

The logo for eef, consisting of the lowercase letters 'eef' in a bold, white, sans-serif font.

The manufacturers' organisation

The background of the cover features a close-up, low-angle shot of several flags flying from a flagpole. The flags are illuminated from below, creating a dramatic, glowing effect. The Union Jack is prominent in the center, surrounded by other colorful flags. The scene is set against a dark blue background.

Catching up with the Continent

Final report on EU and UK manufacturing productivity

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Introduction

This report is the fourth by EEF comparing the UK's productivity performance with that of its competitors. The first and second reports were respectively based on in-depth interviews with senior managers in the United Kingdom and the United States ('Lessons from Uncle Sam') and a large-scale survey ('Catching up with Uncle Sam'). The same approach has been applied to France and Germany with company interviews resulting in the report 'Bridging the Continental Divide', followed by a survey which investigated the issues raised by the interviews. The issues raised in the 'Uncle Sam' work such as working practices - lean manufacturing and High Performance Working - remain critical but in this case we focus on the issues of skills, innovation and investment that seem most important in explaining the productivity gap with France and Germany.

This report investigates these issues further, seeking more evidence across a sample of 600 companies in all three countries on what drives and what constrains the performance of manufacturers on each of these factors. The main findings and implications for policy are discussed in the summary, which also identifies the key strengths and weaknesses of UK manufacturing. Each section of the report starts with a summary of the evidence on the issue, drawing on our survey, previous EEF work and on other published research. It also considers the implications for policy. The rest of each section then looks at the results in detail, breaking them down by company size, sector, country of location and of ownership, and type of firm.

We have now a large body of evidence on which to base our policy prescriptions for further improvement in the performance of UK manufacturing. In addition our report provides more up to date information than other sources, such as the European Union's Community Innovation Survey, which have become quite dated. This report offers some indication of what needs to be done to raise our productivity performance but we will be developing further our thinking in the coming months.

Currently, there are signs of a better outlook for UK manufacturing with productivity and profitability improving, investment rising from a low base and a range of surveys pointing to expanding order books and output. Our survey also has some good news stories to tell, particularly about the performance of companies in the transport manufacturing sectors and of medium-sized and larger firms. However, it also suggests that there are important issues to address if we are to see a sustained improvement in manufacturing.

We would value your comments both in the interpretation of the results but also in suggesting future areas of investigation. For example, should some of the responses to this survey be monitored on a regular basis? Alternatively, would it better to widen the analysis to developing areas of competition such as China and other parts of Asia? We have set up an email address to receive your comments. Please email us at productivity@eef-fed.org.uk

Summary

Characteristics of survey sample

This survey was based on a stratified random sample of engineering companies in Germany, France and the UK. The overall potential sample was constructed to reflect the relative economic weight of the different industrial sectors. Companies were then selected randomly from this group to be interviewed. Therefore variation between the companies across the three countries in terms of firm size, extent of foreign ownership and type of firm tells us something about differences between the three countries in the composition of engineering and manufacturing.

The following differences stood out:

- The UK has more firms in the smallest size band - 84 compared with 68 in France and 65 in Germany.
- Germany has more firms with 201 employees and upwards - 55 - than either the UK (40) or France (36).
- Over a third (34%) of UK-based firms are foreign-owned compared with just 20% in Germany and 12% in France.
- UK-based firms are much more likely to be owned by companies from outside the European Union. Some 22% of UK-based firms are owned by companies from a combination of North America, Eastern Europe and other parts of the world. The comparative figures for Germany are 12% and for France 6%.
- Exactly half of UK firms with more than 201 employees are foreign-owned compared with 79% in France and 71% in Germany. The comparative figures for companies with upwards of 500 workers are UK 55%, France 69% and Germany 70%.
- There are more family and other privately-owned firms in the UK (23%) than in Germany (18%) and France (12%).

Company performance

Over the last two years the balance of firms saying that productivity increased is largest in Germany, with the UK and France level pegging. However, we should be careful in interpreting this result as it is based on perceptions and methods of measuring productivity that will vary considerably from company to company. The UK is

matching and possibly outperforming France and Germany amongst medium-sized and larger firms.

Transport producers (mainly motor vehicles and aerospace) in the UK have performed as well as any other industry in any of the three countries over the last two years.

Germany is the only country where domestically-owned firms have matched foreign-owned companies. The gap between foreign and domestically-owned companies was particularly large in the UK.

Higher rates of productivity growth in Germany have also boosted profitability, while the lower rates of improvement in France and the UK have been insufficient overall to prevent profitability from falling. However, productivity gains have driven the profitability of UK medium-large firms higher.

One of the recurring themes of the research conducted for *'Bridging the continental divide'* was the complementary nature of many of the factors that contribute to productivity growth - the way, for example, that investments in skills, innovation and new equipment reinforce each other. Alternatively, failure to invest on one front could undermine anticipated improvements from investment on another.

We used our survey to construct a select group of firms that invested above average on all fronts - capital equipment, skills and innovation. The majority of such firms are in Germany. In all three countries, the select group achieves higher rates of productivity growth. However, the gap between the select group and the overall sample group is much smaller in the UK than in the other two countries. This raises questions about why UK companies appear to be achieving lower results from their investments.

The survey also shows that higher investors in training and in innovation tend to achieve greater improvements in productivity. These rates of improvement are stronger in Germany where the gap between the select group and the total sample is also larger. However, Germany's lead is

smaller than it is for those that invest across the board in capital equipment, skills and innovation.

Investment

Our survey suggests that investment in UK manufacturing may now be picking up but it continues to lag behind France and Germany. The small balance of +9% of UK firms reporting increased investment in capital equipment over the last 12 months compares with +14% in France and +23% in Germany. Similarly, balances of +16% of UK, +21% of German and +27% of French firms expect to increase investment over the next 12 months. Medium-large firms are the only exceptions with UK firms employing 201-499 employees doing better than any size category in any of the three countries.

Lack of internal finance is considered to be the most important constraint on investment in the UK; twice as many firms cite it than in Germany and a third more than in France. This reflects the greater reliance of UK manufacturing on internal finance to fund investment and the more severe squeeze on profitability that it has suffered. Firms in every size category are more constrained than those in Germany and France except medium-large firms. Family-owned businesses in the UK are also more constrained by the availability of internal finance than any other type of firm, in the UK or elsewhere. The number of UK domestically-owned firms held back by internal finance is well ahead of foreign-owned companies. The gap is much smaller in Germany and is reversed in France where domestically-owned firms appear to be better placed. However, there is little or no difference either in the UK or in the total sample in the investment behaviour of those citing this constraint compared with those not reporting it. Further analysis suggests that weak profitability performance hardens the constraint, while stronger productivity growth helps to ease it.

More UK manufacturers use payback periods and management discretion to assess investment projects than firms in Germany and France. UK firms also look for somewhat shorter paybacks than firms elsewhere.

Companies in the UK are more likely to use management discretion to block projects that meet the technical investment criteria. However, UK firms are not more likely to use discretion to green light projects that fail the technical criteria. This use of discretion therefore seems to be eating into some of the positive influences on investment generated by a stable economy and lower rates of inflation and interest.

This raises questions as to whether the greater use of discretion represents a different approach in the UK or whether it is a temporary response to difficult economic circumstances. Persistently lower levels of investment over the previous three decades suggest that not all the caution is temporary. However, the survey suggests that more recent trends may explain some of the caution. For example, despite facing a similar outlook in world markets and arguably a stronger domestic one coupled with more favourable recent exchange rate movements, fewer firms in the UK than elsewhere suggest that the strength of markets would be positive for investment in the next 12 months. This may reflect the lingering effects of the buffeting that UK manufacturing took in the previous two years when Sterling's strength against the euro combined with depressed world markets to produce the most severe manufacturing recession for twenty years.

UK firms also regard employment regulation and government attitude to manufacturing as more negative than do their counterparts on the Continent. This might seem strange given that levels of regulation are generally acknowledged to be lower in the UK than in much of the rest of Europe. We believe that this reflects the fact that UK firms have faced a greater issue of adapting to higher levels of regulation. The UK's signing of the Social Chapter in 1997 contributed to the rapid introduction of the backlog of employment legislation. Many firms have found this very difficult, because they are used to operating in a different way that has not required them to implement the administrative systems and models of social partnership possessed by companies on the Continent.

It is therefore vital that government addresses the issue of increasing levels of regulation (both real and perceived) if we are to see a turnaround in the attitude of manufacturers towards investing in the UK.

Our survey shows around a fifth of firms in each country are considering making a major investment/expanding capacity abroad in the next 12 months. By far the main factor driving firms to consider investing abroad is to take advantage of lower labour costs elsewhere. This may be the right choice for some firms, allowing them to refocus their efforts at home on higher value activities. However, too fast an exodus of production by major firms before it is replaced by other activities or by other companies makes this transition more difficult as it weakens the domestic markets for firms in the supply chain. It also means that there are fewer companies to make substantial investment in our skills base or in driving levels of innovation higher.

The need to be closer to market is the second most important factor driving the move abroad and again more so in Germany. In the UK, however, the second most important driver is expectation of higher growth in the rest of the world relative to the domestic market. UK firms are more inclined to invest in the faster growing markets of China than German and French firms who are more focused on Central and Eastern Europe. Lower non-labour costs are also a more important factor in the UK than in the other two countries, supporting the case that increases in the cost burden on UK manufacturers are helping to push production abroad.

There is a range of ways to boost our investment performance. Greater and more effective use of modern management practices such as lean manufacturing and High Performance Working would help to unlock the higher levels of profitability required to finance and encourage increased investment. Improving our performance in the linked areas of skills and innovation will also make a difference.

We also believe that changing the current system of capital allowances to one of capital credits would help to address the twin constraints of cashflow and confidence. Such a change would allow firms to access the financial benefit of the capital allowance even if they were not making a profit.

Skills

Our survey shows the UK as the only country where skills availability in the market place has had a negative impact on productivity over the last 12 months. Paradoxically, a lower proportion of UK firms report experiencing skills shortages in any occupations. This could be due to the fact that UK manufacturers, having faced a worse recession than that in Germany and France, have more spare capacity. It could also be that UK employers are stuck in a low skills equilibrium, where lower levels of investment and innovation make limited demands on skills.

Where they exist, skills shortages are most acute for skilled workers (craft workers and technicians) while a substantial proportion of firms in the UK and France are also experiencing shortages of engineers. Skilled workers shortages are highest for metals firms and lowest for electrical/ optical while the opposite is true for shortages of engineers.

The image of manufacturing in the UK has a very negative impact on firms' ability to attract the right people compared with a slightly positive one in Germany and France. The lack of UK-owned household names may mean that engineering and manufacturing companies do not have the presence to attract employees on the basis of their reputation. This lack of national champions may also be one factor contributing to the overall image problem.

Only UK companies see the quality of school leavers as negative for their ability to attract the right people with all industries sharing this view. The quality of graduates is a positive factor in attracting the right people in all three countries but significantly less so in the UK. This probably reflects not just the quality of education but the fact that UK manufacturing is losing the best candidates to other sectors due to its negative image.

In all three countries, firms regard apprenticeships as only satisfactory in meeting their needs for an adequate supply of skilled people. However, UK firms stand out in regarding the status of apprenticeships, careers guidance and availability of government funding as constraints on the numbers undertaking apprenticeships. Of these, careers guidance is seen as the biggest problem by some distance. In addition, smaller firms in the UK regard the availability of government funding as a constraint, while it is seen as a positive factor elsewhere, particularly in France.

While the UK matches France and Germany in increasing investment in training over the last 12 months and in expecting to over the next 12 months, it has the lowest proportion of firms that have recruited apprentices in the last two years - 40% compared with 70% in Germany and 60% in France. In all three countries the main reason for not recruiting apprentices is that companies had 'no need' for them. However, the UK again stands out from the other two countries with 68% stating 'no need' compared with 25% in Germany and 40% in France.

These findings on apprenticeships suggest that there are some fundamental problems with the way that the system of apprenticeships works in this country. Some key issues to tackle include:

- A key priority for the 2004 Spending Review will be to remove restrictions which mean 19-24 year olds entering Advanced Apprenticeships receive substantially lower level of funding.
- The UK's Connexions service concentrates on those at risk of disengagement from education, leaving little resource for the majority of young people. Currently young people are not sufficiently aware of the range of routes to high-level occupations or of the subjects required to pursue them. In this year's Spending Review, resources must be found to increase the number of advisers and the quality of the advice they are able to provide. In addition there should be a comprehensive review of the effectiveness of the Connexions service.

In addition, employer demand for apprenticeships is likely to increase if we address the issues related to investment and innovation covered elsewhere in this report. Helping companies to overcome the barriers they currently face in investing in new technologies and in developing innovative products, processes and services will increase their need for skilled people. Some of these increased skill needs would then be met by recruiting more apprentices.

Our survey also reveals a number of priorities for higher education. These include the need for students to have more work experience, which is also an issue for employers in France and Germany. This is followed by the need to increase the number of science/engineering graduates and to ensure that there is a steady supply of research scientists and engineers going into industry to support our innovation efforts. A review led by Sir Gareth Roberts examined this issue and made recommendations regarding the funding of PhDs in science subjects and the pay of teachers and lecturers in these subjects. We welcome the government's decision to review progress in this area, with a particular focus on the shortage of qualified teachers in science subjects.

Innovation

Our survey shows that the UK compares well on the proportion of firms undertaking all types of innovation activity – new and improved products, processes and services. UK companies in the transport industries (motor vehicles, aerospace and other transport equipment) stand out particularly as do foreign-owned companies. The UK performs consistently better than Germany and France on the proportion of firms undertaking innovation in existing/new services to customers. This suggests that UK firms are leading the way in responding to the demands of modern manufacturing.

However, other evidence makes less comfortable reading. For example, UK firms lag some way behind those in Germany and a little behind those in France in terms of the proportion of turnover from new/renewed products introduced in the last two years. Foreign-owned firms in the UK are the

highest innovators – a situation not repeated in France and Germany. Part of the reason for this may be that, according to our survey, foreign-owned firms in the UK are more likely to be North American-owned and to be larger. Both of these groups have higher rates of innovation. Our reliance on foreign-owned firms to carry out innovation is worrying, given that this is an activity susceptible to movements between competing locations. Therefore as well as encouraging more innovation by UK-owned firms, it is essential that the UK's innovation environment is competitive, allowing us to attract and retain innovation carried out by foreign-owned firms.

The contrast between high levels of innovative activity with a more limited contribution to the bottom line for UK manufacturing also raises questions. It may be that UK firms are overestimating the innovation that they do or that these activities are at lower levels than those carried out by manufacturers in France and Germany. However, it may also reflect constraints on the effectiveness of innovation. For example, working practices may be hindering companies from exploiting the full returns from innovation or it may be that firms are not working well with partners such as other enterprises or academic institutions.

UK firms identified the lack of available finance as the key constraint on innovation and were substantially more likely to point to this than were manufacturers in France and Germany. This may partly reflect the more severe squeeze experienced by UK manufacturing in recent years. It underlines the need to avoid increasing taxation on business. However, it also points to more fundamental problems. One encouraging sign is that tax incentives are rated on a par with France and Germany, suggesting that the R&D tax credit is starting to work. The recent simplification of the guidelines, together with the better marketing of the tax credit recommended by the Lambert Review should go some way to building on this progress.

Almost twice as many firms in the UK reported that the skills available to them deterred innovation, as did those in Germany and France. For companies that saw skills as a constraint on innovation, shortages of engineers were the

main problem. This is further evidence of the need to improve the supply of engineers from apprenticeships and higher education.

An important way of overcoming the constraints of finance is to collaborate with other organisations such as academic institutions and other firms. This provides companies with access to the skills and knowledge possessed by others but also helps to share the burden of risk and cost. UK manufacturers are therefore likely to be hampered by the fact that only two fifths of them have collaborated with academic institutions on R&D projects – the same proportion as in France but well behind the 54% of German firms that have done so. Yet again, the UK transport sector stands out and has the second highest proportion of firms that have collaborated with academic institutions across all sectors and countries. In addition German firms have also collaborated more frequently with academic institutions than those in France and the UK. Our survey suggests that these collaborations bear fruit as there is a strong link between the number of times that firms have worked with universities and the proportion of their turnover generated by new or renewed products.

German firms generally find it easier to collaborate with academic institutions. They indicate that this is more likely to lead to commercially viable projects, and rate academic research, the skills of academic staff (particularly on communication) and business-university links higher than in the UK and France. However, the situation in the UK is not entirely negative as many aspects of the environment for innovation are rated more highly than in France.

The emphasis placed in the Lambert Review on developing and improving mechanisms to encourage technology and knowledge transfer is encouraging. We are particularly attracted to the proposal substantially to increase money for what Lambert terms 'third stream funding'. This refers to the funding required to ease the transition between pure research and getting an activity investment ready. The Spending Review should make such funds available as part of the priority for science that government has already signalled. In addition, it is important that the science

budgets receive a substantial increase and that defence R&D receive settlements that address its past neglect. These are high-risk activities for the private sector but have a track record of generating commercial spin-offs.

Our survey also shows that German firms make greater use of the contacts made through networking. UK firms are finding networking less effective at providing introductions to other companies and academic institutions, information on research projects and access to people with specialised skills. Again, the UK transport sector gets more out of networking than the other sectors and finds networking more effective on a whole range of issues. Finding a way of replicating this in other parts of UK manufacturing could yield considerable benefits.

UK strengths and weaknesses

We conclude this summary with a quick overview of what our survey suggests are the key strengths and weaknesses of UK manufacturing.

Strengths

1. **Medium-large firms setting standards.** These firms have seen the second strongest improvement in productivity over all sizebands and countries.
2. **Transport sector showing other firms the way.** The UK transport (motor vehicles and aerospace) sector is more than matching its competitors and has seen the sharpest increases in productivity in the UK. If this sector can achieve high standards, other sectors can follow its example.
3. **Medium-large firms investing.** Although the investment performance of all other sizes of firms in the UK has been behind that in Germany and France over the last 12 months, UK firms with 201-499 employees increased investment at the fastest rate of any size of firm in any country.
4. **More focused on China.** UK firms are more inclined to invest in the faster growing markets of China than German and French firms who are more focused on Central and Eastern Europe.

5. **Medium-large firms up with the best in innovation performance.** Measured by the proportion of turnover from new/renewed products introduced in last two years.
6. **Innovation activity high.** UK firms are more likely to undertake a range of innovation activities but struggle to translate this activity into new revenue streams.
7. **Innovating in services to customers.** More UK firms undertake innovation in existing/new services to customers, suggesting that they are leading the way in responding to the demands of modern manufacturing.
8. **Transport sector scores well on collaborations.** The UK transport sector has the second highest proportion of firms that have collaborated with academic institutions across all sectors and countries.

Weaknesses

1. **Not closing productivity gap.** Over the last two years UK manufacturing overall does not appear to have made up ground on productivity with its counterparts in Germany and France.
2. **Less able to exploit investment across the board.** Scoring well on all the individual components of skills, innovation and investment brings additional benefits. Firms that have been investing, spending on training and innovating have reaped the rewards of stronger productivity growth. The majority of such firms are in Germany and UK companies seem to struggle in realising the benefits from such activities.
3. **Management discretion blocks investment projects.** More UK manufacturers use management discretion and technical criteria such as payback periods to assess projects and use discretion to block projects that meet the technical criteria.
4. **Skills a constraint on productivity.** The UK is the only country where skills availability in the market place has had a negative impact on productivity over the last 12 months. Paradoxically, fewer firms claim to experience skills shortages.
5. **Poor image of manufacturing.** The image of manufacturing in the UK has a negative impact on firms' ability to attract the right people, while it has a slightly positive one in Germany and France.

6. **Not taking on apprentices.** Substantially fewer UK firms recruited apprentices in the last two years.
7. **German innovation levels higher.** The level of innovation in German firms outstrips that in France and the UK.
8. **Germans show way on collaborations with academia.** Nearly 55 % of German firms have collaborated with academic institutions on R&D projects compared with only 40% in the UK and France. German firms have also collaborated more frequently with academic institutions, find it easier to collaborate and have greater success at generating commercially viable projects from these collaborations than is the case in the UK and France.

Characteristics of survey sample

This survey was based on a stratified random sample of engineering and manufacturing companies in the three countries. The overall potential sample was constructed to reflect the relative economic weight of the different industrial sectors. Companies were then selected randomly from this group to be interviewed. Therefore variation between companies across the three countries in terms of firm size, extent of foreign ownership and type of firm tells us something about differences between the three countries in the composition of engineering and manufacturing.

Firm size

Our analysis in *'Bridging the continental divide'* showed that UK industry had a higher proportion of very small firms. This is confirmed by our survey sample which includes more firms in the smallest size band - 84 in the UK compared with 68 in France and 65 in Germany (table1). In addition, Germany has more firms with 201 employees and upwards - 55- than either the UK (40) or France (36).

In this report, we use the following terms for the different sizes of firm:

Micro:	1-50 employees
Small:	51-100 employees
Medium-sized:	101-200 employees
Medium-large:	201-499 employees
Large:	500+ employees

Foreign ownership

Foreign ownership of UK companies is greater than in either France or Germany. Over a third (34%) of UK-based firms are foreign-owned compared with just 20% in Germany and 12% in France. In addition UK-based firms are much more likely to be owned by companies from outside the European Union. For example, 21% of UK-based firms are owned by companies from a combination of North America, Eastern Europe and other parts of the world. The comparative figures for Germany are 10% and for France 6%.

Table 1
Breakdown of survey sample by firm size

Country	Employment size				
	1-50	51-100	101-200	201-499	500+
UK	84	41	35	18	22
Germany	65	46	34	33	22
France	68	57	39	21	15

These figures reflect the UK's historical attraction to outside investors. This brings with it the advantages of exposure to technological developments and different management approaches from abroad. However, there may also be downsides. For example, there are relatively few large UK-owned firms. This country therefore lacks the manufacturing champions that project a positive image of successful manufacturing. It may also hamper research and development (R&D) the bulk of which is carried out by larger firms. There is a tendency for foreign-owned firms to conduct R&D in the country of ownership. The UK may therefore also lack the major manufacturers who are articulating the research needs of business, forging relationships with academic institutions and creating networks to which smaller firms can attach themselves. Exactly half of UK firms with more than 201 employees are foreign-owned compared with 21% in France and 29% in Germany. The comparative figures for companies with upwards of 500 workers are UK 45%, France 31% and Germany 30%.

