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DTI ECONOMICS PAPER NO. 3

UK Competitiveness: moving to the next stage

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Foreword

The persistence of the productivity gap with our main competitors is a key issue in UK economic policy-making. In order to understand this problem better, the DTI and the ESRC asked Professor Michael Porter, of the Institute of Strategy and Competitiveness at Harvard Business School, to investigate the current state of UK competitiveness.

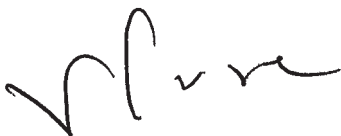
Professor Porter points to the UK's recent success in raising prosperity. He demonstrates the UK's strengths in terms of science and engineering, its supportive market framework, and its improved macroeconomic environment. However, he highlights continued weaknesses in terms of skills, clusters of interconnected companies and innovation.

The most valuable message is that the UK needs a new conception of competitiveness. In the past, the UK has been very successful in implementing key market-based reforms: deregulation, privatisation and competition. But these aspects of industrial policy are now running into diminishing returns.


Professor Porter argues that the UK now needs an approach focussed on improving skills, stimulating innovation and fostering enterprise. It is only by building such capacity, that we will be able to move to the next stage of improving competitiveness and achieve sustained higher levels of prosperity.

In addition to his policy recommendations, Professor Porter has set out an ambitious research agenda for the UK. Both the DTI and ESRC are committed to improving the state of knowledge about the UK economy in order to provide a robust evidence base for future policy development. Much of this work will be carried out through AIM, the management research initiative supported by the ESRC and led by Professor Anne Huff. Other investments by the ESRC will also make a significant contribution.

We hope Professor Porter's analysis will stimulate debate and form part of a wider dialogue involving the DTI, ESRC and all with an interest in the economic performance of the UK.



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DTI Economics Papers

The reviews of the DTI in Autumn 2001 placed analysis at the heart of policy-making. As part of this process the Department has decided to make its analysis and evidence base more publicly available through the publication of a series of DTI Economics Papers that will set out the thinking underpinning policy development. Previous titles include:

Bundling, Tying and Portfolio Effects, Professor Barry Nalebuff (Yale University), February 2003

A Comparative Study of the British and Italian Clothing and Textile Industries, Nicholas Owen (DTI), Alan Canon Jones (London College of Fashion), April 2003

The views expressed within *DTI Economics Papers* are those of the authors and should not be treated as Government policy. We welcome feedback on the issues raised by the *DTI Economics Papers*, and comments should be sent to dti.economics@dti.gsi.gov.uk

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1

Introduction

a) Project Background

In October 2002, the Economic and Social Research Council (ESRC) appointed Professor Michael Porter and his team to conduct a brief, three-month review of the existing evidence on UK competitiveness. The effort was funded jointly by the ESRC and the Department of Trade and Industry (DTI). The London School of Economics and Political Science (LSE) graciously served as the UK-based academic sponsor of the project.

The objective of this review is to synthesise, interpret, and draw implications from the available evidence on the competitiveness of the United Kingdom, applying the Porter competitiveness framework and drawing on the learning from dozens of national competitiveness projects over the last decade. The ESRC asked that special attention be paid to the role of management in UK competitiveness.

The review is based primarily on existing, and sometimes conflicting, research by others. We have also analysed existing detailed data from the Global Competitiveness Report (GCR) that has not been previously published, but we have not created any new primary data. Our findings build on the existing research on UK competitiveness and confirm many of its findings. We aim to provide an integrative framework that can aid scholars and decision makers in the public and private sectors to set priorities and identify missing pieces in the UK competitiveness agenda.

The integrative framework provided by the Porter microeconomic approach to competitiveness goes beyond a growth accounting decomposition of economic performance to identify the probable causes underlying UK economic performance. It also offers a holistic way of assessing their interrelationships and the changing constraints on UK productivity and prosperity growth over time. We hope that this framework will enable a more informed policy debate in the UK on how to manage the transition to the next stage of competitiveness.

This review is decidedly not a comprehensive study of UK competitiveness but is intended to provide high-level guidance to policy makers on broad priorities, and to assist in defining a priority research agenda for the ESRC. In particular, this review will be made available to the ESRC initiative on management headed by Professor Anne Huff.

A preliminary version of this report was delivered by Professor Michael E. Porter in a public lecture at the LSE on January 22nd 2003. This report also draws upon discussions

during and after the lecture and the comments made in a closed policy workshop with participants invited by DTI.

b) Key Findings

Pessimism and the lack of an overall strategic perspective characterise much of the current public discussion about UK competitiveness. Attention is focused on the prosperity and productivity gap that remains with the United States and primary European rivals Germany and France. This performance gap persists despite the UK's far reaching economic policy reforms of the last two decades. A search for explanations has so far not reached a clear consensus.

