

5
7
11
13
17
19
23
29
31

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DTI ECONOMICS PAPER NO.6

UK Productivity and
Competitiveness
Indicators 2003

NOVEMBER 2003



The DTI drives our ambition of 'prosperity for all' by working to create the best environment for business success in the UK. We help people and companies become more productive by promoting enterprise, innovation and creativity.

We champion UK business at home and abroad. We invest heavily in world-class science and technology. We protect the rights of working people and consumers. And we stand up for fair and open markets in the UK, Europe and the world.

CONTENTS

FOREWORD	2	SKILLS	54
EXECUTIVE SUMMARY	4	4.1 Adult literacy and numeracy	55
OVERVIEW	6	4.2 Intermediate and higher-level skills	58
OUTCOMES	12	4.3 Lifelong learning	61
1.1 Macroeconomic stability	14	4.4 Management skills	63
1.2 Output per head	16	4.5 ICT skills	65
1.3 Labour productivity	19	ENTERPRISE	68
1.4 Employment rate	21	5.1 Entrepreneurship	69
1.5 Quality of life	23	5.2 Attitudes to risk taking	71
1.6 Specialisation in knowledge based industries	25	5.3 Venture capital	73
INVESTMENT	28	5.4 Equity markets	76
2.1 Business investment	29	COMPETITIVE ENVIRONMENT	78
2.2 Government investment	31	6.1 Openness to trade and foreign investment	80
2.3 Connecting to the digital market place	34	6.2 Competition	84
2.4 E-commerce adoption	36	6.3 Energy market competition	87
INNOVATION	38	6.4 Unemployment	89
3.1 Publications and citations of research in academic journals	40	6.5 Diversity of employment opportunities	91
3.2 Government spending on R&D	42	6.6 Industrial relations	94
3.3 Business spend on R&D and innovation	44	6.7 Labour market regulation	96
3.4 UK's patenting performance	48	6.8 Political and institutional framework	98
3.5 University knowledge transfer	51	GLOSSARY AND GENERAL NOTES	100
3.6 Sources of information for innovation	52		

FOREWORD

The four years since the first publication of these *Indicators* provides an opportunity to step back and assess the substantial progress made by the UK economy in recent years. The macro-economy has improved dramatically. There has been major reform of our competition law. Employment has risen by over 1.5 million since Spring 1997 and unemployment is now the lowest in the G7.

But these *Indicators* show that more can be done if the UK is to realise its potential, especially in terms of making the key investments in skills and innovation that are required for an enterprising economy.

This poses a major challenge for the way Government thinks about industrial policy. Although modernising the overall framework has been challenging, the framework is directly under the influence of Government.

However, becoming innovative, enterprising and more highly skilled is something that only individual workers and individual firms can do.

Professor Michael Porter has recognised the challenge, describing how ‘the UK currently faces a transition to a new phase of economic development’.

As a result, the role of Government has to become more sophisticated. We need to provide the basic building blocks from which individuals and firms can become more highly skilled and innovative. We also need to encourage firms and workers to take advantage of the new operating environment, to invest in training, to become more enterprising, and to innovate.

As the *Indicators* show, the results of our investments in the foundations of competitiveness – in the science base

“ We find that the competitiveness agenda facing UK leaders in government and business reflects the challenges of moving from a location competing on relatively low costs of doing business to a location competing on unique value and innovation. This transition requires investments in different elements of the business environment, upgrading of company strategies, and the creation and strengthening of new types of institutions.”

Professor Michael Porter

‘UK Competitiveness: Moving to the Next Stage’, *DTI Economics Paper* No. 3 (2003)

and in basic schooling – are paying off. UK science is world class, and its quality is continuing to improve. Our children are leaving school with more and higher qualifications. But we continue to fall at the final hurdle, with a poor innovation performance and low skill levels in the workplace.

Our role has to be to encourage and facilitate those investments. In the Summer the Government published the Skills Strategy, which set out our approach to equipping the workforce with the skills for the twenty first century. But our innovation performance remains a concern. We will not be able to achieve the living standards we want if we continue to under-perform on innovation. As a result, we will shortly be publishing the Innovation Review, which will set out our approach to making the UK a world-class centre for innovation.

Finally, four years on from the first edition of the *Indicators*, this is a good opportunity to review the indicators themselves. The DTI and Treasury will jointly publish, early

in the new year, a consultation document which will examine a number of options for reform. This will include whether there is a case for focussing on a smaller set of indicators that might more clearly assess progress against productivity and the five drivers and help to identify the key gaps that Government policy should seek to address. The choice of indicators (which will be specified in the consultation) will be influenced by the need for continuity, annual updating and benchmarking against other countries.

There are some risks to reducing the number of indicators. Adopting a headline set of indicators for each driver will necessarily mean that not all possible aspects that affect productivity will be covered. There may be a trade-off between simplicity and comprehensiveness. We are especially keen to hear your views. I hope you will find time to participate in the consultation, so that we can make sure we are monitoring the best possible indicators to assess performance and the future direction of our economy.



A handwritten signature in black ink, which appears to read 'Patricia Hewitt'. The signature is fluid and cursive, with a long, sweeping tail that loops back towards the end of the name.

Patricia Hewitt
Secretary of State for Trade and Industry

EXECUTIVE SUMMARY

The UK has made progress in improving absolute and relative prosperity, and has enjoyed the fastest growth of GDP per head in the G7 over the most recent economic cycle. This has been largely driven by the labour market, which has delivered falling unemployment and rising employment. The UK's position in knowledge intensive activity has been maintained. However, a significant productivity gap remains between the UK and its main competitors.

Investment

Investment in physical plant, machinery and buildings helps make workers more productive and is a way of embodying new technology in the production process. The overall investment climate depends on a number of factors, such as the availability of finance, macroeconomic stability and the existence of sufficiently skilled workers to utilise new equipment effectively. In recent years, investment in information and communication technology (ICT) has become increasingly important. It embodies improved technology and facilitates organisational or process change.

The level of business investment still remains below that of our major competitors despite an increase over the most recent cycle. Recently, Government investment has been set on a rising trend. In particular, there has been a significant capital injection into transport infrastructure. There are signs of progress in the implementation of ICT investments.

Innovation

Innovation is the successful exploitation of new ideas. Innovation leads to new products, processes and services, and to novel forms of delivery, leading to higher value added.

The UK continues to represent global scientific excellence. Our strong science base attracts foreign investors, but domestic firms do not seem able to make the best use of the advantages this presents. UK firms are undertaking less R&D than their competitors and the gap between the UK and the G7 R&D leaders has widened. However, there are some positive signs. Patenting has increased and there is evidence of increasing knowledge transfer. For example, our science base is increasingly being consulted by innovative businesses.

Skills

Higher skill levels allow workers to generate new ideas and adapt to the changing economic environment. Without access to a skilled workforce, firms are unable to effectively introduce new technology or organisational changes. Low levels of human capital therefore act as a brake on economic performance. Human capital can be developed through the education system, and also through training during an individual's working life.

The UK continues to show weakness in terms of relative levels of human capital. Too many workers lack the key basic and intermediate level skills. There have been improvements to the *flow* of workers into the labour force – through the reforms made to schooling – but weaknesses remain. Although the UK is a middle-ranking economy on ‘lifelong learning’, more needs to be done. An area of success has been ICT skills, where substantial improvements have been made since the first edition of the *Indicators*.

Enterprise

Enterprise involves seizing new business opportunities. The importance of a vibrant enterprise culture has long been recognised as essential for growth.

The UK remains a middle-ranking enterprise economy. It does not possess an entrepreneurial culture to the same degree as the US. This is manifest in a greater risk aversion, and in a preference to accept tenured employment rather than start a business. The turbulence in the global equity markets following the bursting of the ‘dot.com’ bubble has affected the venture capital industry, reducing the pool of available finance for those looking to establish their own enterprise. However, the overall capital market remains strong.

Competitive Environment

The competitive environment provides the framework under which labour, capital, and product markets operate. These rules and institutions are fundamental for productivity because they facilitate the efficient operation of markets. They need to be transparent and comprehensible to ensure that individuals and organisations recognise their rights and responsibilities.

There has been progress in improving the UK’s competition framework. The Enterprise Act 2002 has further strengthened the regime. The new provisions, together with substantial increases in resources for the competition authorities, provide the framework to increase the competitive intensity of the UK economy and to bring down barriers to innovation.

The labour market remains flexible and efficient. This has combined with an effective industrial relations regime to deliver a robust performance. As a result, the UK has the lowest unemployment rate in the G7. Although business remains supportive of both the political and institutional framework – the UK is ranked third in the G7 in terms of the overall environment – there are tentative indications of concern over the focus of policy. This is despite improvements in outcomes such as macroeconomic stability and employment.

OVERVIEW

The UK economy has made substantial progress since the *Indicators* were first published in 1999. The consistent theme is one of improved overall economic frameworks – macroeconomic, competitive, regulatory – that have not yet generated the increases in capital investment, skills and innovation that are required to raise our productivity performance.

Raising the rate of sustainable growth is the Government's central economic objective. Increasing the productivity of the economy is the driving force behind this and the route to sustained higher levels of prosperity – GDP per head.

Since the first edition of the *Indicators* in 1999, UK productivity performance – measured in terms of the productivity gap between the UK and its major competitors – has remained broadly unchanged on both a per worker and per hour measure.

To an extent this isn't surprising. It takes time for workers, businesses and consumers to realise that the economic environment has changed and gain the confidence to invest in capital, or their own skill levels. As a result, we would not normally expect to see changes overnight in a country's competitive position, despite far-reaching structural reforms. As Professor Michael Porter has said, "This process takes a long time....assets must be built, behaviour has to change, and investments have to feed through to generate results"¹.

Consequently, in assessing progress towards raising productivity and competitiveness it is more reasonable to look for changes in the drivers of productivity. We would expect improvements to competitiveness to be first reflected in the underlying conditions. The Government has identified 'five drivers' of productivity – investment, innovation, skills, enterprise and competitive environment – which provide an analytical framework for thinking about the determinants of productivity performance. Some progress has been made on all five drivers since the first edition. • **table 0.1**

This document is the first attempt to comprehensively undertake a dynamic benchmarking of the UK's competitive position.² In addition to providing the regular snapshot of the UK's relative position, the years since the first edition provide some perspective over recent performance.

¹ Porter, M.E. and Ketels, C.H., 'UK Competitiveness: Moving to the next stage', *DTI Economics Paper* No. 3 (2003)

² OECD, *Science, Technology and Industry Scoreboard* (2001)

Table 0.1: Progress since the first edition

	Progress since the first edition
Overall	The UK has made progress in raising prosperity (GDP per head), through improved labour market participation. It has maintained its position as a knowledge intensive economy. The economy has become less volatile as macroeconomic stability has been locked-in as a result of reforms to the fiscal and monetary framework. Strong GDP performance has been largely the result of growing numbers in employment. Productivity growth remains subdued, and insufficient to narrow the productivity gap with our major competitors, which has remained broadly unchanged since the first edition of the <i>Indicators</i> was published in 1999.
Investment	Investment performance has picked up since 1997, but in common with our competitors has slipped since the peak in 2000. Government investment – especially in transport – has increased, but overall UK investment performance remains behind that of our competitors.
Innovation	The UK science base has continued to excel, and has moved further ahead in the international rankings. On some indicators the UK's ability to translate that knowledge into products and processes remains relatively poor, but there are some positive signs, especially in terms of patenting.
Skills	The UK continues to possess a relative weakness in human capital. Although there have been improvements in schooling since 1998, the overall position in terms of both adult skills and training is broadly unchanged. There have been substantial improvements in ICT skills relative to the other G7 countries.
Enterprise	The UK remains average as an enterprise economy, with attitudes to entrepreneurship significantly behind the US but ahead of much of continental Europe. Although overall venture capital provision remains relatively strong, there has been a reduction in early stage investment.
Competitive Environment	The earlier editions of the <i>Indicators</i> highlighted weaknesses in the UK competition regime, but following reforms the UK's position has improved. The UK remains an open economy, well positioned to take advantage of greater world trade and investment. The labour market remains successful with the UK now enjoying the lowest level of unemployment in the G7. Although business perceptions of Government policy and the wider competitive environment remain positive, they have slipped slightly since the first edition.

Despite the clear message of progress set out in the *Indicators*, some of the data is conflicting or surprising. As a result, the assessment of the *Indicators* has identified three paradoxes that require further investigation:

Paradox 1: Productivity

Productivity is the long run driver of prosperity, and relative prosperity has increased since 1998. However, the UK's relative productivity performance remains poor.

**Paradox 2:
The business environment**

Many of the business perception indicators seem to have weakened, but the outcomes to which they relate have improved.

**Paradox 3:
The knowledge economy**

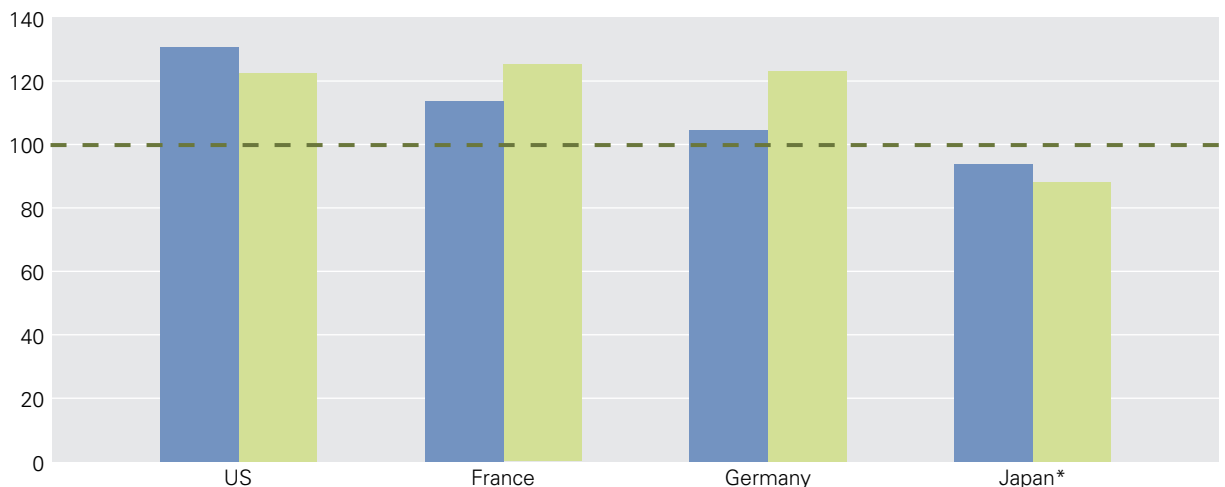
The UK maintained its position as a leading knowledge intensive economy, despite weaknesses in some of the key underlying drivers, such as skills and innovation.

Chart 0.1:
Source: National Statistics
● GDP per worker
● GDP per hour worked
* Japan GDP per hour worked data for 2001

Chart 0.1: GDP per worker and per hour worked

G5 comparison, 2002
Index, UK=100

data



1 Productivity

The most straightforward paradox to reconcile is the puzzle behind the UK's recent growth performance. Over the last five years, the UK has indeed become a more prosperous economy, both absolutely and relative to others. In 1998, UK prosperity, measured in terms of GDP per head – was below that of Germany, Italy, the OECD average and the EU average. It is now above all four of these areas. This has been achieved despite subdued productivity growth and little movement to close the productivity gap with our major competitors. The gap with the US, France and Germany remains at just over 20 per cent in terms of output per hour worked. • **chart 0.1**

The UK has been able to achieve higher prosperity because of strong labour market performance. Prosperity depends on both the productivity of workers and the proportion of the workforce employed. For the UK, the former has improved slightly while the latter has risen sharply since 1998.

It also seems to be the case that productivity and employment are not acting independently of one another. Analysis suggests that this strong labour market performance may actually have held back UK productivity growth. As the economy has generated more jobs, it has brought marginal workers into employment. These workers tend to be less experienced – if not less qualified – and therefore less productive than the average. This 'batting average effect' has the effect of lowering average measured productivity.

2 The business environment

The *Indicators* present a mixed picture of the current environment facing UK business. Although some of the business perceptions indicators suggest a deterioration since 1998, many of the outcomes to which they relate have actually improved. For example, in the last few years there has been a decline in the rating given by business executives to UK labour market regulation – yet unemployment is at historically low levels, suggesting that the functioning of the labour market has improved. • **chart 0.2**

Chart 0.2: Standardised unemployment rates and business executive ratings of labour regulation UK, 1997-2002



Moreover, OECD and other studies suggest that the UK has one of the lowest levels of regulation in the OECD area.³

The dissonance between business perceptions and economic outcomes may be a reflection of cyclical factors: business concerns over short-term demand conditions may translate into general gloom about overall economic performance. While this view is partially supported by the fact that a similar decline is visible in some other G7 countries, the deterioration in perceptions does appear to be more pronounced in the UK.

Professor Michael Porter has also recently noted the confusion over the competitiveness discussion in the UK. He noted a contradiction between his own research that suggested the UK was extremely well set for sustained economic growth, and the results of business surveys which were more pessimistic. Porter argued that the differences were the result of the difficulties the UK faced in making the 'transition to the next stage' of competitiveness. For Porter, many of the issues that worried business – such

as higher environmental standards – were the inevitable, and desirable consequence of the move towards a more innovative economy. As a result, the perceptions indicators could be capturing business' unease with the move away from the low value added, low regulation, price sensitive business model.

It is probably too early to tell if Porter's hypothesis is correct, but the DTI will continue to monitor the performance of the UK economy, and will assess whether the changes in business perceptions are capturing the growing pains of the innovation economy, or providing early warning of emerging weaknesses in UK competitiveness.

3 The knowledge economy

The knowledge economy indicators suggest that the UK is maintaining its position. For example, the share of knowledge intensive output rose by around one percentage point between 1998 and 2000, and remains second only to Germany in the G7, significantly ahead of the US.⁴

• chart 0.3

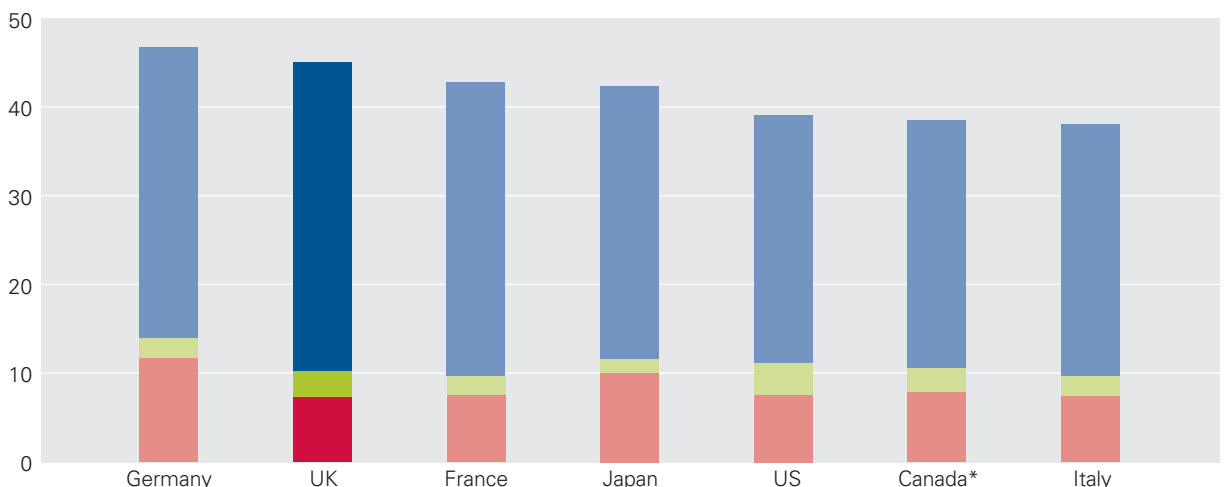
³ Porter, M.E., and Ketels, C.H.M., 'UK Competitiveness: Moving to the next stage', DTI Economics Paper No. 3 (2003)

⁴ The definition of knowledge intensive industries is derived from the OECD. The definition includes some knowledge workers (eg social and community services) not usually thought of belonging to the 'new economy'. On the other hand, it excludes knowledge workers in many 'traditional' industries. Consequently, trends in the share of the economy classified as knowledge intensive need to be interpreted with care.

Chart 0.3: Value added by knowledge based services and industries

G7 comparison, 2000
Per cent of total value added

Chart 0.3:
Source: OECD
● Finance, insurance, other business services, community, social and personal services
● Communication services
● High and medium-high tech
* 1999 data



data

However, on many of the factors that seem to determine success in the knowledge economy, such as skills and innovation performance, the UK continues to under-perform relative to other countries. The UK has lower skill levels than our competitors, with particular weaknesses in intermediate skills, and low levels of off-the-job training. Whilst there have been improvements in education, it will take time for the effects to feed into the wider workforce.

The innovation story is even more perplexing. The last full set of international comparisons suggested that the UK suffers from relatively low R&D and, as a result, has a relatively low rate for introducing new products and processes.

• **chart 0.4**

Closer investigation suggests that part of the puzzle might be explained by the differences between manufacturing and services. Many of the innovation indicators – such as R&D expenditure, patents, or the introduction of new goods – have an implicit manufacturing focus. It is more difficult to identify indicators of service sector innovation. Consequently, it may be that the trend in

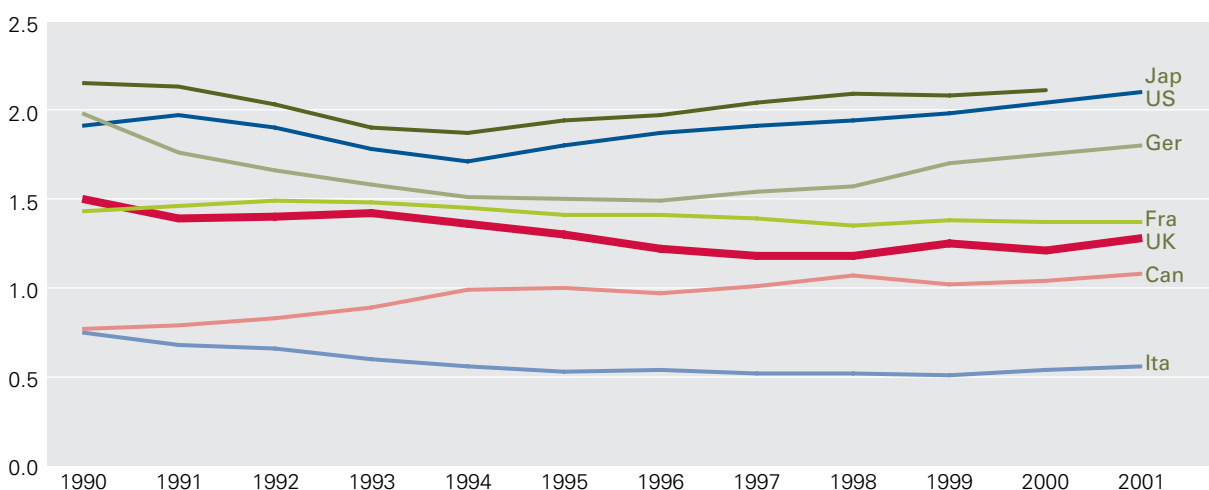
innovation indicators is really reflecting a manufacturing story. Indeed when we look at the data we see that the increase in the share of knowledge intensive sectors in the economy is more than fully accounted for by service sector industries.

Conclusion

Much has been achieved in the past five years. The framework conditions place the UK in an enviable position. The macro-economy is stable. The competition regime now provides firms with the right incentives to invest and grow. The regulatory environment remains relatively benign for business, but now gives people real encouragement to take up employment. Investment in the science base has bolstered the excellence of UK science and technology. The key challenge now is for participants – employers, workers and consumers – to take advantage of the opportunities offered by the reformed economic environment and make the effective investments in capital, skills and innovation that are required to raise productivity and prosperity.

Chart 0.4: Business Enterprise R&D (BERD) as a percentage of GDP

G7 comparison, 1990-2001
Per cent



data

Chart 0.4:
Source: OECD

- Japan
- US
- Germany
- France
- UK
- Canada
- Italy

OUTCOMES

This chapter looks at the high level indicators that measure how successful the UK has been in improving productivity, achieving competitiveness and delivering prosperity. The key measures are:

- **Macroeconomic stability** – macroeconomic instability weakens business confidence and can have a negative effect on investment and long term planning decisions.
- **Output per head** – GDP – total profits and wages – per head provides the best measure of overall economic performance.
- **Labour productivity** – the key determinant of long-term prosperity.
- **Employment rate** – a successful and sustainable economy should have the capacity to generate jobs for the workforce.
- **Quality of life** – a goal in itself but also a key determinant of economic performance and an important factor in competitiveness.
- **Specialisation** – measures of output or trade specialisation provide a measure of the extent to which the UK is developing competencies in higher value added, or more productive, activities.

Summary of the Outcomes Indicators

The traffic light summarises the historical performance of each of the individual indicators compared with the other G7 countries, with each indicator assigned to a band on the basis of the assessment set out in this chapter.

- 1.1 ● Macroeconomic stability
- 1.4 ● Employment rate
- 1.6 ● Output and trade specialisation
- 1.2 ● Output per head
- 1.5 ● Quality of life
- 1.3 ● Labour productivity

- The green light shows those areas where the UK has signs of strength.
- UK performance is regarded as only average in those indicators with an amber light.
- Indicators with a red light show clear signs of weakness. Within each of these bands, indicators are listed in order of appearance in this chapter.

Each indicator is assigned to a traffic light band according to the UK's historical performance compared with other G7 countries. Broadly speaking, green corresponds to a position in the top two in the G7, red to a position in the bottom two, and amber to a position in the middle of the group.

Progress since the first edition

The UK has made progress in improving absolute and relative prosperity, and has enjoyed the fastest growth of GDP per head in the G7 over the most recent economic cycle. This has been largely driven by the labour market, which has delivered falling unemployment and rising employment. The UK's position in knowledge intensive activity has been maintained. However, a significant productivity gap remains between the UK and its main competitors.

The UK economy performed relatively well in 2002 against a backdrop of uncertainty. Shocks in various forms continued to hit the international economy, affecting both employment and output across the advanced countries. The UK macroeconomic framework and microeconomic environment have provided both stability and flexibility.

The UK prosperity performance over the most recent international cycle (1989-2002) has been good, with the economy returning the fastest average growth rate of the G7 economies. This has been associated with improvements in the overall quality of life. However, economic growth has been spatially uneven with widening regional disparities.

The UK continues to face a changing industrial structure. Knowledge based activity continues to grow in importance with almost one half of total output now accounted for by 'knowledge intensive sectors'. This strength is reflected in trade performance, where the UK's share of exports in the knowledge based sectors remains the highest in the G7.

The increase in UK prosperity has been driven by the labour market. The UK's average employment rate over the last cycle was the third highest amongst the G7, and at present the UK leads the G7. But if the UK is to deliver long-term improvements in output per head, it needs to improve its productivity position. Regardless of the labour productivity measure being employed, the economy continues to lag behind the US, France and Germany.

The pursuit of higher productivity in all types of activity will require a continual rethinking of the way business, workers and consumers add value in the economy. Government has a key role to play in this process by ensuring that the UK maintains progress in each of the *five drivers* of productivity.

1.1 Macroeconomic stability

New macroeconomic framework is delivering economic stability

Why is it significant?

The Government's central economic objective is to achieve high and stable levels of growth and employment. Stability helps individuals and businesses to plan for the long-term, improving the quality and quantity of investment in the economy and helping to raise productivity and the sustainable rates of growth and employment. Investment and long-term planning decisions are particularly sensitive to volatile interest rates, high and unstable inflation and unanticipated fluctuations in demand and output. Macroeconomic stability is also a prerequisite of successful economic reform, since a framework of stability permits the rapid achievement of the full benefits of structural reform policies.

How does the UK perform?

Historically, the UK has performed poorly in terms of macroeconomic stability compared with other G7 countries.

• charts 1.1.1-1.1.4

Volatility of economic growth, inflation, employment and interest rates, partly reflecting policy shifts, hindered the long-term health of the economy. In particular, a climate of instability led to deterioration in the skills of the unemployed and made it difficult for companies to undertake the planning and long-term investment necessary for marked and sustainable improvements in productivity.

In response to this historically poor performance, and aware of the essential role of stability in achieving high and stable levels of growth and employment, the Government introduced major reforms to the conduct of macroeconomic management, designed to put policy on a much firmer and more stable footing.

Chart 1.1.1:
Source: DTI
calculations
using OECD
data

● 82 to 92
● 92 to 02

Chart 1.1.2:
Source: DTI
calculations
using OECD
data

● 82 to 92
● 92 to 02

Chart 1.1.1: Volatility of GDP growth

G7 comparison, 1982-2002
Standard deviation in percentage points
Per cent

data

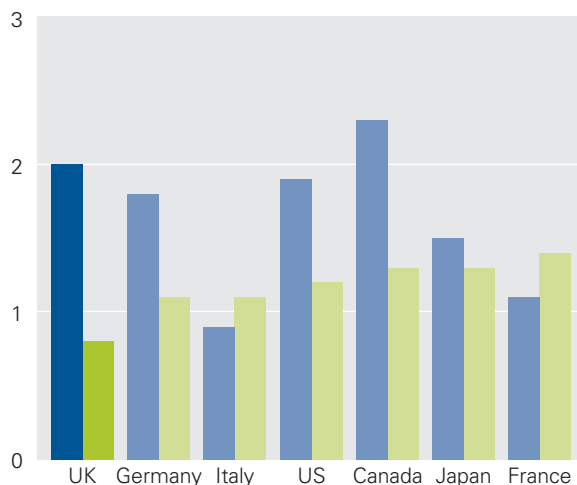
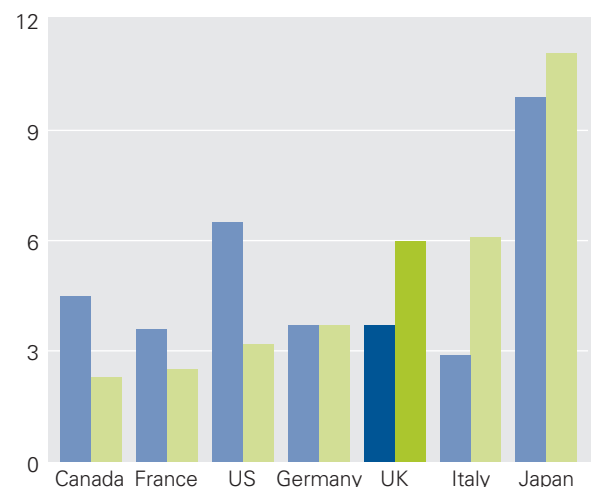


Chart 1.1.2: Volatility of exchange rate movement

G7 comparison, 1982-2002
Standard deviation in percentage points
Per cent

data



The Government handed operational responsibility for monetary policy to the Bank of England, ensuring that interest rates are set on the basis of economic conditions and not short-term political needs. These changes have been complemented by a new framework for fiscal policy, based on coherent principles and strict rules, aimed at maintaining sound public finances.

So far, the new macroeconomic framework has helped to deliver economic stability and to avoid large and destabilising fluctuations in output. It has left the UK well placed to deal with the impact of global events. The monetary policy framework is delivering low and stable inflation, and more recently has allowed the Bank of England's Monetary Policy Committee to respond to risks generated by weakness in the world economy. The fiscal rules are delivering sound public finances and have allowed the automatic stabilisers to operate

freely in support of monetary policy. As a result, the UK now has the lowest growth volatility in the G7, and only the US has a less volatile inflation performance.

What does this mean for the UK?

While the recent improvements in macroeconomic management and performance are clearly positive for the economy, it is vital that they are maintained in the future. Productivity and competitiveness benefit most of all from long-term stability and the gains from a macroeconomic framework that commands confidence will accumulate over time.

The changes to macroeconomic management are already yielding tangible gains. The challenge is to ensure this is maintained and the UK economy is not allowed to return to the weak and unstable climate that has historically held back productivity and competitiveness.

Chart 1.1.3: Volatility of inflation*

G7 comparison, 1982-2002
Standard deviation in percentage points
Per cent

data

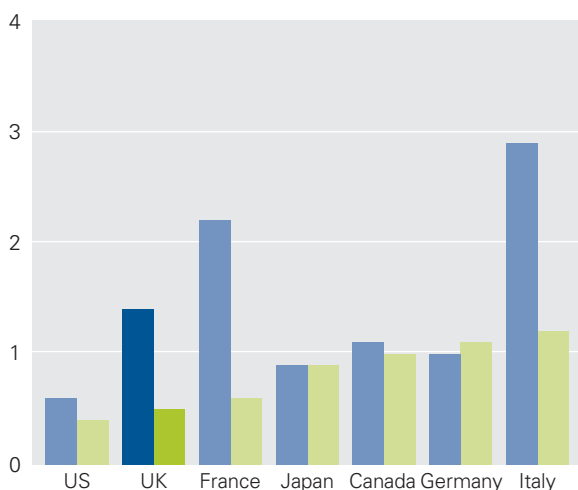


Chart 1.1.4: Volatility of short term interest rates

G7 comparison, 1982-2002
Standard deviation in percentage points
Per cent

data

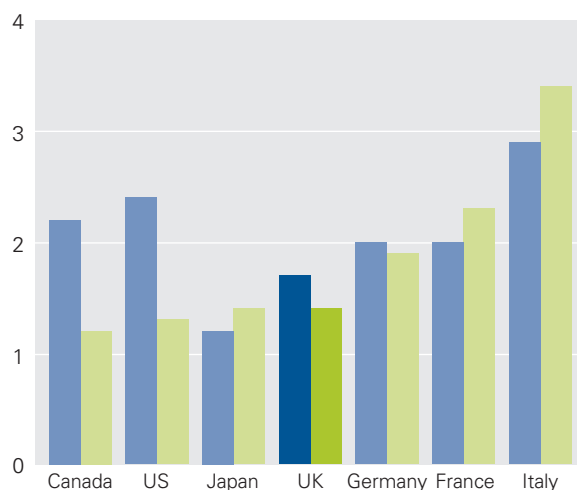


Chart 1.1.3:
Source: DTI calculations using OECD data

- 82 to 92
- 92 to 02

* Inflation measured by implied GDP deflator

Chart 1.1.4:
Source: DTI calculations using OECD data

- 82 to 92
- 92 to 02

1.2 Output per head

Strong income growth produces improvement in relative UK prosperity

Why is it significant?

The Government's key economic objective is raising prosperity. The best single measure of prosperity is GDP per head, which permits comparisons across time and between countries. However, it is only a measure of a country's average relative living standard. It tells us nothing about the distribution of income between groups or regions, nor the sustainability of output.

