individuals may choose to study full-time in further or higher education and the employer can develop links with the institutions that trains them in order to bring about improved supply of skills. In this case, the costs of training – and thereby the risks - are shared, perhaps, more evenly between the individual, the state, and the employer.

It is clear from the evidence provided in this report that employers engage in both types of activity. Food manufacturers have in place policies to retain employers and have developed relationships with training providers. But there is a sense that it is not sufficient to meet their skill needs, especially so in relation to food technologists, and that they are looking to further develop policies and practices to ensure that they able to continue to improve their performance. It is also evident that activities related to R&D, investments in new technologies and so forth will not generate the expected return unless people are in place to put into practice the potential afforded by those investments. It remains the case, however, that where the risk attached to making investments in skills is considered too high, then the much needed skill investments will not be made. There is almost a catch-22 situation where employers are resistant to make much needed investments in certain skills because they are concerned that they will not be able to retain those skills because shortages are at such a high level. Policies that reduce the risk facing employers making a training investment will bring about increased investments.

The conceptual framework used in this study outlined how, to succeed, employers need to adapt their product strategies according to the segment of the market in which they operate. Similarly, they need to be able to develop the skills they require, to operate in a given product market segment, and retain them in the business. In the case of food and drink, most employers are engaged in the production of low cost commodities. But within this segment of the market there are at least two distinct groups of producers:

1. large employers, engaged in mass production, typically using automated production processes that lend them substantial economies of scale;
2. smaller employers typically dependent upon the domestic market, using manual production systems, where it is not always clear whether their production is scalable (sometimes their product value is determined in part on it being a niche product).

This is a gross over-simplification of the actual situation but it serves to illustrate the key point that there are a group of employers that are able to use a variety of mechanisms to expand their markets and reduce their production costs, and a group that are orientated towards producing products on a small scale where the capacity to increase their market and the efficiency with which they produce their products is constrained in a number of ways, but principally that of having a product market strategy that has limited business horizons.

The barriers that inhibit productivity gains amongst the former group relate to the degree of certainty over future market conditions and whether investments in products and processes (e.g. automation / robotics) will yield a return. In summary, there is detailed knowledge of markets and production processes, but some uncertainty about market demand. In the latter case, the factors limiting productivity growth (by expanding markets and / or increasing efficiency) are more to do with ambition in the first instance.

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