Looking at the UK's future competitiveness, concerns dominate as well. A recent survey of UK business leaders reported a significantly more negative view on the future versus current UK competitiveness.¹ Changing priorities in UK economic policy are perceived to threaten the achievements of the past two decades, e.g. low levels of regulation and taxation. Also, other countries are seen as having matched many of the reforms that gave the UK a competitive edge in the past.

Our findings agree on many of the specifics, but are different in overall tone. The UK has in fact achieved a remarkable success in halting the economy's protracted downward economic trajectory of the pre-1980 period. On many indicators of economic performance, the UK has kept pace with, if not outpaced, competing locations, especially in Europe.² This success in terms of economic performance is directly linked to the far-reaching economic policy reforms by successive UK governments that have fundamentally changed the macroeconomic and, more importantly, the microeconomic context for competition.

However, the UK currently faces a transition to a new phase of economic development. The old approach to economic development is reaching the limits of its effectiveness, and government, companies, and other institutions need to rethink their policy priorities. This rethinking is not a sign of the past strategy's failure; it is a necessary part of graduating to the new stage. A public consensus on the direction of the transition and on the next stage of the country's competitiveness would help to manage the uncertainties of this process. The absence of such a consensus at a time when the old policy approach is running its course explains much of the puzzlement and even pessimism in the current UK debate.

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 or strengthening of new types of institutions.

As to management, we find that the role of management cannot be separated from the

overall competitiveness issues facing the country. Management and its decisions are both an input and a result of the business environment. Thus UK management performance in many ways either reflects weaknesses in the business environment or involves decisions that are consistent with the current business environment even though they do not improve competitiveness. Management practices, then, are not at the core of the UK competitiveness challenge; however, there is always room for improvement. As part of the overall effort to upgrade UK competitiveness there is a clear role for management. Efforts to upgrade management will not however be sufficient to achieve a sustained improvement in UK competitiveness.

References

- 1 CBI (2002)
- 2 European Commission (2002)

2

Overall Performance of the UK Economy

Competitiveness remains a concept that is not well understood, despite widespread acceptance of its importance.³ To understand competitiveness, the starting point must be the sources of a nation's prosperity. A nation's standard of living is determined by the productivity of its economy, which is measured by the value of goods and services produced per unit of the nation's human, capital and natural resources. Productivity depends both on the value of a nation's products and services, measured by the prices they can command in open markets, and the efficiency with which they can be produced. True competitiveness then, is measured by productivity. Productivity allows a nation to support high wages, a strong currency and attractive returns to capital, and with them a high standard of living.

The UK economy has performed well on the most important economic metrics in the last two decades, and the awareness of competitiveness issues has increased markedly. Prosperity has improved in absolute terms and has also increased relative to many other advanced economies. Prosperity gains relative to other locations benefited from a significant increase in the level of labour force utilisation in the economy (hours worked per employee, employment rate, and labour force participation rate). Labour productivity growth has been good, but not significantly above the level in other economies. Other intermediate measures of competitiveness, such as the UK's world export market share and FDI attraction, have been stable.

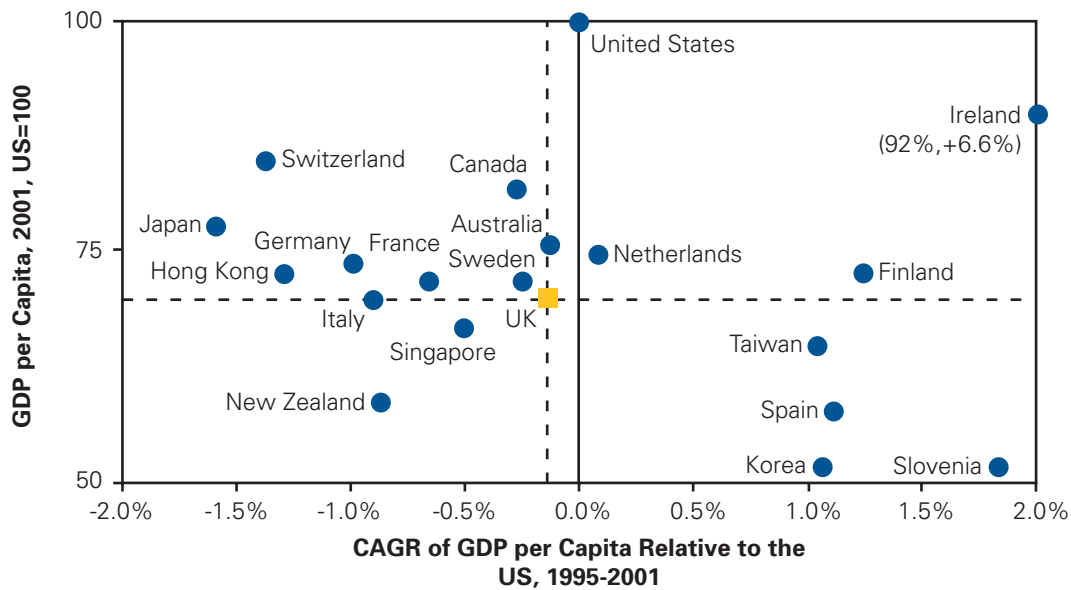
Despite these improvements, the levels of productivity and prosperity in the UK still lag many other advanced economies. With labour force utilisation already at a high level, only further catch-up in labour productivity will be able to reduce the gap. Labour productivity can increase through higher skill labour inputs, higher capital intensity, and higher total factor productivity (technology). In all three areas the UK currently lags behind important competitors such as the United States, France and Germany. It will need to close these gaps to finally achieve prosperity catch-up. This will require sustained improvements in the microeconomic business environment.