How does the UK perform?

The level of UK GDP per head in 2002 remained around that of its major European competitors. That peer group, which includes France and Germany, exceeded both EU and OECD averages. • **chart 1.2.1**

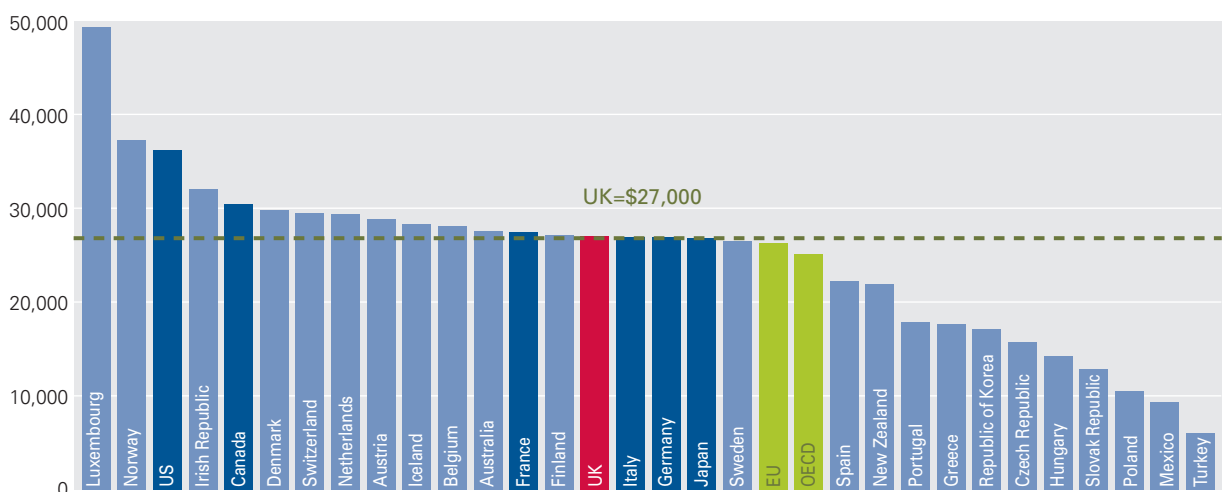
However, the UK's relative prosperity has improved in recent years. Over the most recent economic cycle, the UK outperformed its major competitors with the fastest average growth rate of GDP per head in the G7. • **chart 1.2.2**

Chart 1.2.1:
Source: OECD

Chart 1.2.1: GDP per head of population

OECD comparison, 2002
US dollars, purchasing power parities

data



Changes to boundaries mean that comparable regional statistics for GDP per head are only available from 1990. The data shows a widening of regional disparities over the last decade. Nominal GDP per head in London and the South East has grown significantly faster than the average for the UK. Northern Ireland has made some progress in narrowing the gap but its GDP per head remains behind all but one region. However, most other regions continue to grow significantly slower than the UK average. • **chart 1.2.3**

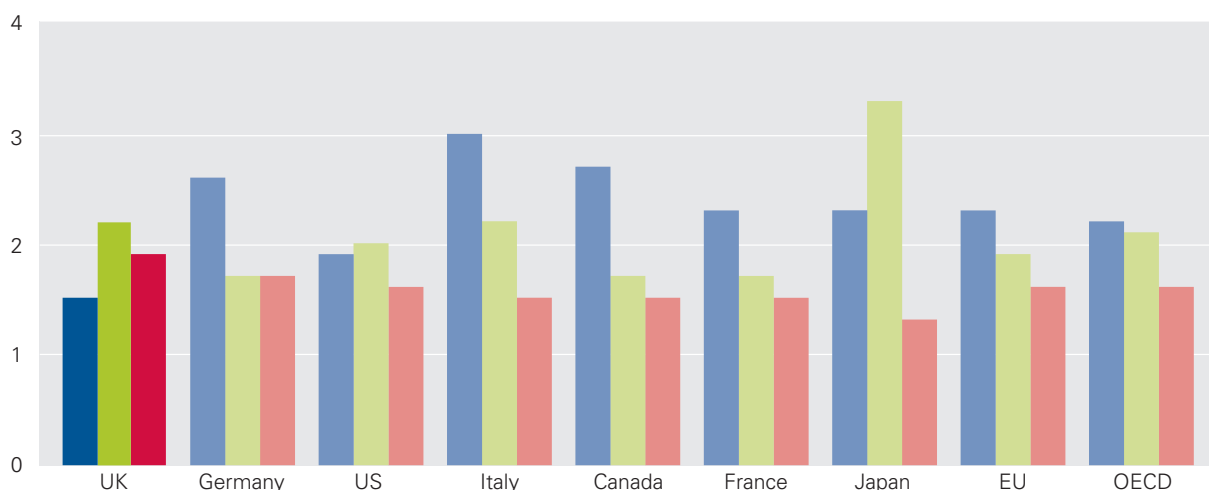
What does this mean for the UK?

Against a backdrop of global economic uncertainty, the UK economy has continued to perform well, generating higher average living standards. The UK has been able to cope with turbulence in the global economy due to its reformed macroeconomic framework, which has provided much greater stability.

However, the UK has still some way to go before it can achieve the levels of prosperity of the best performing countries. As indicator 1.3 will show, this is largely the result of lower labour productivity, and demonstrates the need for further structural reform of product, labour and capital markets.

Chart 1.2.2: Growth of real GDP per head

G7 comparison plus EU and OECD averages, 1973-2002
Average annual per cent change



data

Chart 1.2.2:
Source: OECD

● 1973-1979
● 1979-1989
● 1989-2002

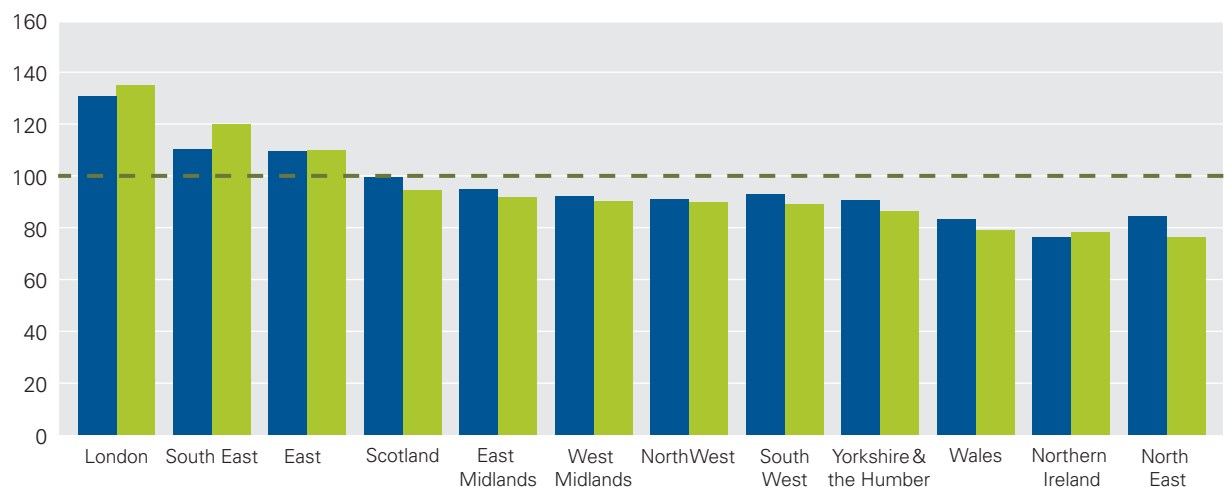
The regional picture reinforces this message. Differences in productivity account for around 60 per cent of the differences in regional GDP per head. If the least prosperous regions are to catch-up with the most prosperous, then productivity needs to improve. This means correcting those *market failures* that constrain regional performance.

Chart 1.2.3:
Source: National
Statistics
● 1991
● 2001

Chart 1.2.3: Regional GDP per head of population

Countries and Government Office Regions, 1991 and 2001
GDP at current basic prices, residence based.
Index, UK=100

data



1.3 Labour productivity

Delivering long-term prosperity requires the UK to raise its productivity performance

Why is it significant?

An economy's productivity performance ultimately underpins its ability to grow. Productivity is not just about working harder. Improvements in performance can be achieved by adopting new practices, products and processes that can add extra value, or that enable existing output to be produced with fewer inputs, allowing resources to be reallocated to more efficient activities.

There are two measures of overall labour productivity: GDP per worker and GDP per hour worked. 'GDP per worker' has the advantage that it is relatively straightforward to calculate but the

disadvantage that it does not reflect a country's working practices; countries with similar technology, skills and capital can have different productivity levels because they differ in the amount of holidays, the length of the working week and the extent of part-time working. 'GDP per hour worked' explicitly accounts for these differences.

How does the UK perform?

The picture of UK productivity performance, whether considered in terms of output per worker or output per worker hour, remains broadly unchanged since the publication of first edition of the *Indicators*. On the output per worker measure, the US and France have a substantial lead over the UK, while Germany is only slightly ahead. • **chart 1.3.1**

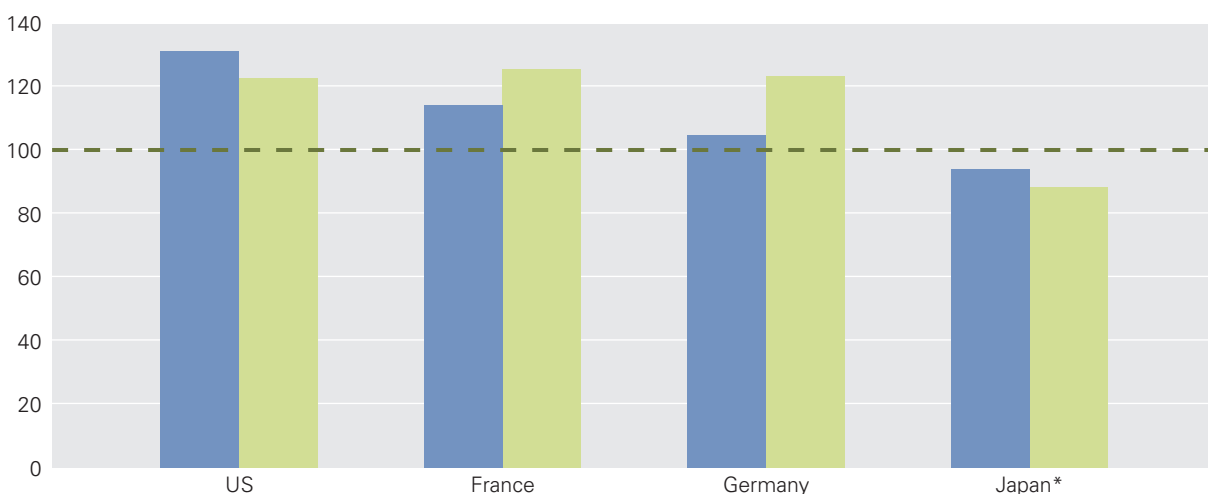
Chart 1.3.1: GDP per worker and per hour worked

G5 comparison, 2002
Index, UK=100

data

Chart 1.3.1:
Source: National
Statistics

● GDP per
worker
● GDP per
hour worked
* Japan GDP
per hour worked
data for 2001



The UK continues to lag despite the fact that over the most recent economic cycle, the UK had the fastest growth of GDP per worker in the G7. • **chart 1.3.2**

On the output per hour measure, the US lead is reduced – because of its longer working week – while France and Germany appear more productive relative to the previous measure, due to their shorter working weeks. As a result, the US, France and Germany are all significantly ahead of the UK on the output per hour measure. The overall effect is that for every hour at work, US, French and German workers produce at least 20 per cent more than the average UK worker.

These variations in performance can be partly accounted for by differences in the capital and skills possessed by workers in competitor countries, especially in France and Germany. The gap with the US also seems to reflect the more efficient way in which the US economy mixes its inputs of capital, skills and workers to produce output.⁵

⁵ O' Mahony, M. and De Boer, W. *Britain's Relative Productivity Performance: Updates to 1999* (2002).

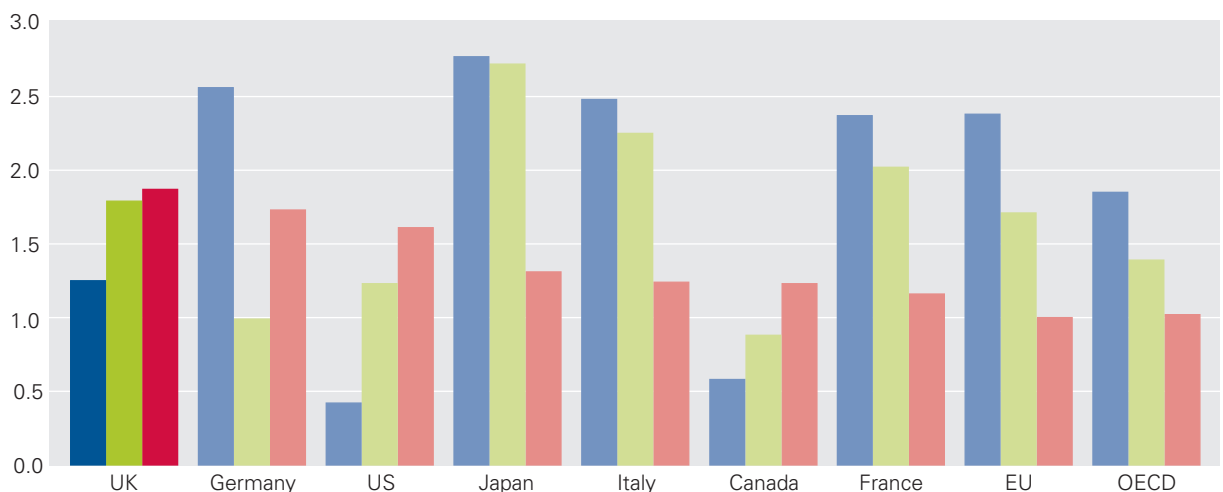
What does this mean for the UK?

UK labour productivity needs to improve if we are to enjoy higher wages, higher profits and greater investment in public services. Other countries show what is possible, and by just catching up, the UK will become better off. The UK needs to continue the process of product, labour and capital market reform in order to help individuals and firms make the most of their potential. Recent initiatives including the DTI Strategy, the Governments Skills Strategy, the Competition and Enterprise Acts, and successive Budgets have set out ambitious policies to raise UK productivity.

Chart 1.3.2:
Source: OECD
● 1973-1979
● 1979-1989
● 1989-2002

Chart 1.3.2: Growth of real GDP per worker

G7 comparison plus EU and OECD averages, 1973-2002
Average annual per cent change



data

1.4 Employment rate

UK now has highest employment rate in the G7

Why is it significant?

The proportion of the population in work indicates the ability of the economy to generate job opportunities for those who want them, and a higher level of income and output for the economy as a whole. Employment is a key determinant of prosperity, which depends on both the proportion of the workforce that is employed as well as the productivity of those workers. Employment also helps to reduce deprivation by fostering social inclusion.

How does the UK perform?

The UK labour market has continued to perform well in providing employment opportunities for the workforce. Employment has risen substantially since the first edition of the *Indicators*. As a result, the UK now has the highest

employment rate in the G7, moving ahead of the US in 2002.⁶ Chart 1.4.1 shows that the UK's male and female employment rates are above the OECD average. • **chart 1.4.1**

The UK's male employment rate is the second highest in the G7, behind only Japan, whilst the UK's female unemployment is second only to Canada and substantially exceeds Japan and other major European countries.

Over the most recent economic cycle (1990-2002), the UK had the third highest average employment rate, behind only Japan and the US. • **chart 1.4.2**

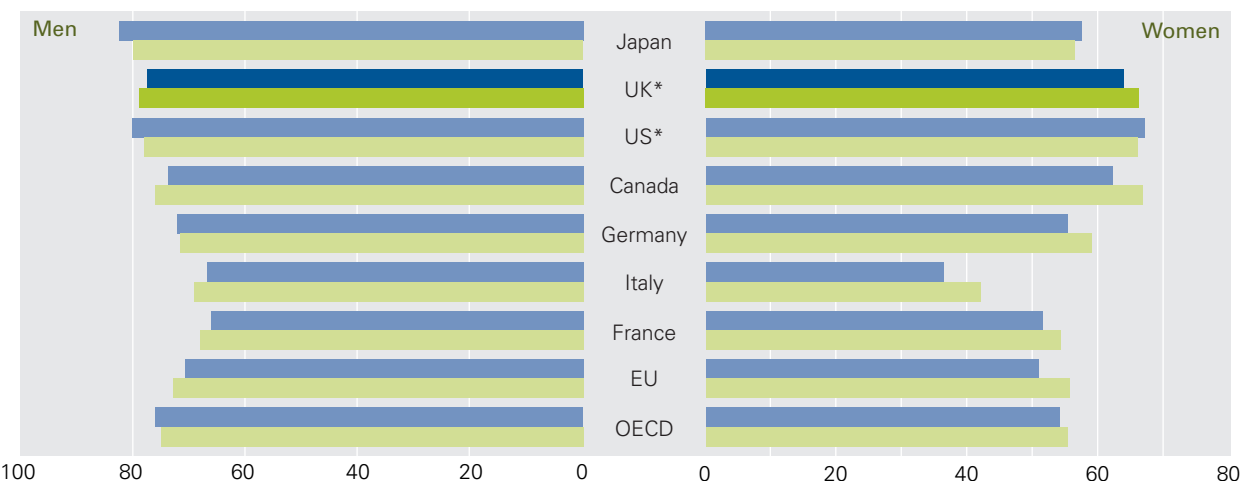
What does it mean for the UK?

UK employment over the last decade has grown strongly. The employment rate has risen by four and a half percentage points over the last 10 years. Over the same period, the number of people in work has increased by almost 2.7 million, which equates to an expansion of almost eleven per cent.

⁶ OECD *Employment Outlook: Towards More and Better Jobs* (2003).

Chart 1.4.1: Employment rates for men and women

G7 comparison plus EU and OECD averages, 1997-2002
Per cent of population aged 15-64



data

Chart 1.4.1:
Source: OECD
● 1997
● 2002
* persons aged 16-64

The UK's impressive performance can be attributed to the stability generated by the Government's macroeconomic framework and the benefits of a flexible labour market. Macroeconomic stability and labour market flexibility have combined to help the UK withstand any adverse effects from the recent world economic downturn. They have also helped to ensure that institutional changes such as the introduction of the minimum wage and the Working Time Directive have been smoothly absorbed by the labour market with no adverse effects on the economy.

The Government's 'Welfare to Work' strategy has also helped to underpin the economy's high employment rate. New Deals introduced for the long-term unemployed have helped to sustain a dynamic and flexible labour market by equipping these people with the skills and opportunities they need to compete successfully for the vacancies generated by the labour market. These improvements will be bolstered by the new cross-

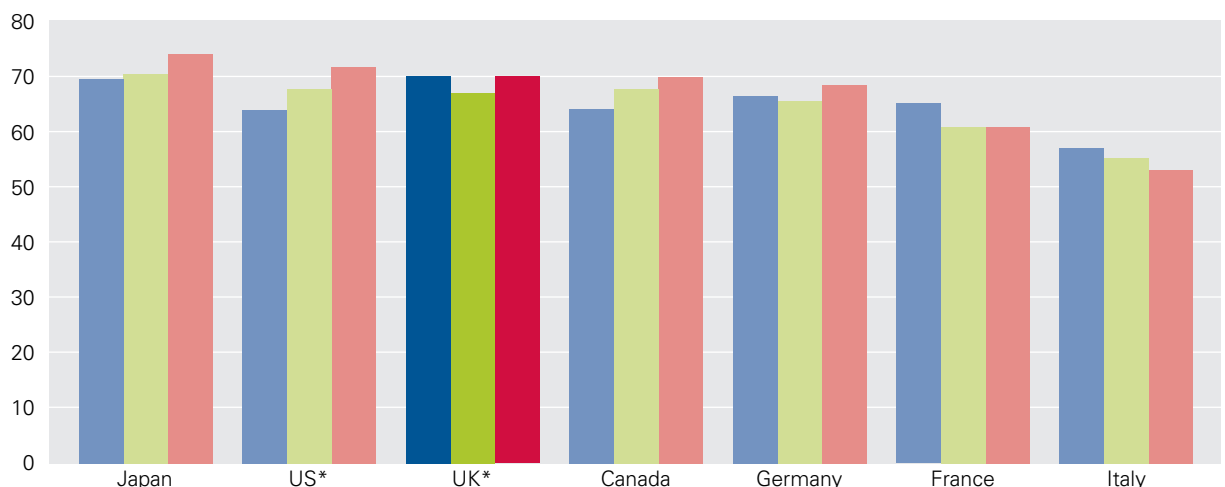
government *Skills Strategy*, which aims to help raise productivity and competitiveness by creating a more highly skilled, more productive workforce.

The Government is also moving to tackle social exclusion, in particular unfair discrimination, which prevents access to the labour market for some groups of workers. Its strategy of promoting equality and diversity covers six areas: gender, race, disability, sexual orientation, religion and age. The Government has recently introduced an equal pay questionnaire, and regulations to tackle discrimination in employment on the grounds of sexual orientation and religion or belief.

Chart 1.4.2:
Source: OECD
● 1974-1979
● 1980-1989
● 1990-2002
* persons aged
16-64

Chart 1.4.2: Average employment rates

G7 comparison, 1974-2002
Per cent of population aged 15-64



data

1.5 Quality of life

Barometer shows improvement but more to be done

Why is it significant?

The Government is committed to sustainable development that aims to ensure a better quality of life for everyone, now and in the future, by simultaneously meeting economic, social and environmental objectives.

Prosperity is a key element of quality of life. But perceptions of quality of life can also be an important determinant of economic performance as they influence the attractiveness for inward investment, location decisions by UK and overseas firms and their ability to retain key knowledge workers.

Actions by individuals to improve the quality of life can also complement economic progress; for example, more sophisticated consumer purchasing decisions can help stimulate markets to deliver more innovative, environmentally and socially acceptable products and services.

How does the UK perform?

The Government has established a set of 15 headline sustainable development indicators, which taken together, make up a 'quality of life barometer'.⁷ These are supplemented by a further 132 core indicators of sustainable development.

The headline indicators in the most recent edition of the barometer, published in June 2003, are reported in column two of table 1.5 on the following page. The third column shows how each of the indicators has changed between 1990 and the latest year for which data are available. Progress has been made on a number of indicators.

For instance, there are fewer households living in non-decent housing, progress has been made on tackling poverty and social exclusion, and river water quality has improved. • **table 1.5**

However, the headline indicators do not paint a universally positive picture. Indicators such as 'expected years of healthy life', have remained broadly unchanged since 1990, and indicators relating to, for example, road traffic and waste, show deterioration in performance.

What does this mean for the UK?

The challenge is to introduce measures that achieve sustainability and quality of life objectives at least cost. In many cases, business can make savings from acting more sustainably. By making improvements in energy efficiency and reducing waste, business can cut costs and improve their competitiveness, as well as benefiting the environment and people's quality of life. Many of the most successful businesses are making sustainable development and corporate social responsibility central to their business strategy, and some have identified clear gains to competitiveness from doing so; for example, by enhancing brand value and reputation.

⁷ DEFRA, *Quality of Life Barometer update (2003)*.

Table 1.5: The Headline Sustainable Development Indicators

Themes, issues and objectives	Key indicators	Since 1990	Since Strategy ⁸ (1999)
Social Progress which Recognises the Needs of Everyone			
Tackle poverty and social exclusion	<ul style="list-style-type: none"> Percentage of elderly in fuel poverty People of working age without qualifications People of working age in workless households Children living in families with persistently low incomes 	●	●
Equip people with the skills to fulfil their potential	<ul style="list-style-type: none"> Qualifications at age 19 	●	●
Improve the health of the population	<ul style="list-style-type: none"> Expected years of healthy life 	●	●
Improve the condition of the housing stock	<ul style="list-style-type: none"> Percentage of households living in non-decent housing 	●	●
Reduce crime and fear of crime	<ul style="list-style-type: none"> Robbery Vehicle theft; burglary 	● ●	● ●
Effective Protection of the Environment			
Reduce our emissions of greenhouse gases	<ul style="list-style-type: none"> Emissions of greenhouse gases 	●	●
Reduce air pollution	<ul style="list-style-type: none"> Days when air pollution is moderate or high 	●	●
Reduce the need to travel and improve choice in transport	<ul style="list-style-type: none"> Total traffic volumes Traffic per GDP 	● ●	● ●
Improve river water quality	<ul style="list-style-type: none"> River water quality 	●	●
Reverse the long-term decline in populations of farmland and woodland birds	<ul style="list-style-type: none"> Populations of farmland birds Populations of woodland birds 	● ●	● ●
Re-use previously developed land	<ul style="list-style-type: none"> Per cent of new homes built on previously developed land 	●	●
Prudent Use of Natural Resources			
Move away from the disposal of waste towards waste minimisation, re-use, recycling and recovery	<ul style="list-style-type: none"> Household waste All arisings and management 	● N/A	● N/A

⁸ The UK Sustainable Development Strategy *A better quality of life* was established in 1999. Progress in the indicators is assessed on two bases: the latest data compared with the position in 1990; and the latest data compared with the baseline position of the data available at the time of the Strategy – in most cases the baseline related to one or two years prior to the Strategy.

Table 1.5:

● Significant change in direction of meeting objective
 ● No significant change
 ● Significant change in direction away from meeting objective
 N/A Insufficient or no comparable data

Note: This table excludes those headline indicators already covered elsewhere in this document.

1.6 Specialisation in knowledge based industries

Impressive performance in knowledge based output and exports

Why is it significant?

The UK's future success depends on its performance in the knowledge economy. Professor Michael Porter notes that, in making the 'transition to the next stage' of competitiveness, businesses must compete on 'unique value and innovation' rather than on costs alone.⁹ This involves re-orientating the UK economy towards high value-added, or more productive, activities.

Knowledge based activities are often characterised by rapid growth in demand and by externalities in the production process. The OECD defines a number as 'knowledge based' and uses them to proxy the importance of high quality outputs across countries. These 'knowledge based industries' comprise knowledge intensive services and high tech and medium-high tech manufacturing.

Whilst there are problems with such broad groupings – namely that they inevitably include some activities and firms that would not generally be described as knowledge based, and ignore the role of knowledge in other sectors – the degree of specialisation in knowledge based output and exports nevertheless provides an indication of the UK's performance in the knowledge economy.

How does the UK perform?

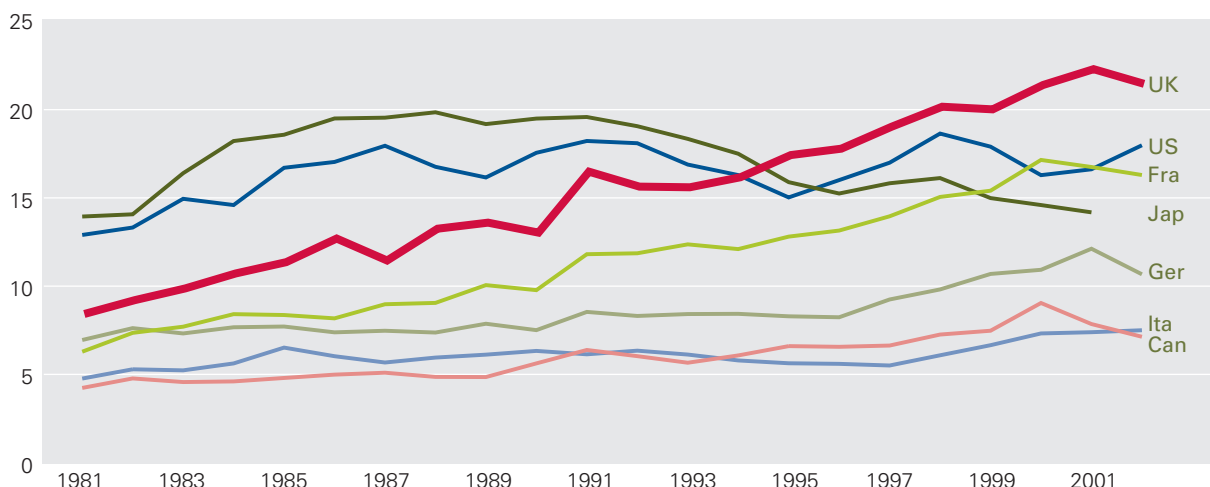
The UK's share of exports in knowledge based goods declined in 2001 and 2002, after almost 20 years of increasing importance. Even so, the UK's share of exports in knowledge intensive industries, at over 20 per cent, is the highest amongst the G7 countries. • **chart 1.6.1**

The recent decline was also experienced by four other G7 countries and was partly due to retrenchment in the ICT sector, the final stages of the 'Year 2000 effect', and global economic uncertainty.

⁹ Porter, M.E., and Ketels, C.H.M., 'UK Competitiveness: Moving to the Next Stage', DTI Economics Paper No. 3 (2003)

Chart 1.6.1: Exports of high and medium-high technology goods

G7 comparison, 1981-2002
Per cent of total goods exports



data

Chart 1.6.1:
Source: UN

- UK
- US
- France
- Japan
- Germany
- Italy
- Canada

Exports of knowledge based services, on the other hand, have remained strong. In 2001 these accounted for over 60 per cent of UK service sector exports in the services sector; a higher share than for any of our G7 competitors. • **chart 1.6.2**

Turning to output, the UK's share of output in knowledge based services and industries is second only to Germany, and ahead of the US, although all countries have shares within 10 percentage points of each other.

• **chart 1.6.3**

What does this mean for the UK?

The UK has a higher share of knowledge based exports than any other G7 country and produces a share of knowledge based output that is second only to Germany. These are encouraging signs. However, the size of the productivity gap with our competitors suggests that more needs to be done. The Government has instituted a range of policies, outlined in the succeeding chapters, to help business compete on quality, know-how and innovation.

Chart 1.6.2:

Source: IMF

- UK
- Japan
- Germany
- Canada
- US
- Italy
- France

Chart 1.6.2: Exports of knowledge based services

G7 comparison, 1991-2001

Per cent of total services exports

data

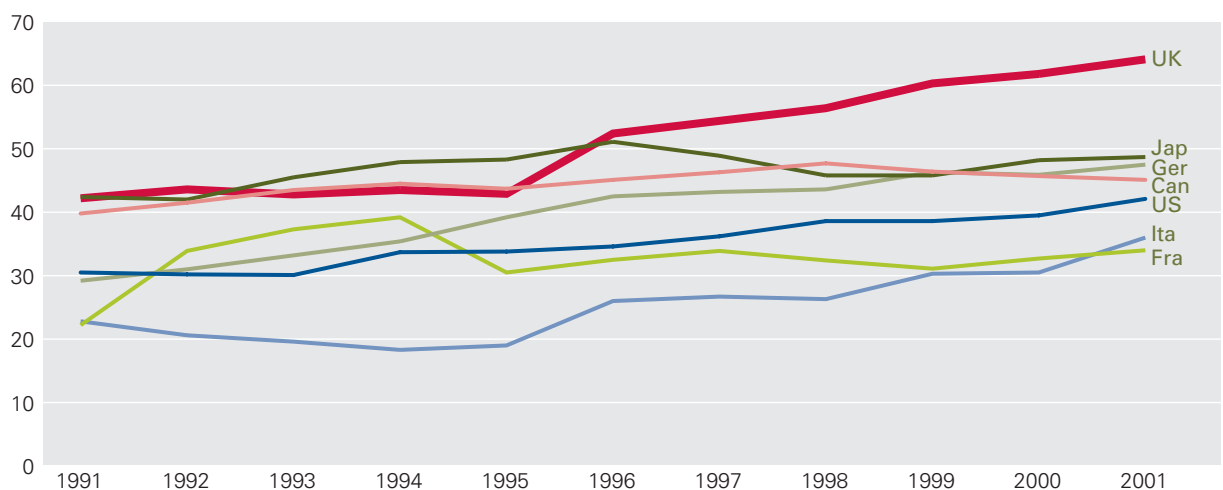
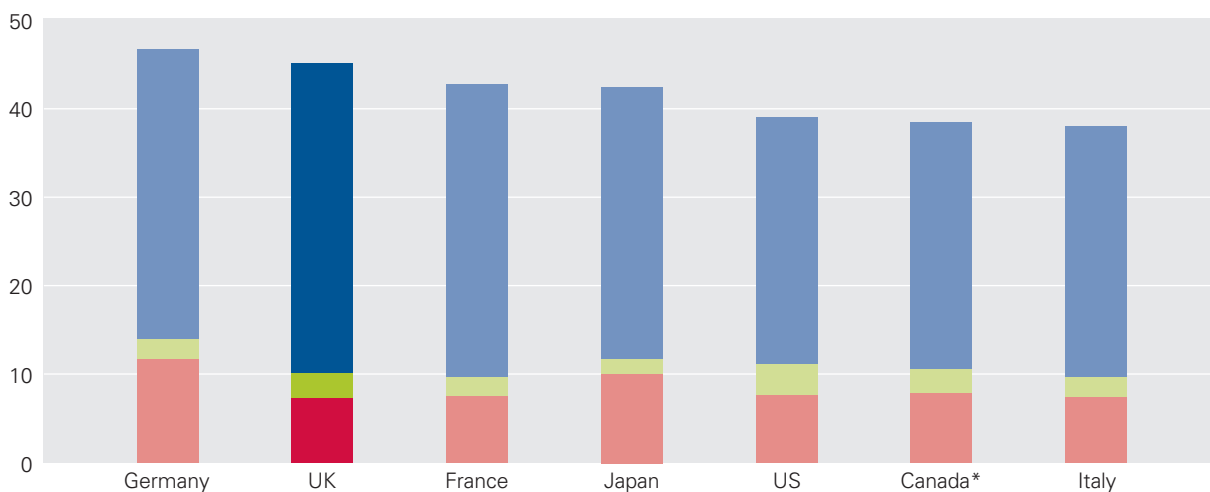


Chart 1.6.3: Value added by knowledge based services and industries

G7 comparison, 2000
Per cent of total value added

data

Chart 1.6.3:
Source: OECD



- Finance, insurance, other business services, community, social and personal services
- Communication services
- High and medium - high tech manufacturing

* 1999 data

INVESTMENT

Investment in physical plant, machinery and buildings helps make workers more productive and is a way of embodying new technology in the production process. The overall investment climate depends on a number of factors, such as the availability of finance, macroeconomic stability and the existence of sufficiently skilled workers to utilise the equipment effectively. In recent years, information and communication technology (ICT) has emerged as an increasingly important type of investment, which embodies improved technology and facilitates organisational or process change.