UK foreign-owned firms are therefore larger than those in the other two countries as table 2 shows. Using the survey results, we estimate that foreign-owned firms in the UK are twice as large as domestically-owned companies. This compares with foreign-owned firms in Germany, which are only one and a half times the size of their domestic counterparts.

Table 2
Comparison of firm size by ownership
 average number of employees in firm

	Foreign-owned	Domestically-owned	Ratio
UK	406	199	2.03
France	304	165	1.84
Germany	373	244	1.52

Type of firm

According to our survey, there are also more family and other privately-owned firms in the UK (23 %) than in Germany (18 %) and France (12 %). This may be important given that UK privately-owned firms tend to perform less well on a range of indicators in our survey.

Sectors covered

We group the sectors covered by the survey in the following way:

Metals: - manufacture of basic metals and fabricated metal products.

Machinery equipment: - manufacture of machinery and equipment not elsewhere classified.

Electrical/optical:- manufacture of office machinery and computers, electrical machinery/apparatus, radio/ TV/ communications equipment and medical/precision/optical equipment.

Transport:- manufacture of motor vehicles/trailers and other transport equipment (including aerospace/railways).

Company performance

Summary of evidence and implications for policy

Our survey provides important insights into how firms in the three countries view their recent performance on productivity and profitability. The results suggest that UK manufacturing has not made progress in closing the productivity gap over the last two years, although there are substantial variations by industry and size of firm. It also shows that in all three countries companies that invest across the board - innovations, skills, equipment - reap the benefit of higher productivity and profitability. However, the gains tend to be lower in the UK, raising question marks about constraints on realising these benefits and the effectiveness of some parts of management.

Productivity gap not being closed

Over the last two years the balance of firms saying that productivity increased is largest in Germany, with the UK and France level pegging. However, we should be careful in interpreting this result as it is based on perceptions and methods of measuring productivity that will vary considerably between company to company. In addition, our survey suggests that the UK is matching and possibly outperforming France and Germany amongst medium-sized and larger firms. UK companies employing 201-499 people perform particularly well on productivity. Weighting the results by employment size might therefore provide a more favourable outcome.

By industry, transport producers (mainly motor vehicles and aerospace) in the UK have performed as well as any other industry in any of the three countries over the last two years. It is the only UK industry to match the performance of German firms.

Germany is the only country where domestic-owned firms have matched foreign-owned companies. The gap between foreign and domestically-owned companies was particularly large in the UK. This may reflect the higher presence of high-performing US-owned firms in the UK. In addition, more of the UK's foreign-owned firms are in the large size bands, which tend to record higher rates of productivity

growth. We must also remember that the statistics often flatter foreign-owned companies as the burden of administrative overheads tends to be in the home country where the head office is usually located.

Profitability has been squeezed

Higher rates of productivity growth in Germany have also boosted profitability, while the lower rates of improvement in France and the UK have been insufficient overall to prevent profitability from falling. However, productivity gains have driven the profitability of UK medium-large firms higher but small and large firms alike in the UK and France are feeling the squeeze.

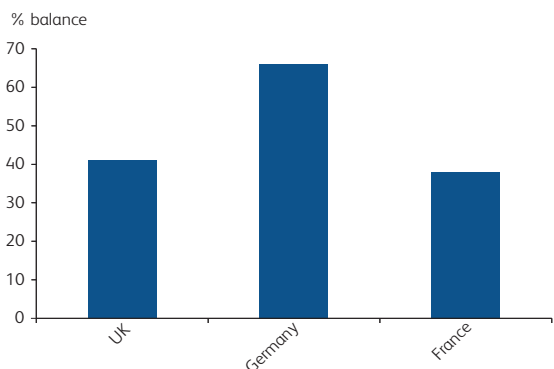
One of the recurring themes of the research conducted for *'Bridging the continental divide'* was the complementary nature of many of the factors that contribute to productivity growth - the way, for example, that investments in skills, innovation and new equipment reinforced each other. Alternatively, failure to invest on one front could undermine anticipated improvements from investment on another.

Lower returns from investment in UK

We have analysed our survey results to test how the three countries compared both in terms of investment across the board and also in the results they yield. The survey will not capture the long-term pay-offs from some of these investments, particularly in innovation. Similarly, our results do not prove causality. It may be that firms experiencing favourable trends in productivity and profitability are better placed to fund these investments.

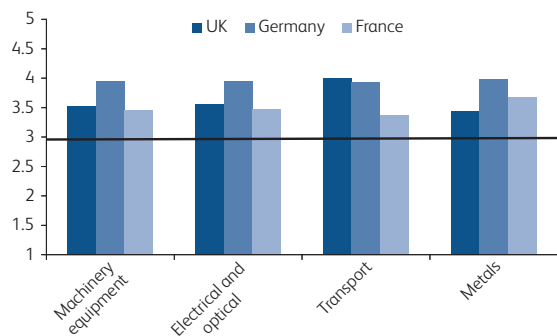
Our analysis shows that the productivity performance of firms that have been investing, spending on training and innovating - the select group - far outstrips that of the average firms. The majority of such firms are in Germany. In all three countries, the select group achieves higher rates of productivity growth. However, the gap between the groups is much smaller in the UK than in the other two countries. This raises questions as to whether other factors, possibly lower use of modern working practices or lower levels of management effectiveness, are preventing UK companies

Chart 1
UK not seen as narrowing productivity gap
 % balance of firms stating that productivity increased over the last two years



Source: EEF/NOP 2003 EU Productivity Survey

Chart 2
Germany leading way, but so is UK transport sector
 5=significant increase, 1=significant decrease in productivity over the last two years



Source: EEF/NOP 2003 EU Productivity Survey

from realising the gains from higher investment. This echoes results from EEF's previous survey 'Catching up with Uncle Sam' which showed that substantially fewer UK-owned companies reported that lean manufacturing programmes had been successful than did EU-owned or US-owned ones.

This must raise questions about some aspects of management performance. The International Institute for Management Development runs a regularly survey asking

business executives to rate the quality of management in different countries. Since 1996, there have been some improvements in the ratings of UK management but it still lags a little behind France and well behind the United States and Germany.

The survey also shows that higher investors in training and in innovation tend to achieve greater improvements in productivity. These rates of improvement are stronger in Germany where the gap between the select group and the total sample is also larger. However, Germany's lead is smaller than it is for those investing across the board in capital equipment, skills and innovation.

Detailed results

Productivity performance

'Bridging the continental divide' highlights academic research that points to a large productivity gap between UK manufacturing and that in France and Germany. The latest estimates for 1999 suggest that the UK lags behind both countries in terms of manufacturing output per hour worked by 30%.

Our survey results provide little evidence to suggest that UK manufacturing is closing this productivity gap. Chart 1 shows that over the last two years the balance of firms saying that productivity increased is largest in Germany, with the UK and France level pegging. The question only gives a rough guide to productivity performance but suggests that the UK has not outperformed the other countries. However, we must be very careful in how we interpret this, particularly as our survey results, which are not weighted by company size, show that for firms with 201 employees or more, UK manufacturing is matching and in one category outperforming its equivalents in France and Germany. In addition, respondents in the different countries may be measuring productivity differently.

Looking at the picture by industry, Germany's lead on productivity growth over the last two years is repeated in every sector (Chart 2). However, amongst transport producers the UK has a slight lead on Germany. The UK's

weakest absolute performance is in metals, which is also the industry where it is lagging furthest behind its rivals.

The gap between small and larger firms is greatest in the UK (Chart 3). While small firms with less than 200 employees have performed poorly compared with France and Germany, the larger companies more than match their competitors. This may reflect the greater proportion of larger UK firms that are foreign-owned, given the latter tend to have higher productivity levels.

Another consistent picture across the three countries is that family-owned businesses have generally seen the weakest productivity performance over the last two years (Chart 4). Privately-owned companies, of which the UK has more than the other countries, also show weaker growth than in France and Germany. In the UK, productivity has increased most strongly for publicly-owned companies suggesting that the influence of external shareholders can have a positive impact on performance.

Previous studies have shown that foreign-owned companies (FOCs) in the UK tend to have higher productivity than domestic ones. This can be attributed to a number of different factors including:

- Foreign firms take over the strong performers/larger firms or are able to turn round poorer performers.
- FOCs benefit from the buying power of their parent firm, its experience and expertise and its greater financial resources.
- FOCs make better use of best practice such as lean manufacturing and High Performance Working.
- Managers with a wide range of international experience can be brought in and employees can benefit from in-company training schemes.
- The productivity of FOCs looks higher because it excludes the overheads of head office which depress recorded levels of productivity and which are located elsewhere.

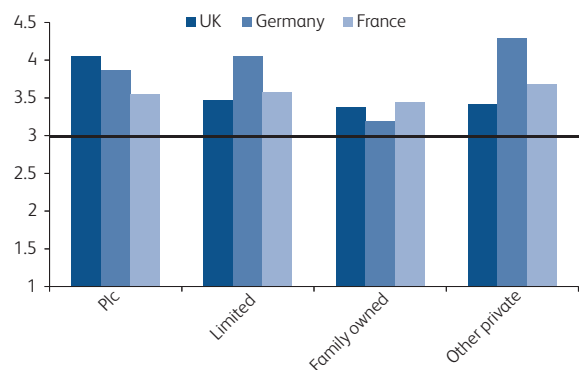
Chart 5 shows that the familiar picture of stronger productivity performance by FOCs has been true for the UK and to a lesser extent in France over the last two years. The

Chart 3
Larger firms matching competitors
5=significant increase, 1=significant decrease in productivity over the last two years



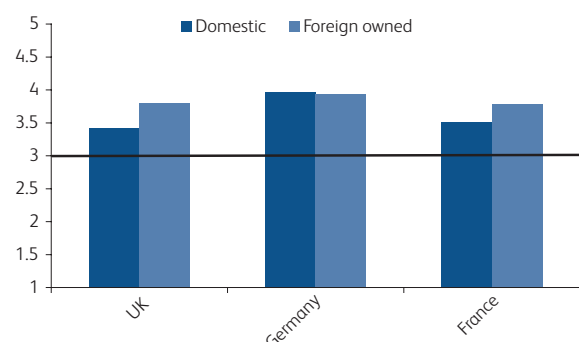
Source: EEF/NOP 2003 EU Productivity Survey

Chart 4
Family-owned businesses seeing weakest productivity growth
5=significant increase, 1=significant decrease in productivity over the last two years



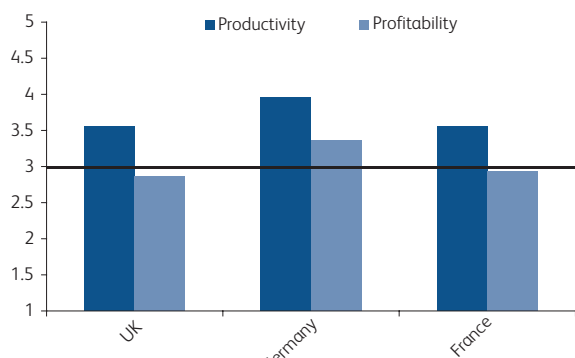
Source: EEF/NOP 2003 EU Productivity Survey

Chart 5
Only domestic German firms match foreign-owned companies
5=significant increase, 1=significant decrease in productivity over the last two years



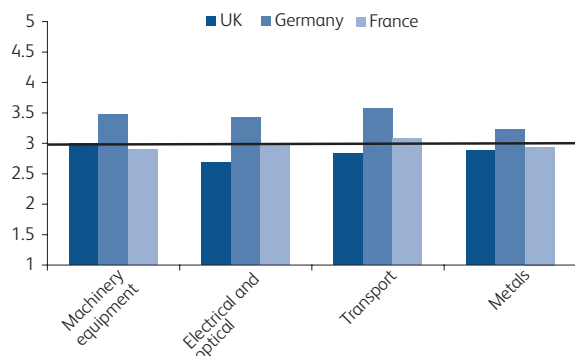
Source: EEF/NOP 2003 EU Productivity Survey

Chart 6
Higher German productivity feeds into improved profitability
 5=significant increase, 1=significant decrease in productivity and profitability over the last two years



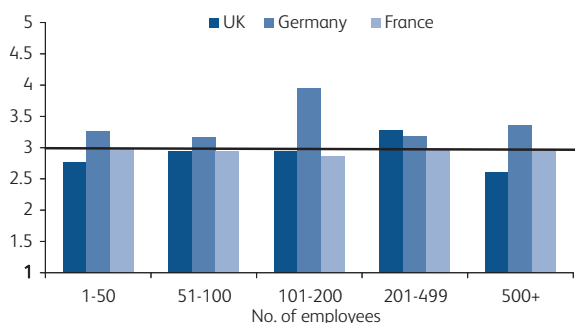
Source: EEF/NOP 2003 EU Productivity Survey

Chart 7
German profitability strong across all sectors
 5=significant increase, 1=significant decrease in profitability over the last two years



Source: EEF/NOP 2003 EU Productivity Survey

Chart 8
Medium-sized German firms' profitability performing strongly
 5=significant increase, 1=significant decrease in profitability over the last two years



Source: EEF/NOP 2003 EU Productivity Survey

higher concentration of US-owned firms in the UK and France helps to explain the disparity between domestic and foreign-owned firms in these countries as US-owned companies are some of the strongest performing foreign companies. In contrast, domestic German firms have outperformed foreign-owned companies both at home and in France and the UK.

Profitability performance

Sterling's strength against the euro for much of the period since 1997 has put UK manufacturing profitability under additional pressure at a time when international competition has become more intense. This makes it harder for firms to fund increased levels of investment and innovation required to transform our productivity performance.

Our survey confirms this impression of weak profitability both in absolute terms and also relative to German manufacturing. Chart 6 compares mean scores on productivity and profitability, showing that stronger German efficiency has fed through onto the bottom line. In contrast UK and French productivity growth has been insufficient to prevent profitability from worsening.

Chart 7 shows Germany's better profitability performance is reflected in every sector. UK profitability is under most pressure in electrical/optical and transport - despite the latter's strong productivity performance.

Chart 8 shows that the strong profitability performance of German manufacturing is underpinned by the strong performance of medium-sized firms (101-200 employees). The squeeze on UK (and French) profitability is not just a small company issue with UK firms employing 500+ reporting the largest squeeze on profitability across all three countries. However, medium-large UK firms have seen a healthy improvement in profitability (underpinned by growth in productivity) and to a greater extent than companies of a similar size in France and Germany.

There is less disparity between the profitability of domestic and foreign-owned companies than is the case for productivity (Chart 9). Although more domestic firms in the UK state that profitability has fallen over the last two years, it is not substantially different to the situation for foreign-owned firms. Across all three countries the strongest profitability performers have been domestic German firms.

Complementarities

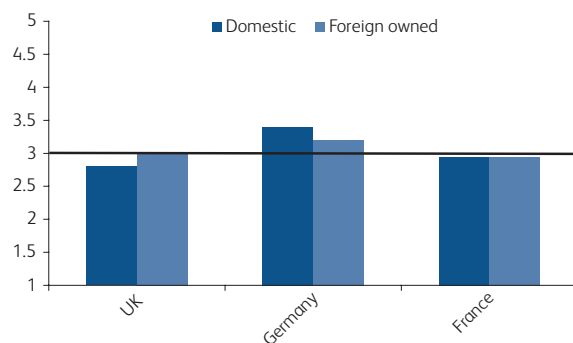
One of the recurring themes of the research conducted for *'Bridging the continental divide'* was the complementary nature of many of the factors that contribute to productivity growth - the way, for example, that investments in skills, innovation and new equipment reinforce each other. Alternatively, failure to invest on one front could undermine anticipated improvements from investment on another front.

We have analysed our survey results to test to how the three countries compared both in terms of investment across the board and also in the results they yield. We recognise that some of these investments, particularly in innovation, may have a long pay-off that this survey will not have captured. Similarly, our results do not prove causality. It may be that firms experiencing favourable trends in productivity and profitability are better placed to fund these investments. However, that in itself is useful evidence of companies that are in a virtuous circle of increasing profitability, productivity and investment.

We make three different comparisons to gauge the impact of complementary investment, looking at:

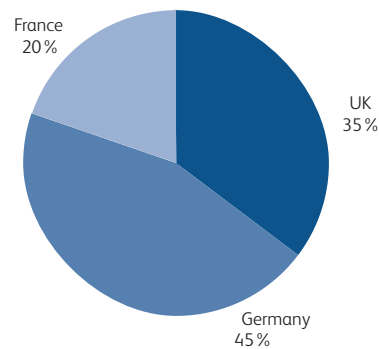
- Investment across the board - training, capital investment and new product development;
- Investment in people - increased spending on training, recruiting apprentices and collaborating with academic institutions;
- Innovators – firms that network at least monthly, have undertaken new product or process innovation and collaborated with a university.

Chart 9
Domestic German firms' profitability increasing more strongly
 5=significant increase, 1=significant decrease in profitability over the last two years



Source: EEF/NOP 2003 EU Productivity Survey

Chart 10
Firms that have increased spending on training, capital investment and have more than 10% of turnover from new/renewed products
 % of total

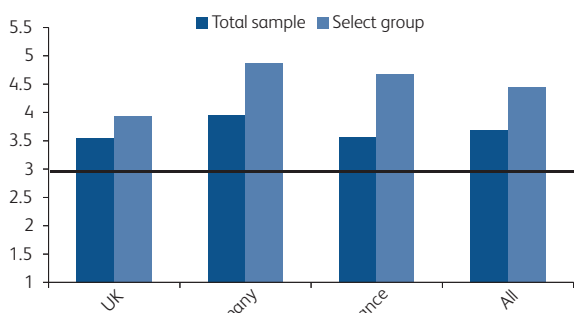


Source: EEF/NOP 2003 EU Productivity Survey

Investment across the board

Only 51 companies out of the sample of 600 (just 8.5%) have increased spending on training, increased investment in capital equipment and have more than 10% of their turnover generated from new/renewed products. Chart 10 shows that 45% of these firms are based in Germany with 35% in the UK and 20% in France.

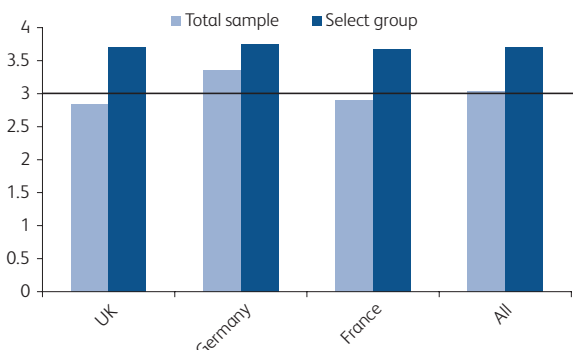
Chart 11
UK gains less from investment across the board
 5=significant increase, 1=significant decrease in productivity over the last two years for total sample and select group



Source: EEF/NOP 2003 EU Productivity Survey

Chart 11 shows that the productivity performance of the group of firms that have been investing, spending on training and innovating - the select group - far outstrips that of the average firms. In all three countries, the select group achieves higher rates of productivity growth. However, the gap between the groups is much smaller in the UK than in the other two countries. This raises questions as to whether other factors, possibly lower use of modern working practices or lower levels of management effectiveness, are preventing UK companies from realising the gains from higher investment.

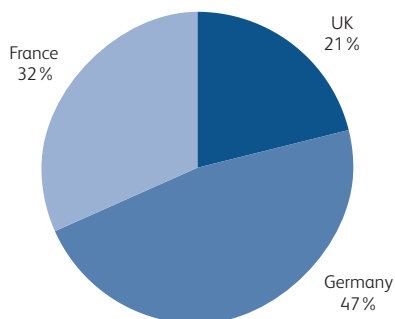
Chart 12
Higher investment firms see gains in profitability
 5=significant increase, 1=significant decrease in profitability over the last two years for total sample and select group



Source: EEF/NOP 2003 EU Productivity Survey

Comparing the two groups on profitability reveals some intriguing results. It again shows that in all three countries, profitability is higher amongst the select group. However, Chart 12 also shows UK firms in the select group gaining the largest increases in profitability despite the finding in Chart 11 of lower rates of productivity growth. Could it be that firms are investing in a way that delivers quick financial returns but not lasting productivity growth? On the basis of the sample sizes, it is hard to draw firm conclusions on this.

Chart 13
Firms that have increased spending on training, recruited apprentices and collaborated at least twice in the last two years with an academic institution
 % of total



Source: EEF/NOP 2003 EU Productivity Survey

Chart 13 shows the breakdown of the 57 firms that have increased spending on training, recruited apprentices and collaborated frequently with universities, with nearly half of the firms in Germany, a third in France only a fifth in the UK.

Chart 14 shows that firms that have increased spending on training, recruited apprentices and collaborated with academic institutions recorded a stronger productivity performance. However, only amongst firms in Germany is there a substantial difference between the total sample and the select group, while the French investors in people are actually worse off. This suggests that firms in Germany are more effective in realising the benefits from people-related investments, possibly due to the strength of its apprenticeship system.

Innovators

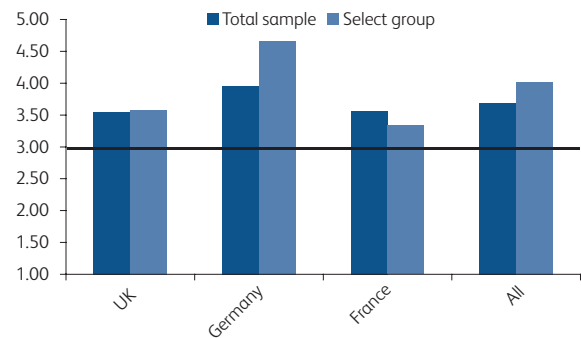
Combining innovation activities can also be powerful in achieving productivity improvements. Nearly half of all firms in the sample that network at least monthly, have undertaken new product or process innovation and collaborated with a university are in Germany, with a quarter each in UK and France. Chart 15 shows that for the sample as a whole there has been a significant productivity advantage for these companies over the average firm. However, the difference between the select group and the total sample is lower than in the other comparisons, reflecting the longer-term and more uncertain pay-offs from innovation. Again Germany is in the lead both in terms of overall productivity and in the size of the gap between the select group and the total sample. However, the size of the gap in Germany is not particularly large compared with France and the UK.

Analysis of profitability also shows small differences between the select group and total sample both for the overall survey and for the individual countries.