a) Prosperity

In the last five years, the UK was one of the few advanced economies that came close

to matching the economic performance achieved by the United States. The UK's growth rate of GDP per capita outpaced other European countries like Germany, France, Italy, and Sweden, and lagged only somewhat behind Australia, the United States, and the Netherlands. Only Ireland, Finland, and a number of European and Asian middle-income countries outpaced it significantly (Figure 1).

Figure 1: Comparative Economic Performance - Selected Advanced Economies



Source: World Development Indicators 2002

The UK's current economic performance presents a significant change from the pre-1980 period.⁴ In the decades before 1980, the UK lost ground against all major competing economies. From 1961 to 1970 the annual growth rate of GDP per working-age person for the UK registered at 2.6%, significantly below most other advanced economies including Germany (4.2%), France (4.4%), Italy (5.2%), Spain (6.6%), and Japan (8.2%).⁵ In the 1970's, growth rates dropped globally due to oil price shocks. The UK's annual growth rate, then at 1.6%, remained behind most other economies. The 1980's brought first stabilisation and later an increase of prosperity growth rates as the first wave of market opening reforms set in. A macroeconomic crisis in the early 1990's brought prosperity growth to a halt. Macroeconomic stabilisation and further micro-economic reforms led to a rebound of prosperity growth in the second half of the 1990's.

Despite its comparatively high growth rate in the last five years, the level of GDP per capita in the UK still falls behind most other advanced economies. In purchasing power terms the gap to the United States is close to 40%, Switzerland 20%, Japan 11%, Germany 6%, and France and Sweden 3%. The UK prosperity level is on par with Italy, and outpaces countries like Singapore, New Zealand, and Spain.

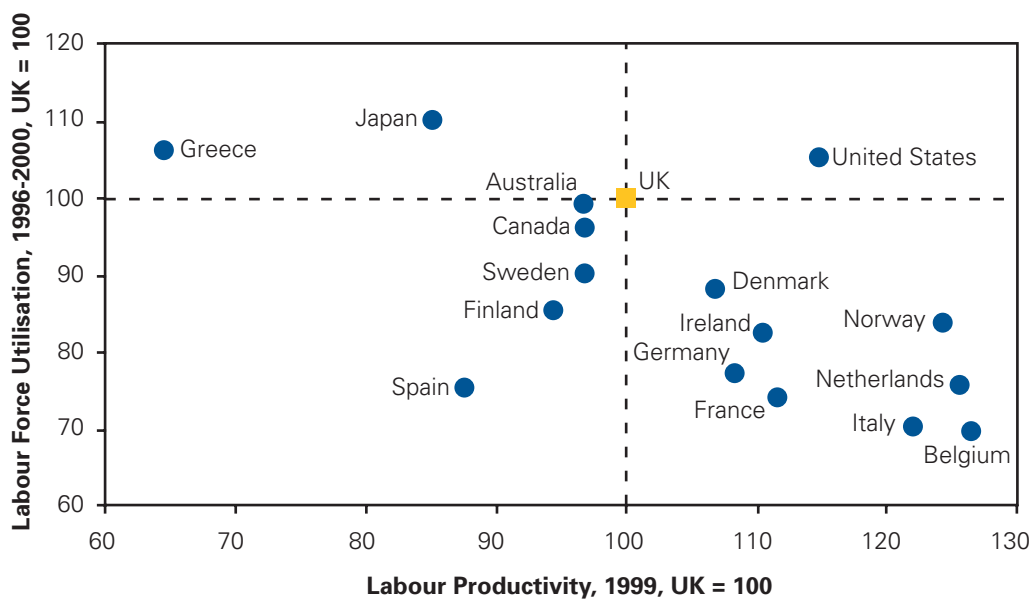
The UK has, according to 1996 data, a high level of poverty relative to other European countries at similar levels of prosperity.⁶ The existence of such pockets of poverty indicates an untapped potential for productivity growth as well as a social challenge. It is also a signal for remaining weaknesses in the business environment, such as lack of training, discrimination, a low level of local government responsibility, and the separation of social and economic policies. The efforts of the last few years to address this problem may have already led to an improvement in the situation, but no consistent data on this is currently available.