This section covers:

- **Physical capital investment** – investment in new physical assets helps ensure that business has the latest available technology, and helps spread technological innovations throughout the economy. Physical investment by Government ensures that the public infrastructure meets the needs of a modern advanced economy.
- **ICT investment** – connecting to the digital market place allows firms to transform the way they do business, creating new markets and changing the dynamics of the old.

Summary of the Investment Indicators

The traffic light summarises the historical performance of each of the individual indicators compared with the other G7 countries, with each indicator assigned to a band on the basis of the assessment set out in this chapter.

2.3 ● Connecting to the digital market place

2.4 ● E-commerce

2.1 ● Business investment

2.2 ● Government investment

- The green light shows those areas where the UK has signs of strength.
- UK performance is regarded as only average in those indicators with an amber light.
- Indicators with a red light show clear signs of weakness. Within each of these bands, indicators are listed in order of appearance in this chapter.

Progress since the first edition

The level of business investment still remains below that of our major competitors despite an increase over the most recent cycle. Recently, Government investment has been set on a rising trend. In particular, there has been a significant capital injection into the transport infrastructure. There are signs of progress in the implementation of ICT investments.

2.1 Business investment

UK business invests less than its competitors, but investment climate is improving

Why is it significant?

Investment is one of the most important determinants of long run economic growth. New plant and machinery helps workers produce more output, and is an important means of embedding new technology in the production process. But investment is not a panacea. In the past, governments around the world have tended to see investment as an end in itself. This led to over-investment, and the mis-allocation of savings into unprofitable projects. Investment can only add to prosperity if it earns sufficient returns to cover its costs.

Investment performance can also be a function of the wider economic climate. Investment can be influenced by the macroeconomic environment as well as by structural factors such as the degree of competition or the availability of workers with the skills to operate new machinery.

How does the UK perform?

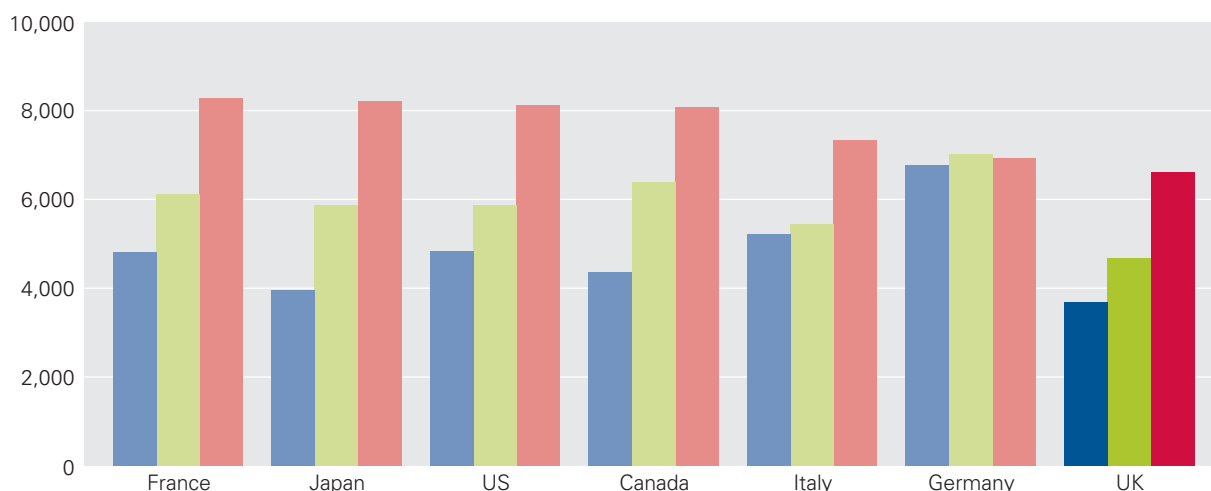
The UK continues to suffer from low levels of capital investment. Over the most recent cycle, business investment per worker remained lower than our major competitors. • **chart 2.1.1**

The persistence of under-investment over the past thirty years has created a significant deficit of capital available to each UK worker. This is common across manufacturing and services.

Chart 2.1.2 shows that the UK has failed to make much progress in closing this shortfall in business investment per worker over the last economic cycle. However, the chart does not include the latest revisions to UK business investment growth which have resulted in substantial upward revisions to growth over the last five years. Were the latest figures to be included, this would show that the UK has begun to close the gap, although under-investment relative to our major competitors would still remain. • **chart 2.1.2**

Chart 2.1.1: Business investment per worker

G7 comparison, 1974-2002
US dollars, at 1995 prices and purchasing power parities, averages



data

Chart 2.1.1:
Source: OECD

● 1974-1979
● 1980-1989
● 1990-2002

The latest data give tentative indications that the reforms of the macroeconomic environment are paying dividends for businesses looking to invest. In addition to the upturn in investment since 1998, the CBI has reported a lowering of company hurdle rates since 1997, which is an important determinant of a firm's investment decisions.¹⁰

What does this mean for the UK?

Low levels of investment continue to hold back UK productivity and prosperity. If the UK is to narrow the productivity gap, then investment performance has to improve. There is evidence that reforms of the macroeconomic framework, and of the business and regulatory environment, have made the investment climate more attractive. In terms of business and regulatory environment reforms the Government has:

- Reformed the corporate tax regime to give powerful incentives to invest;
- Improved institutional investment arrangements through the Higgs and Myners reviews; and

- Removed the regulatory barriers to investment in the planning system.

As well as direct measures to stimulate investment, policies to improve skills levels and to foster knowledge transfer should make it easier for firms to adopt complementary investment in plant and machinery.

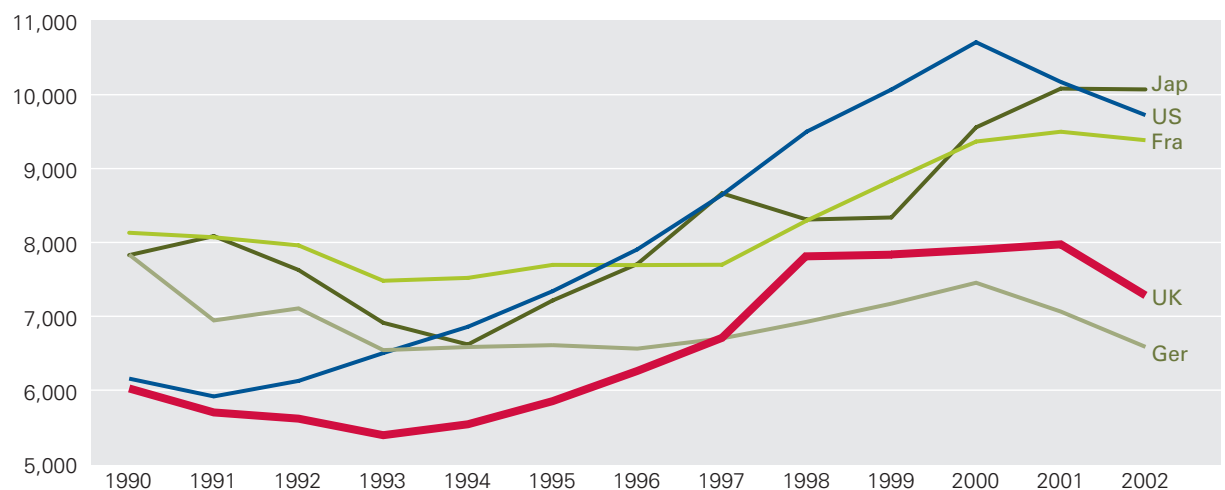
¹⁰ Godden, D., *Investment Appraisal in the UK: Has it changed since the mid 1990's?*, CBI (2001).

Chart 2.1.2:
Source: OECD

- Japan
- US
- France
- UK
- Germany

Chart 2.1.2: Business investment per worker – recent trends

G5 comparison, 1990-2002
US dollars at 1995 prices and purchasing power parities



data

2.2 Government investment

A recent improvement, especially in transport

Why is it significant?

The state – through central, local government and other public bodies – is responsible for crucial elements of the UK capital stock. Of particular importance for productivity is the provision of infrastructure. Good infrastructure, such as effective roads, railways and airports, can improve productivity by lowering transport costs, which permits greater specialisation and economies of scale. It also allows workers to travel more easily, facilitating easier access to a range of employment opportunities.

The public sector is also responsible for health, education and some housing provision. These services have direct impacts on the quality of life of UK citizens, which has indirect effects on productivity and the attractiveness of the UK as a location to live, work and invest.

How does the UK perform?

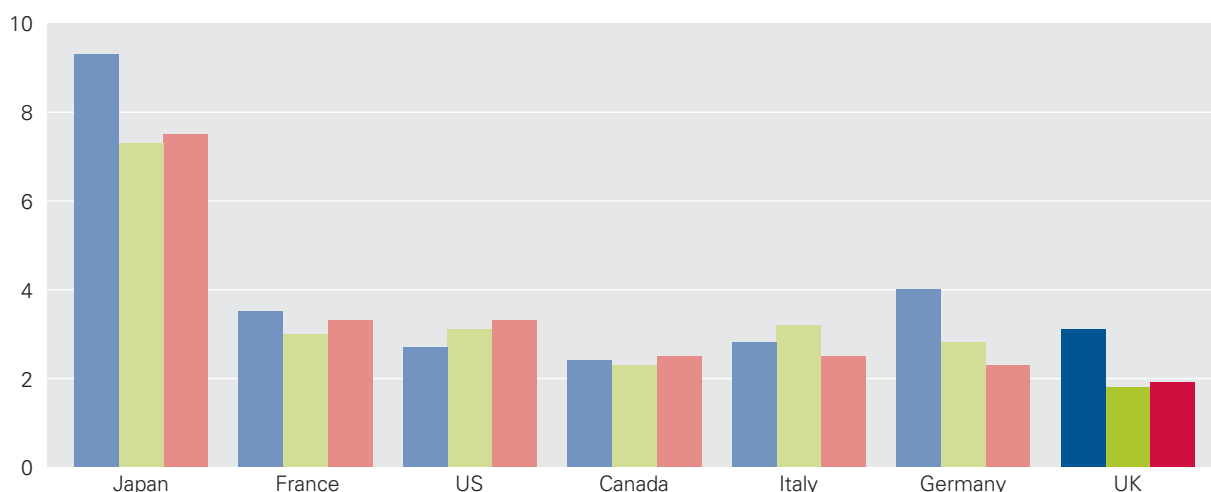
International comparisons of Government investment need to be interpreted with care; different countries will, for historic reasons, have public sectors of differing scale and scope. Financing arrangements such as public-private partnerships will also affect the classification of investment between public and private sectors; public-private partnerships are an important component of publicly supported investment in service delivery in the UK.

For much of the 1980s and 1990s the UK public sector has consistently invested less than our major competitors. • **chart 2.2.1**

This was partly due to the fiscal context; during downturns, governments found it easier to cut the capital budgets rather than current expenditure. It also reflected a conscious decision by previous governments to withdraw from certain activities previously delivered by the public sector. This led to the running down of the UK public sector capital stock and

Chart 2.2.1: Government expenditure on investment

G7 Comparison, 1974-2002
Average annual per cent of GDP, 1995 prices



data

Chart 2.2.1:
Source: OECD
● 1974-1979
● 1980-1989
● 1990-2002

has resulted in a relatively low level of capital per public sector worker. This was especially the case in transport. The combination of low levels of investment, in both the public and private sector, coupled with rising incomes, and therefore increased demand for transport services, contributed to the growth in road congestion and unreliable networks.

However, in successive Spending Reviews the Government has set out expenditure plans that will address the historic under-investment in key public services and deliver a step change in public sector investment. On the Government's preferred measure, Public Sector Net Investment (PSNI), public investment will increase from 0.6 per cent of GDP in 1997/98 to over two per cent of GDP by 2005/06. This year, 2003/04, planned increases in capital expenditure mean that PSNI will be higher in real terms than in any year back to and including 1979-80. In addition, the Government supports investment by the private sector in the delivery of public services through the Private Finance

Initiative (PFI); in 2003/04 investment through PFI is estimated at around £4.6 billion.

These increases have delivered and will continue to deliver substantial improvements in the key priority areas of health, education, transport and housing. In particular, transport investment has shown a steep increase since 1998/99 and the Government is committed to providing sustained levels of increased investment in transport throughout the current decade.

• chart 2.2.2

What does this mean for the UK?

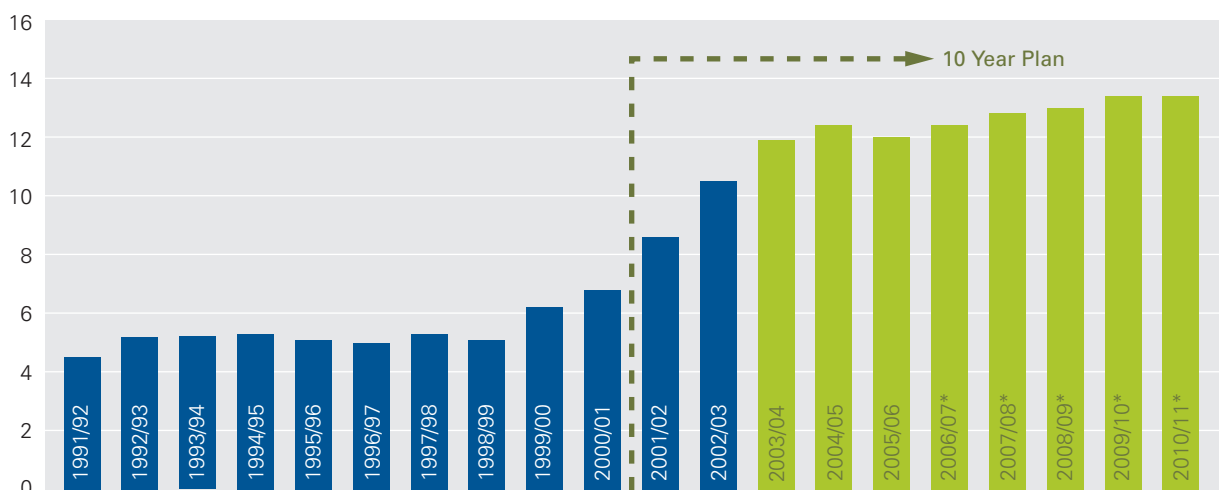
The Government has put in place a series of reforms to foster increased public sector investment. Macroeconomic reform has brought stability to the public finances, and the 'golden rule' provides a sound framework for the Government's investment choices. In addition the Government has taken steps to improve the delivery of investment programmes, including changes to the budgeting framework and reforms to departmental systems and procedures. These improvements have permitted

Chart 2.2.2:
Source: DfT
● Historic
● Latest Plan
* Figures for these years are provisional and subject to review
** Excludes spending by devolved administrations

Chart 2.2.2: Public and private transport investment**

UK, 1991-2011
£bn, cash prices

data



higher levels of Government investment and substantial increases in investment in key services.

The Government is committed to modernising public services and ensuring that they have the asset base necessary to deliver substantial improvements in public service delivery. In the health sector, capital spending is planned to increase on average by over 15 per cent each year in real terms between 1997 and 2006. This has already delivered substantial improvements and will continue to do so, including over 50 major hospital programmes becoming operational by 2008.

An efficient transport system is essential for the effective functioning of the economy. Congestion and unreliability impose costs on individuals and business and inhibit the free movement of resources around the economy. It is therefore essential that the UK has a robust framework in place to ensure the efficient provision of key infrastructure.

The Government's 10 Year Plan for Transport aims to improve the quality of transport infrastructure and services. Published in July 2000, the Plan sets out a long-term spending strategy including over £120 billion of public and private investment, an increase of almost 75 per cent in real terms on the previous decade. A good deal of progress has already been made, but new and improved infrastructure inevitably takes time to deliver, and the growth in demand continues to put pressure on existing capacity. Ways of using the existing transport infrastructure more efficiently, such as active traffic management on roads and better use of the capacity on the railways, are also being developed.

2.3 Connecting to the digital market place

Large firms are well connected, but scope for improvement in small firms

Why is it significant?

Digital technologies are a key enabler of a modern knowledge driven economy. If UK businesses lag behind their competitors in adopting digital technology, they will be less able to take advantage of the opportunities provided by e-commerce and networking. In order to engage in any form of e-commerce, a business must first have a basic level of 'connectivity'. This is defined as having a website, making frequent use of external email or using Electronic Data Interchange (EDI).¹¹ Businesses also benefit if their customer base is well connected.

Once businesses and consumers are connected, they have the potential to engage in a range of e-commerce activities: online trading – both business-to-business (B2B) and business-to-consumer (B2C), providing and using websites and a range of other electronic business processes.

¹¹ The exact indicator is: having a website and/or with 25 per cent or more of employees making daily use of external e-mail and/or using Electronic Data Interchange (EDI).

¹² This percentage is of the number of firms weighted by number of employees.

How does the UK perform?

Overall the UK is well connected: in 2003, 85 per cent of firms achieved the basic level of connectivity.¹² Within the G7, only Japan and the US are doing better, with 90 per cent and 88 per cent respectively.

• chart 2.3

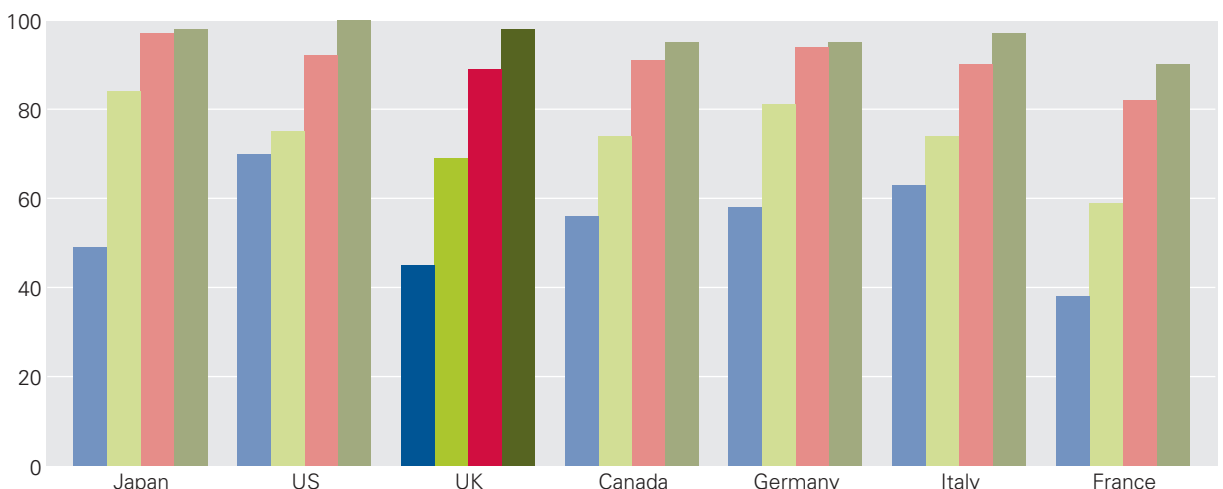
Levels of connectivity have stabilised in the last few years in most G7 countries. Outside the G7, Australia is catching up fast, while Ireland, Sweden and South Korea are already ahead of the UK in terms of overall connectivity.

The overall connectivity figure for the UK is driven mainly by the performance of large firms, 98 per cent of which are connected. Only the US has a higher proportion (100 per cent) for large firms, and most G7 countries have similar high values of around 95 per cent. However, micro and small sized firms in the UK have lost ground. From 2001 to 2003, the proportion of these firms meeting the connectivity measure has fallen from 62 per cent to 45 per cent for micro firms, and from 77 per cent to 69 per cent for

Chart 2.3:
Source:
Business in the Information Age:
International Benchmarking Study, 2003.
● Micro (0-9 employees)
● Small (10-49 employees)
● Medium (50-249 employees)
● Large (250+ employees)

Chart 2.3: Connectivity by business size

G7 comparison, 2003
Per cent of businesses (weighted by number of employees)



data

small firms, slipping the UK to sixth in the G7 rankings in each case. There are several possible explanations for this. It may, for example, reflect retrenchment following the bursting of the 'dot.com' bubble.

What does this mean for the UK?

Although the UK's overall connectivity is good, there is clearly room for improvement among the UK's smaller firms. Connectivity levels need to rise for the UK to fully exploit the commercial potential of information and communication technologies (ICTs), and compete successfully with the rest of the G7.

The Government recognises the importance of a strong and healthy broadband market and has encouraged competition as the best way of ensuring a high level of product choice and of keeping prices down.

The Government has worked closely with industry, for example through the Broadband Stakeholder Group. Eighty per cent of homes have the potential to access Broadband.

Attention is now turning to aggregating public sector demand for broadband, and working to extend access to areas that the market alone is unlikely to serve, particularly those in rural communities.

2.4 E-commerce adoption

Progress needed to fully exploit commercial potential

Why is it significant?

The development of information and communication technologies (ICTs) has propelled the development of the Internet and with it e-commerce. These give businesses the opportunity to make improvements to their internal processes, shorten their supply chains and reduce the cost of processing transactions. There is potential to lower search costs by increasing access to, and lowering the cost of, information for both business and consumers. E-commerce adoption can also reduce the cost of market entry.

The interaction of these effects have the potential to enhance and change the nature of competition in a market, opening up new opportunities and possibly exerting pressure on the margins of existing players. This may contribute to increases in productivity. Recent analysis by the Office for National Statistics shows that businesses using e-commerce for purchasing have a significant productivity advantage over those who do not.¹³

How does the UK perform?

Over the last three years the proportion of UK companies ordering from suppliers on-line has increased from 45 to 54 per cent. In the G7 this places the UK behind the US, Germany and Canada, but ahead of Japan, Italy and France. Similarly the proportion of UK companies that allow their customers to order on-line has increased from 27 per cent in 2000 to 32 per cent in 2003, behind Japan, Germany, Canada and the US.

The proportion of UK companies making payments to suppliers on-line has fallen from 28 per cent in 2000 to 25 per cent in 2003, behind Germany, the US and Canada among the G7 countries. However, the proportion of UK companies allowing their customers to make payments on-line has increased from 13 per cent in 2000 to 17 per cent in 2003, level with the US and behind only Canada of the G7 countries.

• chart 2.4

Some countries outside the G7, such as Sweden, Ireland and Australia, score higher than the UK on each of these measures of e-commerce adoption.

What does this mean for the UK?

The UK ranks around the middle of the G7 countries on most of these measures of e-commerce adoption, but also behind other countries outside the G7. As with connectivity, there is certainly room for improvement. Progress will be needed to fully exploit the commercial potential of ICTs.

The Government will continue raising awareness that investing in ICTs, as part of a strategy that looks at all aspects of a business including people and process as well as technology, will enable businesses to gain sustained benefits and keep pace with local and international competitors. The benefits of ICTs are not only about increasing sales through the Internet, but also improving productivity and managing costs through electronically linking business processes, and facilitating better communications across the workforce.

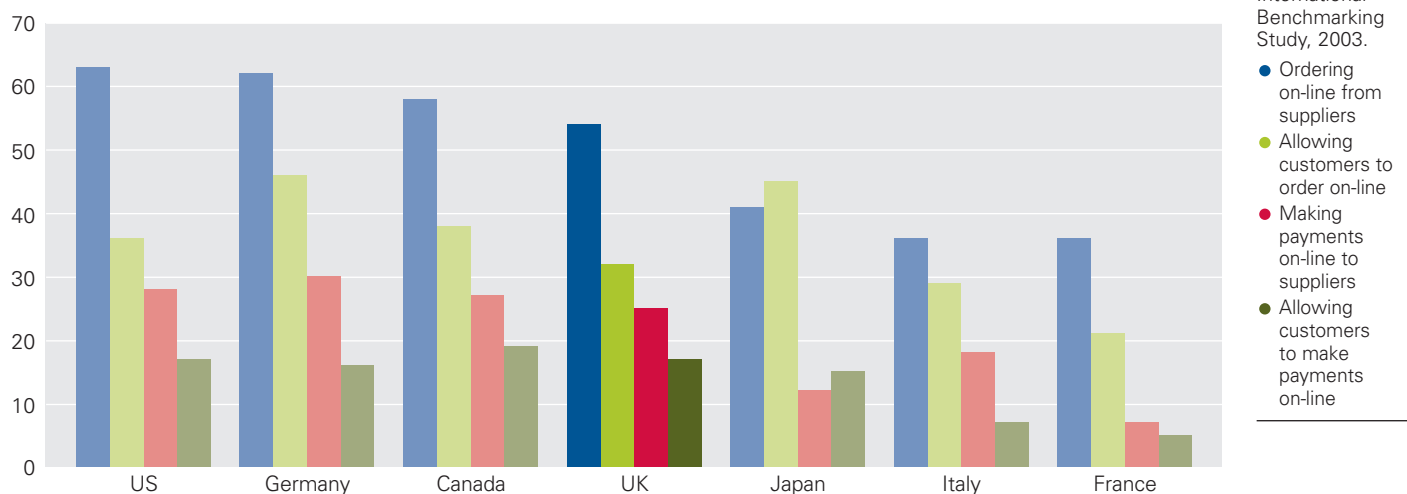
¹³ Clayton, T., Criscuolo, C., Goodridge, P., Waldron, K., 'Enterprise e-commerce measurement and impact' Paper for CAED conference (2003).

The Government is committed to working in partnership with industry to ensure that all sections of the business community realise these benefits. A UK-wide network of e-Business Clubs offers a local environment for businesses to learn from e-business experts and an opportunity to network with other businesses to share experiences and solutions. The clubs are managed by the British Chamber of Commerce, with support from DTI and private sector sponsors.

The National e-Commerce Awards recognise and reward UK businesses and organisations who have realised tangible business benefits or demonstrated innovation through using ICTs to transform the way they do business. The awards have been run annually since 1999 by the DTI and InterForum, a not-for-profit organisation that works to ensure that education, legislation and technology are in place to help UK businesses trade electronically. With almost 3,000 entries for the 2003 Awards, this initiative is now going from strength to strength, highlighting a more mature use of ICTs among SMEs.

Chart 2.4: Adoption of e-commerce by businesses

G7 comparison, 2003
Per cent of businesses (weighted by number of employees)



data

Chart 2.4:
Source:
Business in
the Information
Age:
International
Benchmarking
Study, 2003.

- Ordering on-line from suppliers
- Allowing customers to order on-line
- Making payments on-line to suppliers
- Allowing customers to make payments on-line

INNOVATION

Innovation is one of the main engines of long-run economic growth and structural change. The decisive impact of technology on industrial performance and international competitiveness means that continual improvements in the innovation process are essential for gains in productivity, the creation of jobs, economic growth and higher standards of living. The Innovation Review evidence paper, published alongside this paper, highlights a number of factors that help to explain the UK's innovation performance.¹⁴

- **Customers and suppliers** – create the demand for innovative products and services.
- **Regulatory environment** – can create opportunities and incentives for innovation.
- **Competition and entrepreneurship** – competitive pressures spur firms to innovate, while entrepreneurial behaviour is needed to spot opportunities and turn them into profit.
- **Access to finance** – companies need money to invest in innovation.
- **Sources of new technological knowledge** – companies draw on scientific and business knowledge from a range of sources, including academia and research institutions, competitors, suppliers and employees.
- **Networks and collaboration** – firms rely on a variety of types of collaboration and relationships with many partners.
- **Capacity to absorb and exploit new knowledge** – firms have to build the capability to make the most of external sources of knowledge.

¹⁴ DTI, 'Competing in the Global Economy: the Innovation Challenge' *DTI Economics Paper* No. 7 (2003).

Summary of the Innovation Indicators

The traffic light summarises the historical performance of each of the individual indicators compared with the other G7 countries, with each indicator assigned to a band on the basis of the assessment set out in this chapter.

- 3.1** ● Publications and citations
- 3.4** ● UK's patenting performance
- 3.5** ● University knowledge transfer
- 3.6** ● Sources of information for innovation
- 3.2** ● Government spending on R&D
- 3.3** ● Business spend on R&D and innovation

- The green light shows those areas where the UK has signs of strength.
- UK performance is regarded as only average in those indicators with an amber light.
- Indicators with a red light show clear signs of weakness. Within each of these bands, indicators are listed in order of appearance in this chapter.

Progress since the first edition

The UK continues to represent global scientific excellence. Our science base attracts foreign investors, but domestic firms still under-perform in terms of innovation across a range of other indicators. UK firms are undertaking less R&D than their competitors and the gap between the UK and the G7 R&D leaders has widened. However, there are some positive signs. Patenting has increased and there is evidence of increasing knowledge transfer. For example, the science base is increasingly being consulted by innovative businesses.

3.1 Publications and citations of research in academic journals

UK has maintained its excellent research performance

Why is it significant?

A strong science base is essential in developed economies, both as a source of research and expertise, and as the training ground for the scientists and technologists of the future. The science base is therefore a key resource for supporting innovation, which is fundamental for creating prosperity and new jobs, as well as providing better health care and a cleaner environment.

The number of papers published provides an indication of the production of knowledge and the number of citations gives an indication of the quality of that knowledge, because better papers are more likely to be cited. However, the focus on publications ignores other outputs from science, such as contract research undertaken in confidence for business. It must also be remembered that the number of citations in the UK will

be biased upwards because English is widely read and understood.

How does the UK perform?

The UK has a world-class science base. As chart 3.1 shows, when papers published and citations are adjusted for a country's population, the UK leads the G7. • **chart 3.1**

In terms of the overall share of citations, the UK is second only to the US. Germany and Japan are, however, closing the gap with the UK. This generally reflects the position of each of the broad science disciplines, but there is some variation. For example, the UK's share of citations is behind the US and France for mathematics, and behind the US, Germany and Japan for both physical sciences and engineering.

What does this mean for the UK?

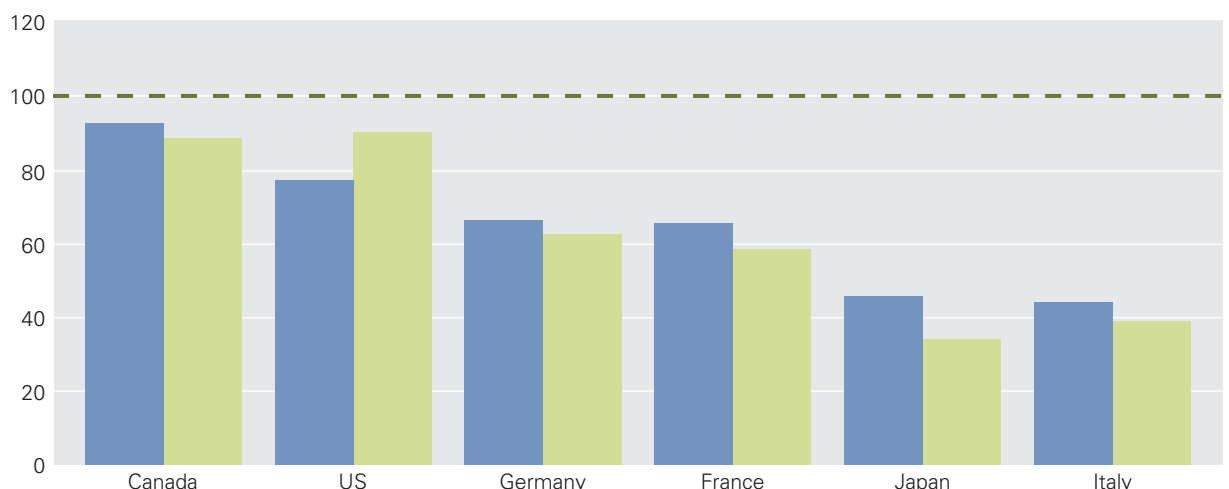
The UK has maintained its excellent research performance, which leaves it well placed to support the UK's wider innovation efforts. However, challenges lie ahead.

Chart 3.1:
Source:
Evidence Ltd,
Thomson ISI

● Papers
per head
● Citations
per head

Chart 3.1: Papers and citations per head of population

G7 comparison, 1997-2002
Index, UK=100



data

There remains a concern about how long the UK can maintain its present performance, particularly in terms of the quality of academic staff and the volume of highest quality research, as documented in the recent Cross-cutting Review of Science and Research.¹⁵

Recognising these concerns, the Government has set in train a number of initiatives. Firstly, in July 2002, as part of the 2002 Spending Review, the Government published *Investing in Innovation*, which announced a 10 per cent real average annual increase in the science budget between 2002/03 and 2005/06, building on the seven per cent real terms increase provided in the year 2000 Spending Review.¹⁶ It set aside funding for university physical capital and for Research Councils to contribute to the full economic cost of the projects they fund,¹⁷ as well as increased stipends and salaries for PhD students and postdoctoral researchers to encourage the next generation.

Further, the Government is consulting on reforms to the way it funds science and how universities manage their finances. Sir Gareth Roberts has reviewed how the Funding Councils use the Research Assessment Exercise to support research. He recommends that the assessors of each subject areas have greater freedom to determine the criteria for assessment, subject to stakeholder approval. This will include recognising multi – disciplinary and applied research, an area noted by the OECD as a challenge for those who fund public research.¹⁸

DfES recently published its White Paper on the Future of Higher Education, which seeks to modernise university funding by allowing universities to charge undergraduates, up to a capped level, for their tuition. Students can repay loans when they are able through the tax system. It will ensure that this does not deter potential applicants from lower income backgrounds by reintroducing grants, as well as ensuring that universities put in place access policies and funds.

¹⁵ HMT, DfES, DTI and OST, *Cross-cutting Review of Science and Research* (2000).

¹⁶ HMT, DfES, DTI and OST, *Investing in Innovation – a strategy for science, engineering and technology* (2002).

¹⁷ DTI and OST, *Science Budget 2003-04 to 2005-06* (2002).

¹⁸ OECD, *Benchmarking Industry Science Relationships* (2002).

3.2 Government spending on R&D

Government spending on R&D remains stable

Why is it significant?

The Government is a key investor in R&D and has a leading role in supporting the UK's science capability. The Government finances R&D carried out by universities, public sector research establishments, the NHS and business. Government support is important because the full value of research can rarely be captured by the private sector. It also ensures that Government delivers better public services through applied policy research.

A recent study by the OECD found a positive link between public R&D and productivity.¹⁹ Analysis also suggests that public R&D is a complement to, rather than substitute for, private sector R&D, implying that an increase in public R&D could raise business' R&D effort, rather than displace it.²⁰

¹⁹ Guellec and van Pottelsberghe de la Potterie, *R&D and Productivity Growth: Panel data analysis of 16 OECD countries* (2001).