Chart 14

Investment in people can make a difference

5=significant increase, 1=significant decrease in productivity over the last two years for total sample and select group

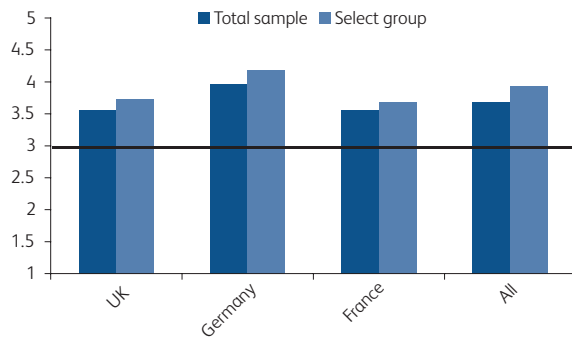


Source: EEF/NOP 2003 EU Productivity Survey

Chart 15

Innovators achieve greater gains

5=significant increase, 1=significant decrease in productivity over the last two years for total sample and select group



Source: EEF/NOP 2003 EU Productivity Survey

Investment

Summary of evidence and implications for policy

'Bridging the continental divide' presented evidence showing UK manufacturing historically investing substantially less than its competitors. Figures for the end of the previous decade showed that thirty years of lower investment had left capital per hour worked 80% higher in France and 30% higher in the United States and Germany. This reflects a long history of under-investment in the UK. That is not to say that the low cost of capital in Germany has not at times led to over-investment there. Indeed organisations such as the National Institute of Economic and Social Research have suggested that Germany may currently be suffering the same problems of over-investment as those that contributed to the many years that Japan's economy has spent in the wilderness. These survey results provide the latest indication of how investment has been performing and expected trends for the future in each of the three countries. With offshoring and outsourcing by business generating large amounts of headlines, we also look at where companies in the three countries are planning to locate investment.

Investment growing faster elsewhere

Our survey indicates that investment in manufacturing may now be picking up in the UK as also suggested by the 2004 first quarter National Statistics figures. Improving levels of profitability may help to support this trend through this year. However, the recovery is from a very low base with investment as a share of gross value added hitting record lows last year. In addition, our survey suggests that the UK continues to lag behind France and Germany. The small balance of +9% of UK firms reporting increased investment in capital equipment over the last 12 months compares with +14% in France and +23% in Germany. Similarly, balances of +16% of UK, +21% of German and +27% of French firms expect to increase investment over the next 12 months. Medium-large firms are the only exceptions, with UK firms employing 201-499 employees doing better than any size category in any of the three countries. UK firms of this size are more likely to be foreign-owned than the equivalent group in France and Germany.

Internal finance constrains investment

Lack of internal finance is considered to be the most important constraint on investment in the UK; twice as many firms cite this reason than in Germany and a third more than in France. As outlined in *'Bridging the continental divide'*, this reflects the greater reliance of UK manufacturing on internal finance to fund investment and the more severe squeeze on profitability that it has suffered. Both small and large firms in the UK are constrained by a shortage of internal finance. Firms in every size category are more constrained than those in Germany and France except medium-large firms, helping to explain their strong investment performance over the last 12 months. Family-owned businesses in the UK are also more constrained by the availability of internal finance than any other type of firm, in the UK or elsewhere. The number of UK domestically-owned firms held back by internal finance is well ahead of foreign-owned companies. The gap is much smaller in Germany and is reversed in France where domestically-owned firms appear to be better placed.

However, shortages of internal finance do not seem to be as hard a constraint on investment as levels of demand or uncertainty over demand. While firms expressing concerns over demand for their product were less likely to have increased investment than the overall sample, this is not true of those constrained by internal finance. Companies reporting this constraint were just as likely to have increased investment as those that did not. However, analysis of the UK sample suggests that companies experiencing productivity growth were more likely to have overcome the internal finance constraints, while those held back by the constraint were more likely to report significant reductions in profitability.

Management discretion blocks projects

UK manufacturing stands out for companies using payback periods and management discretion to assess investment projects more than firms in Germany and France. UK firms also look for somewhat shorter paybacks than firms elsewhere. Companies in the UK are more likely to use

management discretion to block projects that meet the technical investment criteria. However, UK firms are not more likely to use discretion to green light projects that do not meet the technical criteria. This use of discretion therefore seems to be eating into some of the positive influences on investment generated by a stable economy and lower rates of inflation and levels of interest rates.

A key issue is whether the greater use of discretion represents a different approach in the UK or whether it is a temporary response to difficult economic circumstances. Persistently lower levels of investment over the previous three decades suggest that not all the caution is temporary. However, the survey suggests that more recent trends may explain some of the caution. For example, despite facing a similar outlook in world markets and arguably a stronger domestic one coupled with more favourable recent exchange rate movements, fewer firms in the UK than elsewhere suggest that the strength of markets would be positive for investment in the next 12 months. This may reflect the lingering effects of the buffeting that UK manufacturing took in the previous two years when Sterling's strength against the euro combined with depressed world markets to produce the most severe manufacturing recession for twenty years.

To some, the more cautious UK approach may reflect the fact that historically, failure in the UK has had greater consequences. The reform of bankruptcy laws may help in this respect, though this will not happen overnight.

Growing regulation sours attitudes

UK firms also regard employment regulation and government attitude to manufacturing as more negative than do their counterparts on the Continent. This might seem strange given that levels of regulation are generally acknowledged to be lower in the UK than in much of the rest of Europe. We believe that this reflects the fact that UK firms have faced a greater issue of adapting to higher levels of regulation. The UK's signing of the Social Chapter in 1997 contributed to the rapid introduction of a backlog of employment legislation. Many firms have found this very

difficult, because they are used to operating in a different way that has not required them to implement the administrative systems and models of social partnership possessed by companies on the Continent.

It is therefore vital that government addresses the perception of increasing levels of regulation (real and perceived) if we are to see a turnaround in the attitude of manufacturers towards investing in the UK. This means slowing the pace of increases in regulation and considering more fully the impact it has on business costs and competitiveness. There were some helpful measures on this front in the 2004 Budget but this will require constant attention. Perceptions of negative government attitude also reflect the experience of rising costs, whether in the form of increased taxation (climate change levy, landfill tax) or higher costs in other areas such as pensions, insurance and energy. The government has started to address pensions and insurance but UK energy supply threatens to become less competitive. In addition, while relieved by the absence of tax rises in Budget 2004, business fears further increases in the near future.

UK not out of line in looking abroad

Preventing unnecessary rises in the cost of employing people in the UK will also be important in preventing too rapid a movement abroad of UK manufacturing capacity. Our survey shows around a fifth of firms in each country are considering making a major investment/expanding capacity abroad in the next 12 months. By far the main factor driving firms to consider investing abroad is to take advantage of lower labour costs elsewhere. This may be the right choice for some firms, allowing them to refocus their efforts at home on higher value activities. However, too fast an exodus of production by major firms before it is replaced by other activities or by other companies makes this transition more difficult as it weakens the domestic markets for firms in the supply chain. It also means that there are fewer companies to make substantial investments in our skills base or in driving levels of innovation higher.

The need to be closer to market is the second most important factor driving the move abroad and more so in Germany. In the UK, however, the second most important driver is expectation of higher growth in the rest of the world relative to the domestic market. UK firms are more inclined to invest in the faster growing markets of China than German and French firms who are more focused on Central and Eastern Europe. Lower non-labour costs are also a more important factor in the UK than in the other two countries, supporting the case that increases in the cost burden on UK manufacturers are helping to push production abroad.

The case for a capital credit

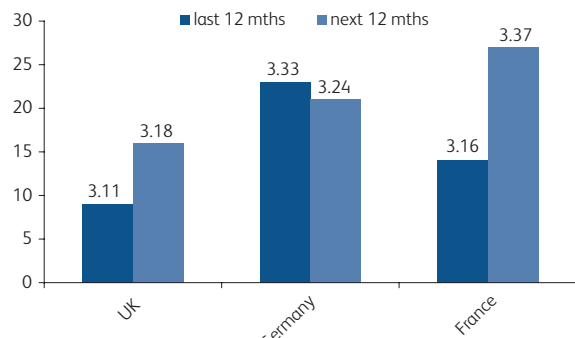
There is a range of ways to boost our investment performance. Greater and more effective use of modern management practices such as lean manufacturing and High Performance Working would help to unlock the higher levels of profitability required to finance and encourage increased investment. Improving our performance in the linked areas of skills and innovation (see next two chapters) will also make a difference.

We also believe that changing the current system of capital allowances to one of capital credits would also help to address the twin constraints of cashflow and confidence. Such a change would allow firms to access the financial benefit of the capital allowance even if they were not making a profit. Firms with the least internal finance available (by definition those not profitable) would receive an additional incentive to invest, while those that were performing strongly and less in need of assistance would see no change in the incentives offered by the tax system (they would continue to qualify for capital allowances). This would therefore better target assistance where it was most needed.

Chart 16

UK losing further ground on investment

% balance of change in investment over 12 months/next 12 months mean score where 5=significant increase, 1=significant decrease in investment



Source: EEF/NOP 2003 EU Productivity Survey

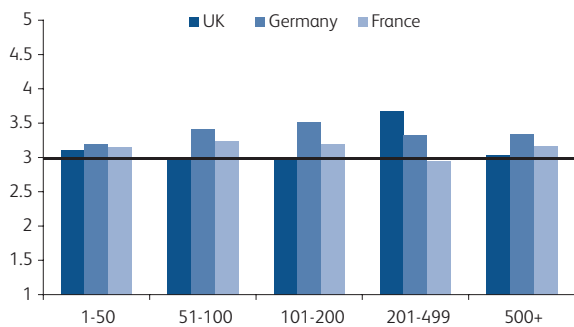
These proposals are covered in more detail in EEF’s Budget Submissions available on our website: www.eef.org.uk

Detailed results

Investment performance

There is little evidence to show that UK manufacturing is narrowing the investment gap with Germany and France (Chart 16). If anything the UK is falling further behind. Over the two-year period covering the last and next 12 months, both German and French manufacturers expect to have increased investment at a greater rate than UK firms. While a small balance of +9% of UK firms report that they increased investment in capital equipment over the last 12 months, this compares with +14% in France and +23% in Germany. Similarly, balances of +16% of UK, +21% of German and +27% of French firms expect to increase investment over the next 12 months.

Chart 17
UK medium-large companies leading way on investment
 mean score where 5=significant increase, 1=significant decrease in investment over last 12 months



Source: EEF/NOP 2003 EU Productivity Survey

Most engineering industries in the UK are experiencing and expecting weaker investment than their counterparts in Germany and France. Over the last 12 months the strongest expansion in investment in the UK was in metals with a balance of 16% of companies increasing investment levels. All other sectors were below the UK average with the transport sector the only one to experience a slight fall. Looking ahead, a modest increase is expected in all sectors except electrical and optical where a marginal fall is anticipated.

The transport sector is an interesting case, with the strongest productivity growth over the past year, but also with the largest proportion of companies reporting a significant decrease in investment spending. There are two possible reasons why companies in the transport sector have managed to sustain productivity growth, while reporting a below par investment performance. Firstly, the recent trend in investment spending may be cyclical. Ongoing difficulties in the aerospace industry and continued restructuring in motor vehicles is likely to have been a temporary response to economic conditions. The survey also shows that the transport sectors are expecting to make a larger commitment to capital investment over the next 12 months than any other sector and investment levels are expected to be on a par with those in the French and German transport sectors.

Secondly, the transport sector has also made a bigger commitment to investment in other areas, such as hiring apprentices, innovating in new and improved products and processes and transport companies generate a larger than average share of their turnover from new and renewed products (see later chapters). The combination of these practices is likely to have supported productivity growth over the past year. In addition, companies are more optimistic about the impact of investment on productivity performance than UK companies overall, over the next 12 months.

There are some more interesting trends by employment size across the three countries. Chart 17 shows that over the last 12 months the investment performance of UK firms of all size bands has been behind that of their counterparts in Germany and France, except for firms with 201-499 employees. These medium-large firms in the UK report the strongest increase in investment over the last 12 months of any size band in any of the three countries. Expectations concerning investment for the next 12 months show similar trends with firms in Germany and France expecting investment to increase more strongly, except for those with 201-499 and to a lesser extent 500+ employees.

Manufacturers in all three countries find that the level of investment in capital equipment has impacted positively on their company's productivity over the last 12 months (Chart 18). However, in both Germany and France it has been significantly more positive for productivity than in the UK. This is indicated by both a higher balance of firms stating investment had a positive impact and a higher mean score (where respondents score the impact of investment on productivity on a scale of 1-5 where 5 is significantly positive and 1 is significantly negative). This is perhaps not surprising given their higher capital intensity and stronger increases in investment. Expectations are that over the next 12 months the level of capital investment will continue to have a more positive impact in Germany and France, although the differences are not statistically significant.

Barriers to investment

Past EEF research including that for *'Bridging the continental divide'* identified three key constraints on manufacturing investment:

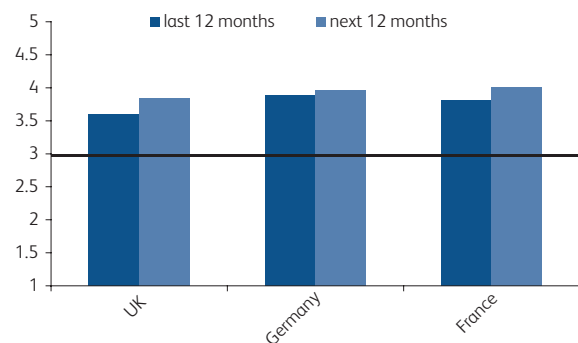
- UK firms are more dependent on internal finance for investment (93% funded from internal sources) and have faced a greater squeeze on that finance;
- Improved macroeconomic stability has been substituted with microeconomic instability for manufacturing firms (production moving overseas, rising cost burden and regulation);
- In addition, for publicly-owned firms there are issues surrounding share ownership structures and short-termism.

Our survey confirms the importance of internal finance with the lack of it considered to be the most important constraint on investment in the UK (Chart 19). Twice as many UK firms cite it than in Germany and a third more than in France. However, this appears not to have seriously impeded their ability to invest over the past 12 months, nor is it expected to do so over the next 12 months. In the total sample of those companies experiencing internal finance shortages, 35% have managed to overcome this constraint and increase investment, almost the same as the 36% of all companies that have increased capital expenditure. Overall, UK companies referring to internal financing constraints were marginally more likely to have raised capital expenditure over the past year.

However, for some firms it seems it may be too great a hurdle. The evidence points to some companies facing internal financing limitations being more likely to decrease investment significantly. Though we have to be careful in interpreting results based on small sample sizes, it appears that more positive trends in productivity and, to a lesser extent, profitability, help firms to overcome these constraints. Looking at the UK sample of companies claiming to have been affected by internal finance constraints, productivity and profitability has increased more strongly in companies able to overcome the constraints.

Chart 18

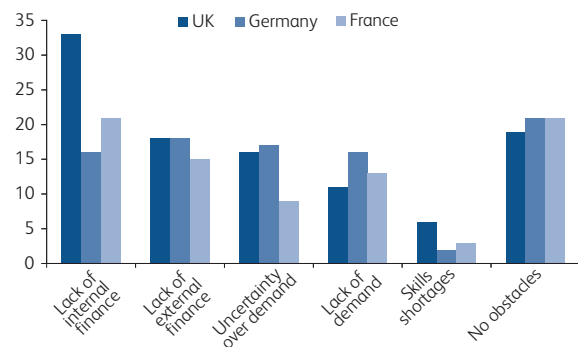
Investment more positive for productivity in Germany and France
mean score where 5=significant positive, 1=significant negative impact on productivity over last/next 12 months



Source: EEF/NOP 2003 EU Productivity Survey

Chart 19

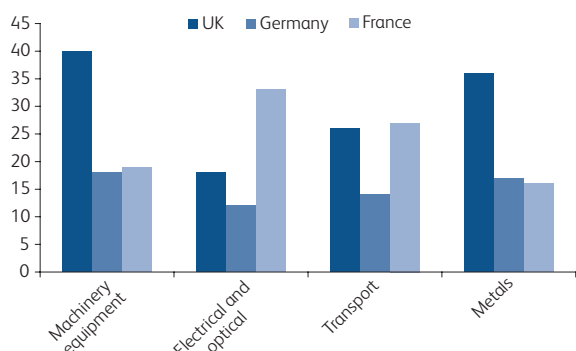
Lack of internal finance more of a constraint on investment in UK
% of firms citing as barrier to investment



Source: EEF/NOP 2003 EU Productivity Survey

For example, 70% of those who overcame the constraints reported increasing productivity compared with 48% of those held back by them. On profitability, 39% of the 'overcoming' group reported improved profitability, almost the same as the 36% of the 'held back' group. However, a quarter of the 'held back' group reported a significant reduction in profitability compared with just 9% of the 'overcoming' group.

Chart 20
UK machinery and metals most constrained by internal finance
 % of firms citing as barrier to investment

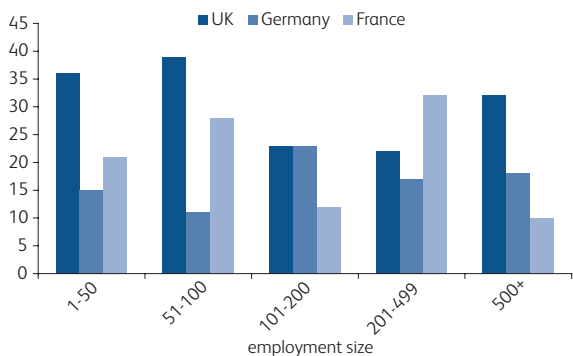


Source: EEF/NOP 2003 EU Productivity Survey

Again the trend is similar in the UK, with a fifth of companies saying investment had decreased significantly over the past year compared with 12% of all UK companies.

In all three countries, around a fifth of companies indicate no obstacles to investment. These companies report higher levels of investment over the past 12 months and marginally more optimistic investment intentions. Fewer than 8% of UK companies reporting no barriers to investment actually reduced investment spending in the past year, compared with around a quarter of all UK companies that cut investment spending. In France 9% of companies cut back investment, despite there being no constraints, compared with 20% of all French companies and the corresponding figures for Germany are 3% and 17%.

Chart 21
Mainly small firms constrained by internal finance
 % of firms citing as barrier to investment



Source: EEF/NOP 2003 EU Productivity Survey

Shortage of internal finance stands out as being particularly acute as a constraint on investment in the UK machinery equipment and metals sectors (Chart 20). By contrast, Germany has the sectors that seem to be least constrained by the availability of internal finance – the electrical and optical, and transport industries.

UK smaller firms are most constrained by a shortage of internal finance (Chart 21). This is likely to reflect the more difficult position that they have faced in recent years, with larger companies putting pressure on smaller supply firms to reduce prices. However, a third of firms with 500+ employees also cite internal finance shortage as a constraint on investment - substantially more so than in Germany and France. However, we should bear in mind that the sample of larger companies in the UK is fairly small - just four. Of the four that reported internal finance as a constraint, three were foreign-owned. These constraints may therefore reflect the wider problems of the parent company.

Uncertainty over demand and lack of demand were mentioned by fewer companies as holding back investment than either internal finance, or external finance, which was the second most common constraint in all three countries. However, they seem to be a harder constraint with a more negative impact. Of those companies citing lack of demand or uncertainty over demand as an investment constraint, a third had cut investment over the past year compared with around a fifth of the total sample.

Family-owned businesses in the UK are more constrained by the availability of internal finance than any other type of firm in all three countries (Chart 22). All types of firm in the UK are more constrained than their European counterparts except other privately-owned firms. No German plcs state that internal finance shortage is a constraint on investment while a low proportion of German family-owned firms and limited companies also report that they are constrained by internal finance.

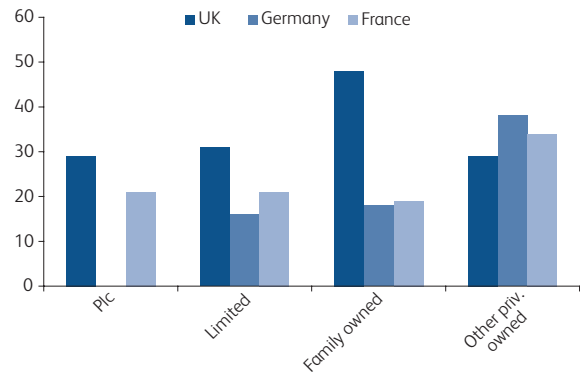
Chart 23 shows that domestically-owned firms in the UK are most constrained by the availability of internal finance. UK domestic firms are significantly more constrained than foreign-owned firms in the UK - a trend repeated in Germany but not in France.

Assessing investment projects

The next set of questions dig deeper into the issue of whether different approaches could explain variations in investment performance by country. In particular do UK firms adopt a more short-term view? And are they more risk averse?