b) Productivity

The UK's GDP per head can be decomposed into two factors: its level of labour force utilisation (hours worked per employee, employment rate, and labour force participation rate) and its labour productivity.

The UK currently has one of the highest levels of labour force utilisation in the OECD behind only Japan and the United States but ahead of the Continental European countries (Figure 2). The UK has a lower unemployment rate than many peer countries, and working hours per employee in the UK again fall between US and Continental European levels. While the literature⁷ tends to view labour productivity as the sole measure of economic performance, integrating a larger share of the potential workforce in the economy is an important economic and social achievement, and the UK deserves credit for its success in this area.

Figure 2: Labour Force Utilisation and Productivity



Note: Labour Force Utilisation measured as hours worked per working age population; Labour Productivity measured as output per hour worked.

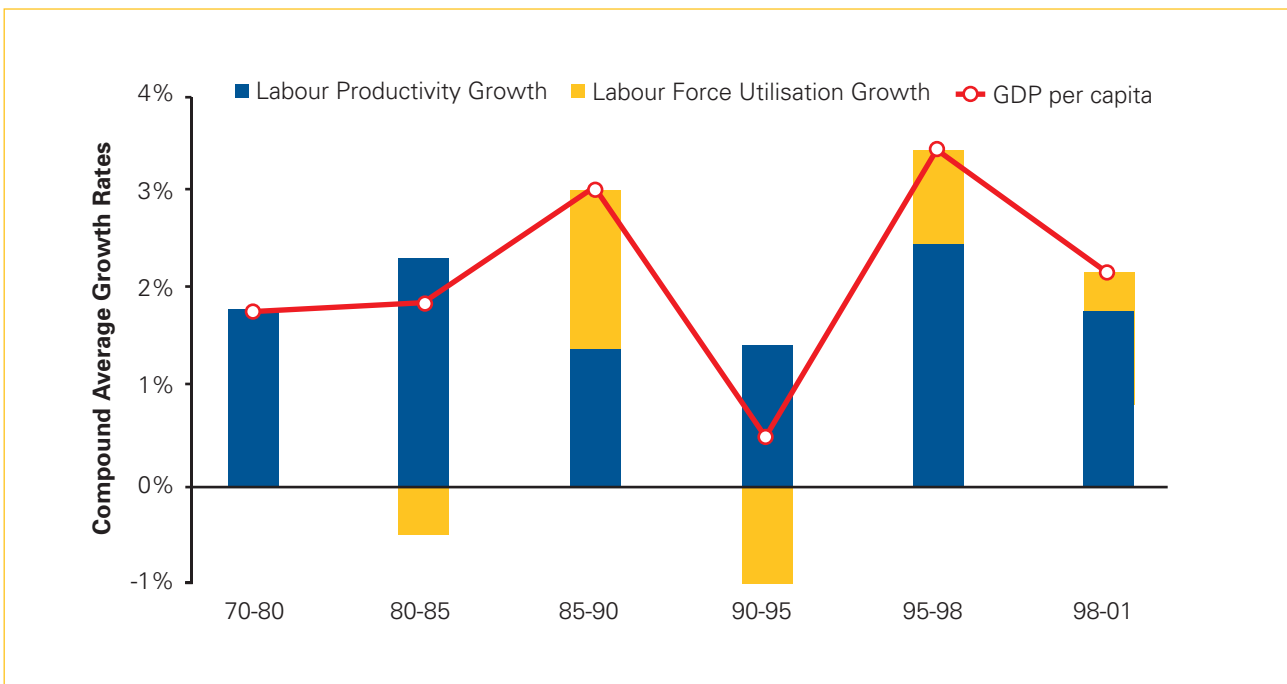
Source: OECD (2001), IMF (2003)

The growth in labour force utilisation in the UK has been stronger than in Continental Europe, and is the decisive factor that allowed the UK to catch up in terms of prosperity.⁸

It is always possible to raise labour productivity by shedding employment, but this neither increases true prosperity nor a location's competitiveness.⁹ Many Continental European countries have gone down the road of making lower productivity employment unattractive and have suffered high unemployment; the UK has instead increased incentives for work. The UK did significantly reduce unemployment, and did not resort to cutting the average employee's working week.