²⁰ David, Hall and Toole, 'Is public R&D a complement or substitute for private R&D? A review of econometric evidence,' *Research Policy* (2000).

How does the UK perform?

The UK is in the bottom half of the G7 in terms of public R&D per worker. The UK's spending has increased between 1996 and 2001, in common with most of the rest of the G7. • **chart 3.2**

As noted in the first edition of the *Indicators*, Government R&D spending has been affected by cuts across the G7 in terms of military R&D.

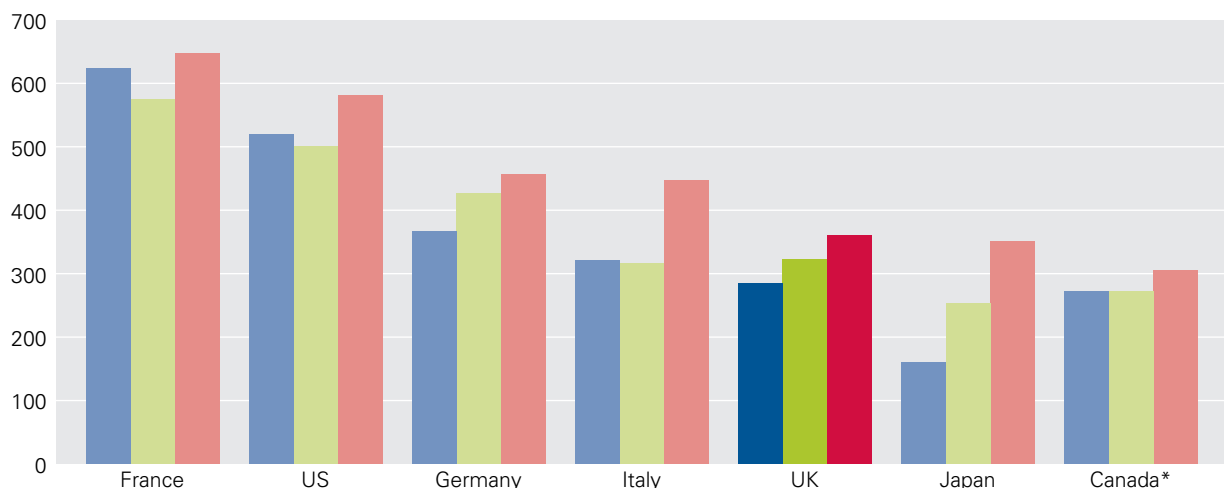
What does this mean for the UK?

Maintaining the general levels of Government spending on R&D is not necessarily a problem for the UK, since reallocation of funds and stricter requirements for support may ensure higher quality output. However, both Government and business funded R&D generate important positive externalities. As a result, lower expenditure on R&D is likely to undermine the long-term knowledge base available to both the science community and industry.

Chart 3.2:
Source: OECD
● 1991
● 1996
● 2001
* 2000 data used for Canada

Chart 3.2: Real government funded R&D per worker

G7 comparison, 1991-2001
US dollars, at 1995 prices and purchasing power parities



data

Building the science and engineering base has been – and continues to be – a priority for the present Government. In 2002 the Government announced further increases in the science budget, which amount to an average of 10 per cent a year in real terms. This means £2.9 billion by 2005/06 compared with £2.1 billion in 2002/03. This includes funding for strategic research priorities across Research Councils as well as funds for the Higher Education Funding Councils which by 2005-06 will distribute £1.154 billion.

Aside from funding higher education, Government Departments will also spend significant sums on science, engineering and technology (SET) between 2002-03 and 2004-05. Civil departments are expected to spend £5,777 million. The largest planned expenditure is by the Department of Health (£1,601 million), with the majority allocated to the NHS (£1,414 million). The Department of Trade and Industry (£1,072 million) has the next largest planned expenditure, which is expected to be directed primarily at Innovation and Energy. The Ministry of Defence plans to spend £7,390 million.²¹

²¹ All figures in this section are in real terms.

3.3 Business spend on R&D and innovation

UK business spends less on R&D than most G7 countries

Why is it significant?

Expenditure on R&D is one measure of the extent to which business is developing new technology and ideas. Business expenditure on R&D accounts for around two thirds of total R&D expenditure. Studies show that R&D intensity – the ratio of R&D expenditure to sales – is linked to subsequent sales growth, albeit with a time delay.²² Moreover, expenditure on R&D by industry has also been shown to generate important spillover benefits for other firms and society as a whole. Economic studies, including recent work by the Institute for Fiscal Studies (IFS), have estimated that the gap between private and social rates of return on R&D is substantial.²³

²² DTI and Company Reporting, *The 2003 R&D Scoreboard*, (2003).

²³ Griffith, R., *How Important is R&D for Economic Growth? How and Should the Government Promote it?* Institute for Fiscal Studies mimeo (2000).

However, business innovation is about more than R&D. The effective adaptation and application of technology to generate new and improved products and services entails complementary expenditures on plant and equipment, other forms of knowledge, a range of design functions and other ancillary business activities. Although the data cannot show the effectiveness of innovation spending, it can give an indication of the structure and approximate level of innovation spending by UK businesses.

How does the UK perform?

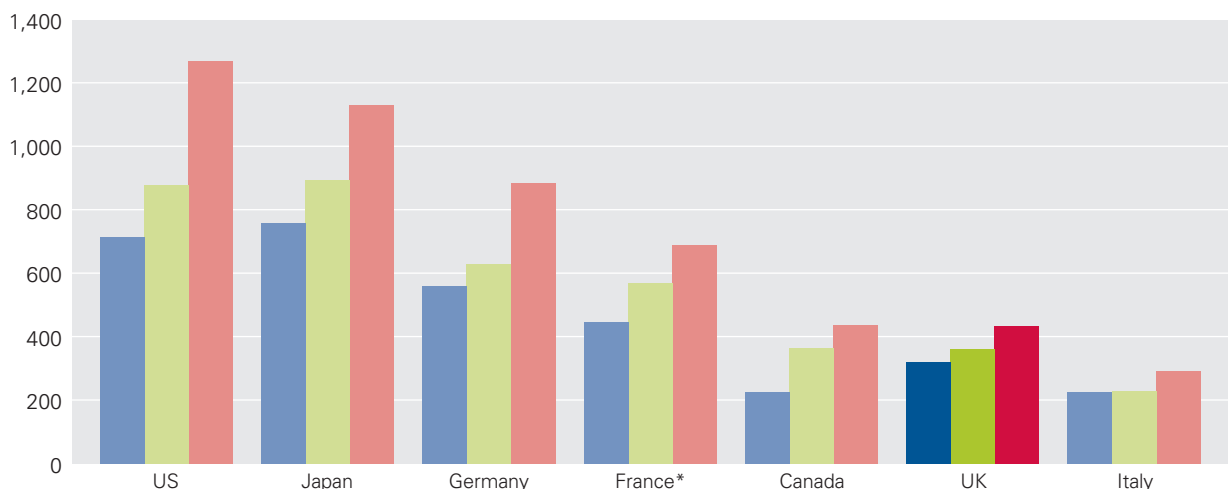
UK business does not provide itself with the same level of technology resources as other leading industrial nations, with lower real expenditure per worker on R&D than most of its major competitors, and since 1991, the gap between spend per worker in the UK and its major competitors has widened. • **chart 3.3.1**

Chart 3.3.1:
Source: OECD
● 1991
● 1996
● 2001

* Latest available data for France are for 2000

Chart 3.3.1: Industry-funded business enterprise R&D (BERD) expenditure per worker

G7 comparison, 1991-2001
US dollars, at current prices and purchasing power parities



data

This pattern is also reflected in trends in business enterprise R&D (BERD) as a share of GDP. Although this ratio has stabilised in the last few years after a period of decline in the first half of the 1990s, this has to be seen against the increasing trend in other major industrial economies, notably the US and Germany. • **chart 3.3.2**

Chart 3.3.3 looks more broadly at overall innovation expenditures in 1998-2000. R&D expenditures are the largest component, closely followed by capital expenditure for innovation, which suggests the continuing importance of technology embodied in plant and equipment.

• **chart 3.3.3**

The relatively low shares in 'market facing' expenditures, such as design, training and 'market preparation' may point to opportunities to enhance the exploitation of business investment in technology.

What does this mean for the UK?

That only around a half of enterprises are active in innovation suggests untapped potential in the UK economy to raise the level and range of its forward-looking investment. Chart 3.3.4, detailing gross expenditure on R&D (GERD),²⁴ shows that the overall commitment of national resources to the R&D necessary for knowledge creation and innovation is lower than for our major competitors.

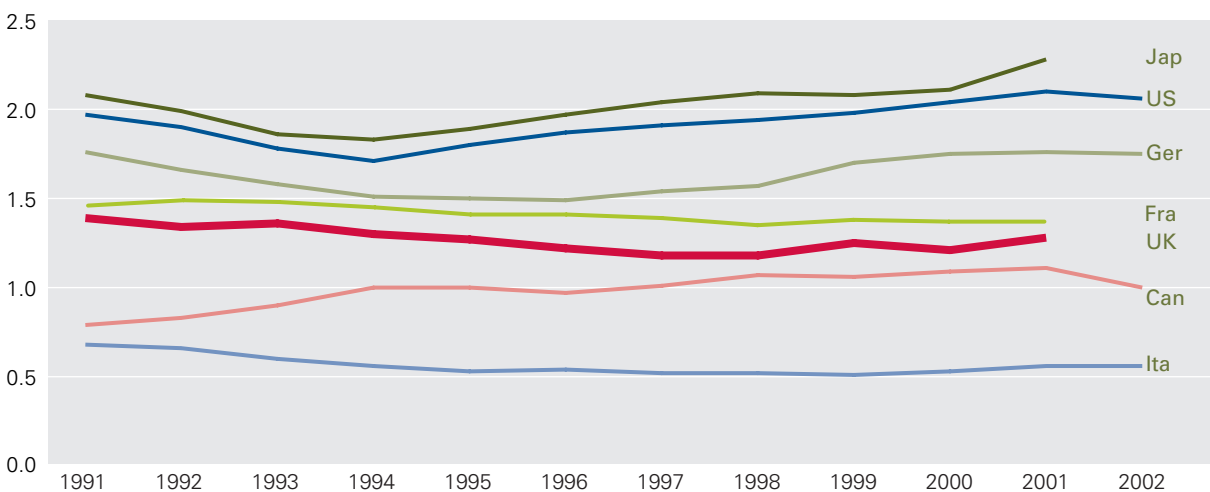
• **chart 3.3.4**

Firms invest in R&D in the hope of developing new technologies that they can turn into commercial success. Lower levels of investment in R&D could reduce the scope for longer term competitive advantage by reducing the option to develop and deploy technology.

²⁴ Gross expenditure on R&D is the sum total of business R&D, government R&D, higher education R&D and the small amount of R&D carried out in the not-for-profit sector.

Chart 3.3.2: Business Enterprise R&D (BERD) as a per cent of GDP

G7 comparison, 1991-2002
Per cent



data

Chart 3.3.2:
Source: OECD
● Japan
● US
● Germany
● France
● UK
● Canada
● Italy

Undertaking R&D is also an important way of developing the capability to understand new technologies developed outside the firm. If UK firms continuously fail to develop new product ranges then they run the risk of finding themselves competing in markets where profits are increasingly eroded by lower cost competition. For successful innovative firms, R&D is not just an input to innovation, but an intimate part of the whole innovation and production process.

To address under-investment in R&D, the Government has introduced a number of tax measures:

- A tax credit which increases the previous 100 per cent tax relief for current spending on R&D to 150 per cent for small and medium-sized enterprises was introduced in 2002; and
- A tax credit scheme for larger companies was announced in 2002.

In addition, the introduction by the Government's Small Business Service of the Small Business Research Initiative will give small firms access to public R&D procurement programmes worth up to £1bn, with a target of public procurement of at least £50m actually being spent on R&D undertaken by SMEs.

Chart 3.3.3:
Source: UK
Community
Innovation
Survey 2001

Chart 3.3.3: Innovation expenditure shares in the UK
1998-2000

data

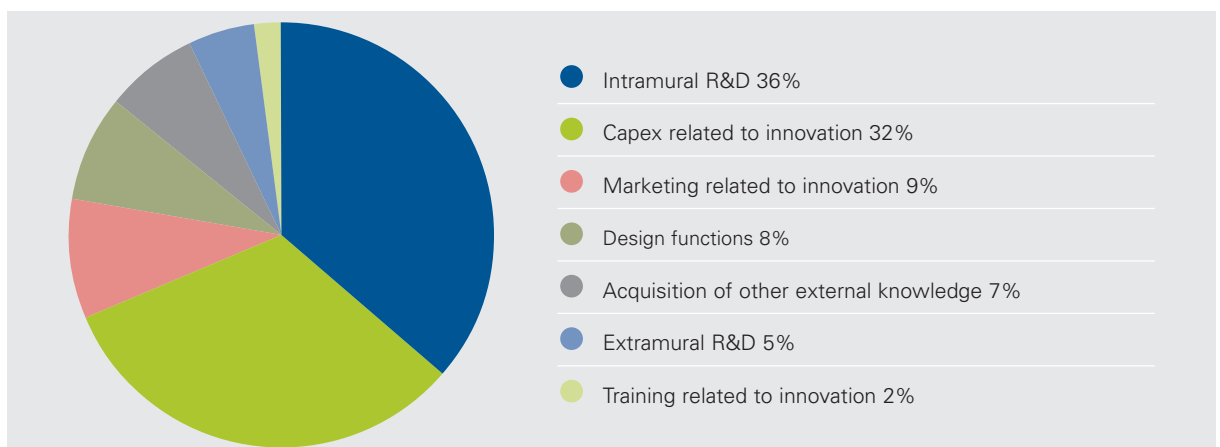
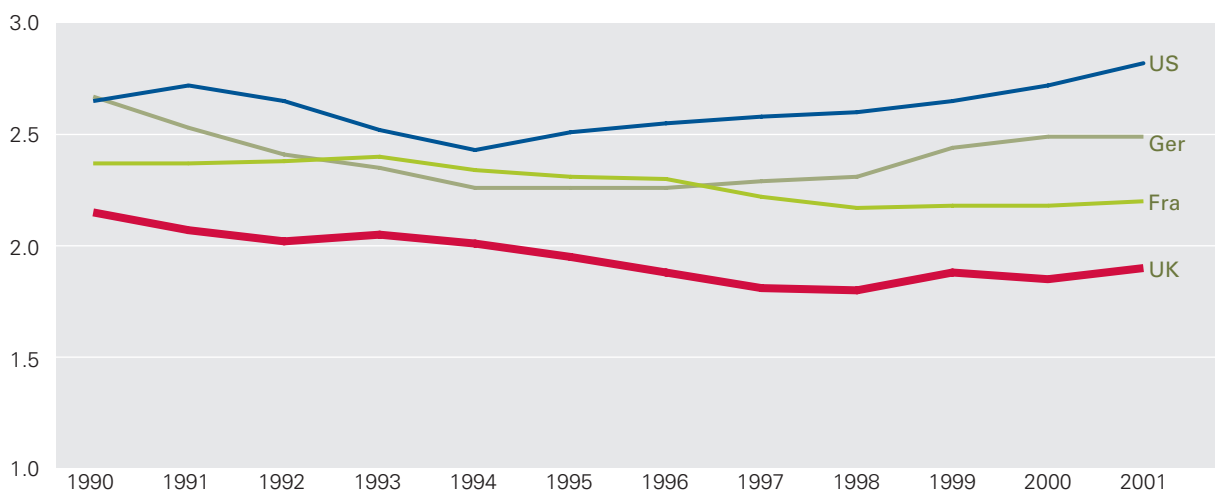


Chart 3.3.4: Gross domestic expenditure on R&D

G5* comparison, 1990-2001
Per cent of GDP

data

Chart 3.3.4:
Source: OECD
● US
● Germany
● France
● UK
* G5 excluding Japan



3.4 UK's patenting performance

Improved performance in recent years

Why is it significant?

The successful exploitation of knowledge and other intangible assets is increasingly recognised as essential for innovation in all sectors. Companies and individuals need to develop ways to appropriate the full benefit of these assets. This can include using formal intellectual property rights (IPR) such as copyright, trademarks, designs and patents, or informal methods, such as know-how, speed to market, confidentiality agreements, and secrecy. What method is chosen will depend on the characteristics of the product, the transferability of the knowledge it embodies, the cost, the level of awareness of IPR, the effectiveness of the legal framework and the ability of the business to exploit it.

Patents provide an indication of how successful the UK is at generating potentially commercially valuable knowledge. However, they do not tell the whole story. Patents are a measure of *invention* rather than *innovation*. Furthermore, patents are a better indicator for some industries rather than others as different industries have different propensities to patent. For instance, pharmaceutical companies are more likely to patent than those in financial services.

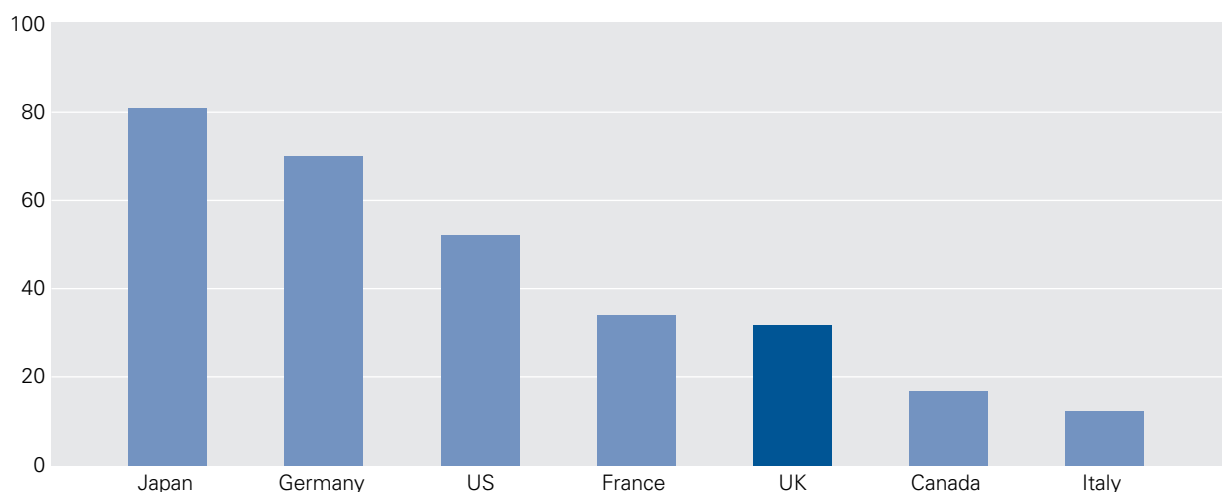
Differences between countries' patent performance can sometimes be explained by differences in industrial structure. Certain countries may have a greater concentration of industries that are more conducive to patenting. Patents are also of uneven value. Many cover inventions of low value that either never reach the market or fail when they do, others protect major technological and commercial successes. This reflects the fact that innovation involves a great deal of trial and error.

Chart 3.4.1:
Source: OECD
Main Science
and Technology
Indicators

Chart 3.4.1: Number of patents in 'triadic' patent families

G7 comparison, 1998
Per million of population

data



The OECD has developed 'patent families' to address some of these concerns. A patent family is defined as a set of patents taken in multiple countries to protect a single invention. The patent family indicators compiled by the OECD relate to patents applied for at the European Patent Office, the US Patent & Trademark Office (USPTO) and the Japanese Patent Office. These are often referred to as 'triadic' patents and are used as an indicator of those inventions where commercial value is likely to be highest.

How does the UK perform?

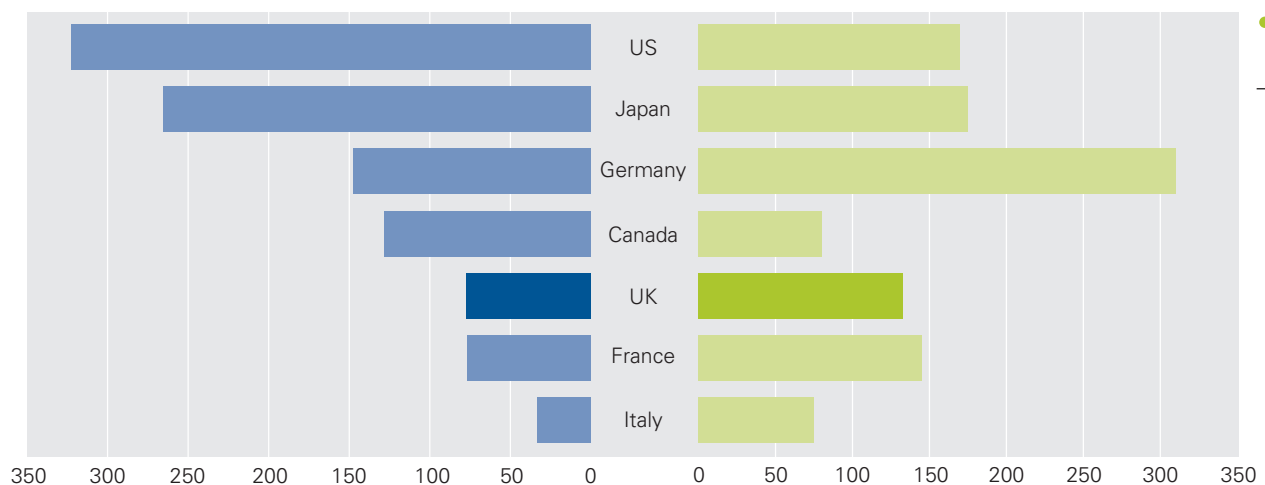
The UK ranks fifth in the G7 in terms of triadic patents per million of population. The level is similar to France, but Japan, Germany and the US have on average approximately twice as many triadic patents per million of population.

• **chart 3.4.1**

More recent data that shows patents granted and applied for again places the UK fifth, which is an improvement when compared to previous editions of the *Indicators*. • **charts 3.4.2 and 3.4.3**

Chart 3.4.2: Patents granted and applications

G7 comparison, 2001
Per million of population



data

Chart 3.4.2:
Source:
NewCronos
(Eurostat)

- US Patents granted, 2001
- EU Patent applications, 2001

What does this mean for the UK?

The figures suggest that, despite progress, the UK still has some way to go to catch up with Germany, Japan and the US.

The UK Patent Office has identified three areas where it can bolster UK patenting performance:

- Raising levels of awareness of IP;
- Reducing the difficulties and cost of using the IP system; and
- Reducing the difficulties and cost of enforcement.

To reduce the difficulty and cost of enforcement the Patent Office will review specific issues – such as the inventive step and the copyright term – within the policy and regulatory framework. It will also examine the opportunity to reduce the costs of legal advice through deregulation, and develop templates/ standard agreements to cover most common IP situations.²⁵

²⁵ The regulatory framework has been harmonised at an international level, e.g. copyright term is harmonised within the EU under Directive 93/83.

Chart 3.4.3:

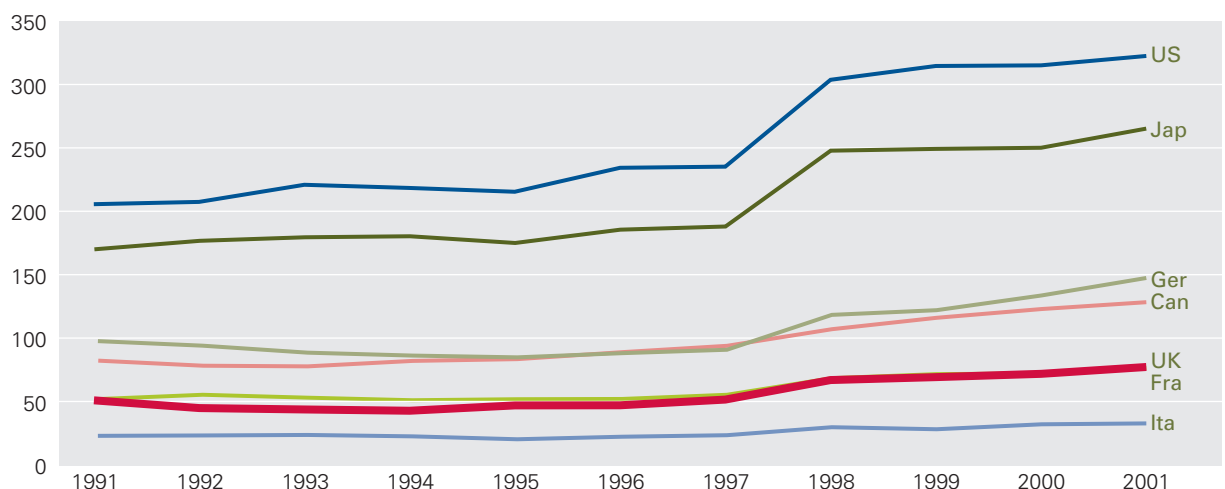
Source:
NewCronos
(Eurostat)

- US
- Japan
- Germany
- Canada
- UK
- France
- Italy

Chart 3.4.3: US patents granted

G7 comparison, 1991-2001
Per million of population

data



3.5 University knowledge transfer

Increased knowledge transfer, but scope to develop links further

Why is it significant?

Universities are an important part of the innovation system as they produce new ideas, instruments, problem solving techniques, networks, and skilled people.²⁶ There are a number of channels through which knowledge can be exchanged between universities and business such as technology commercialisation and entrepreneurial activity, advisory and consultancy contracts and commercialisation of facilities and equipment.²⁷ This indicator concentrates on commercial relationships such as spin-outs, technology licensing and patenting, whereas indicator 3.6 considers information sharing through joint research and consultation.

How does the UK perform?

Overall the evidence suggests that knowledge transfer links are developing in volume and depth in most advanced countries. The proportion of higher education R&D (HERD) financed by industry has increased in every G7 country between 1981 and 2001. HERD as a proportion of GDP increased for all countries except Germany and Japan.²⁸ Over the same period, analysis of US patent data shows that the number of scientific papers cited in patents has increased for all G5 applicants between 1985 and 1998.²⁹

In the UK, the most recent Higher Education Business Interaction survey shows that applications for new patents increased by 26 per cent, although patent applications overall fell very slightly (two per cent).³⁰ Grants increased by 24 per cent, and licensing increased by 25 per cent. In the US, patent applications to the USPTO rose by 11 per cent, but

patents granted fell by three per cent. Licenses and options also fell, by eight per cent in the US.

Further, contract research from industry in the UK in 2000/01 amounted to £258 million, an increase of seven per cent on the previous year. Spin-offs – in which Higher Education Institutes or their employees own equity or intellectual property – also increased, totalling 220 in 2000/01.

What does this mean for the UK?

There has been an increase in knowledge transfer in the UK and the UK's policy efforts to address the problems of information exchange have been well regarded.³¹ However, there remains scope to develop the links further.

The UK continues to develop thinking in this area through Richard Lambert's review of business-university collaboration. The Lambert Review has identified a series of themes:

- Problems of successfully exploiting IP, including its management and skills weaknesses in Technology Liaison Offices, the process of negotiation and engaging with SMEs;
- Incentives for academics, including the design of support programmes and the Research Assessment Exercise;³²
- Business engagement in course design; and
- The regional role of universities; a theme DfES highlighted in their White Paper on the Future of Higher Education.³³

The Lambert report will be published alongside the DTI Innovation Review later this year.

²⁶ SPRU, *Talent not technology* (2000).

²⁷ Adapted from SPRU, *Measuring Third Stream Activities*, A report to the Russell Group of Universities (2002).

²⁸ OECD, *Public Funding of R&D – Trends and Changes* (2003).

²⁹ NISTEP S&T indicators (in Japanese) using CHI Research Inc data, as quoted by OECD *Benchmarking Industry – Science Relationships* (2002).

³⁰ CURDS *Higher Education – Business Interaction Survey*, (2003).

³¹ Copenhagen Business School, *Promoting university interaction with business and community – a comparative study of Finland, Sweden and UK*, Commissioned (2003).

³² RA Review, *Joint Funding Bodies' review of research assessment: Invitation to Contribute* (2003).

³³ DfES, *The Future of Higher Education* (2003).

3.6 Sources of information for innovation

Potential for more knowledge sharing

Why is it significant?

The previous Indicator considered direct commercial relationships between universities and businesses, such as licensing and spin-outs. However, business draws on a much broader range of mechanisms to access information from the science and engineering base (SEB). Firms need to access a wider range of information than just scientific advances. This can include information on potential markets, and on management practices. Joint authorship of scientific and technical articles by universities and businesses is one of the channels through which knowledge is passed between the science base and industry.

³⁴ Calvert, J. and Patel, P., 'University-Industry Research Collaborations in the UK' *Science & Public Policy* (2002).

How does the UK perform?

Forty per cent of innovating businesses cite the SEB as a source of information. Larger enterprises are more likely to engage with these specialised external sources of technology, and as a result, the overall employment associated with 'technology-networked innovators' is substantial. These businesses account for around 57 per cent of employment in innovation active businesses. Of these, the citation levels for the component SEB sources are shown in table 3.6.1. • **table 3.6.1**

On a narrower definition of innovation – those who introduced a new or significantly improved product or process – the share citing the SEB as a source is 44 per cent.

A recent study found that joint publishing increased significantly in the UK between the period 1981/85 and 1996/2000 from 2,931 to 8,366 papers.³⁴ • **chart 3.6.2**

Chart 3.6.1:
Source: Third Community Innovation Survey, 2001

Chart 3.6.1: Citation levels for the component Science and Engineering Base (SEB) sources, innovating firms only.

UK, 1998-2000
Per cent

data

SEB Source	Share of businesses			Share of business employment		
	SME	Large	Total	SME	Large	Total
SEB Total	39	63	40	46	64	57
Universities	23	47	24	32	50	43
Government labs	16	37	17	21	39	32
Other public sector	26	38	27	29	42	37
Private research institutes	16	39	17	21	44	35

This represented a shift from 2.8 per cent to 4.5 per cent in the proportion of all papers published by universities, and a shift from 22.5 per cent to 46 per cent of all papers published by industry. The three most significant joint publishing science disciplines were chemical sciences, medical sciences, and biological sciences which accounted for approximately 20, 20 and 14 per cent respectively of jointly published papers over the past 20 years. In terms of industries, the most significant joint publishers were pharmaceuticals, biotechnology, utilities, electronics and food, drink and tobacco.

The research also found that the highest volume of collaborative publishing is with the most research intensive universities. However, there are a number of 'new' and technology based universities that are intensive joint publishers in some industries. This suggests that many universities are already moving towards a more collaborative approach.³⁵ Foreign firms are dominant collaborators in electrical and electronic industries, and significant in chemicals, instruments and motor vehicles.

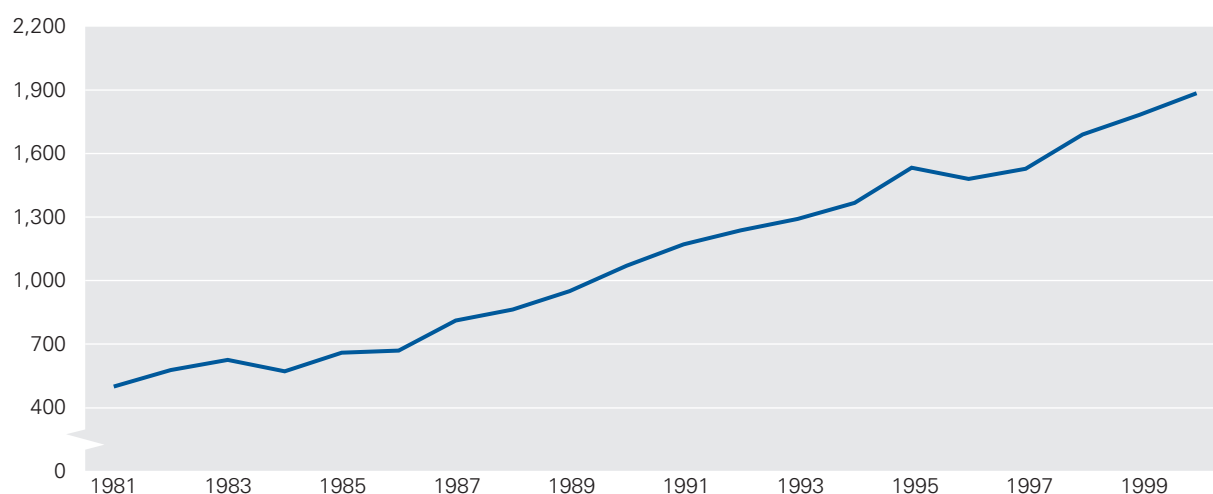
What does this mean for the UK?

Formal collaborations by business with other businesses or institutions are associated with better performance on the share of turnover from new products. Moreover, firms that collaborate with universities tend to be more innovation intensive.

The general increase in collaboration with universities indicates that firms are increasingly looking towards them for new sources of knowledge. However, although the trends seem to be rising, especially in terms of joint publishing, the scale of non-collaboration suggests that there is scope for more knowledge sharing.

³⁵ Lambert Review of Business University Collaboration, *Summary of Consultation Responses and Emerging Issues* (2003).

Chart 3.6.2: Number of joint publications by universities and industry UK, 1981-2000



data

Chart 3.6.2: Source: Calvert and Patel (2000) *University – Industry Research Collaborations in the UK*

SKILLS

Higher skill levels allow workers to generate new ideas and adapt to the changing economic environment. Without access to a skilled workforce, firms are unable to implement new technology or affect organisational change. As a result, low levels of *human capital* act as a brake on economic performance. Human capital can be developed through the education system, and also through training during an individual's working life. This section considers:

- **Skill levels** – basic, intermediate and higher skills affect an economy's ability to drive up productivity.
- **Training** – a commitment to lifelong learning helps ensure that skills are maintained and refreshed.
- **ICT Skills** – knowledge of information and communication technologies (ICTs) is increasingly regarded as a basic skill in today's knowledge economy.

Summary of the Skills Indicators

The traffic light summarises the historical performance of each of the individual indicators compared with the other G7 countries, with each indicator assigned to a band on the basis of the assessment set out in this chapter.

4.5 ● ICT skills

4.2 ● Higher-level skills

4.3 ● Lifelong learning

4.1 ● Adult literacy and numeracy

4.2 ● Intermediate level skills

4.4 ● Management skills

- The green light shows those areas where the UK has signs of strength.
- UK performance is regarded as only average in those indicators with an amber light.
- Indicators with a red light show clear signs of weakness. Within each of these bands, indicators are listed in order of appearance in this chapter.