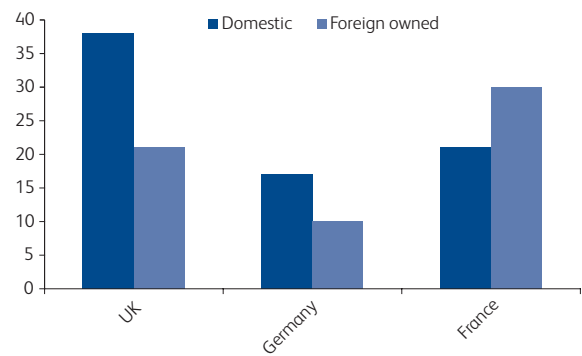
Chart 24 shows that the vast majority of UK manufacturers use a combination of payback periods and management discretion when assessing potential investments. This overlap between technical assessment and management discretion is largely absent elsewhere, mainly due to much lower use of management discretion in France and Germany. Hurdle rates of return are used to a similar extent

Chart 22
Family-owned firms in UK most constrained by internal finance
% of firms citing as barrier to investment



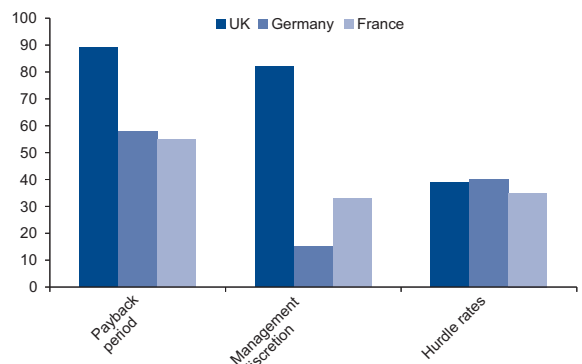
Source: EEF/NOP 2003 EU Productivity Survey

Chart 23
Domestic UK firms most constrained by internal finance
% of firms citing as barrier to investment



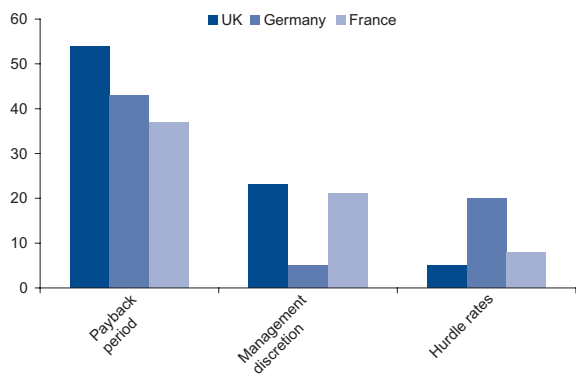
Source: EEF/NOP 2003 EU Productivity Survey

Chart 24
Payback periods and management discretion more widespread in UK
% of firms using following when assessing investment projects



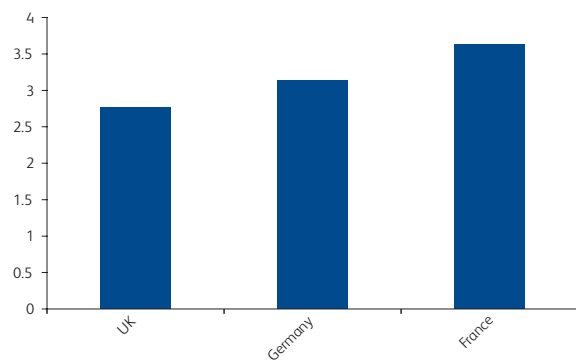
Source: EEF/NOP 2003 EU Productivity Survey

Chart 25
Payback periods and management discretion most important in UK
 % of firms citing following as most important factor influencing decision to invest



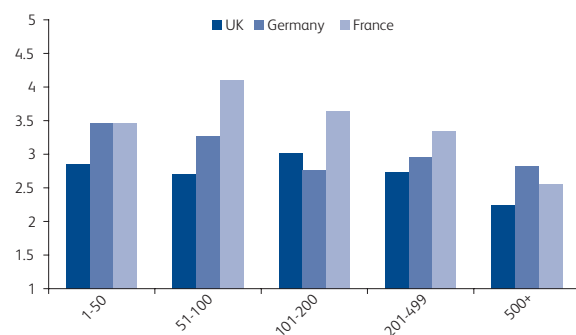
Source: EEF/NOP 2003 EU Productivity Survey

Chart 26
UK firms looking for a quicker payback
 mean payback periods in years cited by firms using payback periods



Source: EEF/NOP 2003 EU Productivity Survey

Chart 27
Large UK firms look for quickest paybacks
 mean payback periods in years cited by firms using payback periods



Source: EEF/NOP 2003 EU Productivity Survey

Chart 25 shows that when asked for the most important factor that they take into account, UK firms attach importance to payback periods and management discretion (although only marginally so relative to France), while German and French firms are more wedded to hurdle rates.

UK firms also use slightly shorter payback periods (in the region of 2.75 years) than in Germany (3.1 years) and France (3.6 years). The differences in Chart 26 may not be large enough to provide clear evidence that UK firms are adopting a more short-termist approach but suggest they are looking for quicker paybacks. UK firms in all four sectors look for the shortest payback periods and French firms the longest. The UK transport sector looks for the shortest paybacks overall (2.4 years) and the French machinery and equipment sectors the longest (4 years). The shorter payback periods used in the transport sector may well explain its weaker investment performance.

In the three countries, payback periods tend to reduce with firm size (Chart 27). Across the size range, UK firms tend to look for quicker paybacks than their counterparts in Germany and France (although German firms with 101-200 employees look for shorter paybacks than firms of the same size in the UK).

Both UK and German plcs tend to look for the quickest paybacks (Chart 28), which gives some support to the theory that pressure is exerted on managers by shareholders to get short-term returns in preference to those over the longer term. By contrast, family-owned firms look for the longest paybacks in both the UK and Germany and the second longest in France. This supports the view that family-owned businesses will take a longer term view about investment decisions than those with shareholders less involved in the company. French limited companies stand out with by far the longest paybacks (5.5 years). However, the evidence shows that over the last 12 months family-owned firms only scored better than average on increasing investment in the UK and scored worse in Germany and France, particularly the latter.

The results also show that domestically-owned firms in all three countries look for longer payback periods than is the case for foreign-owned firms. This probably reflects the fact that foreign-owned firms are more likely to be plcs, which as Chart 28 showed, tend to look for shorter payback periods. The UK sample contains roughly twice as many foreign-owned companies than in Germany and France and this could partly explain the shorter payback periods in the UK.

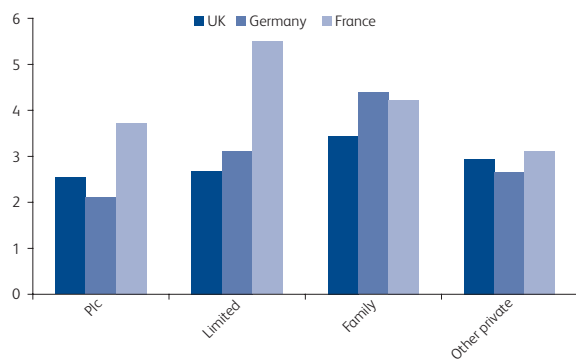
Our survey also suggests that managers in the UK are more likely to use their discretion to block projects that meet the technical criteria than their counterparts in France and Germany. However, all three countries are pretty similar in their use of discretion to allow those failing the criteria to go ahead. This could reflect a greater aversion to risk in UK management relative to Germany and France, although more evidence is needed before this can be confidently asserted.

In the UK 27% of projects that meet hurdle rates/payback periods do not get the go ahead, compared with 20% in Germany and 21% in France (Chart 29). There is much less divergence between the three countries in the proportions of projects that do not meet the hurdle rates/payback periods but still go ahead - 15% in the UK, 14% in Germany and 13% in France.

There is more variation by sector in the UK in the proportion of projects that firms say meet the technical criteria but do not go ahead. Chart 30 shows that projects are most likely to be turned down in the UK machinery equipment and metals sectors. The transport industries block fewer projects but this is probably because they have already set tighter technical criteria such as shorter payback periods.

Chart 28

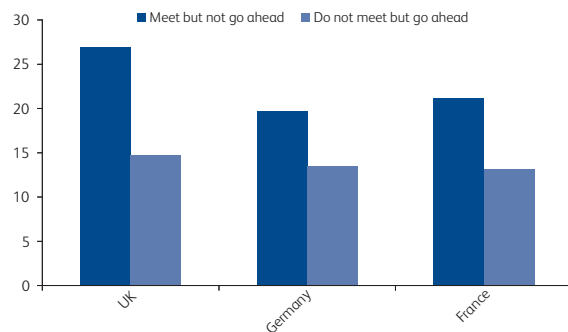
German and UK plcs look for quickest paybacks
mean payback periods in years cited by firms using payback periods



Source: EEF/NOP 2003 EU Productivity Survey

Chart 29

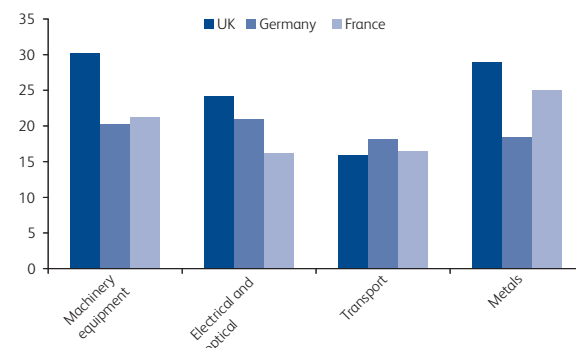
Management discretion can hold back investment projects
% of projects that meet hurdle rates/payback periods that do not go ahead and % of projects that do not meet hurdle rates/payback periods that still go ahead



Source: EEF/NOP 2003 EU Productivity Survey

Chart 30

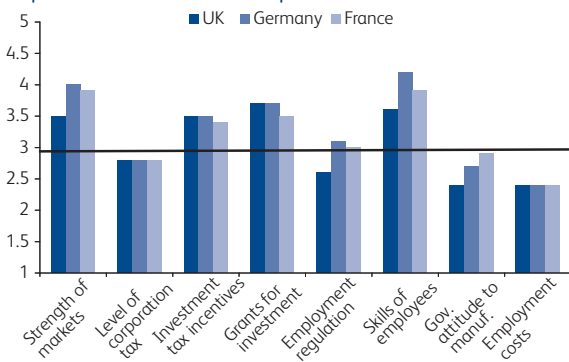
More projects blocked in UK machinery equipment and metals
% of projects that meet hurdle rates/payback periods that do not go ahead



Source: EEF/NOP 2003 EU Productivity Survey

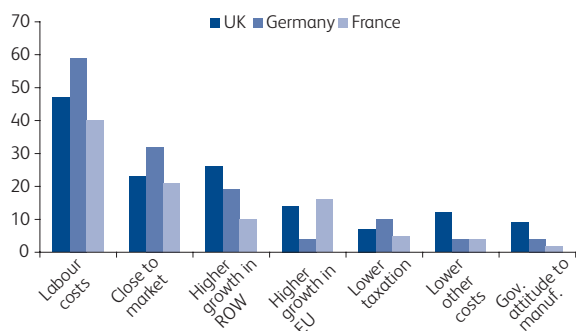
Chart 31
Employment costs, regulation and government attitude are key negatives for investment

mean score where 5=significant positive, 1=significant negative impact on level of investment planned for next 12 months



Source: EEF/NOP 2003 EU Productivity Survey

Chart 32
Labour costs main driver of investment abroad
 % of firms considering making major investment abroad in next 12 months



Source: EEF/NOP 2003 EU Productivity Survey

Factors affecting investment

One of the most positive factors affecting planned investment over the next 12 months is the strength of firms' markets (Chart 31). This no doubt reflects the expected improvement in the global economy over this period. Firms in France and Germany were more positive but this optimism may be undermined if the euro remains strong against the dollar and weakens growth in exports.

The level of corporation tax gets a similar negative rating for planned investment in all three countries, while tax

incentives for investment are similarly positive for planned investment as are grants, though less so in France.

Employment regulation in the UK has a negative effect on investment plans compared with mildly positive ones for Germany and neutral for France. Although the level of regulation is higher in Germany and France, UK firms have faced a greater issue of adapting to higher levels of regulation. The UK's signing of the Social Chapter in 1997 led to rapid introduction of the backlog of employment legislation. Many firms have found this difficult, lacking the administrative systems and models of social partnership possessed by their Continental counterparts.

Medium-large UK firms state that employment regulation has the most negative impact on investment plans and the most of all firm sizes across the three countries. UK firms with 1-50 and 51-100 employees are the next most negative on this issue, providing evidence for the hypothesis that small firms are hit harder by regulation.

Government attitude to manufacturing is a negative influence on investment plans in all three countries but significantly more so in the UK. This may reflect perceptions of higher levels of taxation and regulation. It may also be due to the impression created in the early days of the current government that manufacturing had a limited role to play in the 'New Economy'. While employee skills are positive for investment plans for the year ahead in all three countries, they are significantly more so in Germany and France.

Investing abroad

We end this section with some questions on whether firms are considering investing abroad. Chart 31 showed that employment costs relative to other countries have a similar negative impact on investment plans in all three countries. This suggests that competition from the low cost countries across the globe has a similar impact on investment in all three countries. This is mirrored by Chart 32 which shows taking advantage of lower labour costs elsewhere as by far the main factor driving firms to consider investing abroad.

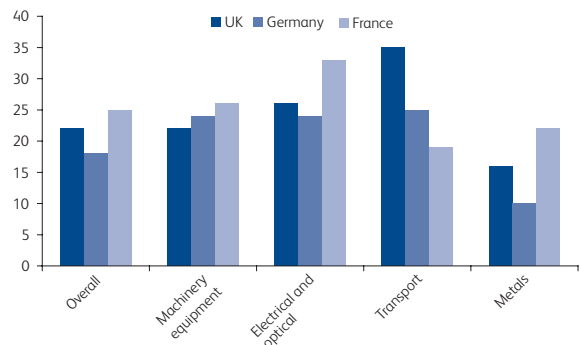
This is particularly true in Germany, bordered by Poland and closest to the new EU members with low labour costs. In addition, higher wages and employer social contributions make it substantially more expensive to employ workers in Germany.

The need to be closer to market is the second most important factor and again more so in Germany. In the UK, however, the second most important driver is expectation of higher growth in the rest of the world relative to the domestic market. Lower non-labour costs are also a more important factor in the UK than in the other two countries, supporting the case that increases in the cost burden on UK manufacturers is helping to push production abroad.

The prospect of manufacturing capacity moving abroad appears to be similar in all three countries. Chart 33 shows that around a fifth of firms in each country are considering making a major investment/expanding capacity abroad in the next 12 months. Indications are that UK transport and French electrical and optical firms are more likely to be considering such a move compared with other sectors across the three countries. The proportion of firms considering such an investment is lowest in the UK and German metals sectors.

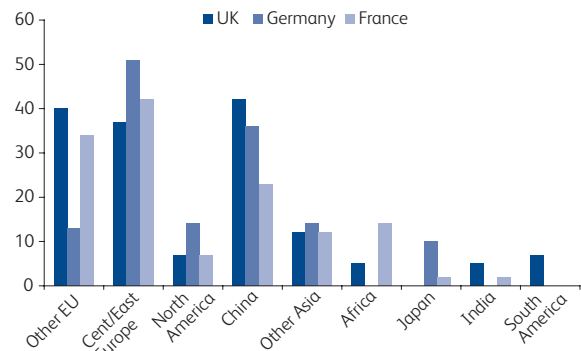
Not surprisingly, foreign-owned firms, plcs and larger companies are more likely to be considering investing abroad. Taking all three countries together, 40% of firms with 500+ employees are considering such an investment compared with only 16% of those with 1–50 employees. Reflecting the greater importance of higher growth rates as a driver of investment abroad by UK firms (Chart 32), UK firms are more orientated to investing in China than German and French firms who are more focused on Central and Eastern Europe (Chart 34). However, German interest in Central and Eastern Europe may also reflect its greater proximity.

Chart 33
Firms considering making a major investment overseas
 % of firms considering making major investment/expanding capacity abroad in next 12 months



Source: EEF/NOP 2003 EU Productivity Survey

Chart 34
UK firms looking more to China
 % of firms considering making major investment abroad in next 12 months



Source: EEF/NOP 2003 EU Productivity Survey

Skills

Summary of evidence and implications for policy

UK skills levels negative for productivity...

Recently published research by O'Mahony and De Boer shows that up to a fifth of the UK's productivity gap with countries such as France and Germany is directly caused by lower skills levels. This may be an underestimate as skills shortcomings also impede the effectiveness of investment in capital equipment and in innovation. In addition, research looking at individual firms by Haskel and Hawkes shows that companies which employ higher skilled workers tend to be more productive than those with lower skilled employees. Our survey supports these findings, showing the UK as the only country where skills availability in the market place has had a negative impact on productivity over the last 12 months.

... but skills shortages lower

Paradoxically, a lower proportion of UK firms than in Germany or France report experiencing skills shortages in any occupations. This could be due to the fact that UK manufacturers, having faced a worse recession than that in Germany and France, have more spare capacity. It could also be that UK employers are stuck in a low skills equilibrium, where lower levels of investment and innovation make limited demands on skills. Our survey does not offer much insight into whether this reflects lower management aspirations or an inability to find the resources needed to break out of this situation. However, the comparisons on investment and innovation in the previous and following chapters and on apprenticeships in this chapter do offer some support for the idea that employers in the UK make lower demands on skills.

Where they exist, skills shortages are most acute for skilled workers (craft workers and technicians) while many firms in the UK and France are also experiencing shortages of engineers. Skilled worker shortages are highest for metals firms and lowest for electrical/optical while the opposite is true for shortages of engineers.

Image problems

Despite reporting lower skills shortages, UK manufacturers rate a range of factors as more negative for their ability to attract the right people. In particular, the image of manufacturing in the UK has a very negative impact on firms' ability to attract the right people compared with a slightly positive one in Germany and France. Despite this in all three countries firms cite their own image as an employer as a positive influence on their ability to attract the right people. However, UK companies rate their image as a significantly less positive factor than those in France and Germany and this applies even for larger companies. The lack of UK-owned household names means that manufacturing companies do not have the presence to attract employees on the basis of their reputation. This lack of national champions may also be one factor contributing to the overall image problem.

Only UK companies see the quality of school leavers as negative for their ability to attract the right people with all industries sharing this view. The quality of graduates is a positive factor in attracting the right people in all three countries but significantly less so in the UK. This probably reflects not just the quality of education but the fact that UK manufacturing is losing the best candidates to other sectors due to its negative image.

Apprenticeships rated less highly

These image issues also apply to UK firms looking to attract people into apprenticeships. In all three countries, firms regard the ability of the apprentice system to meet their needs for an adequate supply of skilled people as only satisfactory. However, UK firms stand out in regarding the status of apprenticeships, careers guidance and availability of government funding as constraints on the numbers undertaking apprenticeships. Of these, careers guidance is seen as the biggest problem by some distance. In addition, smaller firms in the UK regard the availability of government funding as a constraint, while it is seen as a positive factor elsewhere, particularly in France.

While the UK matches France and Germany in increasing investment in training over the last 12 months and expecting to over the next 12 months, it has the lowest proportion of firms that have recruited apprentices in the last two years - 40% compared with 70% in Germany and 60% in France. In all three countries the main reason for not recruiting apprentices is that companies had 'no need' for them. However, the UK again stands out from the other two countries with 68% stating 'no need' compared with 25% in Germany and 40% in France.

These findings on apprenticeships suggest that there are some fundamental problems with the way that the system of apprenticeships work in this country, relating to funding and careers guidance (see below). In addition, employer demand for apprenticeships is likely to increase if we address the issues related to investment and innovation covered elsewhere in this report. Helping companies to overcome the barriers they currently face in investing in new technologies and in developing innovative products, processes and services will increase their need for skilled people. Some of these increased skill needs would then be met by recruiting more apprentices.

Funding failings

Funding mechanisms also seem to work more effectively in the other countries. The UK has a complex funding regime, with money channelled through Learning and Skills Councils who direct the person to a training provider. This can mean that providers are driven by government targets rather than by employer needs. Only 5% of apprentices are recruited and trained directly by the employer. In addition, there is widespread criticism of the substantially lower level of funding for 19-24 year olds entering Advanced Apprenticeships. A key priority for the 2004 Spending Review will be to remove this restriction.

Careers guidance lacking

'Bridging the continental divide' concluded that the apprenticeship system in the UK does not compare favourably with the equivalents in Germany and France, with the end result that fewer young people undertake

apprenticeships, particularly relative to Germany. One key finding was the lack of systematic provision for introducing students to the career opportunities offered by apprenticeships in the UK compared with that in Germany and France. In Germany, the last two years of schooling are set aside for careers teachers to work through information packs and other materials, explaining career options and the training required. In addition, websites publish comprehensive information and visits to careers service centres are arranged and encouraged. As well as web resources, France also has employer-managed Apprentice Training Centres that help prospective apprentices find a place.

The UK's Connexions service concentrates on those at risk of disengagement from education, leaving little resource for the majority of young people. Currently young people are not sufficiently aware of the range of routes to high-level occupations or of the subjects required to pursue them. In this year's Spending Review, resources must be found to increase the number of advisers and the quality of the advice they are able to provide. In addition there should be a comprehensive review of the effectiveness of the Connexions service.

Building on schools improvements

There have been some positive developments in how Secondary schools provide students with equal opportunity to pursue either academic or vocational routes. These include the GCSE in engineering, introduced in September 2002 and the Specialist Schools initiative which has led to a substantial number of schools being recognised as Engineering Specialist Schools. These schools substantially increase the opportunities for young people, and those who influence them, to experience 'engineering' activities at first hand. It is important that government continues to support and promote these developments, and considers mechanisms that remove any bias against vocational and work-based education post-16.

Higher education priorities

Our survey also reveals a number of priorities for higher education. These include the need for students to have more

work experience, which is also an issue for employers in France and Germany. This is followed by increasing the number of science/engineering graduates and ensuring that there is a steady supply of research scientists and engineers going into industry to support our innovation efforts. A review led by Sir Gareth Roberts examined this issue and made recommendations regarding the funding of PhDs in science subjects and the pay of teachers and lecturers in these subjects. We welcome the government's decision to review progress in this area, with a particular focus on the shortage of qualified teachers in science subjects.

Given the analysis contained in section two on company performance, a renewed focus on management training is also needed. Part of this relates to giving professional development the same status it is accorded in other countries. It may also be that we need to pay more attention to how we can encourage the flow of knowledge and use of effective management techniques through the supply chain from larger companies to their suppliers.

Detailed results

Investment in training

In contrast to the story on capital investment, Chart 35 shows UK companies more than matching their competitors in terms of increasing investment in training over the last and next 12 months. This probably reflects the fact that compared with capital expenditure, investment in training is a less risky, lumpy investment. These survey results, of course, do not tell us anything about levels of expenditure.

Chart 36 shows that there are only very limited differences by size band in contrast to the story on capital expenditure. Larger firms are marginally more likely to be increasing expenditure.

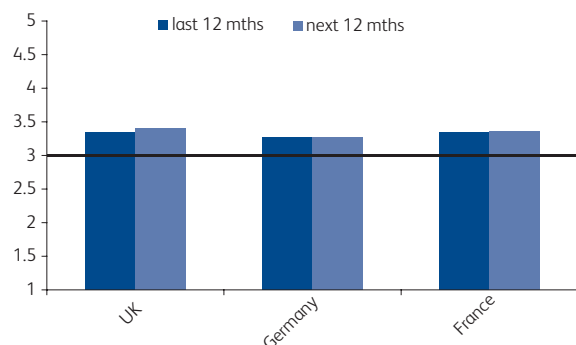
Skills availability and shortages

Less encouragingly, Chart 37 shows that the UK is the only country where skills availability has been negative for productivity over the last 12 months. This is true for every sector in the UK while industries in France and Germany, particularly the latter, suggest skills availability has been positive for their productivity.