UK labour productivity growth has been comparable to other advanced economies - a marked improvement to the pre-1980's where UK productivity growth persistently lagged countries like France and Germany. UK labour productivity growth in the last three decades has fluctuated but averages around 2% annually (Figure 3).¹⁰ In the early 1980's, the initial wave of reforms led to fast productivity growth but also led to a rise in unemployment. With the economy picking up later in the decade, labour force utilisation soared while labour productivity growth moderated. The macroeconomic crisis in the early 1990's cost many jobs, but labour productivity growth remained stable. Recently, both labour productivity growth and labour force utilisation have contributed to strong prosperity growth, but labour productivity is becoming the dominant factor.

Figure 3: Decomposition of UK Prosperity Growth over Time

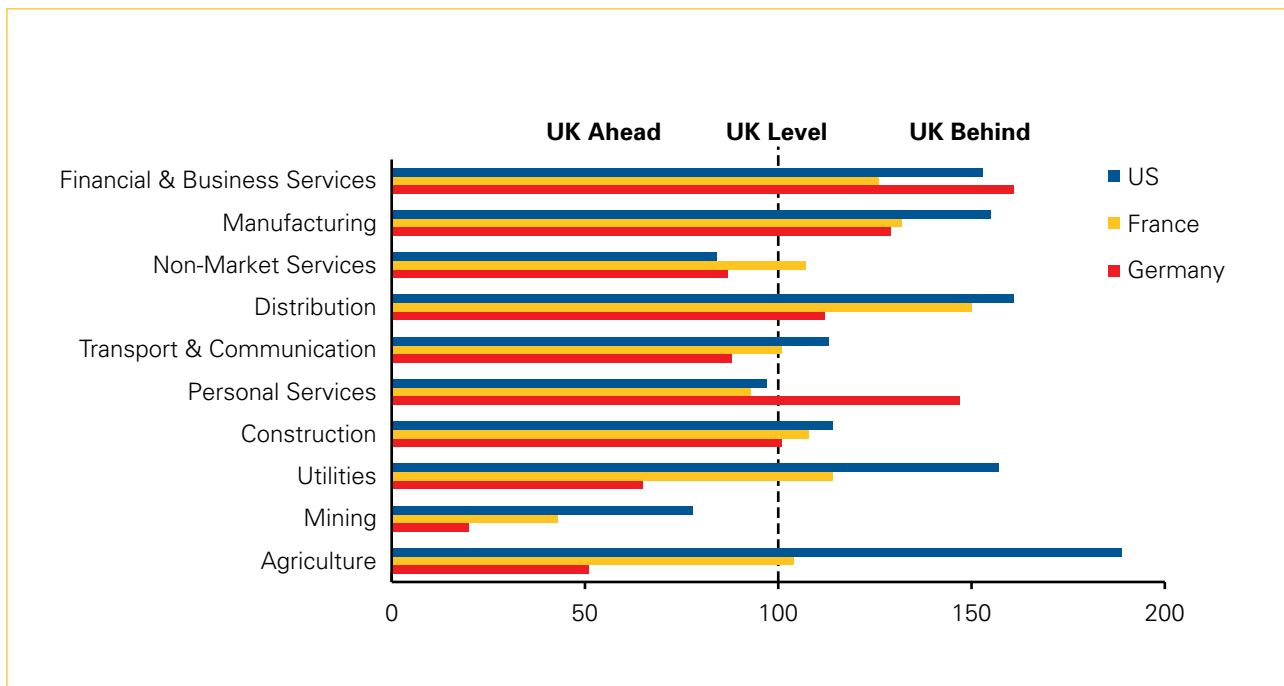


Source: US Bureau of Labour Statistics (2002), author's calculations

While faster UK labour productivity growth rates have halted the erosion of relative productivity, they have not led to a substantial convergence. According to the OECD, the UK labour productivity gap versus the Netherlands per hour worked is at 25%, versus the United States at 15%, versus France at 11%, and Germany at 8%. This data refers to all economic activity; O'Mahony/deBoer (2002) report even higher gaps for the market sector excluding government and non-governmental services.

This productivity gap cannot be explained by differences in the composition of the economies (Figure 4). The overall gap is driven by productivity gaps across all industries.¹¹ With UK labour force utilisation already higher than in many competing countries except the US, further improvements in UK prosperity will have to come from reducing this labour productivity gap.