Progress since the first edition

The UK continues to show weakness in terms of relative levels of human capital. Too many workers lack the key basic and intermediate level skills. There have been improvements to the *flow* of workers into the labour force – through the reforms made to schooling – but weaknesses in the stock of skills remain. Although the UK is a middle ranking economy on lifelong learning, more needs to be done. An area of success has been ICT skills, where there have been substantial improvements compared to the position in the first edition of the *Indicators*.

4.1 Adult literacy and numeracy

Adults still have poor basic skills

Why is it significant?

The effects of the knowledge economy are already clearly visible in the labour market. Advances in technology enable firms to produce the same output with fewer unskilled workers, while at the same time increasing the demand for skilled labour. Most jobs require some competence in basic skills and 50 per cent of jobs are closed to those who lack literacy and numeracy skills at level 1 (the skills level expected of an 11-year-old).³⁶ People with poor literacy, language or numeracy skills are less productive at work and are more likely to suffer from ill health and social exclusion.

How does the UK perform?

The extent of poor basic skills in the UK can be seen in a comparison with other countries. The International Adult Literacy Survey (1997) shows how the UK compares with its international competitors. • **chart 4.1.1**

Although there are significant proportions of adults with poor literacy in all countries, the US and UK perform worse than most. Of the countries shown in the chart, only Poland and the Irish Republic had a higher proportion of adults than the UK with literacy skills at the lowest levels. A similar story applies to numeracy.

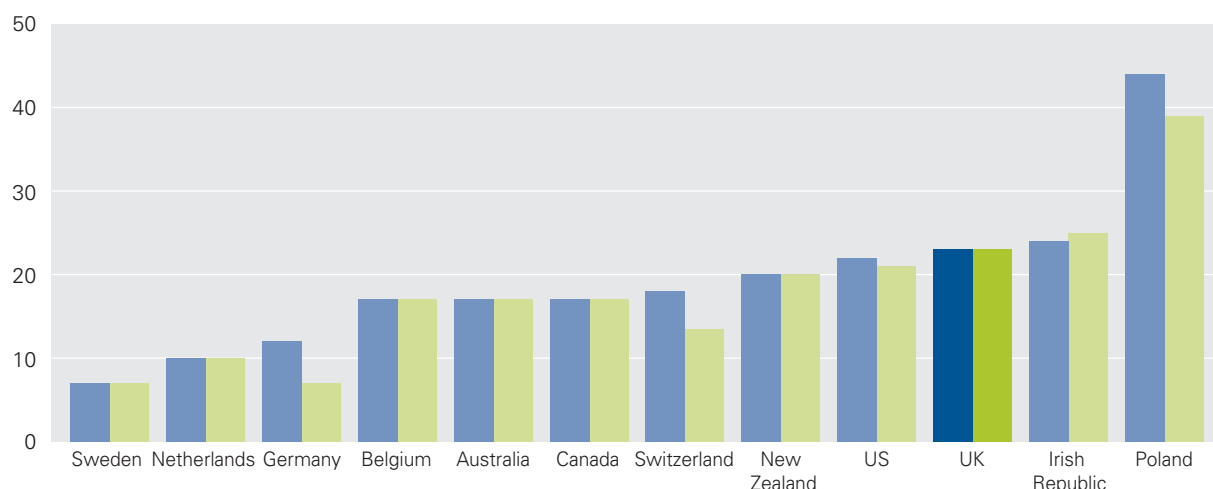
Since the first edition of the *Indicators*, there have been improvements in basic skills. Recent data shows that the number of adults with literacy skills below level 1 has fallen to 5.2 million, replacing the previous figure of seven million.³⁷ There have also been improvements in numeracy and literacy among schoolchildren. • **chart 4.1.2**

³⁶ National Qualifications Framework levels. Level 1 is GCSE grade D-G or equivalent, level 2 is GCSE grade A*-C or equivalent, level 3 is A level or equivalent, level 4 is first degree level or equivalent, and level 5 is higher degree level (e.g. MSc, PhD) or equivalent.

³⁷ DfES, *Skills for Life Survey* (2003).

Chart 4.1.1: Adults with literacy and numeracy skills at the lowest level

Selected OECD country comparison, 1997
Per cent of adult population



data

Chart 4.1.1:
Source: Literacy Skills for the Knowledge Society, OECD

- Percentage of adults with literacy skills at the lowest level
- Percentage of adults with numeracy skills at the lowest level

Moreover, since 1998 there has been a decline in the proportion of the labour force without qualifications. In 1998, 12.9 per cent of the workforce in the UK had no qualifications compared to 10.3 per cent in 2003. However, 29 per cent of the workforce still have either a low level of qualifications (below level 2) or none at all. Although poor basic qualification levels do not necessarily mean poor basic skills, there is a strong correlation between the two.

What does this mean for the UK?

The assessment shows that many people still have poor basic skills. This is likely to create problems for employers who increasingly require workers with the ability to read and write at a good level, and problems for individuals who are likely to find it difficult to acquire other skills and qualifications without first improving their basic skills. Research shows that once people achieve basic skills they can expect to earn more and become more employable. Unskilled male inactivity rates have increased from 3.8 per cent in 1979 to 30.5 per cent in 1998 and have since stabilised.³⁸ Weaknesses in basic skills will therefore put UK businesses and workers at a serious competitive disadvantage in the face of rapid technical change.

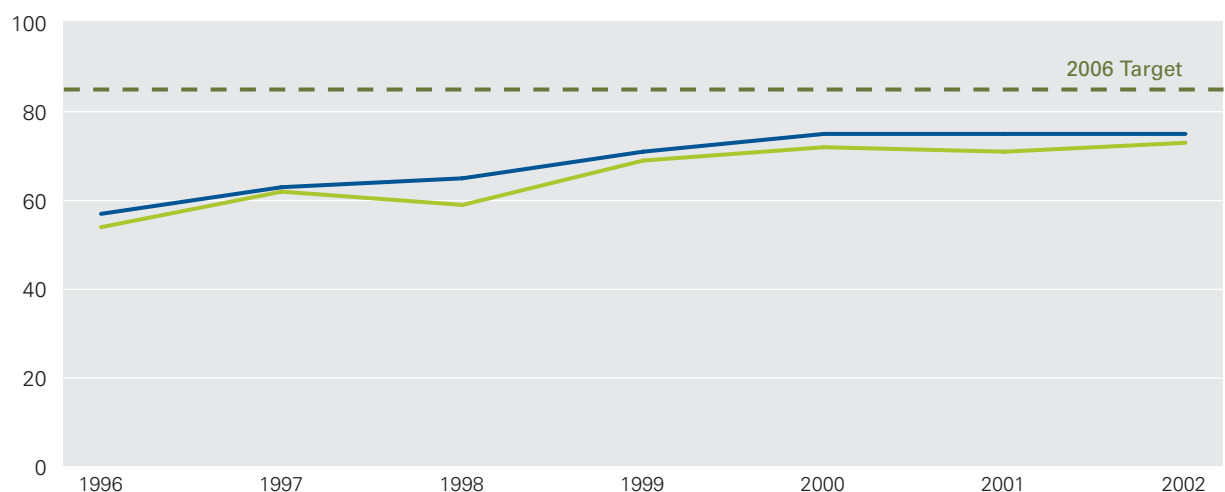
³⁸ Nickell, S., and Quintini, G., *The recent performance of the UK labour market* (2002).

Chart 4.1.2:
Source: DfES
● English
● Mathematics

Chart 4.1.2: Performance of 11 year olds: Key Stage 2 – English and Mathematics

England, 1996-2002
Percentage of pupils achieving the expected standard in Key Stage 2 tests

data



Developing basic skills at an early age enables further educational achievements and enhances work opportunities later in life. However, problems with adult numeracy and literacy also need to be addressed. In 2001, the Government launched *Skills for Life*, the national strategy for improving adult literacy and numeracy skills. The strategy aims to help create a society where adults have the basic skills they need to find and keep work, and participate fully in society, thereby increasing the economic performance of the country. The target is to help 1.5 million adults improve their literacy, language or numeracy skills by 2007, with a milestone of 750,000 by 2004.

Good progress is being made. Well over a million learners have engaged in literacy, language and numeracy courses since the launch of the strategy and by July 2002 over 300,000 adults had achieved a national certificate. All literacy, language and numeracy provision continues to be provided free of charge to the learner. The Home Office, through the Correctional Services contributes to the National Literacy & Numeracy Strategies by providing basic skills training to offenders. A highly effective promotional campaign has prompted 200,000 people to call the 'Learn Direct' helpline to find out more about literacy, language or numeracy courses.

By 2006, the Government aims to raise the qualifications of the population to higher levels. In particular, there are targets for 11 year olds achieving level 4 of the Key Stage 2 tests in English and Mathematics. Chart 4.1.2 shows the per cent of pupils achieving the expected standard since 1996. The target for 2006 is 85 per cent.

4.2 Intermediate and higher-level skills

The UK's intermediate and higher-level skills base is improving, but still lags some G7 competitors, especially at intermediate level

Why is it significant?

Globalisation and the knowledge economy have expanded the need for a more highly trained workforce. In order to improve efficiency and productivity and to take advantage of new opportunities, firms increasingly require workers who can generate new ideas, adapt to new technology and adopt best practice. They also need educated and sophisticated consumers who can stimulate innovation by their willingness to try novel products.

Furthermore, large parts of the economy are now dependent on the management and processing of knowledge and information. Service industries, in particular, have been transformed by technological advances. The demand for the skills needed to understand complex systems and to deliver more sophisticated choices to customers has grown substantially.

How does the UK perform?

International comparisons of educational attainment need to be treated with some caution because of differences in education and training systems and differences in the way countries collect and record data.³⁹ The data shows that, in terms of tertiary (higher) education, the UK falls behind Canada, the US and Japan, but performs well by European standards.⁴⁰ • **chart 4.2.1**

³⁹ The assessment considers educational attainment rates and qualification levels as a proxy for skills. However, many qualifications may simply measure educational attainment rather than skills, and many generic skills, such as team working and interpersonal skills, are not certified. A significant proportion of learning also does not lead to a recognised qualification.

⁴⁰ On chart 4.2.1 'advanced research' corresponds to a higher degree or NVQ level 5, 'tertiary type A' corresponds to a first degree, 'tertiary type B' corresponds to, for example, HNC, HND, BTEC, NVQ level 4.

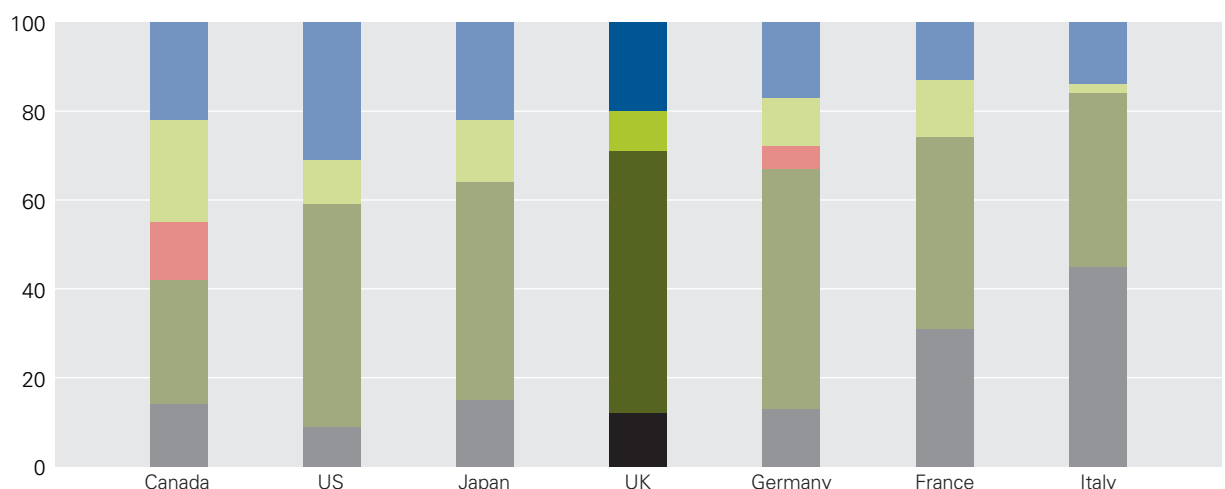
Chart 4.2.1: Distribution of highest completed level of education

G7 comparison, 2001
Per cent of population aged 25 to 64

data

Chart 4.2.1:
Source: OECD
(Education at a glance, 2002)

- Tertiary Type A and Advanced Research
- Tertiary Type B
- Post-Secondary Non-Tertiary
- Upper Secondary
- Below Upper Secondary



The proportion of young people entering higher education in Great Britain has risen sharply over the last decade. Since 1994 around one in three young people have entered higher education in Great Britain, compared with one in six in 1989, and one in 18 during the early 1960s.⁴¹ In 2000, the UK's net entry rate to university level education was well above the OECD average and, at 46 per cent, was well ahead of, for example, Germany (30 per cent).⁴²

In line with the increase in the net entry rate, the proportion of the UK workforce holding qualifications equivalent to level 4 or above (first and higher degree levels) has increased steadily over the last five years. In 1998, 25.2 per cent of the workforce in the UK held qualifications at level 4 and above compared with 29.2 per cent in 2003.⁴³ We also have one of the

leading higher education completion rates in the OECD; 83 per cent of UK full-time undergraduates receive degrees compared with 59 per cent in France, 66 per cent in the US, and 70 per cent in Germany.

There have been some improvements in intermediate level skills. The proportion of economically active adults in the UK holding at least a level 2 qualification (5 GCSEs at grades A* to C or equivalent) has grown from 65.8 per cent in 1998 to 71.0 per cent in 2003. The proportion of economically active adults in the UK holding at least a level 3 qualification (2 A levels or equivalent) has risen from 43.8 per cent in 1998 to 49.6 per cent in 2003.⁴⁴ However, as chart 4.2.1 shows, the UK still lags behind Germany, the US, Canada and Japan in terms of the proportion of the workforce qualified above upper secondary level (above A level or equivalent).⁴⁵

⁴¹ DfES 'Education and Training Trends: The DfES Departmental Report' (2003).

⁴² OECD, *Education at a Glance* (2002).

⁴³ ONS, *Labour Force Survey: Spring 1998 and Spring 2003* (2003).

⁴⁴ ONS, *Labour Force Survey: Spring 1998 and Spring 2003* (2003).

⁴⁵ Note, on chart 4.2.1, that there is no equivalent in the UK for 'post-secondary non-tertiary' education.

What does this mean for the UK?

Although participation in post-compulsory education has been increasing, the UK remains a long way behind some of its international competitors in terms of young people entering the labour market with intermediate vocational qualifications. This coupled with the UK's poor performance in basic skills is especially worrying for broad participation in the knowledge economy.

The Government has put in place complementary and interlocking strategies to transform young people's learning within and beyond compulsory education. Policies aiming to improve success rates within schools and to bridge the transition at 16 include the rolling out of Connexions services and Educational Maintenance Allowances, and establishing a continuous phase of 14-19 learning. To focus action and measure the success of these strategies, the Government has set a number of post-16 attainment targets for 2004 and 2006. For young people, these focus on attainment at level 2 and level 3. • **chart 4.2.2**

Between 2002 and 2004, the aim is a three percentage point increase in level 2 attainment at 19 and, by 2006, a further three percentage point increase over 2004. There is also a specific target for participation on Modern Apprenticeships stating that, by 2004, at least 28 per cent of young people will start a Modern Apprenticeship by age 22.

Of course, raising the skills of the workforce is not just about improving the skills of young people. Adults have an important role to play in closing the skills gap and the next indicator considers lifelong learning.

Where the demand for skills has not been met by the existing UK workforce, immigration has assisted. The Work Permit system enables employers to recruit skilled workers from abroad where they cannot fill the post with a UK or EU worker. The Home Office's High Skilled Migrant Programme has been able to assist where there has been a shortage of higher level skills.

Chart 4.2.2:
Source: National Statistics (Labour Force Survey)

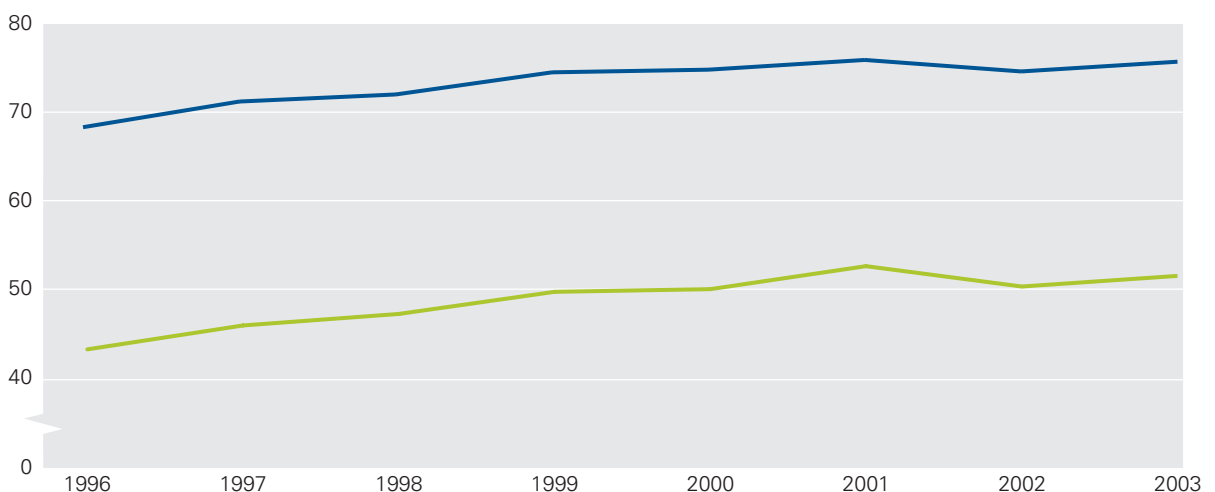
- 19 year olds at level 2+
- 19 year olds at level 3+

* The highest level of attainment for the 19-21 year old age group is used as a proxy for achievement at age 19

Chart 4.2.2: Proportion of 19* year olds qualified to at least level 2 and level 3 in England

1996-2003
Per cent of 19 year olds

data



4.3 Lifelong learning

Spread thinly over a high number of participants

Why is it significant?

Technological change means that firms and workers wishing to retain their human capital need to invest in training throughout their working lives. Increasing demand in the workplace for individuals who are good at using and interpreting knowledge flexibly can only be partially addressed through curriculum changes in schools and universities, as changes initiated in the formal education system today will take many years to have an impact on the population as a whole. Continuing education and training, outside compulsory formal education, also allows individuals to refresh or complement previous education and training.

Encouraging adults to obtain formal qualifications is one way of upgrading skills, but skills can also be developed through more informal routes such as workplace learning. Research suggests that job-related training can have a significant impact on productivity.⁴⁶

How does the UK perform?

The majority (90 per cent) of workplaces in England offer some form of training to some of their employees.⁴⁷ Participation in training in the UK has increased over the last 15 years, although since 2000 the picture seems to have been fairly static.

The 1998 International Adult Literacy Survey (IALS) shows the average amount of continuing education and training undertaken by adults across a range of countries.⁴⁸

The IALS shows the UK performing ahead of the US but behind Canada for 'all continuing education and training'. • **chart 4.3**

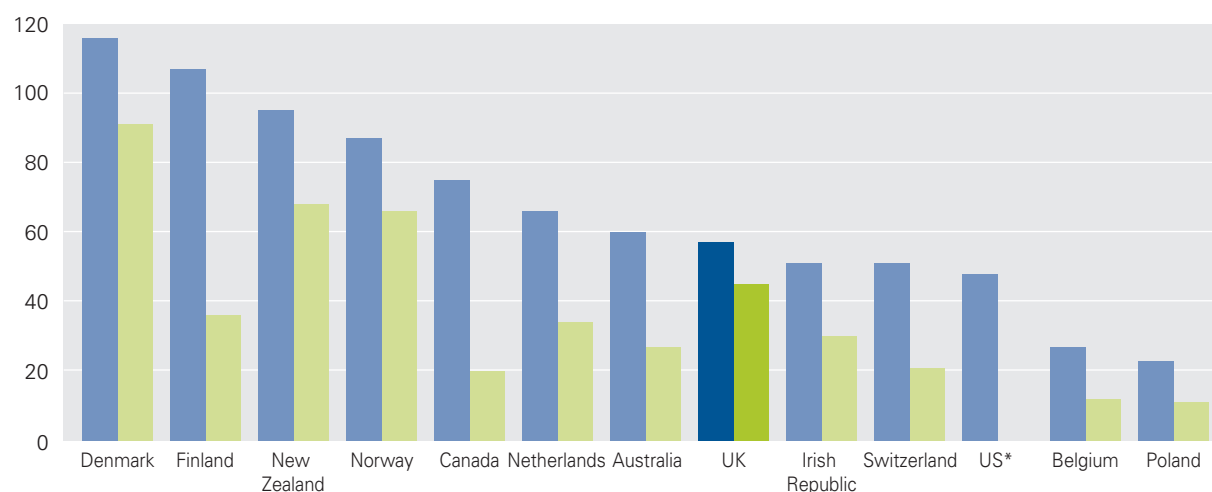
⁴⁶ Dearden, L., Reed, H. and Van Reenen, J., 'Who gains when Workers train? Training and Corporate Productivity in a panel of British Industries', *IFS Working Paper 00/04* (2000).

⁴⁷ DfES *Learning and Training at Work: (2002)*.

⁴⁸ There are difficulties associated with making such international comparisons due to the definitions used. The study excludes some types of informal training, such as learning-by-doing and learning-by-example, which are not readily measured by formal statistical surveys.

Chart 4.3: Average hours of continuing education and training, by type of training

Selected OECD country comparisons, 1994-1998
Mean number of hours, adult population aged 25-64



data

Chart 4.3:
Source:
International Adult Literacy Survey, and national surveys

- All continuing education and training
- Job-related education and training

* US 1999

The IALS finds that participation in adult education and training has become a common activity rather than the exception. It divides countries into three groups: the Nordic countries where lifelong learning has become a reality for a large segment of the population, with overall participation rates over 50 per cent; countries with participation rates of around 40 per cent (the majority of countries fall into this group, including the UK) and countries where lifelong learning is less common with participation rates of around 20 to 30 per cent and below.

Findings from the Continuing Vocational Training Survey (CVTS2) carried out in 2000/01, which compare the provision of training across 25 European countries, broadly support this picture. The UK ranks relatively well in terms of the proportions of employers providing – and employees receiving – training, and is placed amongst a ‘top flight’ of countries also comprising the Nordic countries and the Netherlands. They are followed by a group of northern EU countries, whilst the poorest performers are the southern EU countries and the accession countries.

In addition, a recent UK study found that 61 per cent of adults had undertaken taught learning in the last three years, and 76 per cent had done some sort of learning in the same period.⁴⁹

Even so, the UK performs poorly when considering the amount of time that each trainee spends on training. Here the CVTS2 ranked the UK last of the EU countries. Overall, UK training provision is spread thinly across a high number of participants so that, in terms of the overall volume of training, the UK is placed around the EU average.

What does this mean for the UK?

A skilled labour force is a prerequisite for success in today’s economy. Although the UK is an average performer in terms of lifelong learning, more needs to be done to rectify the historic weakness in the UK labour force, and to equip UK workers with the skills necessary to compete in the knowledge economy.

The Government recognises that challenge, and in July 2003 it launched the Skills Strategy White Paper.⁵⁰ The aim of this national strategy is to ensure that employers have the right skills to support the success of their businesses, and individuals have the skills they need to be employable.

The Strategy contains a target to reduce by at least 40 per cent the number of adults in the workforce who lack NVQ level 2 or equivalent qualifications by 2010. The Strategy also includes: a new guarantee of free tuition to help adults obtain a good skills foundation for employability (level 2 qualifications); expansion of training opportunities for apprenticeships, technicians, higher crafts and trades and associate professionals to meet skills gaps (level 3 qualifications), with support where regional and sectoral skill priorities are identified; expansion of the Sector Skills Council network; development of a national programme to support employers with help focused on those with low skills; delivering the training businesses want; reform of qualifications to make them more business friendly; and, greater business involvement in the course design, delivery and assessment of Modern Apprenticeships.

⁴⁹ DfES, *National Adult Learning Survey* (2002).

⁵⁰ DfES, *21st Century Skills Realising our Potential*, (2003).

4.4 Management skills

UK managers are perceived less well than those in competitor countries

Why is it significant?

Management and leadership are vital drivers of organisational performance. They are pivotal to investment, productivity and the delivery of high quality service. Improved management and leadership capability is an essential prerequisite to workforce development and the creation of organisational cultures that can grasp the opportunities to innovate, change and grow. This is especially true in the context of rapid technological change and applies equally in the private, public and voluntary sectors.

How does the UK perform?

Indicators of management performance are difficult to find. One approach is to ask business executives about their perceptions of the international experience and competence of senior managers in the country in which they operate. On this basis, the UK is behind competitor countries in management skills. The International Institute for Management Development finds that business executives' perceptions of management quality rank the UK fifth in the G7 behind Canada, Germany, the US, and France.

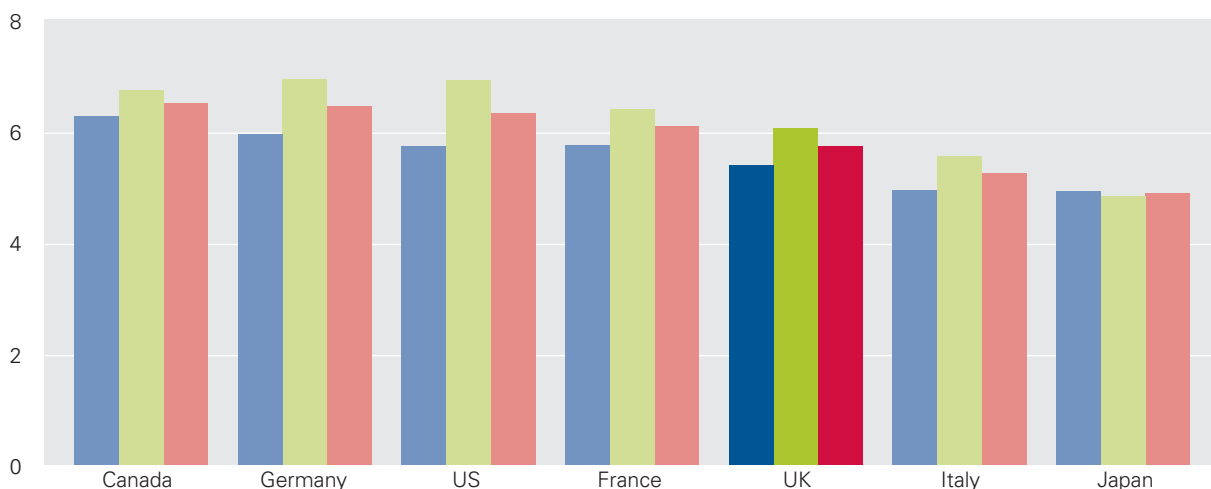
• chart 4.4

Recent research for the DTI and ESRC by Professor Michael Porter finds the supply of the most skilled managers in the UK is likely to be competitive with peer countries but suggests there are problems with managerial skills at the lower and middle management levels.⁵¹

⁵¹ Porter, M.E. and Ketels, C.H.M., 'UK Competitiveness: Moving to the next stage', *DTI Economics Paper No 3* (2003).

Chart 4.4: Business executive perceptions of quality of management

G7 comparison, 1996-2003
Average survey score, 0-10 scale



data

Chart 4.4:
Source: IMD
● 1996 & 1997
● 1999 & 2000
● 2002 & 2003

What does this mean for the UK?

As Porter outlined, the transition to the next stage of competitiveness represents major challenges. The process has to be business led, but Government can help. For example, the Government's response to the Council for Excellence in Management and Leadership's (CEML) report into UK management sets out a demanding agenda for action to achieve a step change in management and leadership capability.⁵² It focuses on stimulating demand, improving supply and ensuring effective delivery of management and leadership learning and development. A joint DfES/DTI action programme is in place. It is recognised that improving the UK's global position so that its managers and leaders are equal to the best in the world cannot be done overnight. It will require sustained action by Government, industry and public and professional bodies over a period of years.

⁵² DfES, *Government Response to the Report of the Council for Excellence in Leadership and Management* (2002).

Since the publication of CEML's report there has been significant progress in a number of areas, for example, the development of Leadership Colleges across the public sector. The Government's Skills Strategy White Paper recognises the key role of management and leadership. New funding is being provided for SMEs to assess their business against the new Investors in People Management and Leadership model. For the technology driven sector, new initiatives such as New Technology Institutes and Knowledge Exchanges aim to speed the adoption of modern management practices through technology transfer and promoting participation in industry clusters.

4.5 ICT skills

Progress in developing and deploying ICT skills

Why is it significant?

Businesses need to be equipped with sufficient information and communication technology (ICT) skills to take full advantage of the opportunities offered by these new technologies. Firms need workers who understand the capacity of ICT, and are able to utilise that capacity to generate value added. Recent research, using the International Benchmarking Surveys 1997-2000, finds evidence that UK company sales performance is positively related to the incidence and intensity of ICT.⁵³ Similarly, the OECD finds that firms can only reap the full gains from ICT if they have the skills and organisational capacity to utilise the equipment effectively.⁵⁴

How does the UK perform?

The International Benchmarking Study (2003) asked companies whether the ICT skills available within the company met their business needs.⁵⁵ Although only 18 per cent of UK companies using ICTs felt their business needs were 'fully met' by their existing ICT skills (similar to the US, Canada, Germany and Italy), the proportion rose to 79 per cent for those who felt their existing ICT skills at least 'mostly met' their needs. Only the US was higher, with France and Japan substantially behind the UK. • **chart 4.5.1**

Companies were also asked if the business skills available within the company were able to optimise their ICT usage. Again the UK was second, with 62 per cent of companies with ICTs able to at least 'mostly optimise' their use, with Japan, France and Italy lagging behind. • **chart 4.5.2**

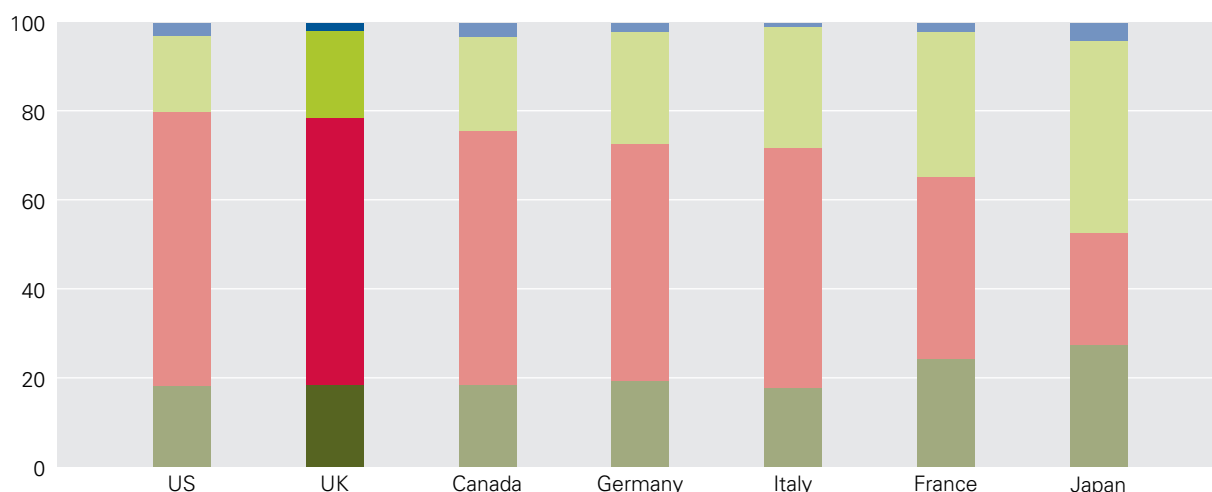
⁵³ Forth, J., and Mason, G., *ICT Investments, Workforce Skills and Company-Level Performance: Recent Evidence for the UK* (2003).

⁵⁴ OECD, *The sources of economic growth in OECD countries*, (2003).

⁵⁵ However, in the above comparisons there must be some uncertainty about factors influencing the responses in different countries. Japan, for example, had the highest percentage of firms which thought that business skills met the needs of the business completely (27 per cent compared to the UK's 18 per cent) and by far the highest percentage of firms which thought that business skills completely optimised ICT usage (29 per cent compared to 10 per cent in the UK).

Chart 4.5.1: How much the current ICT skills within your organisation meet the needs of the business

G7 comparison, 2003
Per cent of businesses with ICTs (weighted by employment)



data

Chart 4.5.1:
Source:
Business in the Information Age:
International Benchmarking Study, 2003.

- Not at all
- Partly
- Mostly
- Completely

The study also found that 11 per cent of UK businesses identified a lack of skills among staff as a barrier to implementing ICTs, again similar to the US, Canada and Italy. Where there was a perceived shortfall in ICT skills, over three quarters of UK businesses offered formal ICT training, either in-house on a structured or ad-hoc basis, or through outsourced training programmes. Along with the US, this is the highest level among G7 countries.

What does this mean for the UK?

Although firms are not yet fully satisfied with their ICT skills, the UK performs well compared with other G7 countries and there has been progress since the first edition of the *Indicators*. Moreover, where there are weaknesses, firms have generally responded by providing training to ensure that workers have the right skills.

General user ICT skills are now defined as basic skills alongside literacy and numeracy in the Government's Skills for Life programme. An organization, e-skills UK, was licenced in April 2003 by the Sector Skills Councils, under the aegis of the Department for Education and Skills (DfES), to boost the supply, level and connection with business in the ICT skills arena. e-skills UK is now jointly responsible to DTI and DfES.