Chart 35

Training increasing across all countries

mean score where 5=significant increase, 1=significant decrease in investment in training over last/next 12 months



Source: EEF/NOP 2003 EU Productivity Survey

Chart 36

Training increasing more for larger firms

total sample, mean score where 5=significant increase, 1=significant decrease in investment in training over last/next 12 months

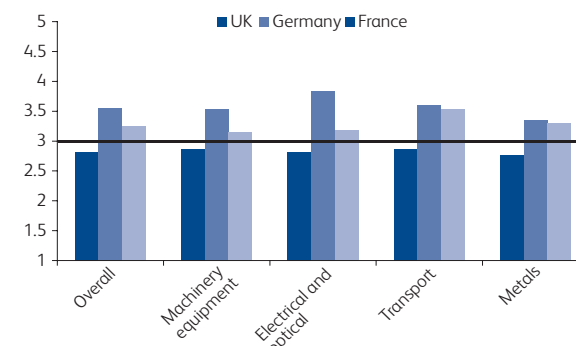


Source: EEF/NOP 2003 EU Productivity Survey

Chart 37

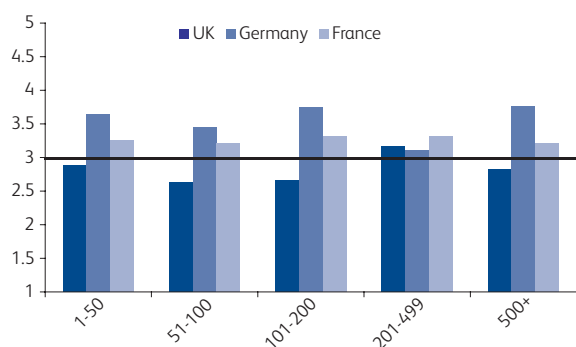
UK productivity held back by skills availability

mean score where 5=significant positive, 1=significant negative impact of skills availability in market place on productivity over last 12 months



Source: EEF/NOP 2003 EU Productivity Survey

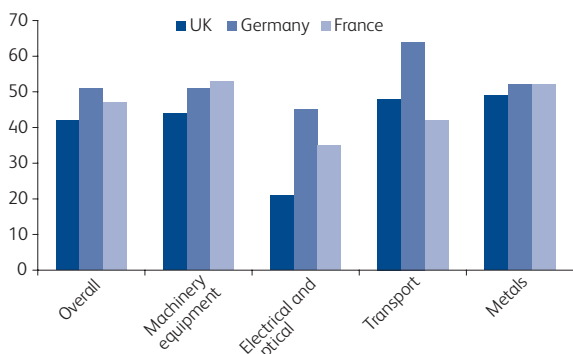
Chart 38
Medium-large UK firms bucking the trend
 mean score where 5=significant positive, 1=significant negative impact of skills availability in market place on productivity over last 12 months



Source: EEF/NOP 2003 EU Productivity Survey

Chart 38 shows that medium-large UK firms are bucking this trend and are on a par with French and German firms of a similar size in seeing skills available in the market place as positive for productivity.

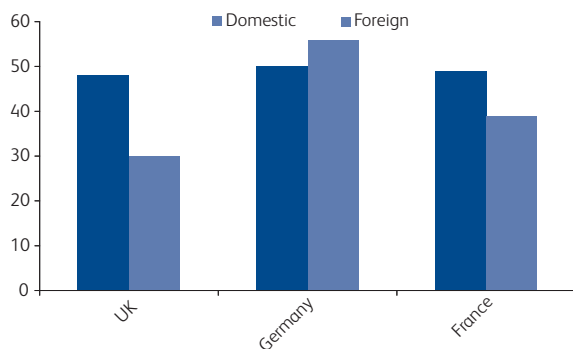
Chart 39
Skills shortages lowest for UK firms
 % of companies stating experiencing skills shortages in particular occupations



Source: EEF/NOP 2003 EU Productivity Survey

Somewhat paradoxically, UK firms are less likely to report skills shortages (Chart 39) and this is the case for every sector. This difference could be explained by a number of factors. Firstly, it could be that firms in each country are at different stages in the business cycle and that UK firms have more spare capacity to meet the demands placed on their business. Secondly, it could reflect greater aspirations for the future in German and French firms that mean they see a greater need for skilled workers. Thirdly, UK firms could be trapped in a low investment/low skills equilibrium and unable to see how to break out of it. Finally, persistently higher levels of long-term unemployment in Germany and France could mean that skills are at a premium as many people have seen their skills base erode.

Chart 40
Skills shortages lowest for UK foreign-owned firms
 % of companies stating experiencing skills shortages in particular occupations



Source: EEF/NOP 2003 EU Productivity Survey

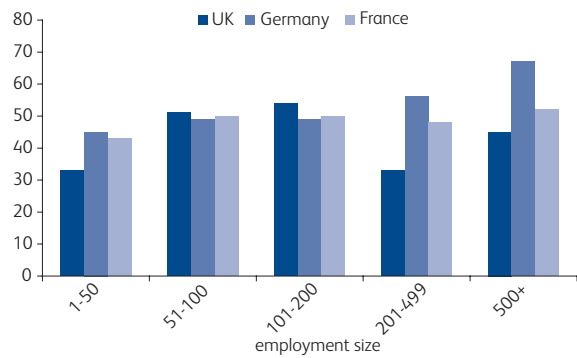
Part of the difference can also be explained by the higher proportion of foreign-owned firms in the UK sample. Chart 40 shows that there is a significant difference between the proportions of UK-owned firms and FOCs experiencing skills shortages in the UK. The picture is repeated in France but in Germany the opposite is true with a lower proportion of domestic firms experiencing skills shortages than FOCs.

There is also a difference in the extent of skills shortages by company size. UK firms with 1-50 and 201-499 employees have the lowest proportion experiencing skills shortages (Chart 41). The other UK sizebands have proportions of firms experiencing skills shortages close to the average across all three countries.

Perhaps one of the more worrying trends across the EU is that innovative firms are experiencing the highest skills shortages. Chart 42 shows that for the total sample, firms with 75%+ of their turnover arising from new/renewed products are most likely to experience skills shortages. This reflects the greater skills needs of highly innovative companies.

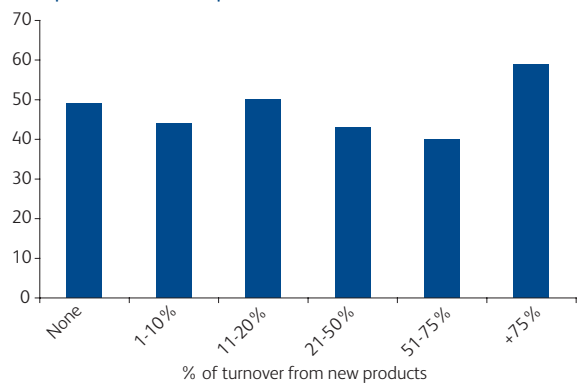
Of those firms experiencing skills shortages across the three countries Chart 43 shows that the majority are doing so for skilled workers (e.g. craft and technician level). A large number of firms in the UK and Germany are also experiencing shortages of engineers (graduate engineers or equivalent).

Chart 41
Skills shortages lowest for UK small and medium-large firms
 % of companies stating experiencing skills shortages in particular occupations



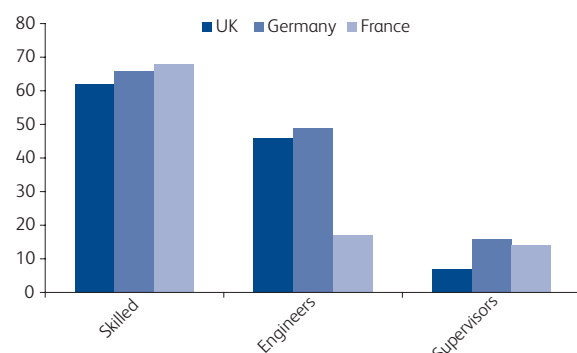
Source: EEF/NOP 2003 EU Productivity Survey

Chart 42
Skills shortages greatest for highest innovators
 % of companies stating experiencing skills shortages in particular occupations, total sample



Source: EEF/NOP 2003 EU Productivity Survey

Chart 43
Skilled workers and engineers in demand
 % of companies with skills shortages experiencing them in following occupations

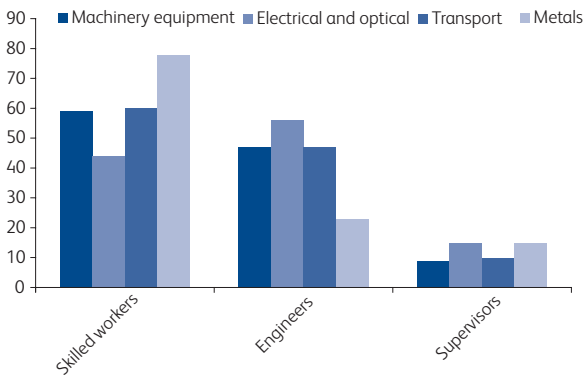


Source: EEF/NOP 2003 EU Productivity Survey

Chart 44

EU wide trends in skills shortages

% of companies with skills shortages experiencing them in following occupations, total sample



Source: EEF/NOP 2003 EU Productivity Survey

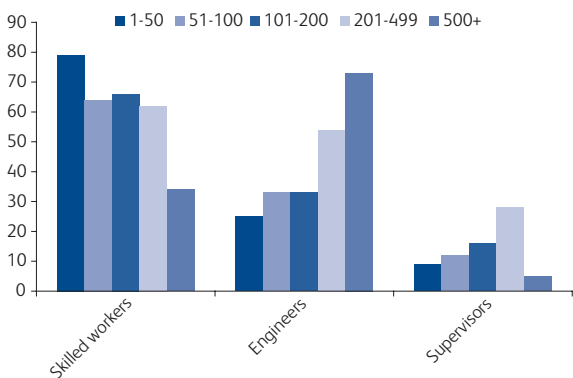
The results for all three countries together (Chart 44) show that the biggest shortfall for skilled workers is in the metals industries while engineers are most in shortage in the electrical and optical sector (where the orientation to innovation is higher).

There are also some clear trends at the EU level by firm size. Skilled worker shortages are most intense for small firms while the converse is true for shortages of engineers which are more common for larger firms (Chart 45) Again this is likely to reflect their orientation to innovation. Shortages of supervisors also increase with firm size, except for those with 500+ employees.

Chart 45

Large firms short of engineers and small firms short of skilled workers

% of companies with skills shortages experiencing them in following occupations, by firm size, total sample



Source: EEF/NOP 2003 EU Productivity Survey

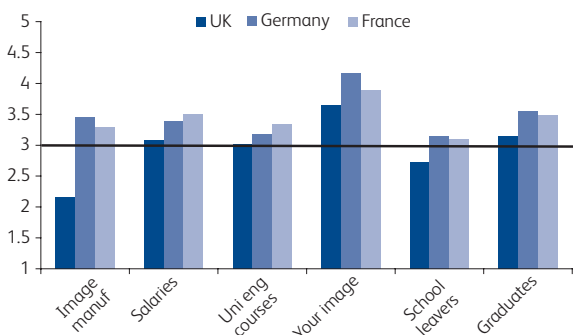
Attracting the right people

The image of manufacturing in the UK has a very negative impact on firms' ability to attract the right people compared with a slightly positive one in Germany and France (Chart 46). By sector this story is consistent across the board in all three countries. This confirms the findings of *'Bridging the continental divide'* which showed that engineers were more likely to view pursuing a career in manufacturing as a profession in France and Germany than they were in the UK.

Chart 46

Image makes it hard to attract right people

mean score where 5=significant positive, 1=significant negative impact on ability to attract right people to employ



Source: EEF/NOP 2003 EU Productivity Survey

Higher wages in France and Germany mean that salary levels are significantly more helpful in attracting the right people (Chart 47). The real difference between the UK and Germany/France is at the small firm end, where salaries do not have a positive impact. The experience of medium and large firms in the UK is much more closely in line with those in Germany/France, with salaries having a significantly positive impact. This partly reflects the higher levels of foreign ownership of larger UK firms, with foreign-owned firms tending to pay higher salaries.

The quality and number of engineering courses available has a neutral impact in the UK but a positive one in Germany and particularly France (Chart 48). This reflects our finding in *'Bridging the continental divide'* that engineering courses in France and Germany tended to be both longer and cover the subject in more depth.

In all three countries firms cite their image as an employer as a positive influence on their ability to attract the right people despite the fact that the overall image of manufacturing is seen as negative in the UK. However, in both France and Germany firms rate their image as a significantly more positive factor than in the UK. In all three countries the larger the firm the more it sees its image as an employer as a plus. The UK continues to lag behind the other two countries even for larger companies. The lack of UK-owned household names means that manufacturing companies lack the presence to attract employees on the basis of their reputation. This lack of national champions may also be one factor contributing to the overall image problem.

Only UK companies see the quality of school leavers as negative for their ability to attract the right people with all industries sharing this view. In the other countries none of the sectors see this factor as a significant negative impact on their ability to attract the right people. This probably reflects not just the quality of education but the fact that UK manufacturing is losing the best candidates to other sectors due to its negative image. The quality of graduates is a positive factor in attracting the right people in all three countries but significantly more so in France and Germany. Again this may also reflect image and recruitment issues.

Chart 47
UK small firms handicapped by salaries
 mean score where 5=significant positive, 1=significant negative impact of salaries on ability to attract right people to employ

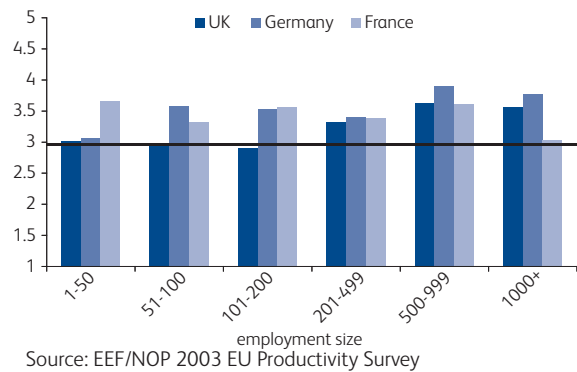


Chart 48
Engineering courses have negative impact in UK
 mean score where 5=significant positive, 1=significant negative impact of quality/number of university engineering courses on ability to attract right people

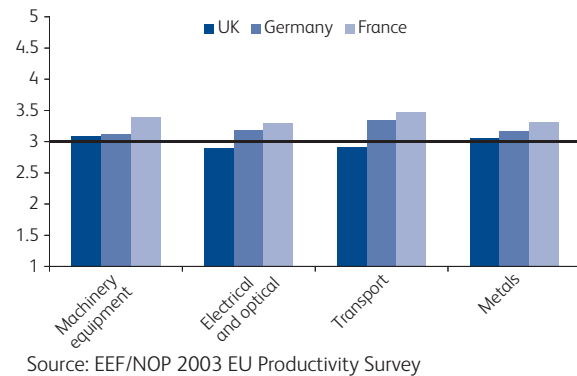
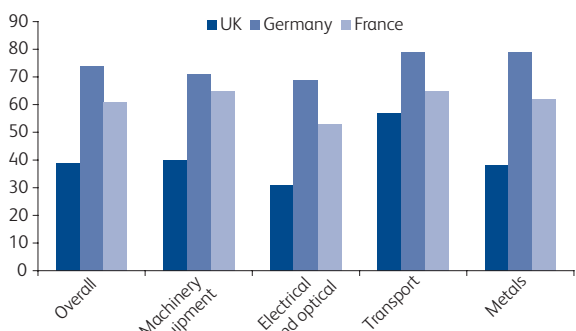
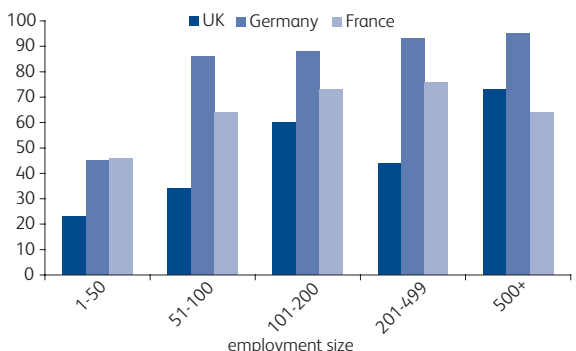


Chart 49
Fewer UK firms recruit apprentices
 % of firms stating that they have recruited apprentices in the last two years



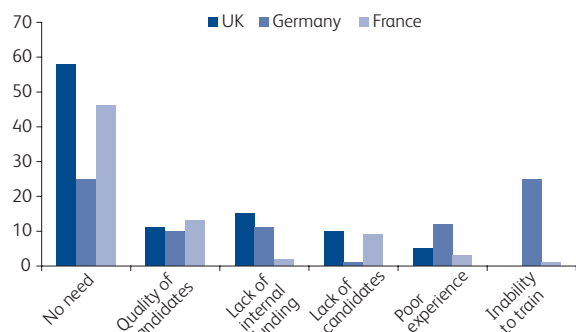
Source: EEF/NOP 2003 EU Productivity Survey

Chart 50
Medium large UK firms lag behind France and Germany
 % of firms stating that they have recruited apprentices in the last two years



Source: EEF/NOP 2003 EU Productivity Survey

Chart 51
'No need' main reason for not recruiting apprentices
 % of firms not recruiting apprentices that state following reasons



Source: EEF/NOP 2003 EU Productivity Survey

Recruiting apprentices

The UK has the lowest proportion of firms that have recruited apprentices in the last two years (Chart 49). Only 40% say they have done so compared with 61% in France and 74% in Germany. The gap is large across all industries, though somewhat narrower in transport where 57% of firms in the UK have recruited apprentices in the last two years, compared with 65% in France and 79% in Germany.

In every sizeband the UK has the lowest proportion of firms taking on apprentices (Chart 50). Significantly, UK medium-large firms which have scored well on many indicators in this report have a particularly large gap with their French and German counterparts. Not surprisingly, in all three countries the smaller size bands have the lowest proportion of firms recruiting apprentices.

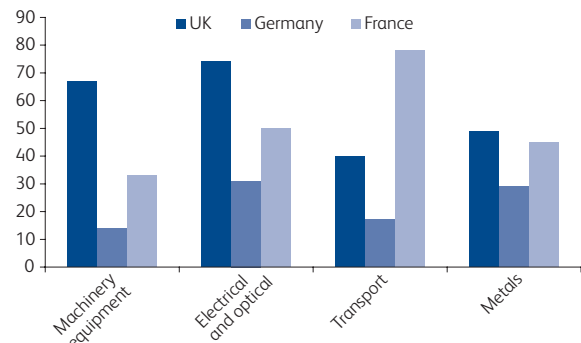
The main reason for not recruiting apprentices in all three countries is 'no need' (Chart 51). The highest proportion of firms citing this factor is in the UK, followed by France and Germany. Lack of funding is the second most common factor in the UK and was mentioned more than in France and Germany. 'No need' could be a reflection of cyclical factors affecting the firm i.e. that they have enough spare capacity to meet future demand or that they plan to put current employees through apprenticeships rather than recruit. However, recruitment in Germany has held up despite the downturn faced by its manufacturers. This suggests that the strength of the German system keeps employers recruiting in both good times and bad. It may also be a reflection of other aspects of business performance. For example, if UK companies are less likely to be investing in new technology, they are also likely to need to increase skills levels.

Indications are that the 'machinery equipment' and 'manufacturing, electrical and optical' sectors in the UK have a higher proportion of firms not recruiting apprentices because they have 'no need' compared with those in France and Germany (Chart 52). These two sectors are likely to have suffered in recent years with the worldwide downturn in electronics and lack of investment in the UK, suggesting that cyclical factors could be making a major contribution to the 'no need' explanation. In addition, of all the firms in the UK stating that they have not recruited apprentices and have 'no need' for them, the vast majority (80%) are small firms with less than 100 employees.

Chart 53 shows that in all three countries, employers rate the apprenticeship system's performance as just about positive in providing an adequate supply of qualified people. Larger companies in all three countries appear to be more satisfied than smaller firms. Smaller UK companies tend to be more negative than those in France and Germany while larger UK firms are relatively positive. This suggests that smaller UK firms face more problems with the constraints of image, funding and careers guidance.

In the UK the status of apprenticeships is seen as neutral, while in Germany it is highly positive and in France marginally positive (Chart 54). In the UK, only the machinery equipment sector sees the status as a positive factor while all German sectors report status as a highly positive factor.

Chart 52
Strong German commitment to apprenticeships across the board
 % of firms not recruiting apprentices that state no need as reason



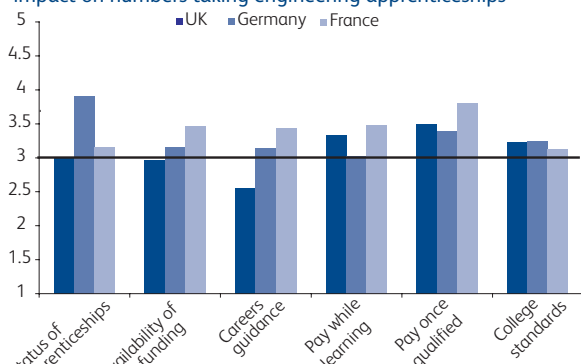
Source: EEF/NOP 2003 EU Productivity Survey

Chart 53
Apprenticeship systems only performing adequately
 mean score where 5=very well, 1=very poor in meeting the company's requirements for an adequate supply of qualified people



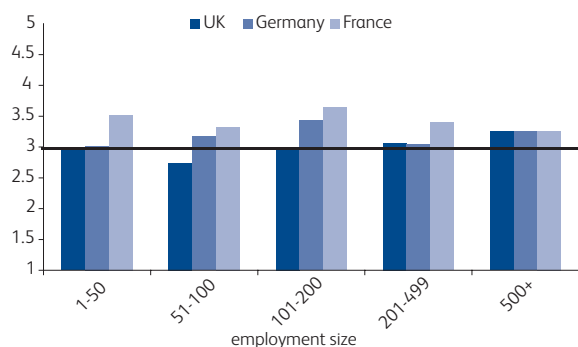
Source: EEF/NOP 2003 EU Productivity Survey

Chart 54
UK hampered by status, guidance and funding
 mean score where 5=significant positive impact, 1=significant negative impact on numbers taking engineering apprenticeships



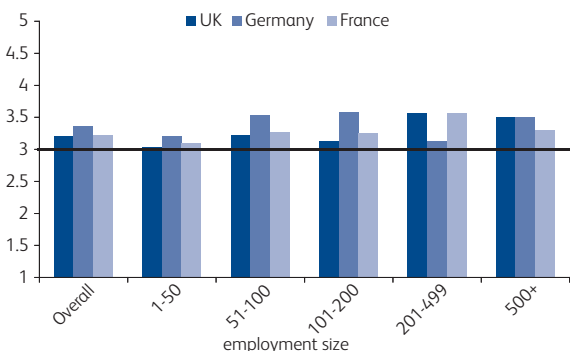
Source: EEF/NOP 2003 EU Productivity Survey

Chart 55
UK small firms most constrained by government funding
 mean score where 5=significant positive impact, 1=significant negative impact of availability of government funding on numbers taking engineering apprenticeships



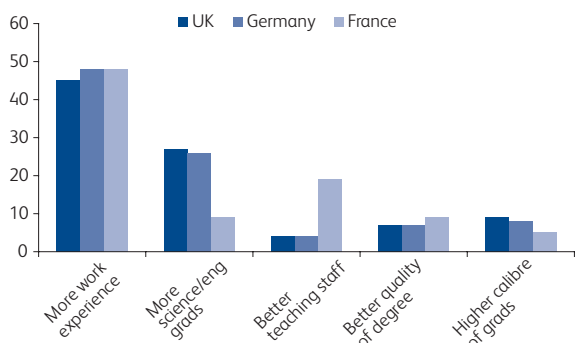
Source: EEF/NOP 2003 EU Productivity Survey

Chart 56
Higher education systems adequate
 mean score where 5=very well, 1=very poor in meeting the company's requirements



Source: EEF/NOP 2003 EU Productivity Survey

Chart 57
Work experience the top higher education priority
 % of firms mentioning following factors as key manufacturing priority for higher education



Source: EEF/NOP 2003 EU Productivity Survey

The availability of government funding is considered to have a neutral impact on numbers taking apprenticeships in the UK, while it is a marginally positive factor in Germany and a highly positive one in France. Chart 55 shows the gap in ratings between the UK and the others is largest for smaller firms. This suggests that either smaller firms in the UK face greater resource constraints or that there are mechanisms to overcome these problems in France and Germany.