Figure 4: Relative Output per Hour Worked by Sector, 1999 (UK = 100)



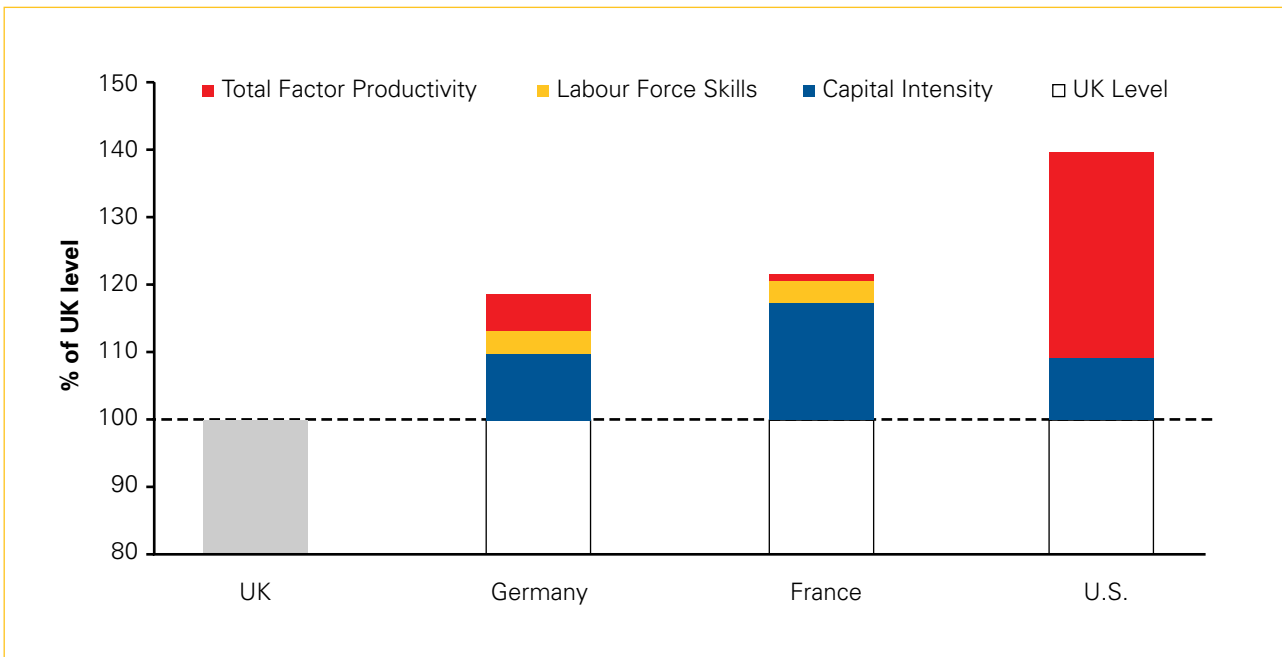
Note: Sorted by share in UK output.

Source: O'Mahony/deBoer (2002)

Decomposing UK Productivity

Applying the techniques of growth accounting, the UK labour productivity gap versus other advanced economies can be further decomposed into the effects of three components: capital intensity, labour force skills, and total factor productivity (or the component of productivity that cannot be explained by the quality or quantity of factor inputs). Each of these components is not causal per se, but can be seen as an intermediate indicator of many other microeconomic attributes of an economy. Nevertheless, the exercise of decomposing provides helpful clues about where to look for the sources of competitiveness differences.

O'Mahony/deBoer (2002) provides a detailed analysis of the UK versus the United States, Germany, and France on these measures. They find that the UK lags Germany and France mainly on capital intensity and to a lesser degree on labour force skills (Figure 5). The UK lags the US mainly on total factor productivity and, to a lesser degree, on capital intensity. The IMF (2003) presents a slightly different view, finding that total factor productivity differences are the main driver of the UK productivity gap versus all peer countries. However, the authors also acknowledge that total factor productivity is often connected to capital investment.

Figure 5: Decomposing the UK Labour Productivity Gap

Note: The data applies to the market sector (excluding the public sector) in 1999

Source: O'Mahony/deBoer (2002)

The UK has a lower capital stock per worker and per hour worked than the other three countries, lagging France by 60%, Germany by 32%, and the United States by 25% in terms of capital stock per hour worked.¹² Figures on the capital/output ratio are more favourable and put the United Kingdom in the middle of the OECD countries,¹³ but normalising by output favours relatively less productive countries like the UK, yielding a potentially biased indication of capital intensity.¹⁴ The UK's rate of capital investment in the last decade has increased strongly, and its capital stock growth rates *are on par with France but lag Germany and the United States*. However, capital investment rates are not high enough to close the capital intensity gap.

Lower capital intensity in the UK has been raised repeatedly as a source of its labour productivity gap. The growth accounting analysis supports this view, but important questions remain: What specific types of capital investment are lagging relative to other locations, and why are UK companies making the decision to operate with lower capital stocks? Our analysis below will examine the available evidence on these questions.