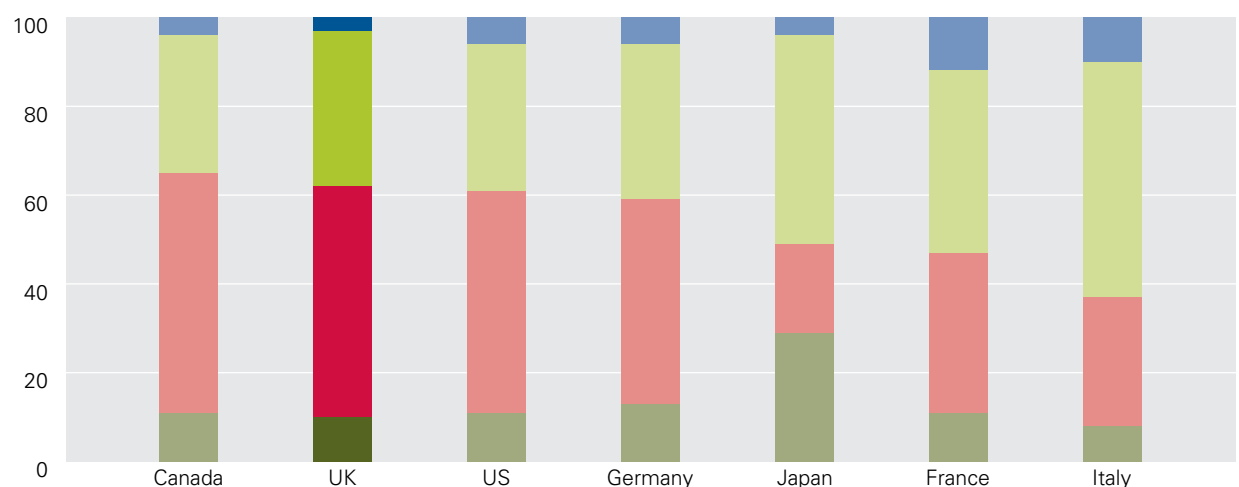
The Government is also taking steps to ensure that ICT training is embedded in the education system. Priorities will include £700 m to improve the ICT infrastructure in schools and further/higher educational establishments, and £230 m to improve ICT skill levels among educators, as well as the establishment of City Learning Centres, which provide both school pupils and adults with the chance to make the most of the Internet and new technologies.

Chart 4.5.2:
Source:
Business in the
Information Age:
International
Benchmarking
Study, 2003.

- Not at all
- Partly
- Mostly
- Completely

Chart 4.5.2: How well do the business skills within your organisation optimise the usage of ICT

G7 comparison, 2003
Per cent of businesses with ICTs (weighted by employment)



data

The White Paper *Opportunity for All in a World of Change*, describes policies to:

- Expand specialist ICT and other high-tech learning programmes in further and higher education. By 2004/05, the UK will be training up to 10,000 students a year on full time and updating courses;
- Introduce a programme to train 1,000 unemployed people over the next three years for technician level jobs in ICT; and
- Work with business to reverse the under-representation of women in ICT jobs; the aim is for the UK to match best international performance with regard to women's employment in ICT.

ENTERPRISE

Enterprise involves seizing new business opportunities. The importance of a vibrant enterprise culture has long been recognised as essential for growth.

Whilst enterprise is important for both new and incumbent firms, this section mainly focuses on new entrants, and the ability and willingness of individuals to start and develop new businesses. There are a number of features that contribute to the overall state of enterprise in the economy:

- **Entrepreneurship** – the motivation for business creation and business growth in an economy, seizing opportunities and being rewarded for success.
- **Socio-cultural attitudes** – social and cultural norms influence a community's attitudes and preferences.
- **Capital markets** – efficient and effective financial markets provide organisations and individuals with funding for new ventures and investment.⁵⁶

⁵⁶ In previous editions of the *Productivity and Competitiveness Indicators*, the financial market indicators were split into three sections covering venture capital, parallel markets and main equity markets. In this edition, the parallel markets and the main equity markets indicators have been subsumed into a single indicator under the heading 'Equity markets'. Similarly, the entry and exit rates and fast growing firms indicators have been subsumed into a single indicator under the heading 'Entrepreneurship'.

Summary of the Enterprise Indicators

The traffic light summarises the historical performance of each of the individual indicators compared with the other G7 countries, with each indicator assigned to a band on the basis of the assessment set out in this chapter.

5.4 ● Equity markets

5.1 ● Entrepreneurship

5.3 ● Venture capital

5.2 ● Attitude to risk-taking

- The green light shows those areas where the UK has signs of strength.
- UK performance is regarded as only average in those indicators with an amber light.
- Indicators with a red light show clear signs of weakness. Within each of these bands, indicators are listed in order of appearance in this chapter.

Progress since the first edition

The UK remains a middle-ranking enterprise economy. The UK does not possess an entrepreneurial culture to the same degree as the US. This is manifested in a greater risk aversion, and in a preference to accept tenured employment rather than start a business. The turbulence in the global economy and equity markets following the bursting of the 'dot.com' bubble has affected the venture capital industry, reducing the pool of available finance for those looking to establish their own enterprise. However, the overall capital market remains strong.

5.1 Entrepreneurship

UK only has a medium level of entrepreneurial activity

Why is it significant?

Entrepreneurship is the ability to seize new business opportunities. One way of exploiting new market opportunities is to start new enterprises. Data on start-ups and closures can give a good indication of the capacity of the economy in exploiting new market conditions. High entry rates demonstrate the entrepreneurial dynamism of the economy as a whole and its capacity to transform and adjust itself to new market opportunities. High exit numbers should, in principle, improve resource allocation, as resources are quickly re-allocated to those most able to exploit them.

How does the UK perform?

There are a number of ways in which business start-ups and closures can be compared across countries.⁵⁷ The best internationally comparable survey is the Global Entrepreneurship Monitor (GEM).

The GEM survey looks at the variation in the level of entrepreneurial activity between countries. The results show UK performance on a par with Germany and Italy, better than France and Japan but significantly below Canada and the US.

• chart 5.1

On this basis, GEM classifies the UK as having a medium level of entrepreneurial activity. When the analysis is broadened to cover non-G7 countries, the UK has the 23rd highest measure of activity among the 37 countries investigated.

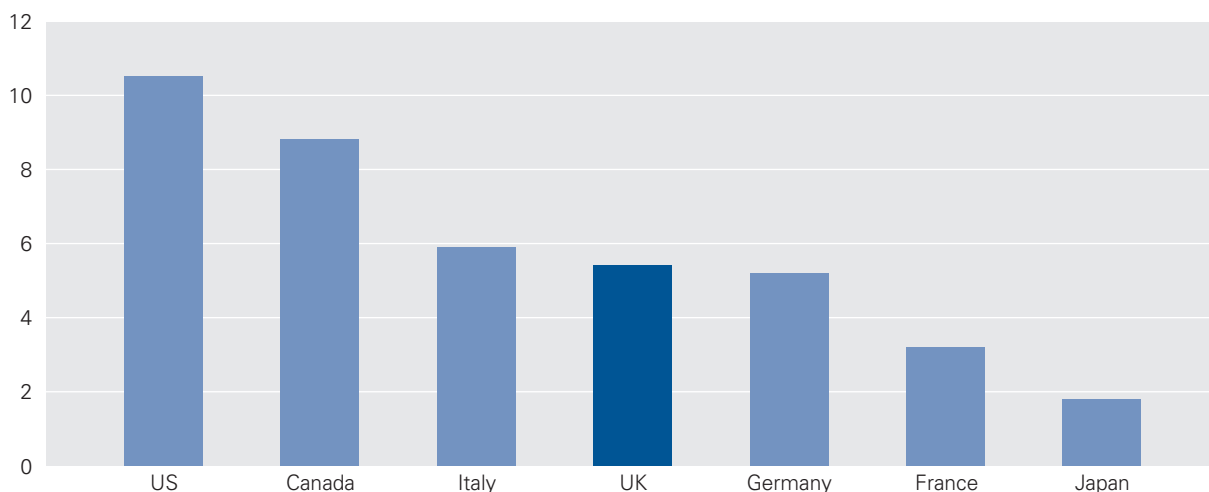
GEM also makes the distinction between ‘opportunity’ entrepreneurs – who start a business when they perceive an opportunity – and ‘necessity’ entrepreneurs – who start a business as a last resort. The UK has over four times as many ‘opportunity’ entrepreneurs as ‘necessity’ entrepreneurs.⁵⁸ This suggests that UK entrepreneurs are motivated more by the potential, rather than by the need to start a business because of reduced employment opportunities, which is typical of G7 countries.

⁵⁷ Bank account surveys suffer from technical problems such as multiple accounts and customer switching. The best official Government guides to the pattern of business startups and closures are VAT registrations and deregistrations. However, international comparisons are extremely difficult to make due to variations in the economic cycle and differences in VAT thresholds.

⁵⁸ Global Entrepreneurship Monitor, *Executive Report* (2002).

Chart 5.1: Business start-ups

Total Entrepreneurial Activity (TEA) Index for G7 countries, 2002
Per cent of the labour force either (i) actively involved in starting a new business or (ii) owner or manager of a business that is less than 42 months old



data

Chart 5.1: Source: Global Entrepreneurship Monitor 2002 Executive Report

What does this mean for the UK?

This evidence suggests that starting a business in the UK and much of Europe remains a less attractive proposition than in the US or Canada. Many factors influence the pattern of business start-ups: the macroeconomic environment, regulation as well as cultural attitudes to enterprise. The UK macro position has improved, and a recent European Commission report shows that there are no European Union countries where it is cheaper or quicker to set up an individual enterprise than in the UK.⁵⁹ This suggests that the broad framework factors cannot be behind the UK's average entrepreneurship performance.

Entrepreneurial activity is not just about business creation but also about business growth. A relatively small number of fast growing enterprises tend to be the main source of innovation and job creation.

These companies are quick to spot new opportunities, and are flexible enough to be able to exploit them.

For this reason Government policy focuses on both promoting start-ups and supporting the growth of SMEs.

The Government's Small Business Service (SBS) aims to build an enterprise society in which all small businesses thrive and achieve their potential. It encourages more people to start a successful business, to grow their business and to create a supportive business environment that makes it easier for businesses to interact with Government and its services.

The Government has introduced a range of initiatives to help firms grow. For instance, there is a focus on programmes that encourage small businesses to link with universities for the purpose of knowledge transfer, and on improving the local availability of help and advice for management and skills development. The Government also funds 'Business Link', which provides help to over 100,000 businesses each quarter to assist them in tackling barriers to growth.

In addition, the Government has taken action to improve access to finance for firms seeking to grow rapidly. Very few small companies can grow quickly without external debt or equity finance. The 2000 Budget announced £100 million for the SBS to plug the equity gap in order to help those parts of the venture capital market where private sector provision is not meeting business needs in full. The SBS has a target to generate £1 billion of investment for small firms nationwide by 2005.

⁵⁹ European Commission Report, *Benchmarking the Administration of Business Start-ups* (2002).

5.2 Attitudes to risk taking

Relatively low levels of entrepreneurial motivation in the UK

Why is it significant?

If society is not supportive of entrepreneurs and their activities, fewer people will be prepared to take risks in business. Cultural attitudes to failure are also important as entrepreneurs sometimes need to be able to learn from their mistakes before going on to establish successful businesses.

Society's attitude to risk can also affect the dynamism of an economy through its influence on, for example, the demand for new products and services, the adoption of new technology, the availability of risk capital, and Government approaches to regulation.

How does the UK perform?

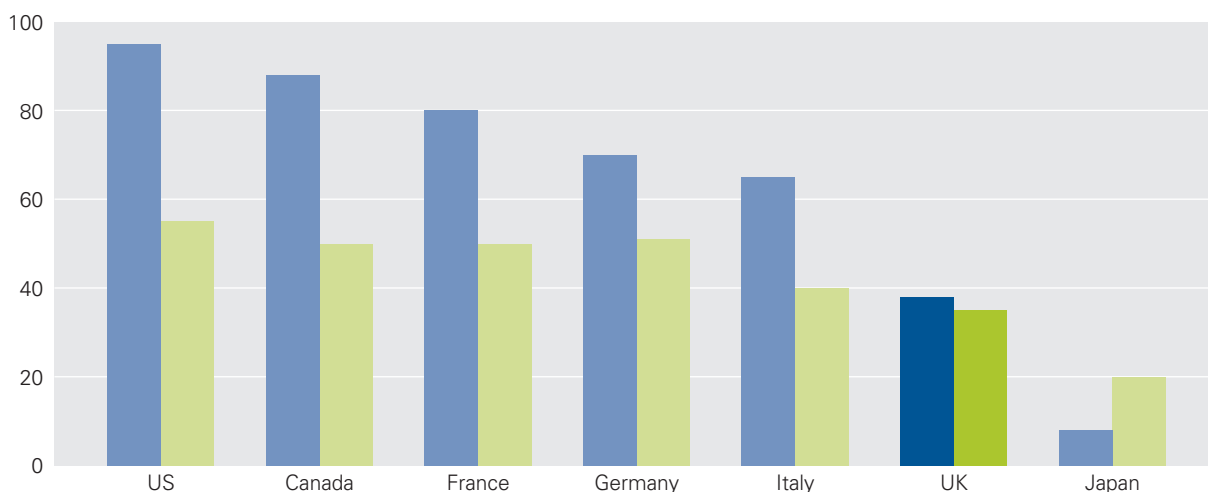
The Global Entrepreneurship Monitor (GEM) compares the level of entrepreneurial motivation across countries (for example, it examines whether entrepreneurs believed that becoming an entrepreneur was considered a desirable career option in their country).⁶⁰ It finds relatively low levels of entrepreneurial motivation in the UK, especially when compared with the US or Canada. • **chart 5.2**

GEM also examines society's wider attitudes to entrepreneurship and finds the UK scoring the lowest of all of the reported countries apart from Japan. GEM concludes that, in the UK, entrepreneurial options are given less serious consideration than in France or Germany, which have very similar levels of perceived opportunity as each other.

⁶⁰ Global Entrepreneurship Monitor, *Executive Report* (1999).

Chart 5.2: Attitudes to entrepreneurship

G7 comparison, 1999
Percentage of entrepreneurs giving affirmative responses to statements



data

Chart 5.2:
Source: Global Entrepreneurship Monitor, 1999

- Starting a new business is a respected occupation
- Willingness to start a new business

More recent data from the European Commission show that the propensity towards entrepreneurship in the UK is about average for Europe, with 47 per cent of the UK population considering self-employment in 2001. The corresponding figures for the EU ranged from 27 per cent (Finland) to 68 per cent (Greece), with an average of 48 per cent. The figure for the US was higher at 59 per cent.⁶¹

What does this mean for the UK?

Overall, the evidence suggests that attitudes in the UK are less supportive of risk-taking, enterprise and innovation than in the US. Nevertheless, there are some positive signs: GEM finds that the UK has a supportive business environment for entrepreneurs; and its commercial and professional infrastructure is rated as one of the strongest among the countries studied.

However, the UK's more risk-averse approach generally contributes to low levels of entrepreneurial activity and affects the early adoption of new technology and new products and processes based on such technologies.

Without changes in cultural attitudes towards risk, it will be difficult to achieve significant improvements in levels of innovation and overall economic performance. GEM identifies education as a critical issue, with younger people receiving limited exposure to business issues. The Government is supporting moves to improve enterprise education through a variety of measures, taking forward the recommendations of the Davies Review of Enterprise and the

Economy in Education in 2002. It supports Enterprise Insight – a coalition of the UK's main business representative bodies and delivery organisations for enterprise education, training and support. Through a national campaign of raising enterprise awareness amongst key audiences (business, the media, Government and young people), Enterprise Insight aims to change attitudes to enterprise in the UK and to encourage the development of enterprise skills in the generic sense, that is, qualities such as initiative, innovation, and approaches to risk.

⁶¹ European Commission, *Benchmarking Enterprise Policy: Results from the 2002 Scoreboard* (2002).

5.3 Venture capital

Strong performance but funding gap is still evident

Why is it significant?

Innovative smaller businesses with the potential for high growth can make a key contribution to productivity growth. But these firms can only realise their potential if they have access to the appropriate level and type of finance.

Smaller firms in their early stages of development will often not be generating sufficient profits to finance their investment internally, and have therefore to seek external sources. Bank and trade finance are the most significant sources of external finance for the majority of SMEs, and factoring and leasing are becoming increasingly important. However, where the project is perceived to be high risk, or where there is likely to a lengthy delay before cash flow is generated, bank finance is usually not appropriate and

trade finance will be too short-term. In this situation, equity finance is often more suitable because it avoids the cash flow problem associated with debt finance whilst allowing the finance provider a share of the upside when growth gets underway.

How does the UK perform?

During 2002 the performance of the UK venture capital market proved relatively strong in the face of global economic uncertainty. On the proportion of venture capital investment to GDP, the UK ranked fourth out of the fourteen European countries surveyed. • **chart 5.3.1**

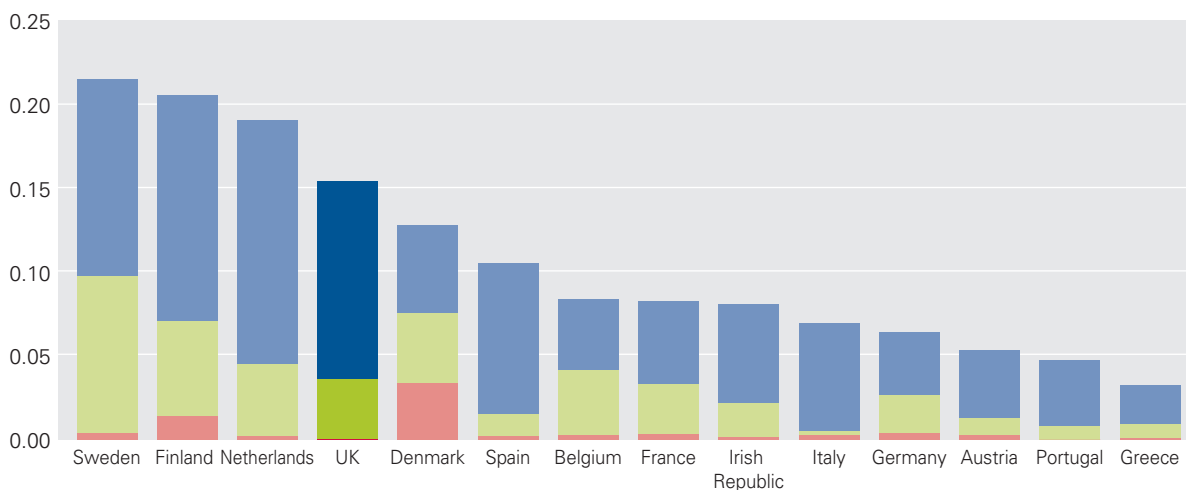
The UK performance in this area has improved the since the early 1990s.

• **charts 5.3.2 and 5.3.3**

However, the UK still lags well behind the US, particularly in the area of early stage investment which is less than half US levels.

Chart 5.3.1: Venture capital investment

EU comparison, 2002
Per cent of GDP



data

Chart 5.3.1:
Source:
European
Venture Capital
Association
(EVCA) and
OECD
● Expansion
● Start-up
● Seed

What does this mean for the UK?

The performance of the venture capital market has meant that there continues to be a relatively large pool of available funds overall in the UK compared to other EU economies. Although the value of venture investments fell back after 2000 as the global investment climate weakened, the market has nevertheless stood up well overall enabling the more dynamic and innovative firms to obtain finance. However, the rationalisation that has occurred following the bursting of the 'dot.com' bubble has reduced the relative proportion of funds going into *early stage* finance.

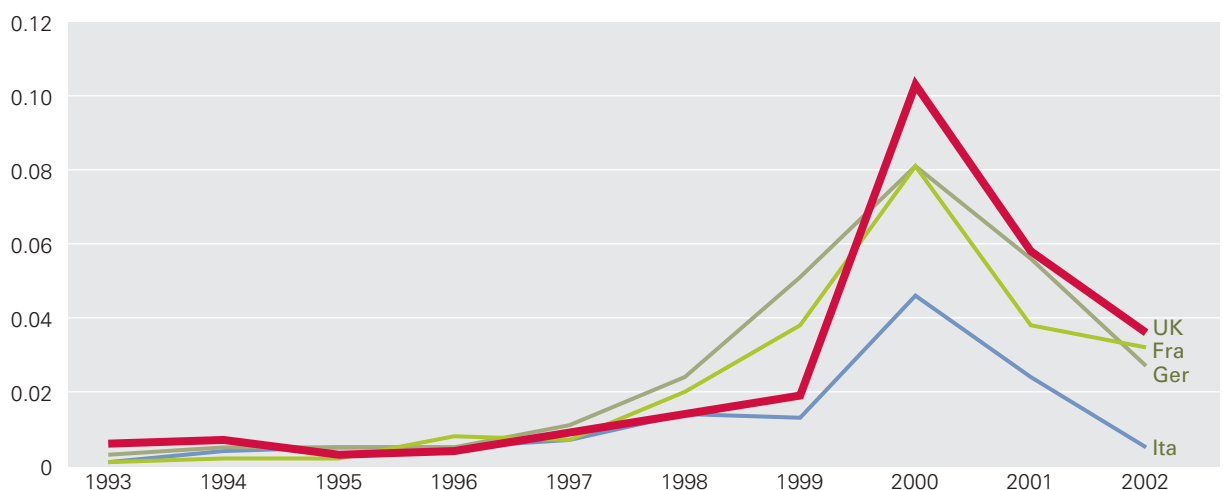
It remains the case that the vast majority of UK venture capital investment is directed towards larger deals involving established businesses. This means that funding gaps arise which result in projects in certain sectors or regions going unsupported. The Enterprise Investment Scheme and the Venture Capital Trust tax incentives aim to boost the supply of risk capital to businesses affected by the equity gap and, more recently, the Government has created a network of Regional Venture Capital Funds and the UK High Technology Fund. These initiatives are intended to address financing gaps in the provision of small-scale equity and signal the opportunities presented by those gaps to other providers.

Chart 5.3.2:
Source: Eurostat

- UK
- France
- Germany
- Italy

Chart 5.3.2: Venture capital investment – early stages

UK, Germany, France and Italy comparison, 1993-2002
Per cent of GDP



data

The UK High Technology Fund has successfully raised £126.1 million, exceeding its target of £125 million. Of this, £123 million has been committed to specialist venture capital funds that have, in turn, invested in over 121 technology-based companies. The nine Regional Venture Capital Funds have a total of £250.5 million available for small-scale investments (i.e. those under £500,000) in SMEs with potential for rapid growth.

In light of the responses to the April 2003 *Bridging the Finance Gap* consultation, the Government is currently assessing the possible options for further measures that might address the remaining equity gap. This consultation invited views on whether a variant of the Small Business Investment Company programme, which has been an important driver of the growth of the US early-stage venture capital sector, could be applied in the UK.

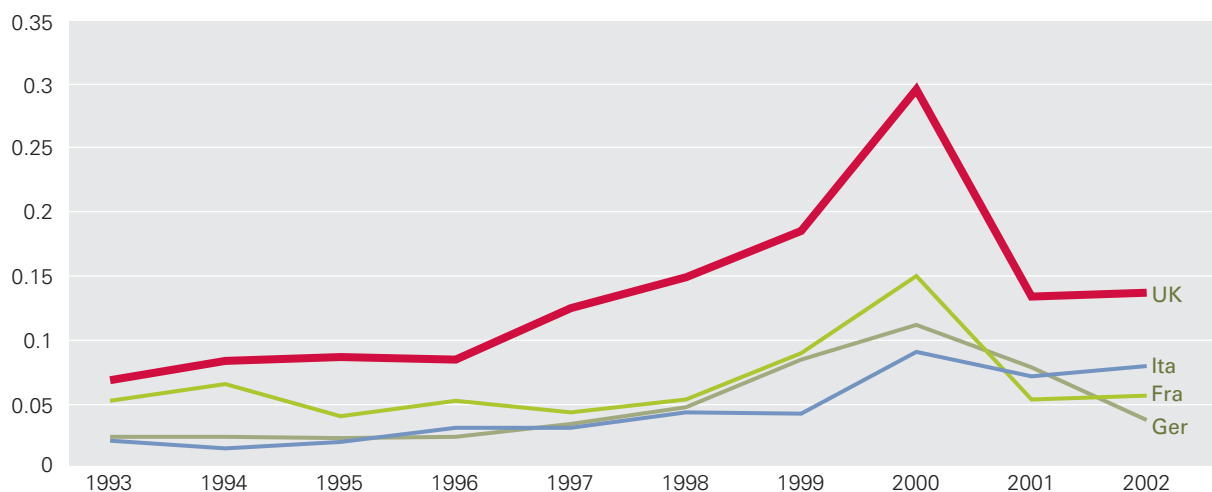
Chart 5.3.3: Venture capital investment – Expansion and Replacement

UK, Germany, France and Italy comparison, 1993-2002
Per cent of GDP

data

Chart 5.3.3:
Source: Eurostat

- UK
- Ita
- Fra
- Ger



5.4 Equity markets

London remains one of the world's leading equity markets

Why is it significant?

Stock markets play an important role in restructuring at the corporate level by facilitating mergers and divestments. In addition to this, some companies still use the stock market as an important source of finance, alongside retained profits and debt. In general, the larger the stock market, the greater will be its liquidity and the more efficient it will be at allocating finance to companies.

How does the UK perform?

In 2002 the LSE was the largest market in the world in terms the ratio of capitalisation to GDP. • **chart 5.4**

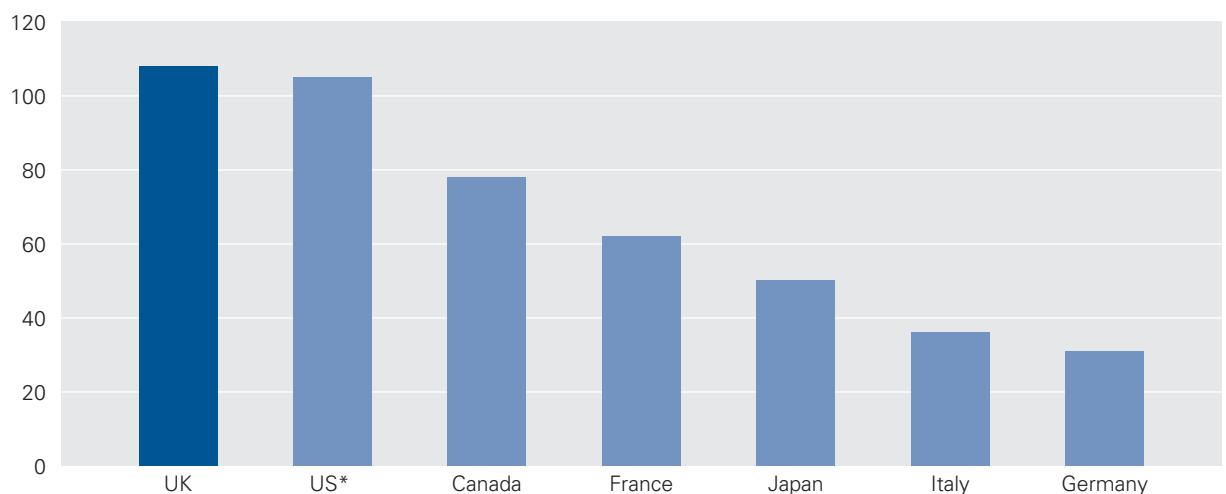
The LSE also has more companies with shares listed on it than any other European exchange and had more newly listed companies than any other European exchange apart from Madrid.

The size of the stock exchange is one aspect of London's important position within Europe as an international financial centre.

Chart 5.4:
Source: DTI calculations, using World Federation of Stock Exchanges (FIBV), Euronext and OECD data
* NYSE + Nasdaq

Chart 5.4: Stock market capitalisation

G7 comparison, 2002
Per cent of GDP



data

What does this mean for the UK?

These figures suggest that UK companies may have better access to stock markets than other G7 economies and derive benefit from having, in London, Europe's largest financial centre.

However, it is difficult to assess the extent to which the LSE gives the UK a competitive advantage. A full assessment would need to take into account other types of finance such as debt, and also look at the way internal finance is allocated to investment (which is very difficult to quantify).

Furthermore, the effects of issues such as ownership structures and corporate governance arrangements on long-term investment decisions also need to be considered.

It is also important to examine the experience of different types of companies. In particular, in recent years concern has been expressed about the effectiveness with which smaller non-technology companies are able to raise equity finance from UK stock markets.

COMPETITIVE ENVIRONMENT

The competitive environment provides the framework under which labour, capital, and product markets operate. These rules and institutions are fundamental for productivity because they facilitate the efficient operation of markets. They need to be transparent and comprehensible to ensure that individuals and organisations recognise their rights and responsibilities.

There are a number of dimensions to the competitive environment:

- **Competition** – open and competitive markets encourage firms to innovate and strive for greater efficiency; providing incentives to reduce costs and prices. Competition can deliver real benefits for consumers.
- **The labour market** – dynamic, modern economies require flexible and efficient labour markets to respond to changing circumstance and to make the best of new opportunities. They also need to offer appropriate worker protection, in order to foster commitment and partnership in the workplace.
- **Institutional and political environment** – business confidence and the willingness to invest are affected by the institutional and legal framework, and by the efficiency of the regulatory system. The latter is also particularly important for consumer confidence.

Summary of the Competitive Environment Indicators

The traffic light summarises the historical performance of each of the individual indicators compared with the other G7 countries, with each indicator assigned to a band on the basis of the assessment set out in this chapter.

6.1 ● Openness to trade and foreign investment

6.2 ● Competition

6.3 ● Energy market competition

6.4 ● Unemployment

6.6 ● Industrial relations

6.5 ● Diversity of employment opportunities

6.7 ● Labour market regulation

6.8 ● Political environment

- The green light shows those areas where the UK has signs of strength.
- UK performance is regarded as only average in those indicators with an amber light.
- Indicators with a red light show clear signs of weakness. Within each of these bands, indicators are listed in order of appearance in this chapter.

Progress since the first edition

There has been progress in improving the UK's competition regime. The provisions of the new Enterprise Act 2002, together with substantial increases in resources for the UK competition authorities, provide the framework to increase the competitive intensity of the UK economy and bring down barriers to innovation.

The labour market remains flexible and efficient. This has combined with an effective industrial relations regime to deliver a robust performance. As a result, the UK has the lowest unemployment rate in the G7.

Although business remains supportive of both the political and institutional framework – with the UK ranked third in the G7 in terms of the overall environment – there are tentative indications of concern over the focus of policy. This is despite improvements in outcomes such as macroeconomic stability and employment.

6.1 Openness to trade and foreign investment

UK is actively promoting trade liberalisation and remains an attractive location for FDI

Why is it significant?

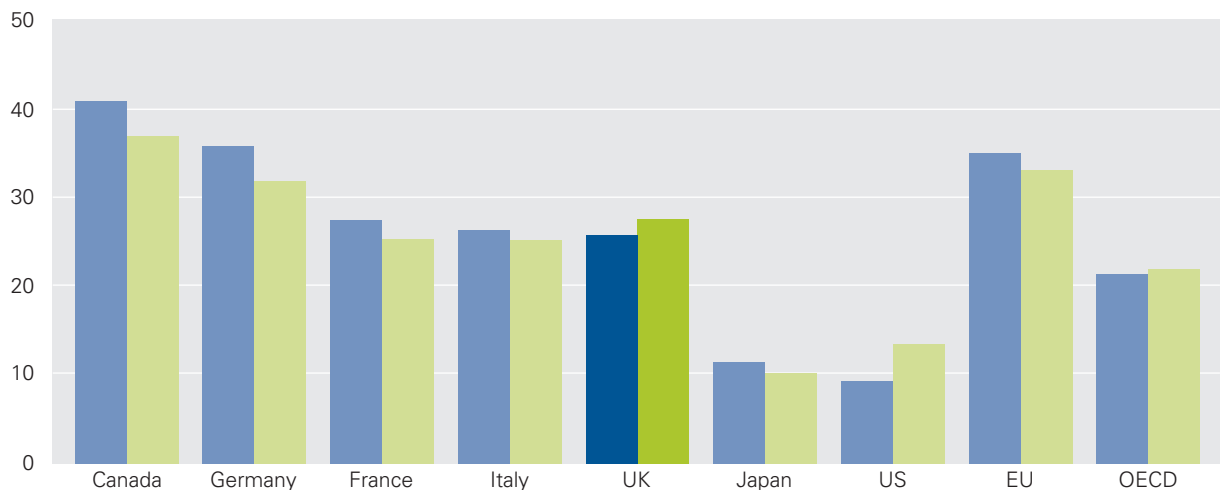
Competition, whether from abroad or between domestic firms, is a spur to efficiency and the diffusion of new technology and innovation. However, the contribution of competition to economic performance cannot easily be measured alongside other inputs like labour, capital and technology. Instead it is one of the determinants of the conditions which generate high productivity levels.

Competition is a complex and multi-dimensional dynamic process. As well as being dependent on the domestic competition regime, the degree of competitive intensity is also based on the openness of the economy. In addition to the increased competition that it creates, openness facilitates technology transfer, helps spread best practice and promotes access to the global knowledge pool. It can also open up new markets and increase the potential return to new ideas. Export intensity, import penetration, the level of tariff and non-tariff barriers, and the degree of inward investment all provide indicators of the degree of openness in the UK.

Chart 6.1.1:
Source: OECD
● Exports
● Imports

Chart 6.1.1: Trade in goods and services
G7 comparison plus EU and OECD averages, 2002
Per cent of GDP

data



How does the UK perform?

In terms of trade as a proportion of output, the UK performs well taking account of the size of our economy. The UK was grouped with France and Italy in 2002, behind Canada and Germany but substantially ahead of the US and Japan.

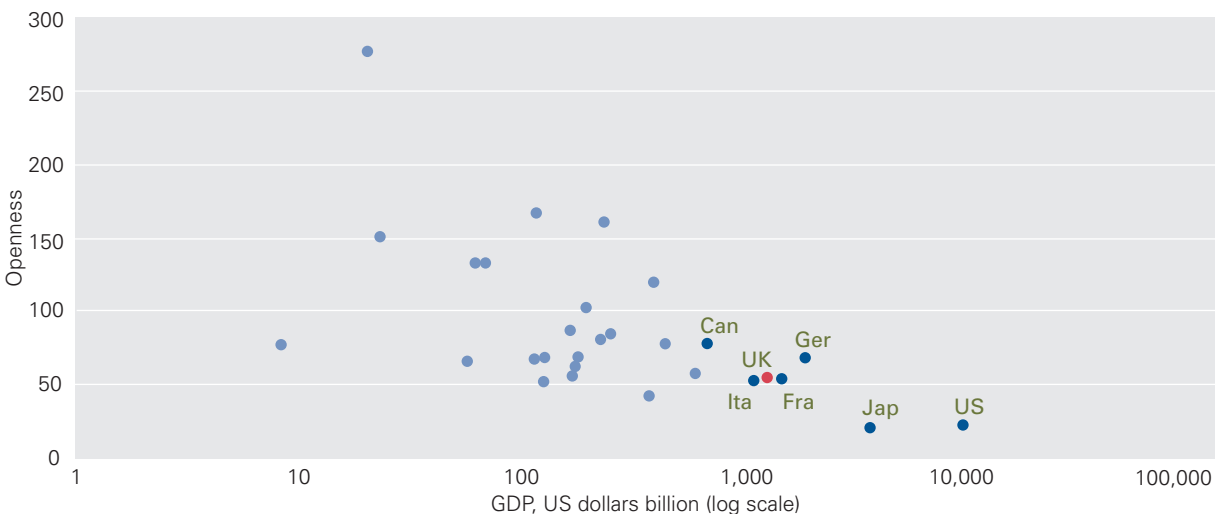
• charts 6.1.1 and 6.1.2

The extent of barriers to trade is another indicator of openness. Low barriers mean that domestic industries are exposed to more competition from efficient low-cost producers abroad, which in turn allows them to assemble more efficient global supply chains. Average industrial tariff rates in developed countries are low and have

fallen further in recent years. Since the Uruguay Round additional market opening has occurred with the implementation of the Information Technology Agreement (eliminating tariffs on computers, telecoms equipment, semiconductor manufacturing and testing equipment, software and scientific instruments). In 2001 the average 'most favoured nation' applied tariff for non-agricultural goods was 4.3 per cent in the EU, compared with 3.6 per cent in the US, 2.7 per cent in Japan and 4.3 per cent in Canada. However, whilst average industrial tariffs are low, rates can still be high for individual products. Furthermore, non-tariff barriers can pose a substantial additional barrier to trade.