Across every sector and size of firm, careers guidance in the UK is seen as a negative impact on the numbers taking engineering apprenticeships. This is in stark contrast to the situation in Germany and France where it is positive. The most negative about careers guidance are high innovators (firms with 75%+ of their turnover generated from new/renewed products). This reflects their particular frustration at the poor communication of the attractive career opportunities available within their firms.

Employers feel that pay structures are sending the right signals to potential candidates for engineering apprenticeships. In France and the UK pay while learning is seen as a positive factor (in Germany it is neutral) and pay once qualified is seen as a highly positive factor in all three countries (more so in France).

Higher education

The higher education system gets a marginally positive rating in all three countries (Chart 56). In all countries larger companies are more satisfied than smaller ones. Larger firms are better placed to attract the best graduates and have more resources to develop the raw material that they recruit. In addition, UK larger companies tend to be more positive than those elsewhere.

Manufacturers across the three countries are in agreement on the top priority for higher education - the need for students to get more work experience (Chart 57). There is also agreement between UK and German firms that more science and engineering graduates is the second highest priority (although in France the second highest priority is the need for better teaching staff). All the other factors are mentioned by less than 10% of firms in each country.

Innovation

Summary of evidence and implications for policy

It is now widely agreed that innovation is absolutely critical to the success of manufacturing in the UK. Developing and enhancing revenue from new or improved products, processes and services is essential as competition from lower cost countries becomes more intense. The large numbers of science and engineering students graduating from universities in countries such as India and China suggest that they are rapidly increasing their potential to innovate. Previously published international comparisons of UK spending on research and development (R&D) as a share of GDP and on patents are also not particularly encouraging. In addition, a recent study by London Economics for the Engineering and Technology Board showed that science and technology intensive sectors in the UK contributed an annual 0.5% to labour productivity growth over the 1993-2000 period compared with 0.9% in Germany and Japan, 0.8% in France and 0.7% in the United States.

Our survey examines whether we can take encouragement from the more recent performance of UK manufacturing, analyses the drivers behind it and constraints faced by companies and seeks their views on the innovation environment. Many of the findings suggest that the recommendations of the recent Lambert and DTI Innovation Reviews are hitting the right targets, as are the priorities outlined in the Government's consultations on its Science Strategy. As always the challenge will be in translating this into action and the Spending Review will be an important indication of the progress that can be expected in the coming years.

Activity high in UK

We start with an encouraging finding from our survey that the UK compares well on the proportion of firms undertaking all types of innovation activity – new and improved products, processes and services. UK companies in the transport industries (motor vehicles, aerospace and other transport equipment) stand out particularly as do foreign-owned companies. The UK performs consistently better than Germany and France on the proportion of firms undertaking innovation in existing/new services to

customers. This suggests that UK firms are leading the way in responding to the demands of modern manufacturing.

However, other evidence makes less comfortable reading. For example, UK firms lag some way behind those in Germany and a little behind those in France in terms of the proportion of turnover from new/renewed products introduced in the last two years. Previously published research such as the EU's Community Innovation Survey (CIS) for 1994-96 also showed a large lead for German manufacturing but with the UK ahead of France. The UK's weak R&D performance since then may have pushed France ahead of the UK.

UK more reliant on foreign firms

Our survey does, though, contradict evidence from the CIS which showed that UK firms of all sizes lagged behind Germany. Our figures show that medium-large UK firms (employing 201-499 people) come out well from the comparison. This may be because medium-large UK firms are more likely to be North American-owned than are those in France and Germany. North American-owned companies tend to lead the field in innovation, which is the main reason why foreign-owned firms are more innovative than their domestic counterparts in the UK but not in France and Germany. Foreign-owned firms also show up well on this measure in the UK as they tend to be larger than those in France and Germany. In general, larger firms are more innovative.

Our findings fit well with a 1998 study from the OECD which showed the UK ranked fifth of all the OECD nations in terms of the share of foreign affiliates in manufacturing R&D. Their share of 31.5% in the UK is well ahead of 18.5% in France, 16.4% in Germany and 16% in the United States. Part of the reason for this may be that, according to our survey, foreign-owned firms in the UK are more likely to be North American-owned and to be larger. Both of these groups have higher rates of innovation. Our reliance on foreign-owned firms to carry out innovation is worrying, given that this can be a footloose activity. Therefore as well as encouraging more innovation by UK-owned firms, it is essential that the UK's innovation environment is competitive, allowing us to attract and retain innovation carried out by foreign-owned firms.

The contrast between high levels of innovative activity with a more limited contribution to the bottom line for UK manufacturing also raises questions. It may be that UK firms are overestimating the innovation that they do or that these activities are at lower levels than those carried out by manufacturers in France and Germany. However, it may also reflect constraints on the effectiveness of innovation. For example, working practices may be hindering companies from exploiting the full returns from innovation or it may be that firms are not working well with partners such as other enterprises or academic institutions. Or it may be that innovation activity is not backed up by investment in skills or capital equipment, reflecting our finding that there are few UK-based companies investing across the board.

Finance is key constraint...

Mirroring the findings in the investment section, UK firms identified the lack of available finance as the key constraint on innovation and were substantially more likely to point to this than were manufacturers in France and Germany. This finding was repeated in a recently published Institute of Directors (IOD) survey, looking at a wide range of sectors. This may partly reflect the more severe squeeze experienced by UK manufacturing in recent years. However, it also points to more fundamental problems summarised below. It does, though, underline the need to avoid increasing taxation on business and keeping fiscal policy tight to minimise the need to raise the cost of borrowing to control inflation. One encouraging sign is that tax incentives are rated on a par with France and Germany, suggesting that the R&D tax credit is starting to work. The recent simplification of the guidelines, together with the better marketing of the tax credit recommended by the Lambert Review should go some way to building on this progress.

... followed by skills

Reflecting the financial situation they face, around twice as many UK firms suggested that more grants would make the most difference to their innovation performance. While grants certainly have a role to play, they are unlikely to address the fundamental problems faced by UK manufacturers. For example, almost twice as many firms in the UK reported that the skills available to them deterred

innovation as did those in Germany and France. The IOD study also identified skills as the second most important constraint on innovation. For companies that saw skills as a constraint on innovation, shortages of engineers were the main problem. This reinforces the point made in the previous section about improving the supply of engineers from apprenticeships and higher education.

Less collaboration with universities in UK

An important way of overcoming the constraints of finance is by collaborating with other organisations such as academic institutions and other firms. This provides companies with access to the skills and knowledge possessed by others but also helps to share the burden of risk and cost. Analysis by the DTI of data from the CIS and from National Statistics reveals a strong correlation between collaboration and business performance. Enterprises that used universities as a partner were twice as likely (or close to this) as those that did not work with universities, to increase their range of goods and services, open new markets or increase market share, improve the quality of goods and services and reduce unit labour costs.

UK manufacturers are therefore likely to be hampered by the fact that only two fifths of them have collaborated with academic institutions on R&D projects – the same proportion as in France but well behind the 54% of German firms that have done so. Yet again, the UK transport sector stands out and has the second highest proportion of firms that have collaborated with academic institutions across all sectors and countries. In addition German firms have also collaborated more frequently with academic institutions than those in France and the UK. Our survey suggests that these collaborations bear fruit as there is a strong link between the number of times that firms have worked with universities and the proportion of their turnover generated by new or renewed products.

German system facilitates collaboration

Indeed German firms generally find it easier to collaborate with academic institutions, indicate that this is more likely to lead to commercially viable projects and rate academic

research and the skills of academic staff (particularly on communication) and business-university links higher than in the UK and France. However, the situation in the UK is not entirely negative as many aspects of the environment for innovation are rated more highly than in France.

The strengths of the German system were analysed in detail in *'Bridging the continental divide'*. German technology policy has focused on public institutions for the diffusion of knowledge and technology and its transfer from public research into private industry. Regionally-based organisations such as the Fraunhofer institutes, funded pretty much equally from government grants, government sponsored projects and commercial contracts, have excelled at supporting innovation in Germany's key areas of industrial strength. However, the system has performed less well in newer industries such as software and biotechnology. In addition, its success has also been supported by some particular features of the German economy – a stable industrial structure with large established industries with surrounding suppliers that has supported co-operative research, a tradition of lifetime employment preserving technology-specific knowledge and a bank-centred financial system providing long-term low risk external financing. Little of this is easily transplantable to the UK nor would much of it be welcome given other problems associated with Germany's more regulated labour markets and the problems faced by German banks in recent years.

Spending Review priorities for science

However, the emphasis placed in the Lambert Review in developing and improving mechanisms to encourage technology and knowledge transfer is encouraging. We are particularly attracted to the proposal substantially to increase money for 'third stream funding'. This refers to the funding required to ease the transition between pure research and getting an activity 'investment-ready'. One example is the funding of demonstrator projects aimed at potential finance providers. The forthcoming Spending Review should make funds available for this as part of the priority for science that government has already signalled. In addition, it is important that the science budget receives a substantial increase but that defence R&D obtains a

settlement that addresses its past neglect. These are high-risk activities for the private sector but have a track record of generating commercial spin-offs.

UK networking more limited and less effective

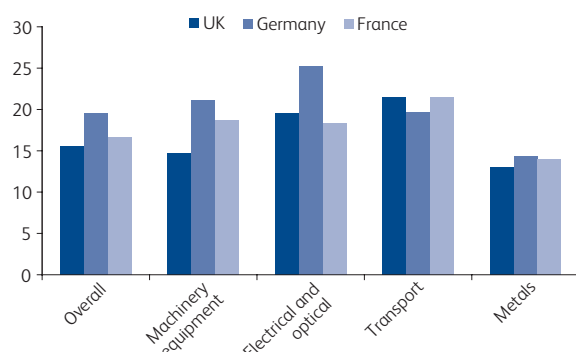
Our survey also shows that German firms make greater use of the contacts made through networking. UK firms are finding networking less effective at providing introductions to other companies and academic institutions, information on research projects and access to people with specialised skills. Again, the UK transport sector gets more out of networking than the other sectors and finds networking more effective on a whole range of issues. Finding a way of replicating this in other parts of UK manufacturing could yield considerable benefits.

Detailed results

Innovation levels

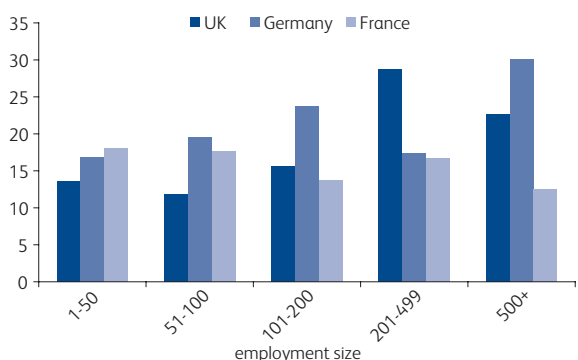
The level of innovation in German manufacturing is higher than in both UK and France. Chart 58 shows that on average German firms generate 20% of turnover from new or renewed products, compared with close to 15% in the UK and 16% in France. In every sector except transport, UK firms are lagging behind their German counterparts. However, in the transport sector UK firms have the highest

Chart 58
Germany leading way on innovation
 mean score of proportion of company's turnover from new or renewed products introduced in last two years



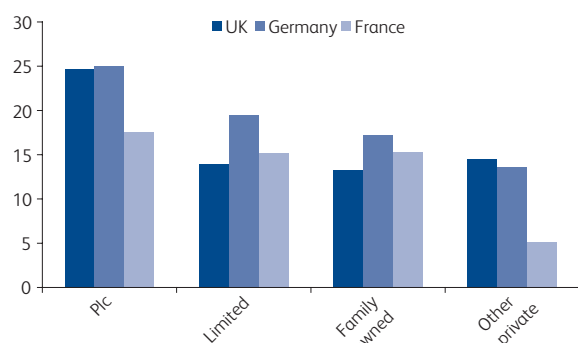
Source: EEF/NOP 2003 EU Productivity Survey

Chart 59
UK medium-large firms up with the best
 mean score of proportion of company's turnover from new or renewed products introduced in last two years



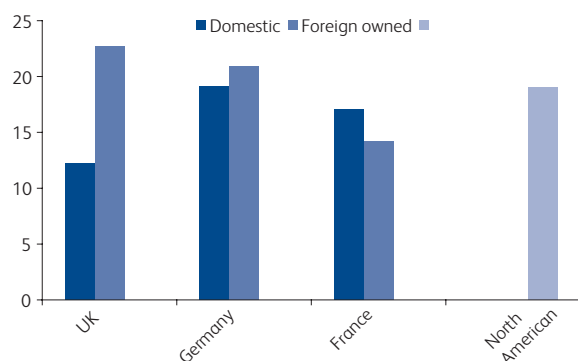
Source: EEF/NOP 2003 EU Productivity Survey

Chart 60
UK and German plcs leading innovators
 mean score of proportion of company's turnover from new or renewed products introduced in last two years



Source: EEF/NOP 2003 EU Productivity Survey

Chart 61
Foreign-owned firms in UK are the leading innovators
 mean score of proportion of company's turnover from new or renewed products introduced in last two years



Source: EEF/NOP 2003 EU Productivity Survey

levels of innovation (equal with France) and the second highest levels across all the sectors in all three countries. The metals sector has the lowest levels of innovation in all three countries.

Large German firms are leading the way in terms of innovation levels. However, they are closely followed by medium-large firms which are by far the highest performers in the UK. Relative to the other two countries, the UK's weakness is again at the small firms end (Chart 59). In all three countries, plcs are the leading innovators, with German and UK plcs performing particularly well. UK limited and family-owned companies tend to perform worse than their French and German counterparts (Chart 60).

Foreign-owned UK firms tend to perform better than domestically-owned ones. This is not repeated elsewhere with domestically-owned German firms much more closely in line with foreign-owned firms. Domestically-owned French firms actually outperform foreign-owned ones. This can partly be explained by the high presence of North American-owned firms in the UK - of the 61 in the sample 32 are based in the UK. Chart 61 shows that these North American-owned firms in the three countries have high levels of innovation. In addition larger firms tend to be more innovative and UK foreign-owned firms are much larger than domestically-owned ones, employing twice the number of employees. In contrast, foreign-owned firms in Germany only employ around one and a half times the number of people working for domestically-owned ones while those in France average 84% more workers.

The strong performance of foreign-owned companies in the UK can be attributed to a number of factors:

- They are less constrained by the availability of finance;
- Managers that have come from companies outside the UK with a strong innovation track record will bring their experience with them;
- Success from collaboration with universities or networking by other firms within the group will breed awareness of their potential;
- FOCs are more able to deal with skills problems that constrain innovation by providing training.

Types of innovation

The UK compares more favourably when firms are asked in more detail about what types of innovation activity they have undertaken. Chart 62 shows a higher proportion of UK firms have undertaken all types of innovation in the last two years. This should be seen as a positive reflection on the UK's innovation performance but it must be put in context. It does not take into account the extent of the innovation, how much actually translated into new services/products/processes and revenue streams or whether it simply represents catch up on the UK's behalf. In fact the UK's weaker performance on new products as share of turnover would suggest the UK has difficulties translating this activity into revenue streams.

On many aspects of innovation there is a common sectoral pattern of stronger performance by the UK transport sector, with the other sectors more on a par with their counterparts in Germany and France. This is true of new product development, improving existing products, improving existing processes (UK electrical/optical also outperforms its counterparts) and development of new processes (UK metals also outperforms the other countries).

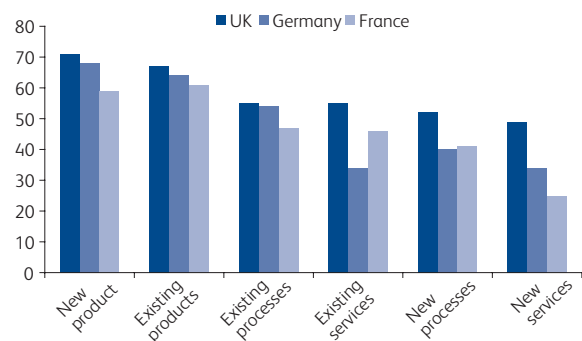
The UK performs consistently better than Germany and France on the proportion of firms undertaking innovation in existing/new services to customers. Chart 63 shows that in every sector many firms are undertaking innovation in services to customers. The UK electrical and optical sector leads the way in innovation in existing services while the UK machinery equipment sector (closely followed by UK electrical and optical) in innovation in new services to customers.

There is a widely held belief that for manufacturers to be competitive in the future and win new customers/hold on to existing customers they will need to develop services offered on the back of their product and process capability. The apparent UK strength in this area suggests that firms are leading the way in terms of adapting to some of the demands of modern manufacturing.

Chart 62

UK firms leading way on innovation activity

% of firms undertaking innovation in the following areas in the last two years

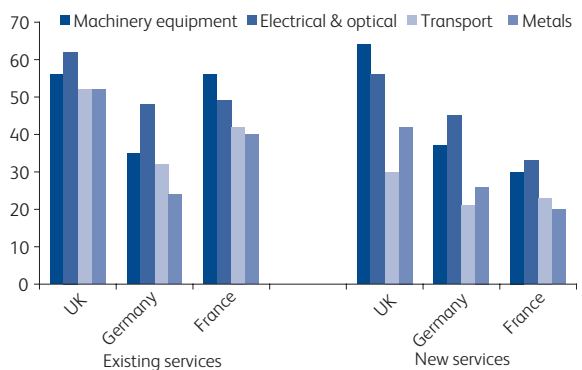


Source: EEF/NOP 2003 EU Productivity Survey

Chart 63

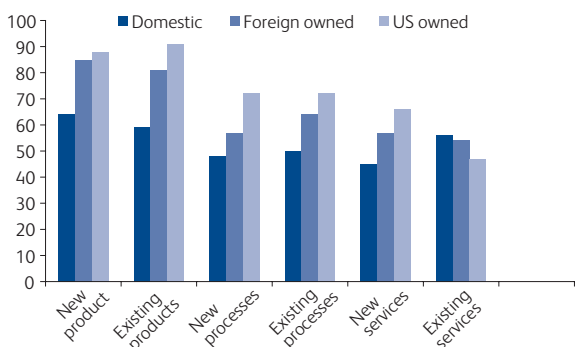
More UK firms undertaking innovation in services to customers

% of firms undertaking innovation in services to customers in the last two years



Source: EEF/NOP 2003 EU Productivity Survey

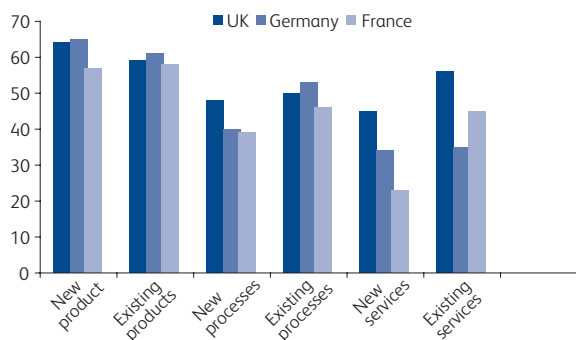
Chart 64
Foreign-owned firms in UK undertaking more innovation
 % of firms undertaking innovation in following areas in the last two years



Source: EEF/NOP 2003 EU Productivity Survey

Just as they earn more from new product development, foreign-owned firms are more active in the various dimensions of innovation. Chart 64 shows that foreign-owned firms in the UK have a particularly large lead on product innovation and a substantial lead on processes. The difference is particularly stark between domestic UK firms and North American firms based in the UK. Domestically-owned firms only come top for existing services while the gap on new services is relatively small.

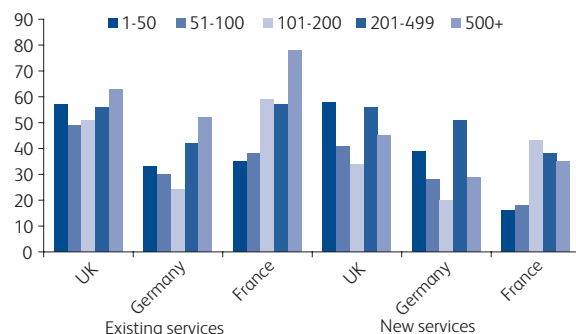
Chart 65
UK domestic firms outperforming on innovation in services
 % of domestically-owned firms undertaking innovation in following areas in the last two years



Source: EEF/NOP 2003 EU Productivity Survey

Chart 65 shows that when the innovation performance of domestically-owned firms in all three countries is compared, there are similar proportions undertaking innovation in new products, existing products and processes. However, UK firms show a clear lead on innovation in new processes, existing services and new services.