On skills, the UK lags the US in the share of high skill employees in the labour force and also has a slightly higher share of low skill employees. The UK has a significantly lower share of intermediate skill employees than Germany and France, while the share of high skill employees is roughly equal. The UK's labour force skill problem appears to be mainly a problem of the current stock of employees; in terms of *inflows from recent graduates the UK does not lag its European competitors or the United States*.

Lower levels of skills in the UK labour force have also been raised in the literature for some time as a source of the UK productivity gap. Once again, the growth accounting analysis supports this view. But it also highlights the pattern of skill distribution across countries. We will discuss the implications of the UK skill mix in our further analysis.

In total factor productivity (TFP), the part of labour productivity that cannot be directly attributed to factor inputs, the UK falls in the lower middle group of advanced economies. The UK lags the US, the global leader, by roughly 50%, France by 10%, and is comparable to Germany; based on OECD data for the 1995-1998 period.¹⁵ The data on the growth of TFP is somewhat conflicting: the US Bureau of Labour Statistics reports UK TFP growth to be high in the early phase of microeconomic reforms in the 1980's, but falling back to a level similar to other advanced economies more recently.¹⁶ The IMF instead reports UK TFP to be lower than in peer countries except the United States not only throughout the 1970's but also the 1980's, and increasing in the first half of the 1990's. As do other sources, the IMF reports falling UK TFP growth towards the end of the 1990's.¹⁷

Lower levels of TFP indicate inefficiencies unrelated to the level and quality of factor inputs and reflect low levels of innovation, broadly defined, and less effective use of technology. Deficits in TFP are especially problematic for an advanced economy like the UK, because TFP becomes increasingly important for labour productivity as an economy seeks higher levels of prosperity. We will examine various measures of innovation and probable explanations for UK innovation performance in our further analysis.

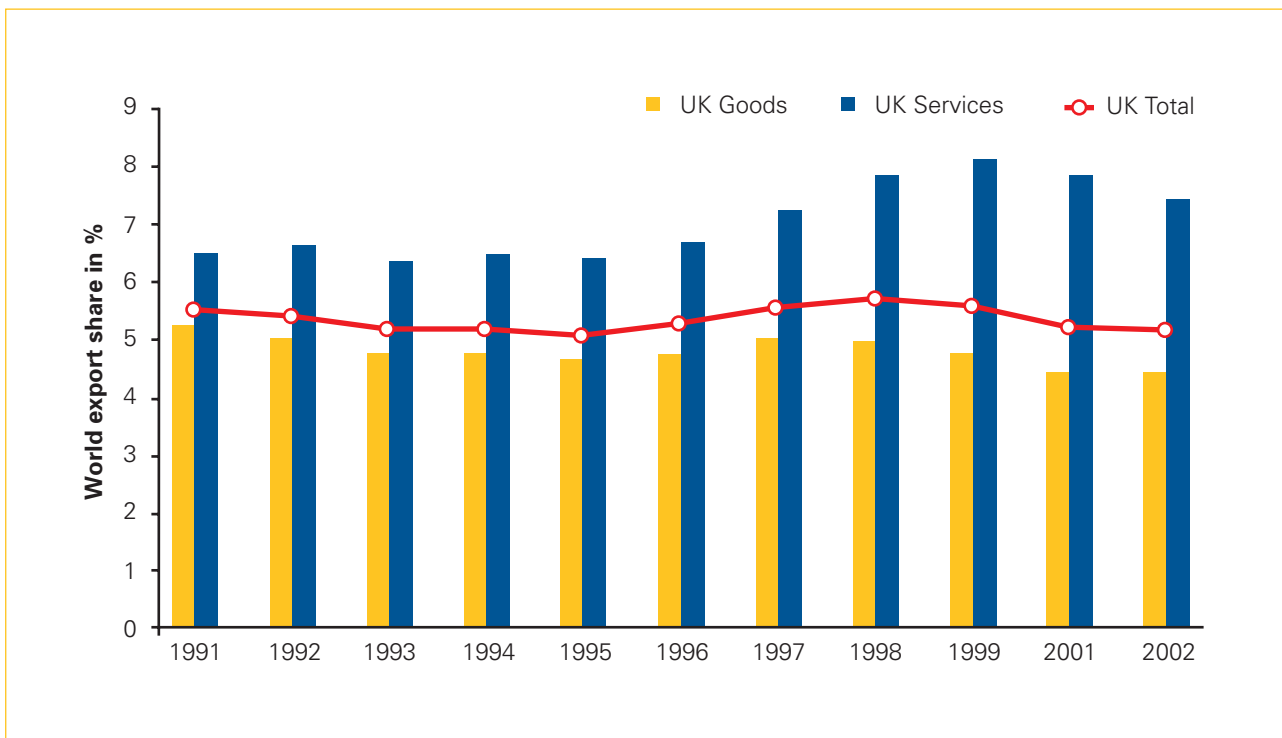
c) Internationalisation, Innovation and Productivity Growth

Productivity growth is underpinned by trade, foreign investment, and innovative activity. Here we examine these three areas as additional indications of the trajectory of the UK economy. In general, we find that the UK's export position is stable; that its attractiveness for foreign direct investment is high but decreasing; and that its innovation performance is weak.