Chart 6.1.2: Relationship between openness of trade and GDP

OECD comparison, 2002



data

Chart 6.1.2:
Source: OECD
● UK
● G7 countries
● Non G7 countries
Note: Openness is defined as exports plus imports of goods and services as a per cent of GDP

The EU's Single Market programme has been a major factor in reducing barriers to trade within Europe. Ten years of the Single Market is estimated to have increased EU growth by 1.8 per cent. In the last year further progress has been made, with agreement to 'a common political approach' on the Community Patent, which will significantly reduce the costs to business of securing pan-EU patents. The European Commission's Better Regulation Action Plan has also been adopted – a new integrated system of impact assessments for legislative and policy initiatives, which is designed to reduce the burden imposed on business by overly complex and disproportionate legislative requirements.

Recent years have been challenging for inward investment. The combination of a sluggish world economy and, in the last year, uncertainties over Iraq meant that many businesses deferred or cancelled investment decisions. There has been a 53 per cent decline in the level of world FDI inflows in 2002 compared to the peak of US\$1,400bn in 2000. The UK has not been immune to this trend, but it remains an attractive location for investors as the world's second largest recipient of inward investment and the second largest investor overseas behind the US. In proportion to GDP, the UK has the highest ratio of both inward and outward investment amongst the G7. • charts 6.1.3 and 6.1.4

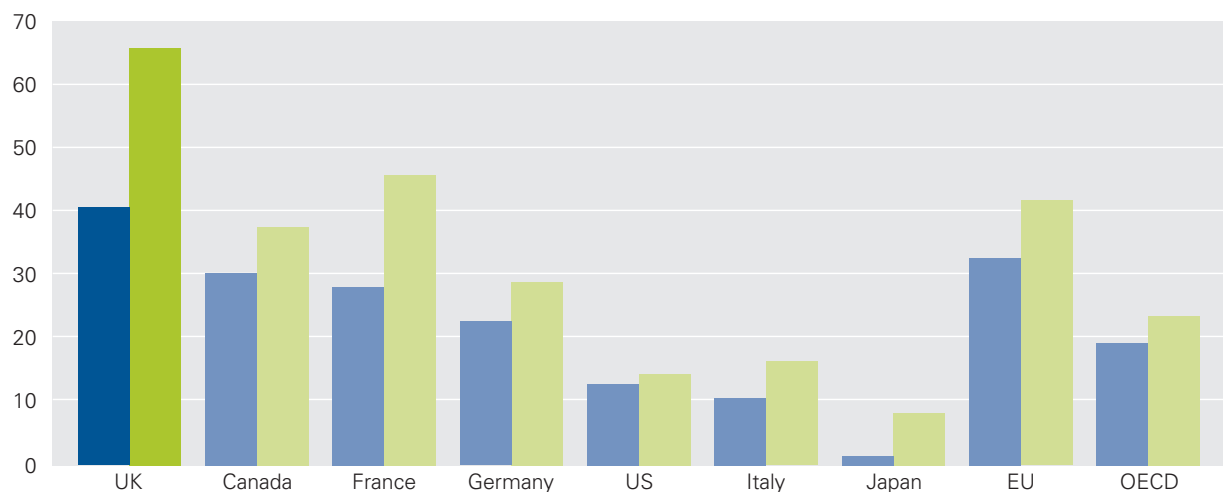
Chart 6.1.3:
Source: UN
World
Investment
Report

● Inward
● Outward

Chart 6.1.3: Value of foreign direct investment

G7 comparison plus EU and OECD averages, 2002
Book value of balance sheet as per cent of GDP

data



What does this mean for the UK?

The UK remains a relatively open economy. This puts the UK in a good position to take advantage of increasing global trade, and to benefit rapidly from new developments, ideas and techniques. It is however important that the UK continues to take positive action to improve openness. It will, in conjunction with the EU and the World Trade Organisation (WTO), continue to encourage the removal of existing barriers to trade.

Such moves will not only benefit the UK. The WTO Doha Development Round is expected to improve the trading capacity of developing countries by removing barriers to trade, especially in industrial goods and services, where many markets around the world still remain unliberalised. Within the EU, there will be continued pressure for greater openness. At the Lisbon Summit in 2000, the 15 EU Member States agreed a 10 year plan of economic reform, involving removal of barriers in the service industries, the completion of the energy liberalisation process, and intensified efforts to promote competition and modernisation of the state aid regime.

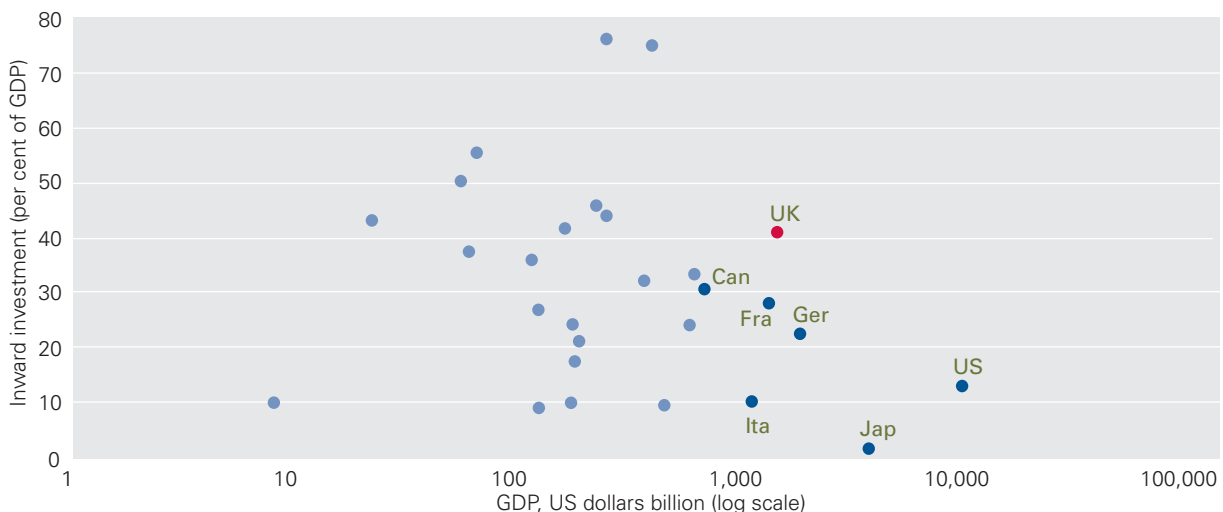
Chart 6.1.4: Relationship between inward foreign direct investment and GDP

OECD comparison, 2002

data

Chart 6.1.4:
Source:
UN World
Investment
Report

- UK
- G7 countries
- Non G7 countries



6.2 Competition

UK regime well-regarded

Why is it significant?

Increasing competition is a key element of the Government's drive to increase productivity. Research shows that sectors where competition is stronger tend to perform better in terms of productivity growth, innovation and international competitiveness.⁶² Competition leads to lower prices, a wider choice and higher quality of goods and services, and a fairer deal for consumers.

⁶² OECD, *Competition, Innovation and Productivity Growth: A Review of Theory and Evidence*, Economics Department Working Paper No 317, (2002); Aghion, P., Bloom, N., Blundell R., Griffith R., and Howitt P., 'Competition and Innovation: an Inverted U relationship', *IFS Working Paper* 04/02 (2002).

How does the UK perform?

Measuring the competitive intensity of the economy is difficult. Competition does not tend to take place at the macroeconomic level between countries, but between firms operating in the same economic market. With these markets – be they retail, wholesale, local, national or international – competition can take many forms. It can be based on price, quantity, product differentiation or a mixture of these features.

The process of competition is invariably characterised by dynamic rivalry. This can, for example, take the form of product and service innovation driven by investment in R&D and technological advances where companies seek to gain short- or longer-term advantages over each other.

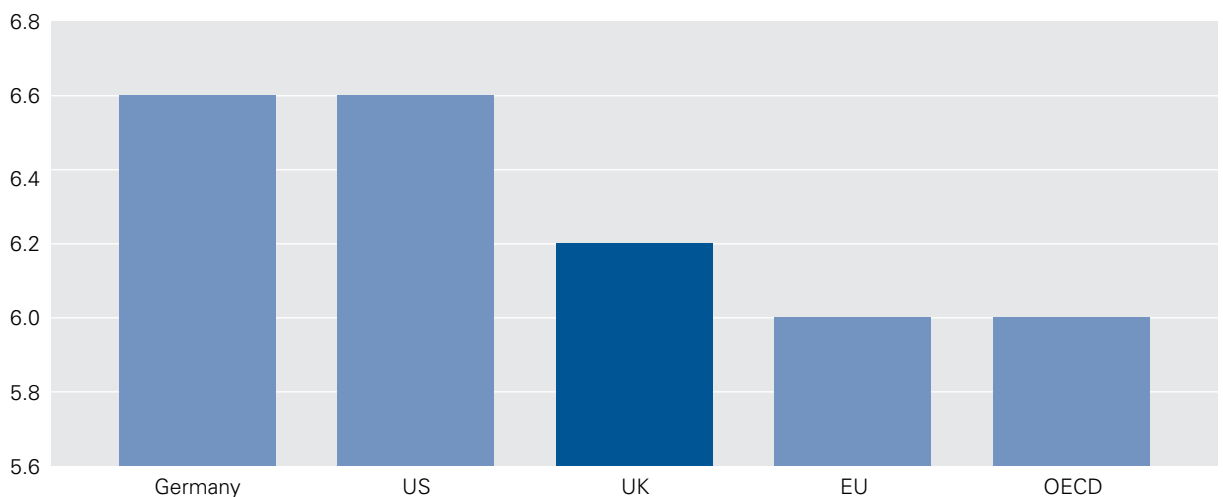
The complex nature of the interactions between firms competing in a market means they cannot readily be measured by comparative statistics. While data relating to market concentration and profitability provides, in some instances, a 'filter' for competition authorities to target their investigative resources into certain markets, they do not necessarily allow inferences of the competitive intensity of a given market to be drawn in lieu of detailed investigations into the behaviour of a specific firm or firms. These statistics can also fail to capture the 'threat of entry' that often has an important effect on competition within markets. Moreover, as noted, these descriptive statistics relate to individual markets rather than to the economy as a whole.

Chart 6.2.1:
Source:
Pricewaterhouse
Coopers.

Chart 6.2.1: PWC ranking of competition regime

Comparison, 2001
Index (scale 0-10)

data



Nevertheless, one key driver of competition that can be assessed is the extent to which national competition regimes are effective at providing the type of environment within which efficient firms can flourish. For example, a strong and effective competition regime helps to ensure that anti-competitive behaviour is dealt with effectively. Two studies have sought to comparatively measure national competition regimes.

A study carried out by PWC in 2001 asked one hundred experts from different countries including lawyers, economists, representatives of companies and consumer organisations to rank the effectiveness of the UK competition regime with its peers in the OECD.⁶³ The review placed the UK in the top half of its peer group, behind Germany and the US, but ahead of the rest of the OECD.

• **chart 6.2.1**

The UK system was considered to be less effective for merger inquiries. In this area, the UK competition policy institutions were considered to be significantly less politically

independent, and slower in decision-making, than their EU counterparts.

The weaknesses have since been addressed in the Enterprise Act 2002.⁶⁴ This is supported by the Global Competition Review (GCR) 2003. The GCR ranked the UK joint second in the world behind the US. • **chart 6.2.2**

Another peer review is planned for 2004 and will also help to assess the impact of the new legislation.

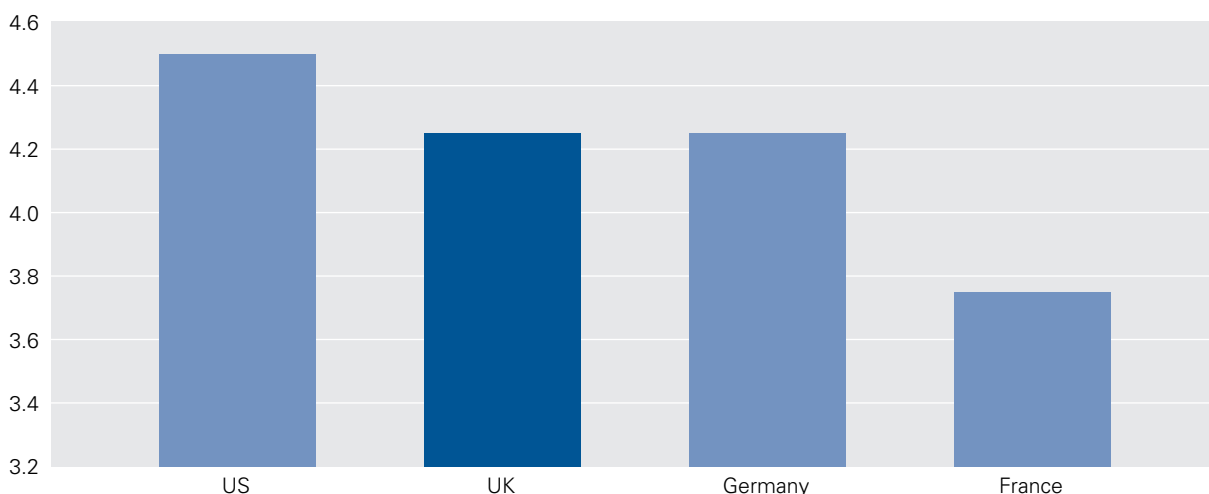
These measures do not necessarily assess all aspects of the competitive intensity of the UK economy, but as noted above, accurate indicators of competition are difficult to obtain. However, as part of the consultation on the *Indicators*, DTI and Treasury will work with competition specialists to see if more meaningful indicators of the level of competition in the UK economy can be developed

⁶³ PWC, *Peer Review of UK Competition Regime* (2001).

⁶⁴ <http://www.dti.gov.uk/enterpriseact/index.htm>

Chart 6.2.2: GCR ranking of competition regime

G5* comparison, 2003
Rating out of five



data

Chart 6.2.2:
Source: Global Competition Review

* G5 excluding Japan

What does this mean for the UK?

The DTI has a PSA target to bring UK levels of competition, consumer empowerment and protection up to the level of the best by 2006. The Enterprise Act 2002 has recently come into force, which will strengthen the UK's competition and consumer law framework, transform the approach to bankruptcy and corporate rescue, and empower consumers. The Act is intended to address the weaker points of the UK competition regime and build on the progress made by the Competition Act 1998, recent insolvency reforms and measures already implemented in the 1999 consumer White Paper, *Modern Markets: Confident Consumers*.

Significant features of the Enterprise Act include:

- The explicit removal of politics from merger decisions. The independent Office of Fair Trading (OFT) and Competition Commission now have sole responsibility for merger decisions (with the exception of those in a few areas of national interest) using competition-based tests;
- A more pro-active role for the OFT in investigating markets. The OFT may make market investigations references to the Competition Commission where it suspects that one or more features of a market prevents, restricts or distorts competition in the UK;
- More transparent and accountable decision-making by the competition authorities. The competition authorities will issue comprehensive guidance on the new regime. They will be obliged to consult on and give reasons for all significant decisions. There will be a new right of appeal to the Competition Appeal Tribunal in merger and market inquiries. Inquiries will have to be completed within

statutory maximum timetables. Reforms to the Competition Commission's procedures will allow for a more transparent and better informed remedy-setting phase following the publication of provisional competition findings;

- Criminal sanctions with a maximum penalty of five years in prison to deter those individuals who dishonestly operate hardcore cartels – that is, agreements to fix prices, share markets, limit supply or production and rig bids. US research shows that cartels raise the prices of the affected goods and services by 10 per cent on average;⁶⁵ and
- Greater opportunities for victims of anti-competitive behaviour to gain redress, making it easier to bring claims for damages for losses suffered due to anti-competitive behaviour.

Empowered consumers have a key role to play in promoting competition. The Government is tackling consumer empowerment and detriment on three levels:

- Government needs to create an effective framework for market transactions, help close the information gap between producers and consumers and ensure effective enforcement in the market to tackle unscrupulous traders;
- The Enterprise Act has enhanced the powers of redress for consumers and introduced a new super-complaints procedure which gives consumer bodies a formal means of bringing consumer problems to the attention of the OFT and other regulators; and
- Initiatives such as DTI's new 'Consumer Direct' Helpline will empower consumers to make the right choices and place more effective pressure on business to improve products and services.

⁶⁵ Wouter P J Wils, *Does the effective enforcement of Articles 81 and 82EC require not only fines on undertakings but also on individual penalties, in particular imprisonment?* (2001).

6.3 Energy market competition

UK has one of the most competitive gas and electricity markets in Europe and G7

Why is it significant?

Energy is vital to the functioning of a modern economy. Energy must be competitively priced in order to maintain competitiveness and encourage inward investment. As in other markets, vigorous competition in energy stimulates innovation and ensures the efficient allocation of resources, improving service quality and driving down prices.

How does the UK perform?

An assessment of performance undertaken on behalf of the DTI indicates that the UK had one of the most competitive energy markets in the EU and G7 in 2002.⁶⁶

- chart 6.3

The existence of competition in the UK has helped to drive down energy prices. For domestic consumers, average prices fell in real terms by 10 per cent for gas and 19 per cent for electricity between 1997 and 2002. For industrial users, gas and electricity prices have fallen by 28 per cent and 29 per cent respectively in real terms between 1997 and 2002. The UK's industrial gas and electricity prices were the second and third lowest respectively in the EU in 2002, while domestic gas and electricity prices were the third and fourth lowest. All customers have been able to change their gas or electricity supplier since May 1999. Since then, over 19 million customers have changed supplier, seeing significant savings on their energy bills.

⁶⁶ OXERA, *The relative extent of energy market competition in Europe and the G7* (2003). The detailed results and rankings for 2002 are only provisional at this time, due to the incompleteness of the datasets for that year.

Chart 6.3: Overall competitiveness score for selected EU energy markets

Selected EU countries
Partial 2002 data

data



Chart 6.3: Source: *The Relative Extent of Energy Market Competition in Europe and the G7*; report by OXERA on behalf of the DTI, September 2003

• Electricity
• Gas
• Energy

What does this mean for the UK?

The UK has one of the most competitive energy markets in Europe and the G7. This has helped to deliver lower prices for domestic and business customers. It has also stimulated the investment needed to help ensure secure supplies of gas and electricity and to improve quality of service.

As the full requirements of the revised Energy Liberalisation Directives are implemented, the gap between the UK and other competitive countries is likely to narrow. This will bring about greater benefits for domestic and industrial consumers and will provide a level playing field for UK energy companies to compete abroad.

6.4 Unemployment

Low average unemployment rates

Why is it significant?

Low unemployment rates are evidence of an efficient and flexible labour market. Efficient labour markets and flexible workers are necessary for a successfully functioning economy that generates high levels of prosperity. Reducing unemployment also helps foster social inclusion.

Youth and long-term unemployment are also important indicators of economic performance. In the case of youth unemployment, it is widely held that a period of unemployment early on can adversely affect individuals' employability and earnings potential for the duration of their working life. A similar problem can arise from a period of long-term unemployment.

How does the UK perform?

Comparisons of unemployment rates across the G7 show that the UK has performed extremely well over the last few years, with a substantial fall since 1997. • **chart 6.4.1**

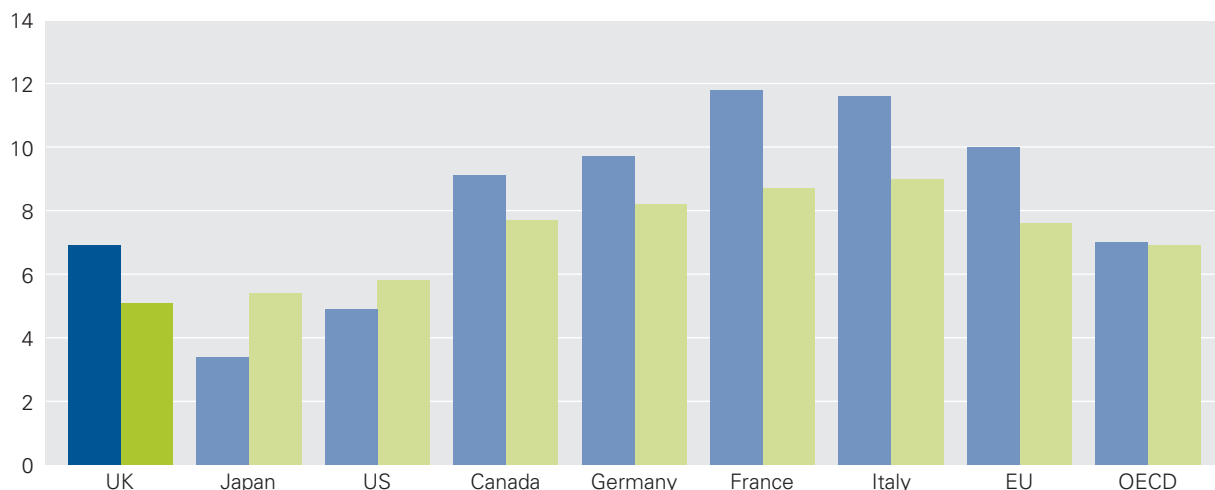
As a result, in 2002 the UK's unemployment rate fell below that in Japan and the US, to give the lowest unemployment rate in the G7. The UK's continued low unemployment rate is particularly impressive when set against recent weaknesses in the global economy which have led to rising unemployment in Japan and the US.

Chart 6.4.2 shows that the US and Canada have the lowest proportion of long-term unemployed. • **chart 6.4.2**

The UK performs well against Japan and the other major European countries. It also performs well compared to a few years ago, with the number of long-term unemployed having fallen by around 60 per cent since Spring 1997.

Chart 6.4.1: Standardised unemployment rates

G7 comparison, 1997-2002
Per cent of total labour force



data

Chart 6.4.1:
Source: OECD

● 1997
● 2002

In all G7 countries, the youth unemployment rate remains higher than the average rate for all those of working age. The UK's youth unemployment rate of 11 per cent is bettered only by Japan and Germany. The problem is particularly severe in France and Italy. • **chart 6.4.2**

What does this mean for the UK?

The continued decline in unemployment over the last few years has been facilitated by the stability generated by the UK's macroeconomic framework and a flexible labour market. This has helped bring about a continued improvement in the UK's relative performance during a period of slower world economic growth.

The Government's Welfare to Work strategy has helped tackle the problem of long-term unemployment. The New Deal for young people and the New Deal for those aged 25 – programmes involving comprehensive support for job search and training – have helped to deliver significant reductions in long-term and youth long-term unemployment.

Almost 445,000 long-term unemployed 18 to 24 year olds and almost 155,000 older adults have found jobs through the New Deal. In addition, the New Deal for over 50s, introduced nationally in 2000, has helped increase the employment rate of those aged between 50 and state retirement age to 69 per cent from 65 per cent in 1997.

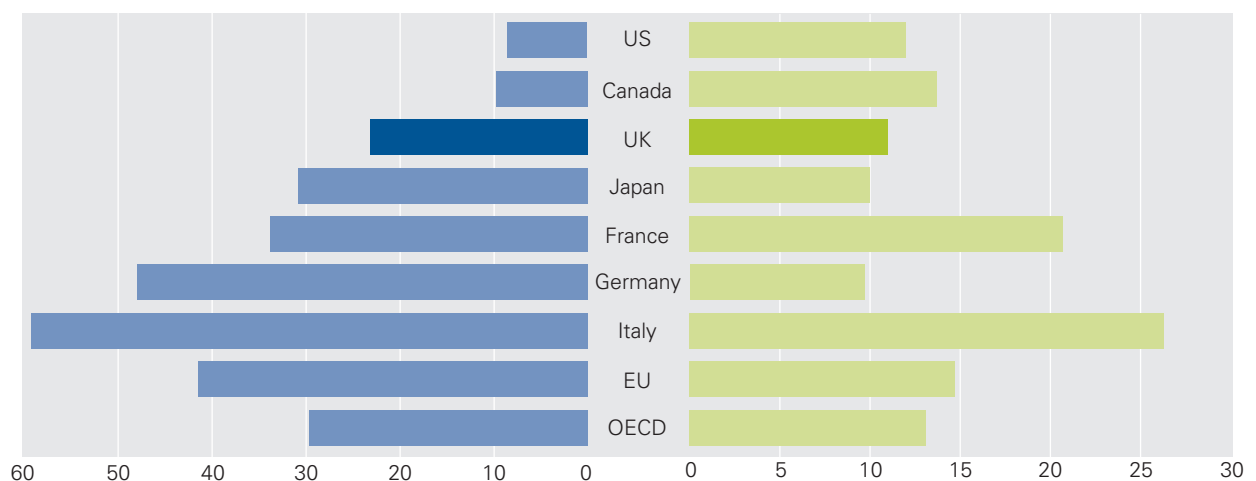
Whilst the UK's rate of unemployment on most measures is now low, there has been a persistent increase in male inactivity since the 1970s and this shows little sign of falling significantly. The increase in male inactivity is closely associated with the rise in male sickness and disability. A reduction in the number of men who are inactive due to sickness or disability would permit a continued expansion of the labour market. The Government aims to tackle the issue of inactivity through Jobcentre Plus.

Chart 6.4.2:
Source: OECD

- Long term unemployment – 12 months or more (as a per cent of total unemployment)
- Youth unemployment (as per cent of youth age group)

Chart 6.4.2: Long-term and youth unemployment rates

G7 comparison plus EU & OECD averages, 2002



data

6.5 Diversity of employment opportunities

A wide range of employment opportunities available

Why is it significant?

A labour market with a wide and diverse range of employment opportunities increases the supply of labour and helps to give business the flexibility that it needs. It helps ensure that those who want to work can do so. It also helps those workers who cannot take full-time employment to remain engaged with the labour market, and stops their skills atrophying.

How does the UK perform?

There exists a wide range of employment opportunities in the UK. Between 1997 and 2002, working patterns are broadly unchanged. • **chart 6.5.1**

Chart 6.5.2, displaying trends over a longer time period, shows that the incidence of part-time working picked up in the early 1990s, while the incidence of self-employment fell during the 1990s.

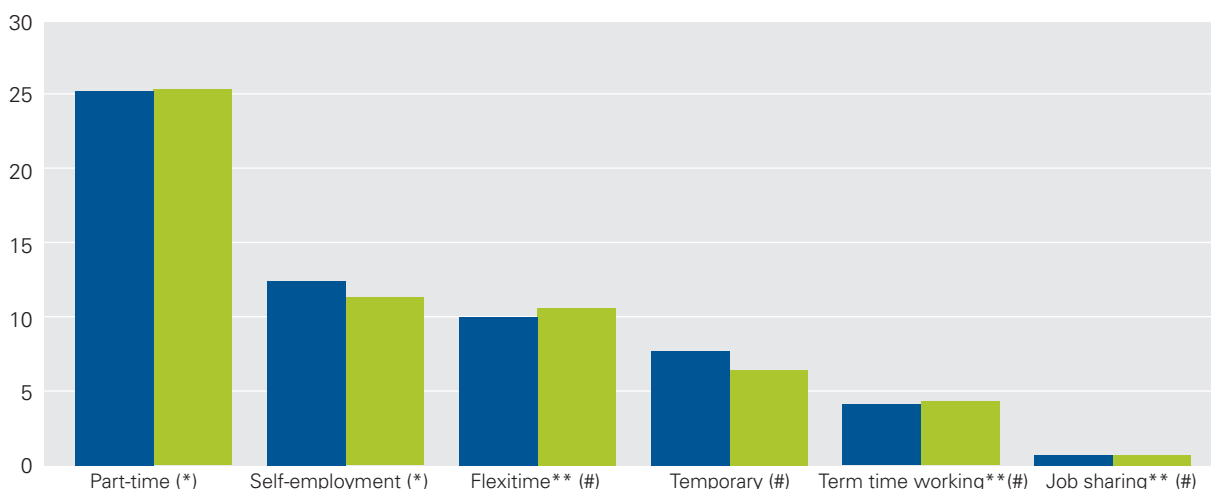
• **chart 6.5.2**

The proportion of people working part-time in the UK is high when compared with other EU Member States. Self-employment is about average. The incidence of temporary employment appears to be below the European average although, in other EU countries, a higher proportion of 'temps' have long-term, quasi-permanent relationships with their employers, as firms attempt to side-step onerous regulatory obligations attached to permanent staff.

• **chart 6.5.3**

Chart 6.5.1: Working patterns

United Kingdom, 1997 & 2002
Per cent of all in employment (*) and employees (#)



data

Chart 6.5.1:
Source: National Statistics (Labour Force Survey)

● 1997
● 2002

**Data are not consistent with 2001 Census revisions

What does it mean for the UK?

The diverse range of employment opportunities offered by the UK's labour market has made an important contribution to promoting labour market flexibility and expanding the supply of labour over the last 10 years. It is important that workers can continue to have access to a choice of employment opportunities so that the economy can exploit new ways of working.

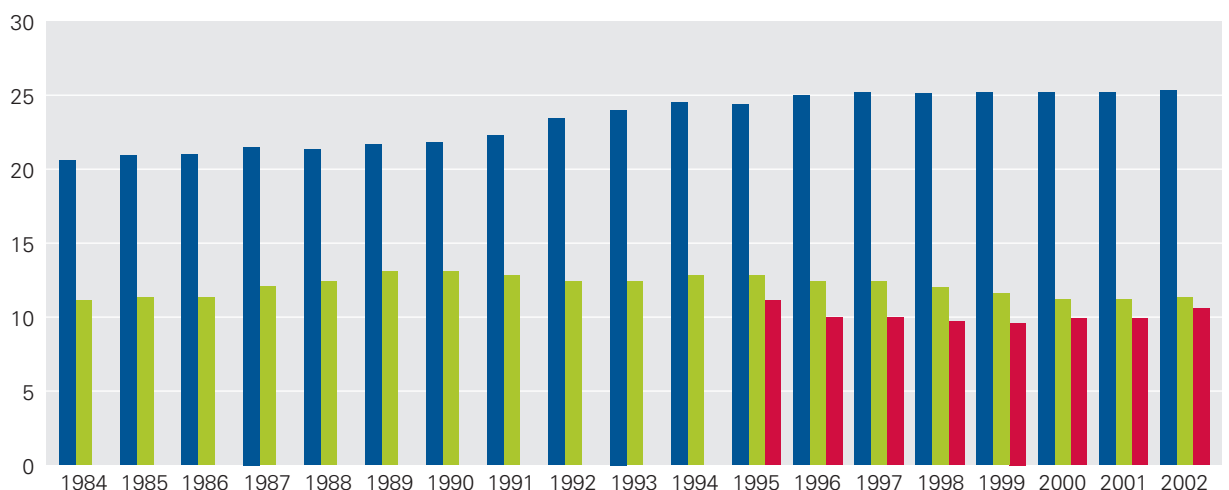
The Government has introduced a range of measures to increase opportunities for flexible working and to maintain parents' attachment to the labour market whilst they achieve their desired work-life balance. The main Work & Parents and flexible working legislation came into effect in April 2003, so it is too soon to see their impact on this edition of the *Indicators*.

Chart 6.5.2:
Source: National
Statistics (Labour
Force Survey)

● Part-time (*)
● Self-
employment
(*)
● Flexitime** (#)
**Data are not
consistent with
2001 Census
revisions

Chart 6.5.2: Part-time, temporary and self-employment

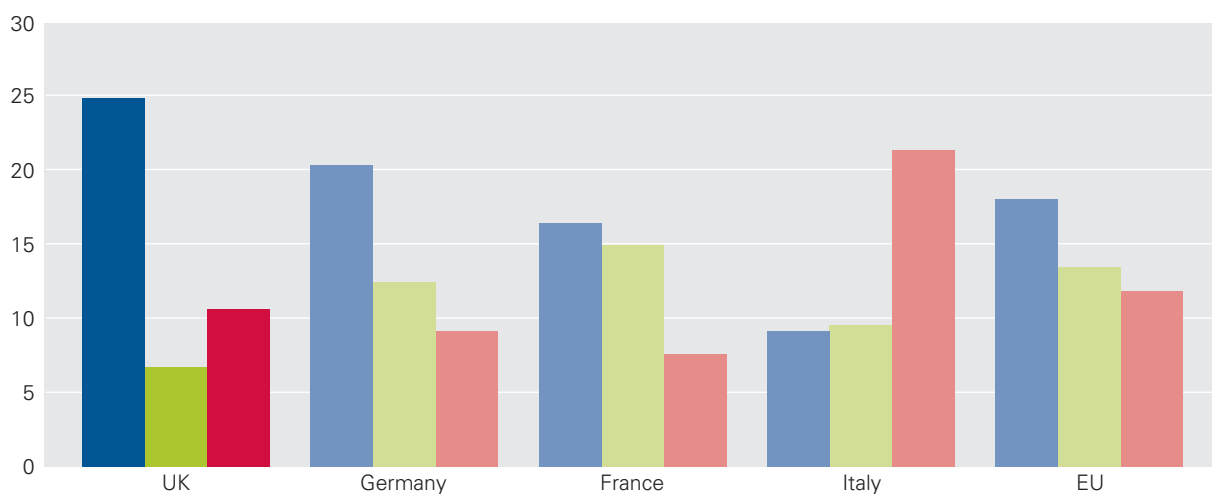
United Kingdom, 1984-2002
Per cent of all in employment (*) and employees (#)



data

Chart 6.5.3: Part-time, temporary and self-employment

UK, Germany, France and Italy plus EU average, 2001
Per cent of total employment



data

Chart 6.5.3:
Source: Eurostat
(European
Labour Force
Survey)

- Part-time
- Temporary
- Self-employed
(excluding
agriculture)

6.6 Industrial relations

Healthy employer-employee relations

Why is it significant?