Chart 66
UK firms consistently ahead on innovation in services
 % of firms undertaking innovation in existing/new services in the last two years



Source: EEF/NOP 2003 EU Productivity Survey

In all three countries larger firms consistently undertake more innovation than smaller ones. The UK's lead on services is repeated for almost all sizes of firm (Chart 66).

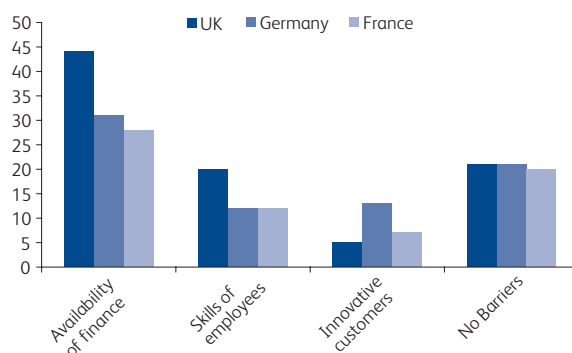
Barriers to innovation

UK companies are ahead of France and Germany in regarding both finance and skills as constraints on innovation (Chart 67). Lack of available financial resources is mentioned by nearly 45% of firms in the UK compared with 25-30% in France and Germany. Similarly, a fifth of UK firms mention inadequate employee skills compared with just 12% in both Germany and France. Approximately a fifth of firms in each country state that there are no barriers to innovation.

A greater proportion of UK companies of all sizes cite availability of finance as a constraint on innovation than the equivalent firms in Germany and France. The difference is largest for firms with 201-499 employees (Chart 68). Similarly all the main sectors in the UK cite availability of finance as more of a constraint than in Germany and France, with the highest proportions across the whole sample being those of 47% in the UK metals and 46% in the UK machinery equipment sectors. The availability of skills is particularly an issue for UK firms in the metals and transport sectors.

Asked to comment on aspects of the innovation environment, companies in all three countries rate the system of corporate taxation as negative, with the UK actually slightly less so than the other two countries (Chart 69). The UK stands out in its particularly negative rating of the government's attitude towards manufacturing. We suspect that this relates to a business perception of rising levels of taxation and regulation that they feel makes it harder for them to focus on improving competitiveness, rather than on any aspects of the government's innovation policy itself. It may well reflect the impression created in the early days of this government that manufacturing had a limited role to play in the 'New Economy'.

Chart 67
UK more constrained by finance and skills
 % of firms citing the following as a major barrier to innovation



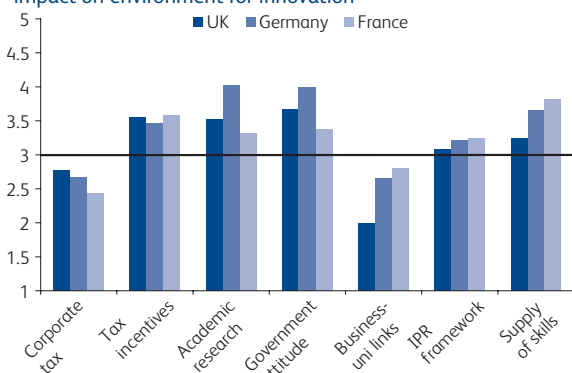
Source: EEF/NOP 2003 EU Productivity Survey

Chart 68
Availability of finance as constraint on innovation by firm size
 % of firms citing availability of finance as a major barrier to innovation



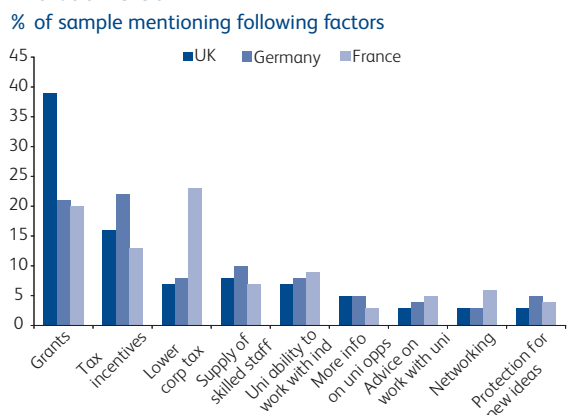
Source: EEF/NOP 2003 EU Productivity Survey

Chart 69
Government attitude particularly negative for innovation in UK
 mean score where 5=significant positive and 1=significant negative impact on environment for innovation



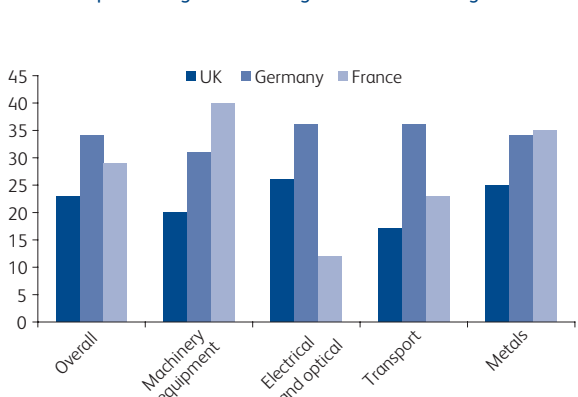
Source: EEF/NOP 2003 EU Productivity Survey

Chart 70
Grants and tax incentives seen as making most difference to innovation levels



Source: EEF/NOP 2003 EU Productivity Survey

Chart 71
Skills shortages less of an innovation constraint in UK



Source: EEF/NOP 2003 EU Productivity Survey

Tax incentives have a positive effect in all three countries suggesting that the R&D tax credit is beginning to make a difference in the UK. The UK is also positive on academic research, business-university links and the supply of skills but lags behind Germany on all three fronts and with France on skills. The positive ratings on intellectual property rights framework (IPR) are slightly misleading as more than half of companies answered this as either 'no impact' or 'don't know'. In the UK a quarter of companies responded by saying 'don't know', suggesting that there is a need to raise awareness of the benefits of IPRs.

In all three countries, business-university links are regarded as a positive factor, with the UK ahead of France. This raises questions as to why fewer UK firms are collaborating with universities and why it happens less frequently.

With finance seen as the biggest constraint on innovation, it is not surprising that grants are seen by firms as the policy that would make the biggest difference to their innovation performance, followed by tax incentives. UK firms are particularly in favour of grants as Chart 70 shows. While grants may be one way of addressing this constraint, particularly for smaller firms, a more effective way forward is likely to come from easing collaboration between businesses and academic institutions and other firms so that they can share risks and costs.

Despite the fact that UK firms state that the supply of skills has the weakest impact on innovation, Chart 71 shows a lower proportion of firms citing skills shortages as constraining innovation and that is true in each of the four sectors. This to some extent reflects the situation overall on skills where UK firms cite skills as negative for productivity and yet they report lower proportions of skills shortages. The factors put forward in that case as possible explanations also apply here – cyclical factors mean greater spare capacity in UK, German and French firms have greater aspirations for the future, UK firms could be trapped in a low skill/low investment equilibrium and higher levels of unemployment in Germany and France could explain the higher skills shortages.

The strong innovators in Germany also seem to be more constrained by skills shortages. Of firms with half of their turnover from new product, a higher proportion of German firms (35%) cite skills shortages than in the UK (25%) and France (28%).

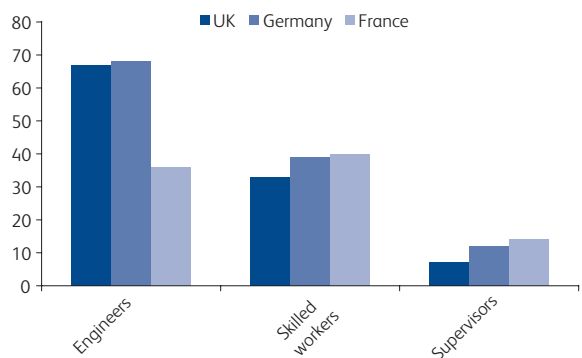
For Germany and the UK nearly 70% of firms that are experiencing skills shortages that constrain innovation cite shortages of engineers (Chart 72). In France skills shortages are equally split between engineers and skilled workers. In all three countries a relatively small proportion of firms mention shortages of supervisors as a factor constraining innovation. In the UK skills shortages for engineers are particularly apparent in the machinery equipment and electrical/optical sector.

Collaborations with universities

Chart 73 shows that nearly 55% of German firms have collaborated with universities/academic institutions on research and development projects at some point, compared with only 40% in the UK and France. In all three countries between a fifth and a quarter of firms have not collaborated but are interested in doing so. Nearly a third of firms in the UK have not collaborated and are not interested in doing so compared with 19% in Germany and 25% in France. There is also a slightly higher failure rate in the UK with 7% of firms having tried but failed, compared with 4% in Germany and France.

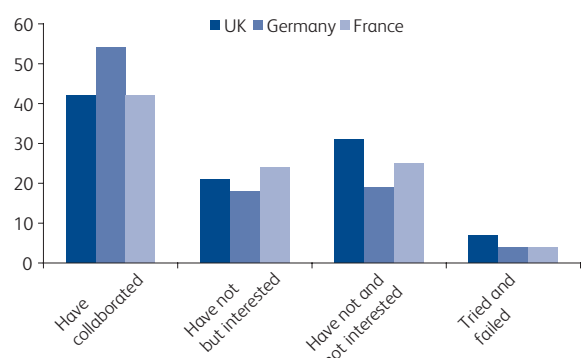
The UK's performance on collaborations with universities is more divergent by sector than in the other two countries (Chart 74). The UK transport sector has the second highest proportion of firms reporting they have collaborated. However, the least active collaborators are also in the UK – the metals and electrical/optical sectors.

Chart 72
Engineers most in demand for innovation in Germany and UK
 % of those experiencing skills shortages that constrain innovation in following occupations



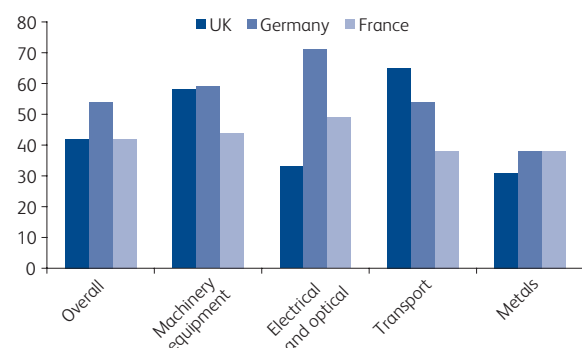
Source: EEF/NOP 2003 EU Productivity Survey

Chart 73
Germany leads the way on collaborations with universities
 % firms that in terms of collaborations with universities/academic institutions have...



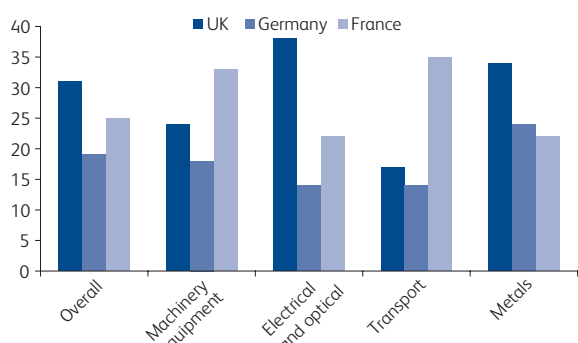
Source: EEF/NOP 2003 EU Productivity Survey

Chart 74
German electrical/optical and UK transport ahead on university collaboration
 % firms that have collaborated with universities/academic institutions on R&D projects



Source: EEF/NOP 2003 EU Productivity Survey

Chart 75
UK electrical/optical least interested in collaboration with universities
 % firms that have not collaborated with universities/academic institutions on R&D projects and not interested/not appropriate

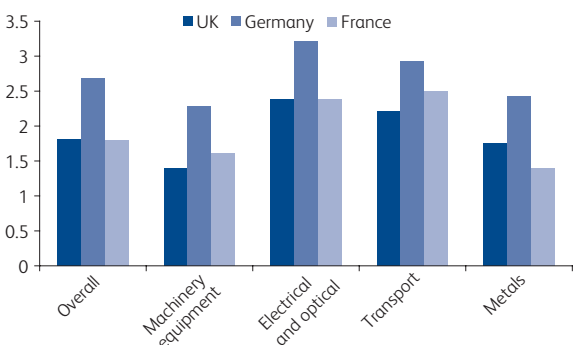


Source: EEF/NOP 2003 EU Productivity Survey

In all three countries, large firms are more likely than smaller ones to have collaborated with universities. The UK more or less matches Germany for smaller firms but is well behind for firms with 201 employees or more. Some 82% of German firms of that size have collaborated with universities compared with 62% in the UK, with France even further behind at 50%.

Chart 75 looks at companies who do not currently collaborate with universities/academic institutions, and would not be interested in doing so in the future. It shows that the UK has the highest proportion of 'not interested' firms, particularly in the electrical/optical and metals sectors.

Chart 76
German firms collaborating more frequently across all sectors
 mean score in number of occasions for firms that have collaborated in the last two years

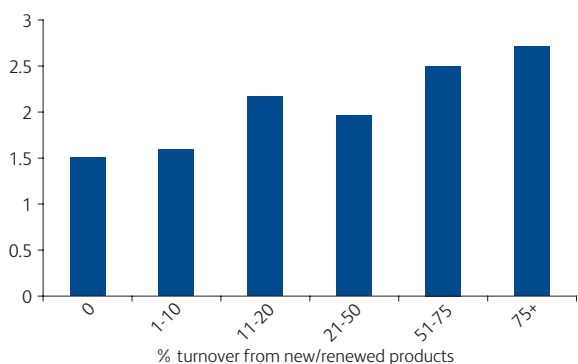


Source: EEF/NOP 2003 EU Productivity Survey

Firms that tried to collaborate and failed were asked the reason for this. The sample for this question is very small and it is not possible to read too much into the answers except to say a variety of reasons is at play. Some of the explanatory factors include projects not being commercially viable, university staff did not possess the right skills, firms failed to meet a partner or the whole process took too long. Very few firms actually highlighted problems with staff in their own organisation.

German firms also collaborate more often with universities. Chart 76 shows that this occurs across all sectors in Germany but French and UK machinery equipment and metals sectors do so more rarely. Again, medium-large UK firms show up well, leading those in Germany and France by a slender margin. In the UK, foreign-owned firms have worked with universities more frequently than their domestic counterparts. This suggests that there is an issue in helping UK-owned firms to better understand how to work with universities.

Chart 77
Collaborations with universities are bearing fruit
 mean score in number of occasions for firms that have collaborated in the last two years



Source: EEF/NOP 2003 EU Productivity Survey

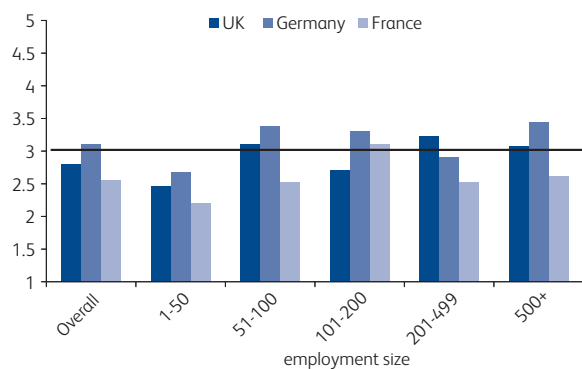
Collaborations with universities appear to be bearing fruit. Chart 77 illustrates a clear link across the whole sample between the proportion of turnover firms have achieved from new products and the number of times they have collaborated with universities.

UK firms find it harder to work with academic institutions than those in Germany, though they are ahead of France (Chart 78). Very small firms with 1-50 employees find it hardest to work with universities and large firms with 500+ employees find it easiest. Medium-large UK firms with 201-499 employees find it more straightforward to work with universities than firms of the equivalent size in Germany and France.

Firms in all three countries struggle to complete a project once a partner is found (Chart 79). North American firms in the sample find it easier to complete projects. This suggests they bring with them experience of working with universities at home and elsewhere. Once again, across the whole sample, micro firms find it hardest to complete projects and large firms find it easiest.

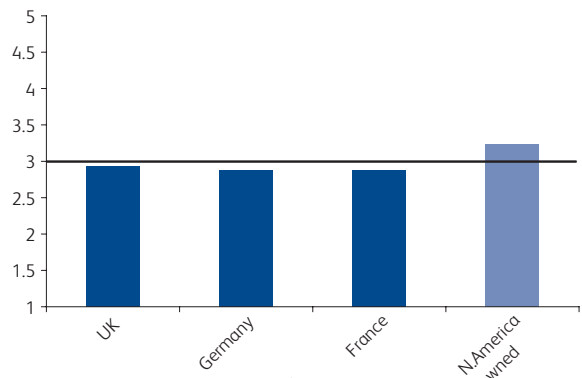
Chart 80 shows that collaborations are more likely to lead to commercially viable projects for German firms, with three quarters of those having collaborated stating they have been successful. The UK comes second on this measure with 58%, ahead of France with 48%. In the UK the transport sector has had most success in achieving commercially viable projects and US-owned firms have had more success than domestic firms.

Chart 78
German firms find it easier to work with universities
 mean score where 5=very easy and 1=very difficult to work with universities, for all except those not interested in collaborating



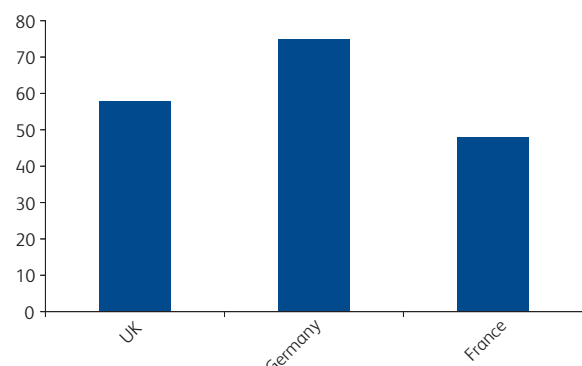
Source: EEF/NOP 2003 EU Productivity Survey

Chart 79
Not easy to complete projects once a partner is found
 mean score where 5=very easy and 1=very difficult to complete a project once partner found, for all except those not interested in collaborating



Source: EEF/NOP 2003 EU Productivity Survey

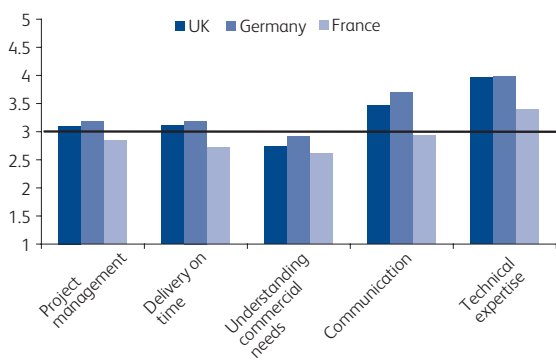
Chart 80
Collaboration generates more viable projects in Germany
 % of all having collaborated that had success in producing commercially viable opportunities



Source: EEF/NOP 2003 EU Productivity Survey

Chart 81
Strengths of academic staff are communication and technical expertise

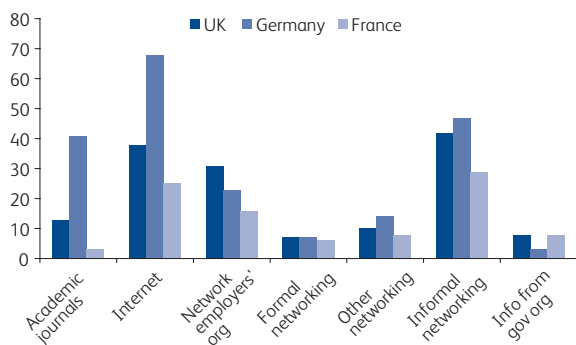
mean score for all having collaborated, where 5=very good and 1=very poor skills in meeting business needs in following areas...



Source: EEF/NOP 2003 EU Productivity Survey

Chart 81 shows that French firms rate the skills of academic staff in their country less highly, and in most cases less than adequate. In all three countries academic staff are deemed to struggle to understand commercial needs. The skills strengths of German and UK academic staff are seen as relating to technical expertise and communication. In the UK there is some evidence to suggest that greater familiarisation with academia leads to a better understanding and assessment of their abilities. The transport sector tends to rate the skills of UK academic staff more highly and has the highest proportion of firms that have collaborated with academic institutions.

Chart 82
More German firms using internet and academic journals
% of firms using following to obtain information on potential research projects and partners



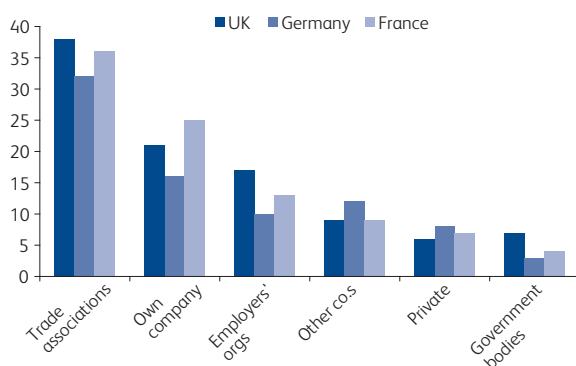
Source: EEF/NOP 2003 EU Productivity Survey

A higher proportion of German firms tend to use the methods outlined in Chart 82 for obtaining information on potential research projects and partners. Just over 40% of German firms use academic journals regularly - substantially more than in the UK and France. A much higher proportion of German firms also use the internet to obtain this type of information. More UK firms use employers' organisation networks. French firms are somewhat further behind in using all of the ways outlined to obtain this type of valuable information.

Networking opportunities

'Bridging the continental divide' suggested that French and German firms get more out of formal networking than their UK counterparts. Our survey suggests that UK firms are just as likely as those in France and Germany to use the various networking methods but they do so less frequently than firms in Germany and find it less effective than either of the other two countries.