The overall employer-employee relations climate is important to ensure a constructive dialogue, partnership at work and improved business performance. It helps to build the trust that can facilitate the introduction of new working practices. Evidence from the Workplace Industrial Relations Survey shows that good industrial relations are associated with higher levels of productivity.

How does the UK perform?

The number of working days lost to industrial stoppages over the period between 1997 and 2001 remained at historically low levels. The number of days lost in the UK has been lower than in Canada, France, Italy and the US, but higher than in Germany and Japan. • **chart 6.6**

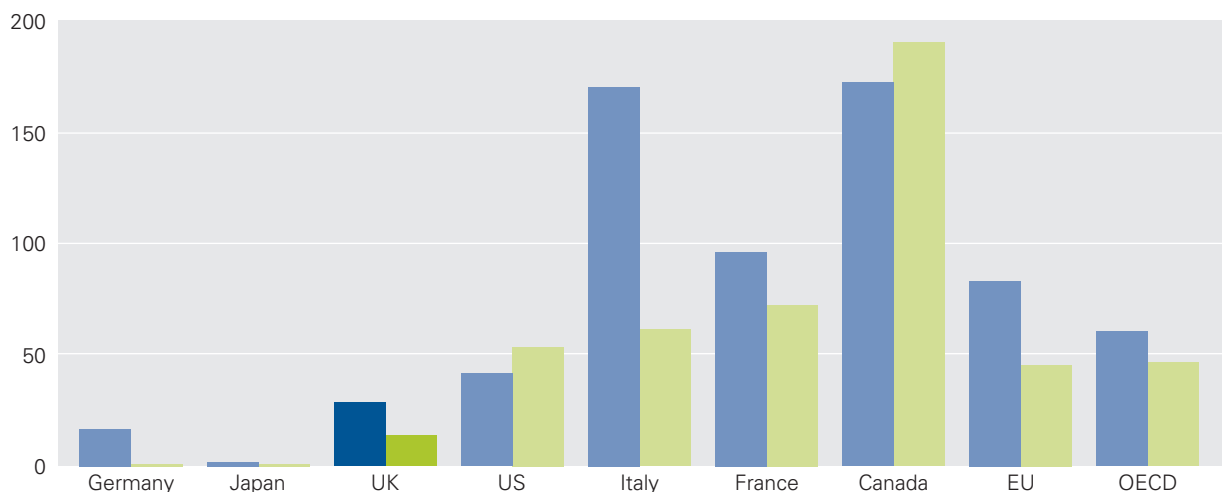
Whilst over a million working days were 'lost' in the UK over the past year, these have been confined to a small number of disputes, and the total number of stoppages has fallen to its lowest since records began in 1920. The number of working days lost for 2002 (1.3 million) was only a fraction of the working days lost in the 1980's (annual average 7.2 million) and 1970's (annual average 12.9 million). Further, the UK strike rate has remained below the OECD average rate since 1997, and is currently two thirds of the OECD rate.

Chart 6.6:
Source: ILO,
Eurostat, OECD
● 1992-1996
● 1997-2001

Chart 6.6: Working days lost due to industrial stoppages

G7 comparison plus EU and OECD averages, 1992-2001
Working days not worked per 1,000 employees in all industries and services

data



What does it mean for the UK?

The UK's industrial relations performance should be considered in the context of significant industrial restructuring over the last few years – both in the private and public sectors – and the rolling out by Government of a programme of increased individual and collective employment rights. On the collective side, one of the main measures taken has been the introduction of a statutory trade union recognition procedure in workplaces with more than 20 workers, to ensure trade unions have the right to recognition by the employer where a majority of the workforce want it.

Also, an individual facing a grievance or disciplinary hearing has a new right to be accompanied by a union official or fellow worker, and there has been a strengthening of individual trade union membership rights. That said, the Government has retained the essential features of the trade union law reforms of the 1980s including pre-strike ballots and the outlawing of secondary industrial action.

6.7 Labour market regulation

Strong performance, but concerns showing

Why is it significant?

Labour market regulation is a necessary and important component of the institutional framework. It affects the ability of employers to offer a diverse range of employment opportunities to meet their needs and those of their employees. It also influences the ability of the unemployed or inactive to find suitable employment. However, it is important that regulations are introduced in a way that does not damage business competitiveness.

It is difficult to measure the extent of labour regulation. Data on executive perceptions and mark-up on labour costs provide partial indicators of performance.

How does the UK perform?

A survey in the International Institute for Management Development's (IMD) World Competitiveness Yearbook suggests that the UK labour market is perceived to have a significantly better regulatory environment than other major European countries and Japan. • **chart 6.7.1**

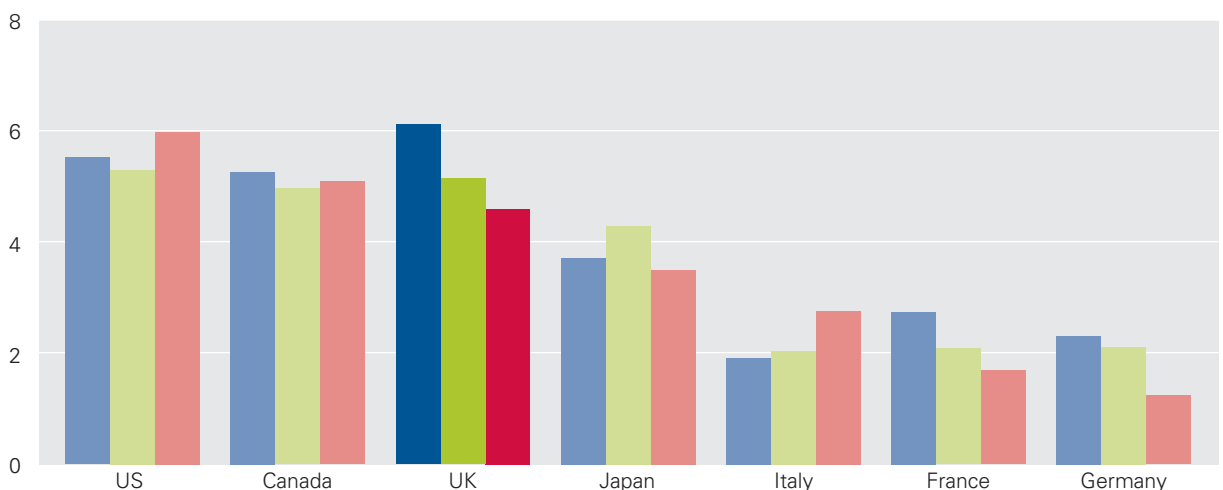
Since the first edition of the *Indicators* there has been a slight decline in this perception – in common with both France and Germany – but as indicators 1.4 and 6.4 have shown, the perception that the regulatory environment is less favourable has coincided with a period when the labour market has performed strongly.

The mark-up on wage costs faced by employers (e.g. social security charges) is another measure of the burden of Government intervention. US figures show that the UK compares very favourably with other G7 countries on this measure, with non-wage labour costs just over 15 per cent of total labour costs, is the lowest in the G7; half the proportion of France. • **chart 6.7.2**

Chart 6.7.1:
Source: IMD
● 1996 & 1997
● 1999 & 2000
● 2002 & 2003

Chart 6.7.1: Business executive perceptions of labour regulation

G7 comparison, 1996-2003
Survey score, 0-10 scale



data

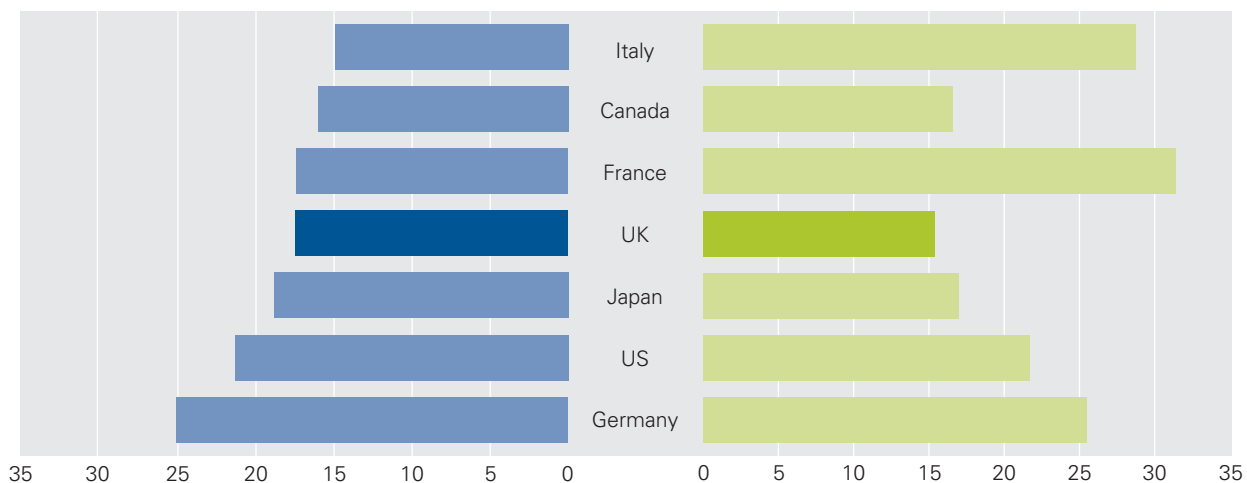
What does it mean for the UK?

The Government has set three goals for the labour market: more jobs, more diversity and choice, and more high performance workplaces. The employment regulations introduced by this Government have been designed to create a framework of decent workplace standards, which promotes a skilled and flexible labour market. The Government is continuing to build on this framework in its drive to raise productivity, including a range of changes to support families and encourage work participation.

In regulating the labour market, the Government has aimed to strike the right balance between the need to provide adequate protection for employees and the desire not to damage business competitiveness. The Government wants this balance maintained, with any new proposals taking account of the key principles of intervention in the labour market, published in the 2003 Budget Report. Any measures that improve the labour supply (such as by setting minimum

standards) must ensure that burdens on business, especially on small firms, are kept to a minimum. The Government is also promoting best practice, where it considers it to be a more appropriate option than regulation, such as its campaign to convince employers of the benefits of introducing work/life balance policies in the workplace.

Chart 6.7.2: Hourly labour costs and non-wage labour costs*
G7 comparison, 2002



data

Chart 6.7.2:
Source: US Bureau of Labor

- Total hourly labour costs (US dollars)
- Non-wage labour costs (per cent of total)

* production workers

6.8 Political and institutional framework

Unease amongst business about the economic environment

Why is it significant?

Economic activity occurs within a political, institutional and legal framework. The institutional setting provides market participants with confidence to produce, invest, innovate, and work. Consequently, the framework can provide the right incentives for a country to make the best use of its resources.

Measurement of the overall environment is difficult, both across time and across countries. Business perceptions provide partial proxy indicators for the relative effectiveness of the institutional framework. However, they need to be treated with care, as they depend on the sampling methods used, short-term macroeconomic fluctuations and the weights chosen when aggregating the data.

How does the UK perform?

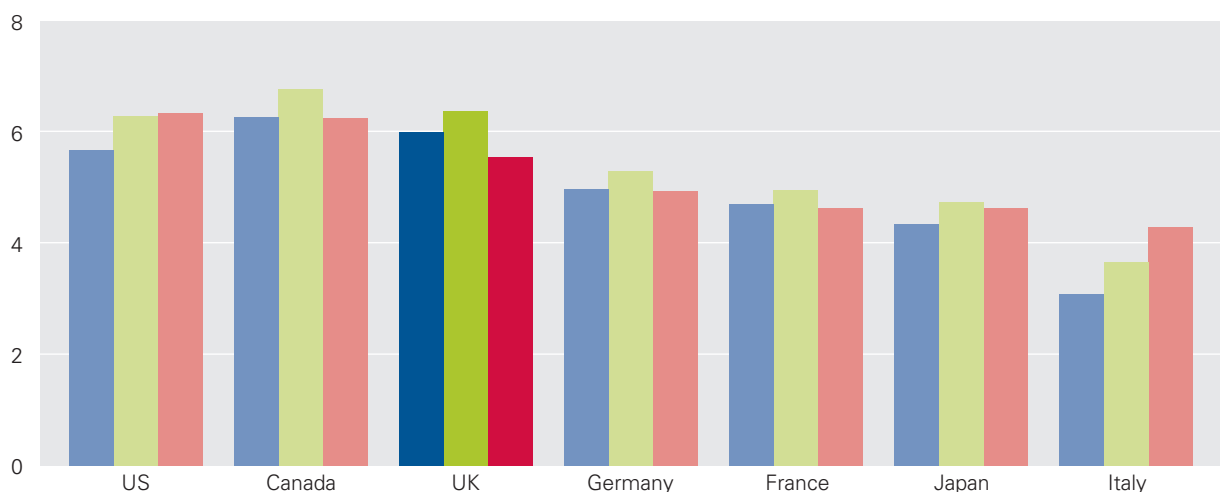
Surveys of executive perceptions undertaken by the International Institute of Management Development (IMD) allow a comparison of both the supportiveness of Government policies on competitiveness and of the overall regulatory environment. Chart 6.8.1 shows business executive perceptions of how institutions and Government policies support competitiveness, taking account of the tax system, the adaptability and transparency of the legislative process, the legal framework and the efficiency of the administration. • **chart 6.8.1**

It shows that the UK performs well, especially when compared to continental Europe. However, there has been a slight slippage in the UK's score. Closer inspection of the underlying data suggests that despite consistently strong scores on many of the fundamental aspects of the framework – administration, customs efficiency, the legal system – there has been a concern over the future course of policy.

Chart 6.8.1:
Source: IMD
● 1996 & 1997
● 1999 & 2000
● 2002 & 2003

Chart 6.8.1: Business executive perceptions of how institutions and government policies support competitiveness

G7 comparison, 1996-2003
Average survey score, 0-10 scale



data

The UK enjoys a similarly strong performance in terms of business executive perceptions of regulation. The UK is again in the top half of the G7, and once more leads Europe. • **chart 6.8.2**

While the scores are lower in 2002/3 than in 1996/7, this trend is evident across much of the G7, but to a lesser extent than in the UK. The positive picture is confirmed by recent analysis that suggests that the UK has the lowest level of product and labour market regulations in the OECD.⁶⁷

What does this mean for the UK?

The UK continues to perform well, especially relative to continental Europe, in providing an effective environment in which to do business. Policies are seen as supportive, and regulations are relatively low.

However, in so far as these indicators reflect more than just cyclical fluctuations, they suggest that there is some unease in business about the economic environment. The difference in perception and reality of

many of the outcomes suggest that business is worried about the future course of economic policy; that the UK is at risk of losing the competitive advantage provided by the overall operating environment.

As Professor Michael Porter notes, these worries may also reflect businesses concern about the transition of the UK from a country operating on a low cost, low innovation, low value added business model, to a high innovation, high skill, high productivity approach. However, the Government needs to recognise these concerns, and ensure that policies to support competitiveness are seen to be effective, and that regulation is soundly based and implemented in a way that is proportional to the problem.

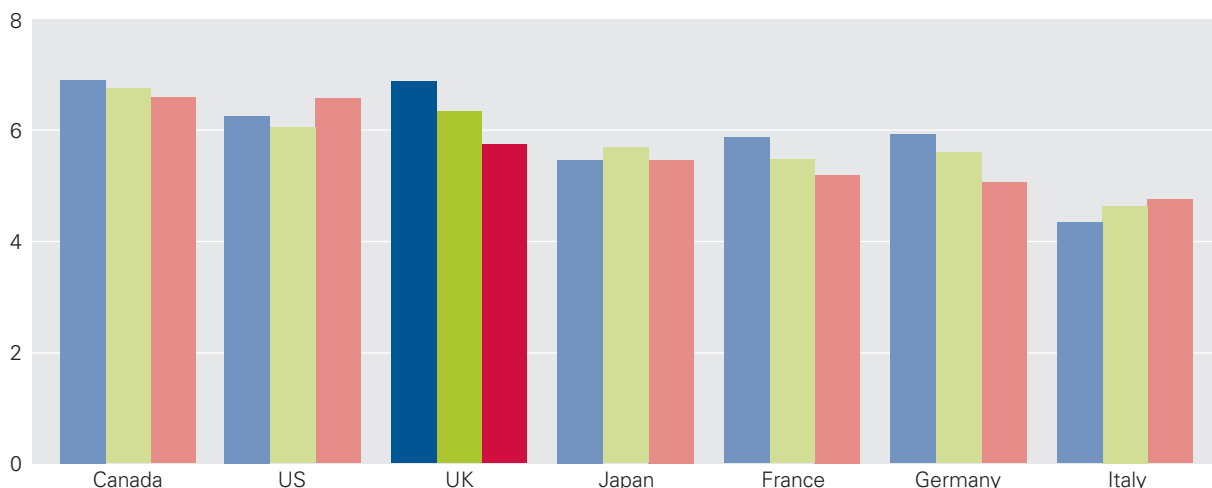
⁶⁷ Porter, M.E. and Ketels, C.H.M., 'UK Competitiveness: Moving to the Next Stage' *DTI Economics Paper No.3* (2003).

Chart 6.8.2: Business executive perceptions of government regulations

G7 comparison, 1996-2003
Average survey score, 0-10 scale

data

Chart 6.8.2:
Source: IMD
● 1996 & 1997
● 1999 & 2000
● 2002 & 2003



GLOSSARY AND GENERAL NOTES

Glossary

G7 includes the UK, the US, Japan, Germany, France, Italy and Canada.

G5 includes the UK, the US, Japan, Germany and France.

OECD refers to countries belonging to the Organisation for Economic Cooperation and Development. The following 30 countries are members: Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Republic of Ireland, Italy, Japan, Republic of Korea, Luxembourg, Mexico, The Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States.

EU refers to the 15 countries that are currently members of the European Union: Belgium, Denmark, Spain, France, Germany, Greece, Ireland, Italy, Luxembourg, The Netherlands, Austria, Portugal, Finland, Sweden, United Kingdom.

General notes on data compilation

International comparisons of GDP

(and many of the derivatives used in the *Indicators* report such as GDP per head, labour productivity, business investment per worker etc) depend on:

- a consistent basis for calculating GDP. All of the G7 countries and the majority of other OECD countries national accounts are compiled according to the new **System of National Accounts** (SNA93) standard, (The EU Member States compile their national accounts according to the equivalent **European System of Accounts**, ESA95); and
- a common unit or currency in which GDP is expressed. The simplest way to convert GDP would be to use official currency exchange rates. However, these are widely recognised as being inadequate because exchange rates do not adequately reflect the comparative purchasing power of local currencies in their own markets. **Purchasing Power Parities** (PPPs) were developed to provide an alternative conversion rate for GDP to equalise this effect: a given sum of money when converted into different currencies at PPP rates will buy the same basket of goods and services in all countries. In other words PPPs are the rates of currency conversion that eliminate the differences in price levels between countries.

Defining the knowledge based industries.

It is difficult to measure knowledge in the economy. However, for illustrative purposes, the OECD use different sectors as proxies for knowledge intensity. The OECD define knowledge based industries as **knowledge based services** (communications, finance, insurance, business services, community, social and personal services); **high tech manufacturing** (aircraft, office and computing equipment, drugs and medicines and radio, TV & communication equipment); and **medium-high tech manufacturing** (professional goods, motor vehicles, electrical machinery (excluding communication equipment), chemicals (excluding drugs), other transport equipment, non-electrical machinery).

The main criteria used in deciding which industries are included as knowledge-based industries is the level of R&D intensity (R&D as a proportion of value added) in that sector. There is also an element of 'embodied' technology, i.e. that present in intermediate inputs.

For services there is no formal methodology. The principle is that knowledge intensive services (and indeed manufactures) include those with high IT use and/or high R&D spending and/or high proportion of highly skilled workers – such as communications, finance and arguably, areas of health and education. Lack of detailed service data in many countries means that it is difficult to formally group industries according to knowledge intensity (hence there is no formal methodology).

The bulk of the **data sources** used in the *Indicators* report have been taken from the publications of the following organisations:

- Organisation for Economic Cooperation and Development (OECD)

- Statistical Office for the European Community (Eurostat)
- Office for National Statistics, UK (ONS)
- United Nations (UN)
- International Monetary Fund (IMF)
- International Institute for Management Development (IMD)

Historical data for **Germany** are not available – national accounts for unified Germany officially commence in 1991. Prior to that long-run data (for use in comparisons over economic cycles) have been imputed, generally using growth rates from the data for West Germany spliced on to the Germany data.

Notes on Overview

0.1 GDP per worker and per hour worked

International comparisons for the labour productivity gap, on both a per worker and per hour basis, are sourced from the ONS website.

0.2 Business executive perceptions of labour regulation and standardised unemployment rates

Data for business executive perceptions of labour regulation are taken from the International Institute for Management Development (IMD) *World Competitiveness Yearbook*, 2003 (See notes under 6.8). Respondents were asked the question whether labour market regulations are 'not flexible enough or flexible enough'. (This question is also included within charts 6.8.1 and 6.8.2). In order to eliminate some of the year-to-year volatility of the surveys, results presented are the average of 1996 & 1997, 1999 & 2000 and 2002 & 2003 surveys.

Standardised unemployment rates are taken from OECD *Employment Outlook*, September 2003.

0.3 Value added by knowledge based services and industries

Data on share of output in knowledge based industries are taken from OECD STAN database. Figures are for 2000 apart from Canada, which is for 1999.

The following industries (with International Standard Industrial Codes Rev. 3) are included under the three groups:

- Finance, insurance, real estate and business services (ISIC 65-74) excluding real estate activities (ISIC 70); education (ISIC 80); health and social work (ISIC 85); other community and personal services (ISIC 90-93)
- Post and telecommunications (ISIC 43)
- High and medium-high tech industries: chemicals (ISIC 24); machinery and equipment (ISIC 29-33); transport exc. building ships and boats (ISIC 34-35 less 351)

0.4 Business Enterprise R&D (BERD) as a percentage of GDP

Data are taken from the OECD *Annual Business Enterprise R&D* (ANBERD) database, which collates the results of national R&D surveys.

Notes to Chapter 1: Outcomes

1.1 Macroeconomic stability

Data for GDP growth and inflation (implied GDP deflator), exchange rate changes and nominal short-term interest rates come from the OECD *Economic Outlook* database, June 2003. Volatility is measured by the standard deviation across the periods.

1.2 Output per head

Growth rates and levels of real GDP per head are derived from GDP and population data taken from OECD *Economic Outlook* database, June 2003. Additional population data are taken from OECD Quarterly Labour Force Statistics.

Estimates of regional GDP per head are produced by the ONS. The estimates used in this edition are residence based rather than the workplace based ones used in the previous *Indicators* publication.

1.3 Labour productivity

International comparisons for the labour productivity gap, on a per worker and per hour basis, are sourced from the ONS website.

Data on the growth of real GDP per worker are from the OECD *Economic Outlook* database, June 2003.

1.4 Employment rate

The percentages of the population of working age (men and women aged 15-64) in paid employment are taken from OECD *Employment Outlook*, September 2003. When interpreting these figures it must be recognised that if there is an increase in the number of people in full-time education (and who are not working) then

the employment rate would fall. However, a fall for this reason would be offset in part by the fact that many students have some form of casual employment, and so would appear in the employment figures.

1.5 Quality of life

The Government's Indicators for the Strategy for Sustainable Development in the UK are published by the UK Department for Environment, Food and Rural Affairs (DEFRA). They can be found on the Internet at: www.sustainable-development.gov.uk/indicators/headline/

1.6 Specialisation in knowledge based industries

Trade in goods data are taken from the OECD and UN *Comtrade* Database. The following categories of goods (with Standard International Trade Classification numbers) have been included: pharmaceuticals (SITC 54); office machines and ADP equipment (SITC 75); telecoms and sound recording & reproducing apparatus and equipment (SITC 76); aircraft and associated equipment, spacecraft (inc. satellites) and parts (SITC 792).

Trade in services data are taken from IMF *Balance of Payments Yearbook*, 2001. The following categories of services have been included: communications; insurance; financial; computer and information; other business; royalties and licence fees. Data are compiled according to the standards set out in the IMF Balance of Payments Manual (5th Edition), which is consistent with SNA93. Data on the new basis are available only from 1991.

Data on share of output in knowledge based industries are taken from the OECD STAN database. Figures are for 2000 apart from Canada, which is for 1999.

The following industries (with International Standard Industrial Codes Rev. 3) are included under the three groups:

- Finance, insurance, real estate and business services (ISIC 65-74) excluding real estate activities (ISIC 70); education (ISIC 80); health and social work (ISIC 85); other community and personal services (ISIC 90-93)
- Post and telecommunications (ISIC 43)
- High and medium-high tech industries: chemicals (ISIC 24); machinery and equipment (ISIC 29-33); transport exc. building ships and boats (ISIC 34-35 less 351)

Notes for Chapter 2: Investment

2.1 Business investment

Figures for investment per worker in the business sector are taken from the OECD's *Economic Outlook* Database, June 2003. Business investment includes investment in public corporations.

2.2 Government investment

Government investment and GDP data are taken from the OECD *Economic Outlook* Database, June 2003.

The data on public and private investment in transport are from the Department for Transport (DfT).

2.3 Connecting to the digital market place

Data on connectivity are taken from the DTI, *Business in the Information Age: International Benchmarking Study*, 2003. The DTI's International Benchmarking Study will be published in December 2003.

2.4 E-commerce adoption

Data on e-commerce adoption are taken from the DTI, *Business in the Information Age: International Benchmarking Study*, 2003.

Notes on Chapter 3: Innovation

3.1 Publications and citations of research in academic journals

Data from Evidence Ltd, Thomson ISI, collected on behalf of OST for PSA target metrics for the UK research base 2003.

3.2 Government spending on R&D

Data are taken from the twice yearly OECD *Main Science and Technology Indicators*.

3.3 Business spend on R&D and innovation

Data are taken from the OECD *Annual Business Enterprise R&D* (ANBERD) database, which collates the results of national R&D surveys.

Data on innovation expenditure shares are taken from the third *UK Community Innovation Survey*, 2001.

Data on Gross domestic expenditure on R&D are taken from the OECD *Main Science and Technology Indicators database*, 2003.

3.4 UK's patenting performance

Data for the G7 comparison number of patents in 'triadic' patent families comes from OECD *Main Science and Technology Indicators database*, 2003.

Data for the number of US patents granted and for the EU patent applications comes from NewCronos (Eurostat).

3.6 Sources of information for innovation

Data for citation levels for the component Science and Engineering Base (SEB) sources, comes from the third *UK Community Innovation Survey*, 2001.

The data on the number of joint publications by universities and industry comes from Calvert and Patel University – Industry Research Collaborations in the UK, 2000.

Notes on Chapter 4: Skills

4.1 Adult literacy and numeracy

Data for literacy and numeracy are taken from OECD, *Literacy Skills for the Knowledge Society*. The chart shows the percentage of adults with 'poor' level 1 literacy and numeracy skills.

Data measuring progress in meeting National Learning Targets for England for 2002, set by the Department for Education and Skills (DfES) formally the Department for Education and Employment (DfEE), are derived from National Statistics, National Curriculum Assessments of 7 and 11 year olds in England 2002 (provisional).

4.2 Intermediate and higher-level skills

Data on highest completed level of education are derived from the OECD indicators on education and skills *Education at a glance*, 2002 Edition.

Data on the proportion of 19 year olds qualified to at least level 2 and 3 in England are taken from the Spring Labour Force Surveys between 1996 and 2003 produced by the ONS.

4.3 Lifelong learning

Data on continuing education and training are taken from the OECD *Final Report of the International Adult Literacy Survey: Literacy in the Information Age*, 2000.

4.4 Management skills

Data on business perceptions of the efficiency of management are taken from the International Institute for Management Development's World Competitiveness Yearbook 2003. The indicators used from the publication were principally the availability of competent senior managers and the international experience of management. The priority of employee training was also included (with a lower weight) as an indicator of the degree to which management invests in its people.

4.5 ICT skills

Data on how much the current ICT skills within organisations meet the needs of the business and on how well the business skills within organisations optimise the use of ICT are taken from *Business in the Information Age: International Benchmarking Study*, 2003. Note that this indicator has changed since the *UK Competitiveness Indicators: 2nd Edition*. The latter recorded data on IT skills shortages as a reason for not adopting or further developing e-commerce.

Notes on Chapter 5: Enterprise

5.1 Entrepreneurship

Start-up rates come from the *Global Enterprise Monitor* (GEM), 2002. GEM was created in 1997 as a joint research project initiative by Babson College and London Business School with strong support from the Kauffman Center for Entrepreneurial Leadership and the Ewing Marion Kauffman Foundation. This is a cross-national comparison of the role and impact of entrepreneurship in national economic growth. Ten countries participated in the 1999 exercise: the G7 plus Denmark, Finland and Israel. GEM2002 added 30 countries from across Europe, Asia and South America. Data were assembled from three principal sources: population surveys; in depth interviews of national experts; and standardised national data.

5.2 Attitudes to risk taking

Data on entrepreneurial attitudes are taken from the GEM 1999 full report. The European Commission report *Benchmarking Enterprise Policy: Results from the 2002 scoreboard* is available at 'http://europa.eu.int/comm/lisbon_strategy/pdf/1213_EN.pdf'.

5.3 Venture capital

The data on the amount and composition of venture capital comes from the European Private Equity and Venture Capital Association (EVCA).

- "Seed" venture capital is defined as: financing provided to research, assess and develop an initial concept before a business has reached the start-up phase;
- "Start-up" venture capital is defined as: the provision of finance to companies for use in product development and initial marketing. Companies may be in the process of being set up or may

have been in business for a short time, but have not yet sold their product commercially. Also included is financing to companies that have completed the product development stage and require further funds to initiate commercial manufacturing and sales. They will not yet be generating a profit; and

- "Expansion" venture capital is defined as: financing provided for the growth and expansion of an operating company, which may or may not be breaking even or trading profitably. Capital may be used to finance increased production capacity, market or product development, and/or provide additional working capital.

Data on GDP are from the OECD *Economic Outlook* database, June 2003.

The time series data on early stage, expansion and replacement venture capital investment are taken from the Eurostat Structural Indicators.

- Early stage is defined as seed plus start-up (see earlier definition); and
- Replacement is defined as the purchase of existing shares in a company from another private equity investment organisation or from another shareholder or shareholders (then replacement and expansion are combined – see earlier definition of expansion).

5.4 Equity markets

Data on stock market capitalisation are taken from the International Federation of Stock Exchanges (FIBV) & Euronext and the data for GDP are taken from the OECD *Economic Outlook* database, June 2003.

Notes on Chapter 6: Competitive environment

6.1 Openness to trade and foreign investment

The trade and GDP data are taken from OECD *Economic Outlook*, June 2003.

Data on foreign direct investment stocks are taken from *UN World Investment Report*, 2003. A foreign investment is classified as a direct investment if the foreign investor holds at least 10 per cent of the ordinary shares or voting rights in an enterprise and exerts some influence over its management.

6.2 Competition

Data on competition policy regime are taken from the *Peer review of the UK Competition Regime, 2001* produced for DTI by PricewaterhouseCoopers and from the *Global Competition Review*, 2003.

6.3 Energy market competition

The data are taken from *The Relative Extent of Energy Market Competition in Europe and the G7*, a report produced for DTI by OXERA in September 2003.

6.4 Unemployment

Standardised, long-term and youth unemployment rates are taken from OECD *Employment Outlook*, September 2003.

6.5 Diversity of employment opportunities

Data used are taken from the *Labour Force Survey*, August 2003 produced by the ONS.

The EU comparison data are taken from the *European Labour Force Survey (ELFS)*, 2002 compiled by Eurostat. ELFS data relate to Spring and so potentially may include some seasonal effects (compared with annual results taken from the UK's national LFS results) though these will be less significant when looking at changes over a number of years.

6.6 Industrial relations

Data on working days lost are taken from ONS *Labour Market Trends*, April 2003. The original sources for the number of days lost were the International Labour Organisation (ILO), Eurostat and the employee data from the OECD.

6.7 Labour market regulation

Data for business executive perceptions of labour regulation are taken from the International Institute for Management Development (IMD) *World Competitiveness Yearbook*, 2003 (See notes under 6.8). Respondents were asked the question whether labour market regulations are 'not flexible enough or flexible enough'. In order to eliminate some of the year-to-year volatility of the surveys, results presented are the average of 1996 & 1997, 1999 & 2000 and 2002 & 2003 surveys. (Also see chart 0.2).

Data for hourly costs and non-wage labour costs were taken from the US Bureau of Labor web site, and can be found in their publication: *International Comparisons of hourly compensation costs for production workers in manufacturing, 1975-2003*.

6.8 Political and institutional framework

The source used was the IMD *World Competitiveness Yearbook*, from 1996 to 2003. The IMD surveys the opinions of a panel of over three thousand top and middle management from 59 countries with a 110-item questionnaire. The survey is completed at around March of each year. A similar exercise is carried out annually by the World Economic Forum (The Global Competitiveness Report). Until 1995 the IMD and WEF produced a joint report, after which WEF set up their own report with a slightly different compilation methodology.

For business executive perceptions of how institutions and Government policies support competitiveness two broad sets of indicators were selected. The figures presented are the simple average of the scores under these headings.

For **Government policies** the following indicators listed in that publication were chosen: the deterioration or improvement of the management of public finances; the incentive effect of real personal taxes; the incentive effect of real corporate taxes; the extent of tax evasion; the adaptability of Government economic policies to a changing economic environment; the legislative activity of the parliament and its relation to the nation's competitive requirements; and transparency – the Government does not communicate its intentions clearly.

For **institutions** those used were: the effect of the legal framework on competitiveness; the appropriateness of the political system to today's economic challenges; the effect of the customs administration on the efficient transit of goods; the extent of corruption; public service and political interference; are Government decisions effectively implemented; is the law fairly administered and are people and property adequately protected.

For business executive perceptions of **Government regulation**, the following questions were used: does environmental regulation hinder business; is labour regulation too restrictive (the same question used in chart 6.6.1); the extent of Government price controls; do competition laws prevent unfair competition; bureaucracy and its effect on business development; and product liability as a constraint on business.

In order to eliminate some of the year-to-year volatility of the surveys, results presented are the average of 1996 & 1997, 1999 & 2000 and 2002 & 2003 surveys.



Printed in the UK on recycled paper with a minimum HMSO score of 85
First published November 2003. Department of Trade and Industry. <http://www.dti.gov.uk>
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