Chart 83
Structure of networking similar in all three countries
% of firms undertaking formal networking that do so through the following facilitators



Source: EEF/NOP 2003 EU Productivity Survey

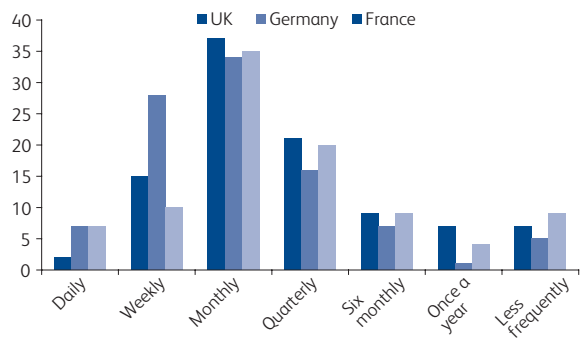
Formal networking can provide a crucial arena for firms to exchange ideas on innovation and learn from the experience of others. It involves pre-arranged and regular meetings/seminars where firms can meet with other firms' employees and/or academic staff to discuss matters around innovation. Chart 83 shows that the largest facilitators in each country are trade associations, followed by companies and employer organisations. Government bodies play a small part in all three countries.

German firms, however, make greater use of the contacts they obtain through networking. Chart 84 shows that nearly 70% of German firms use the contacts they make either once a month or more frequently. This compares with equivalent figures of 54% for the UK and 52% in France.

Chart 85 shows that UK-based firms also find networking delivers least on a number of fronts - providing introductions to other companies, introductions to academic institutions, information on research projects and access to people with specialised skills. The German system seems to be particularly effective in generating introductions to academic institutions, while the French one excels in providing introductions to other companies and opportunities to access government funding. In the UK the transport sector consistently gets more out of networking than the other industries. Medium-large UK firms also find networking most effective.

Chart 84

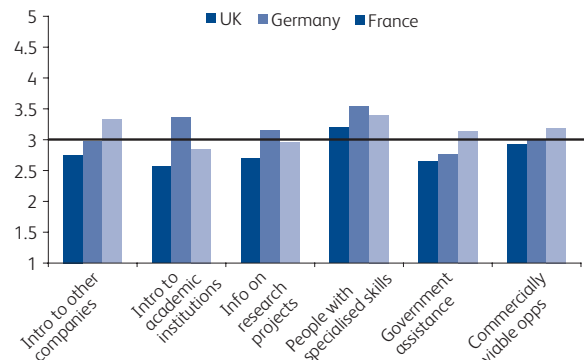
German firms using contacts made more frequently
% of firms using formal networks that draw on resources/contacts made at following intervals



Source: EEF/NOP 2003 EU Productivity Survey

Chart 85

UK firms find networking least effective
mean score of all firms undertaking formal networking on effectiveness of networking at doing following, where 5=very effective and 1=not at all effective



Source: EEF/NOP 2003 EU Productivity Survey

Have no responsibility and your advice is not sought in such areas S2a

ASK IF CODES 3 or 4 @ S2

S2a Is there anyone else within your organisation that is more involved in these decisions than yourself?

Yes

ASK FOR NAME & REQUEST TO BE TRANSFERRED

No/don't know CLOSE 1

CLOSE 1: I'm sorry but for this study we need to speak to decision-makers within EEF membership organisations. Thank you for being willing to help anyway.

ASK ALL / SP

S3 What is your company's main area of activity?

PROBE TO PRECODES

- Basic metals
- Chemical/Rubber/Plastic
- Electrical machinery and apparatus
- Electrical, Gas, water and Construction
- Fabricated metal products (except machinery and equipment)
- Machinery equipment
- Medical, precision and optical instruments, watches and clocks
- Motor vehicles, trailers and semi-trailers
- Office machinery and computers
- Radio, television and communications equipment or apparatus
- Retail, Public Services, Social and Personal
- Other Manufacturing
- Other transport equipment
- Other (specify)

ASK ALL / SP

S4 How many people does your company employ in your country?

PROBE TO PRECODES

- 1-10
- 11-25
- 26-50
- 51-100
- 101-200
- 201-499
- 500-999
- 1000+
- Don't know

MAIN QUESTIONNAIRE SECTION A : COMPANY PERFORMANCE

ASK ALL / SP

Q1 Thinking about your company's performance, would you say that productivity has increased, decreased or remained the same on average over the last two years?

IF INCREASED /DECREASED, PROBE:

And would you say that the increase/decrease has been significant or not?

ONLY ADD IF NECESSARY:

By significant, we mean an increase or decrease of more than 5% per year.

- Significant increase 1
- Increase 2
- Remained the same 3
- Decrease 4
- Significant decrease 5
- Don't know V

ASK ALL / SP

Q2 And has your company's profitability increased, decreased or remained the same on average over the last two years?

IF INCREASED /DECREASED, PROBE:

Again, would you say that the increase/decrease has been significant or not?

ONLY ADD IF NECESSARY:

By significant, we mean an increase or decrease of more than 5% per year.

Significant increase	1
Increase	2
Remained the same	3
Decrease	4
Significant decrease	5
Don't know	V

ASK ALL / SP

Q3 Over the last 12 months, did your investment in capital equipment (plant, machinery, IT but not buildings or vehicles)...**READ OUT**

Increase significantly	1
Increase moderately	2
Remain the same	3
Decrease moderately	4
Decrease significantly	5
Don't know	V

ASK ALL / SP

Q4 Over the next 12 months, do you anticipate that your investment in capital equipment will...**READ OUT**

Increase significantly	1
Increase moderately	2
Remain the same	3
Decrease moderately	4
Decrease significantly	5
Don't know	V

ASK ALL / SP

Q5a How, if at all, has your company's productivity been impacted by the level of investment in capital equipment by your organisation in the last 12 months?

Would you say that investment has had a...	
Significant positive impact [on productivity]	1
Moderate positive impact	2
No impact	3
Moderate negative impact	4
Significant negative impact	5
Don't know	V

ASK ALL / SP

Q5b And, how, if at all, do you anticipate that your company's productivity will be impacted by the level of investment in capital equipment by your organisation in the next 12 months?

Would you say that investment will have a ...	
Significant positive impact [on productivity]	1
Moderate positive impact	2
No impact	3
Moderate negative impact	4
Significant negative impact	5
Don't know	V

ASK ALL / MP

Q6a What, if anything, are the major barriers to investment in capital equipment for your organisation?

DO NOT READ OUT. CODE ALL THAT APPLY.

Lack of demand/orders	1
Uncertainty over demand/orders	2
Exchange rate	3
Lack of external finance available	4
Lack of internal finance available	5
Inability to meet payback periods /	

hurdle rates	6
Lack of skills of employees / candidates in the marketplace	7
Views of external financiers	8
Other [specify]	9
Don't know	V
NO OBSTACLES TO INVESTMENT	X

ASK ALL / MP

Q7a Which of the following factors do you take into account when assessing potential investment projects?

PROMPT: Do you take anything else into account that I haven't mentioned?

READ OUT. CODE ALL THAT APPLY

Payback period [the maximum period in which an investment has to pay for itself (the returns over the period are equal to the cost of the investment)]	1
Hurdle rates [the minimum required rate of return per year from an investment project]	2
Management discretion	3
Other 1(write in at the time)	4
Other 2 (write in at the time)	5
Other 3 (write in at the time)	6
Don't know	V

ASK IF MORE THAN ONE CODED @ Q7a / SP

Q7b And which of those factors would you say is the most important in influencing the decision whether to invest or not?

PRECODE LIST OF ALL CODED AT PREVIOUS QUESTION TO APPEAR

Don't know	V
------------	---

ASK IF CODE 1 @ Q7a. / SP

Q7c What length of payback periods do you use when assessing potential investment projects?

PROBE TO PRECODES

Up to 1 year	1
1-2 years	2
2-3 years	3
3-4 years	4
4-5 years	5
Over 5 years	6
Don't know	V

ASK IF CODE 2 @ Q7a / SP

Q7d What hurdle rates do you use when assessing potential investment projects?

PROBE TO PRECODES

Up to 5%	1
6-10%	2
11-15%	3
16-20%	4
21% or more	5
Don't know	V

ASK IF CODES 1 or 2 @ Q7a / SP

Q7e Approximately, what proportion of projects that meet either the hurdle rates or payback periods do not go ahead?

None, all that meet the criteria proceed	1
1-25%	2
26-50%	3
51-75%	4
Over 75%	5
Don't know	V

ASK IF CODES 1 or 2 @ Q7a / SP

Q7f Approximately, what proportion of projects that don't meet either the hurdle rates or payback periods still get the go ahead?

None, all that fail the criteria do not proceed	1
1-25%	2

26-50%	3
51-75%	4
Over 75%	5
Don't know	V

ASK ALL / SP PER ASPECT

Q8 How, if at all, do each of the following factors affect the level of investment your company is planning to make in this country over the next 12 months?

ROTATE. READ OUT

1. Strength of your markets
2. Level of corporation tax
3. Tax incentives for investment
4. Grants for investment in capital equipment
5. Employment regulation
6. Skills of your employees
7. Government attitude to manufacturing
8. Employment costs relative to other countries

Would you say that this has a...	
Significant positive impact	1
Moderate positive impact	2
No impact	3
Moderate negative impact	4
Significant negative impact	5
Don't know	V

ASK ALL / SP

Q9 Is your organisation considering making a major investment/ expanding capacity overseas in the next 12 months?

Yes	1
No	2
Don't know	V

ASK IF CODE 1 @ Q9 / MP

Q10 Which country or region do you think will be the location for that investment by your organisation?

PROBE TO PRECODES. CODE ALL THAT APPLY

UK	1
Germany	2
France	3
Other EU	4
Central/ Eastern Europe	5
China	6
India	7
Japan	8
Other Asia	9
USA	10
Canada	11
Mexico	12
South America	13
Africa	14
Other	15
Don't know	V

ASK IF CODE 1 @ Q9 / MP

Q11 What are the main reasons for your decision to invest abroad?

DO NOT READ OUT. CODE ALL THAT APPLY

Expectations of higher growth in the rest of the EU than in your domestic economy?	1
Expectations of higher growth in the rest of world than in your domestic economy?	2
Exchange rate	3
Labour costs	4
Availability of skills in domestic/destination economy	5
Lower taxation in destination economy	6

Grants available in destination economy	7
Closer to market	8
Government attitude to manufacturing	9
Other (specify)	10
Don't know	V

MAIN QUESTIONNAIRE – SECTION B : SKILLS/TRAINING

ASK ALL / SP

Q12a Over the last 12 months, did your investment in Training...**READ OUT**

Increase significantly	1
Increase moderately	2
Remain the same	3
Decrease moderately	4
Decrease significantly	5
Don't know	V

ASK ALL / SP

Q12b And, over the next 12 months, do you anticipate that your investment in Training will...**READ OUT**

Increase significantly	1
Increase moderately	2
Remain the same	3
Decrease moderately	4
Decrease significantly	5
Don't know	V

ASK ALL / SP

Q13 How, if at all, has your company's productivity been impacted by the skills available in the marketplace over the last 12 months?

Would you say that this has had a...

Significant positive impact	1
Moderate positive impact	2
No impact	3

Moderate negative impact	4
Significant negative impact	5
Don't know	V

ASK ALL / MP

Q14 Is your company currently experiencing any skills shortages in particular occupations?

IF YES: In which occupations are you experiencing the most significant skills shortages?

PROBE TO PRECODES. CODE ALL THAT APPLY.

Senior Managers	1
Scientists	2
Engineers	3
Supervisors	4
Skilled workers	5
Semi-skilled workers	6
Unskilled	7
Other	8
Don't know	V
NO SKILLS SHORTAGES	X

ASK ALL / SP PER ASPECT

Q15 How, if at all, do you think each of the following currently impact on your ability to attract the right people to employ?

ROTATE. READ OUT

1. The image/status of the engineering industry in [the UK/France/Germany]
2. Salary levels offered by your company
3. Quality and number of university engineering courses available
4. Image of your company as an employer
5. Quality of school leavers
6. Quality of graduates

Would you say that this has a...	
Significant positive impact	1
Moderate positive impact	2
No impact	3
Moderate negative impact	4
Significant negative impact	5
Don't know	V

ASK ALL / SP

Q17 Have you recruited any apprentices in the last two years?

Yes	1
No	2
Don't know	V

ASK IF CODE 2 @ Q17

Q18 Why haven't you recruited any apprentices in the last two years?

DO NOT READ OUT. CODE ALL THAT APPLY

No need	1
Quality of potential candidates	2
Lack of potential candidates	3
Fear of loosing them/being poached	4
Quality of courses/training	5
Lack of funding from external sources	6
Lack of funding within your organisation	7
Other	8
Don't know	V

ASK ALL

Q19a How does the apprenticeship system perform in meeting your company's requirements for an adequate supply of qualified people?

READ OUT

Very Well	1
-----------	---

Well	2
Neither Well nor Poor	3
Poor	4
Very Poor	5
Don't know	V

ASK ALL

Q19b How does the university/higher education system perform in meeting your company's requirements for an adequate supply of qualified people?

READ OUT

Very Well	1
Well	2
Neither Well nor Poor	3
Poor	4
Very Poor	5
Don't know	V

ASK ALL / SP PER ASPECT

Q20 How, if at all, do each of the following factors impact on the number of people undertaking engineering apprenticeships in the UK as a whole...

ROTATE. READ OUT

1. Status of apprenticeship schemes
2. Availability of government funding
3. Careers guidance
4. Pay whilst learning
5. Pay once qualified
6. Standards of colleges

Would you say that this aspect has ...

Significant positive impact	1
Moderate positive impact	2
No impact	3

Moderate negative impact	4	51-75 %	6
Significant negative impact	5	75-100 %	7
Don't know	V	Don't know	V

ASK ALL / SP

Q21a Which, if any of the following, do you believe should be the key manufacturing priority for higher education in the UK?

READ OUT

More science/engineering graduates	1
More management graduates	2
Higher calibre of graduates	3
Better quality of degrees	4
More work experience	5
Better facilities	6
Better teaching staff	7
Don't know	V

MAIN QUESTIONNAIRE – SECTION C : INNOVATION

I'd now like you to think specifically about the area of innovation or research and development within your organisation.

ASK ALL / SP

Q22 What proportion of your company's turnover has come from new or renewed products, introduced within the last two years?

ADD IF NECESSARY:-

Renewed products are existing product lines that have been significantly improved

None	1
1-5 %	2
6-10 %	3
11-20 %	4
21-50 %	5

ASK ALL / MP

Q23 Has your company undertaken innovation in any of the following areas in the last two years?

READ OUT. CODE ALL THAT APPLY

New product development	1
Significant improvement in existing products	2
Development of new processes	3
Significant improvement in existing processes	4
Provision of new services to customers	5
Significant improvement in existing services to customers	6
Another area	7
None of these	X
Don't know	V

ASK ALL / MP

Q24 What, if anything, are the major barriers to undertaking more innovation within your organisation?

DO NOT READ OUT. CODE ALL THAT APPLY.

Skills/abilities of your employees	1
Access to new technologies	2
Access or involvement with innovative customers/markets	3
Availability of financial resources	4
Access to knowledge sharing networks	5
Accessing information on research opportunities	6
Knowledge is too well protected by IPR framework	7
IPR framework is not adequate for	

protecting new ideas	8
Regulation	9
Other [specify]	10
Don't know	V
NO BARRIERS	X

ASK ALL / SP PER ASPECT

Q25 Which, if any, of the following factors do you feel encourage or deter an environment for innovation within the UK

ROTATE. READ OUT

1. Corporate tax system
2. Tax incentives for innovation (e.g. R&D tax credit)
3. Quality of academic research
4. Business-University links
5. Government attitude to manufacturing/engineering
6. IPR [Intellectual Property Rights] framework
7. Supply of skills (quality of candidates/skills of your employees)

Would you say that this aspect has ...

Significant positive impact	1
Moderate positive impact	2
No impact	3
Moderate negative impact	4
Significant negative impact	5
Don't know	V

ASK ALL / SP

Q26a Which, if any of the following, new policies would make the most difference to your company being able to innovate successfully?

READ OUT. ROTATE ORDER

Lower corporation tax	1
Greater tax incentives for innovation	2

Grants to support innovation projects	3
Greater protection for new ideas	4
Easier access to innovations in other organisations	5
More formal networking opportunities	6
Improved supply of skilled R&D staff	7
Advice on how to work more closely with universities/academic institutions	8
More information on opportunities to work with universities/academic institution	9
Improvements in universities abilities to work with business	10

NONE OF THESE WOULD MAKE ANY DIFFERENCE

Don't know	X
	V

ASK ALL / MP

Q27 Is your company experiencing any skills shortages in particular occupations which is specifically constraining innovation?

IF YES: In which occupations are skills shortages significantly constraining your innovation performance?

PROBE TO PRECODES. CODE ALL THAT APPLY.

Senior Managers	1
Scientists	2
Engineers	3
Supervisors	4
Skilled workers	5
Semi-skilled workers	6
Unskilled	7
Other	8
Don't know	V
NO SKILLS SHORTAGES	X

ASK ALL / SP

Q28a In terms of collaborations with universities/academic organisations on research and development projects, which of the following best describes your organisation’s position...**READ OUT**

1. We have collaborated with universities/other academic organisations
2. We haven’t collaborated with universities/other academic organisations, but would be interested in doing so in the future
3. We haven’t collaborated with universities/other academic organisations, and we are not interested or it would not be appropriate for us to do so in the future.
4. Have tried to collaborate but failed
5. Don’t know

ASK IF CODE 4 @ Q28a / MP

Q28b Why have you failed to collaborate with universities/other academic institutions?

DO NOT READ OUT. CODE ALL THAT APPLY

1. University staff did not possess right skills
2. Staff within your organisation did not possess right skills
3. Failed to meet a suitable partner
4. Project not commercially viable
5. Unable to agree on Intellectual Property Rights
6. Other (specify?)
7. Don’t know

ASK IF CODE 1 @ Q28a / SP

Q29 On how many occasions have you worked with universities/academic institutions on a research project in the last two years?

- 1
- 2
- 3
- 4
- 5 or more

- None X
- Don’t know V

DO NOT ASK IF CODED Q28a/3 / SP

Q30 How easy [is it/do you think it is] to identify a partner when trying to work with universities or other academic institutions on a research project?

- Very easy 1
- Easy 2
- Neither easy nor difficult 3
- Difficult 4
- Very difficult 5
- Don’t know V

DO NOT ASK IF CODED Q28a/3 / SP

Q31 How easy [is it/do you think it is] to complete a project once a partner is found when working with universities or other academic institutions on a research project?

- Very easy 1
- Easy 2
- Neither easy nor difficult 3
- Difficult 4
- Very difficult 5
- Don’t know V

ASK IF CODE 1 @ Q28a / SP

Q32 Have collaborations between yourself and universities/other academic institutions been successful at producing commercially viable opportunities for your organisation?

- Yes 1
- No 2
- Don’t know V

ASK IF CODED Q28a/1 / SP

Q33 How do you rate the skills of staff in universities/academic institutions in meeting your business needs in each of the following areas...

ROTATE. READ OUT

1. Project management
2. Delivery of work to time
3. Understanding commercial business needs
4. Communication
5. Technical expertise

Would you say staff abilities in this area are...

Very Good	1
Good	2
Adequate	3
Poor	4
Very Poor	5
Don't know	V

ASK ALL / SP PER ASPECT

Q34 To what extent do you use the following to obtain information on potential research projects and partners. For each if you could say whether you use it regularly, occasionally, rarely or never. So, how often do you use...

READ OUT

ADD AS NECESSARY:-

Formal networking involves pre-arranged and regular meetings/seminars etc where firms can meet with other firms' employees and/or university/other academic staff to discuss innovation issues.

Informal networking is where firms have the opportunity to discuss innovation issues with other firms' employees and/or university/academic staff on an adhoc basis or at meetings/seminars designed for other purposes but which bring the relevant people together.

1. Academic journals
2. Searches on/information feeds from the Internet
3. Formal networking opportunities via employers' organisations, associations or trade bodies, such as - EEF, CBI, Chambers of Commerce
4. Formal networking opportunities via Government organisations at both National and Federal/Regional level

5. Other formal networking opportunities [e.g. privately organised seminars]
6. Informal networking via your own contacts
7. Information provided by Government organisations

Would you say....

Regularly	1
Occasionally	2
Rarely	3
Never	4
Don't know	V

ASK IF FORMAL NETWORKING – CODES 3, 4 or 5 @ Q34 / SP

Q35 Thinking about the formal networking opportunities available in your country, which organisation would you say is the main facilitator of such networks? Is it...READ OUT

Your own company	1
Other companies in the industry	2
Employers organisations	3
Trade bodies or associations	4
Private event/seminar organisers	5
Government bodies	6
Other	7
Don't know	V

ASK IF FORMAL NETWORKING – CODES 3, 4 or 5 @ Q34 / SP

Q36 How frequently do you draw on the resources/contacts made through these formal networks?

PROBE TO PRECODES

Daily	1
Weekly	2
Monthly	3
Quarterly	4
Once every six months	5

Once a year	6
Less frequently than this	7
Don't know	V

ASK IF FORMAL NETWORKING – CODES 3, 4 or 5 @ Q34 / SP

Q37 How effective, if at all, do you think that networking has been in each of the following areas...[READ OUT](#)

ROTATE. READ OUT

1. Introduction to other companies as research partners
2. Introduction to other university/academic institutions as research partners
3. Information on prospective research projects
4. Access to people with specialised skills
5. Accessing government assistance/schemes for innovation
6. Leading to commercially viable opportunities

Would you say that for this aspect networking has been ...[READ OUT](#)

Very effective	1
Effective	2
Neither effective nor ineffective	3
Not very effective	4
Not at all effective	5
Don't know	V

SECTION D : CLASSIFICATION

Finally, I would like to ask you some questions about your company in order to put your earlier answers into context.

ASK ALL / SP

C1 What is the country of ownership for your organisation [including any parent company]?

PROBE TO PRECODES

UK	1
Germany	2
France	3
Other EU	4
Central and Eastern Europe	5
China	6
India	7
Japan	8
Other Asia	9
USA	10
Canada	11
Mexico	12
South America	13
Africa	14
Other	15
Don't know	V

ASK ALL / SPC2.

What status is your organisation?

[READ OUT](#)

Public limited company	1
Limited	2
Family owned	3
Other privately owned (i.e. non-family)	4
Government owned	5
Other	6
Refused	X

About EEF

EEF, the manufacturers' organisation, has a membership of 6,000 manufacturing, engineering and technology-based businesses and represents the interests of manufacturing at all levels of government. Comprising 11 regional Associations, the Engineering Construction Industries Association (ECIA) and UK Steel, EEF is one of the UK's leading providers of business services in employment relations and employment law, health, safety and environment, manufacturing performance, and education and skills.

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Published: June 2004
ISBN: 1 903461 32 4