Exports

International trade is a direct way to ratchet up the productivity of the domestic economy by concentrating on those activities in which the country has a relative productivity advantage. The ability to trade domestic for foreign goods and services is equivalent to having access to a more efficient technology. International exports are also an effective measure of companies' ability to compete successfully on world markets. Stable and growing export shares that are not engineered through devaluations foster rising productivity.

The UK's share of exports and imports in GDP indicates significant openness to international trade and is in line with the size of its economy.¹⁸ The UK's export performance has been strong over the last decade (Figure 6). Its share of world exports in both goods and services has stayed relatively stable at about 5.2%¹⁹. The UK owes its stable performance mainly to its increasing strengths in service exports, which have offset the slowly declining position in goods exports. Exports remained strong as the UK's real exchange rate appreciated significantly after mid-1996.²⁰ Only a few other advanced economies such as Canada and the Netherlands have maintained their world export shares, while many others including the United States, Japan, Germany, France, and Italy have experienced slower export growth than countries such as China and Korea.

Figure 6: UK World Export Market Shares over Time

Source: WTO (2002), author's calculations

Foreign Direct Investment (FDI)

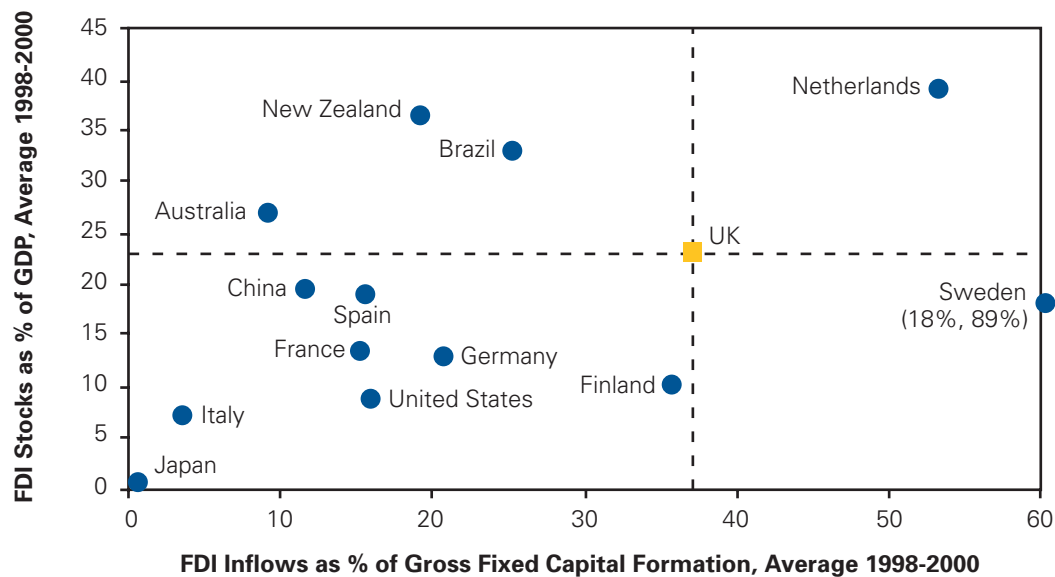
Inward foreign investment improves the business environment by elevating the level of domestic competition, and raising the level of buyer sophistication through the procurement standards and choices of foreign multinationals. And it also provides an economy with an inflow of new technologies, operational practices, and other knowledge developed elsewhere. Foreign investors have capabilities otherwise not available in the domestic economy; that is the reason they can compete in a location they otherwise know less well.²¹ These superior capabilities are reflected in the higher productivity of foreign-owned companies relative to the average domestic company, typical in all leading economies.²²

Outward foreign investment enables an economy to grow areas of the economy with high relative productivity, hence raising productivity growth. Outward FDI also amplifies the competitive position of UK-based firms allowing them to tap into low cost resources for activities not requiring UK-level skills. Also, outward foreign investments allow companies to deepen their positions in foreign markets through providing local service and product customisation. Higher value activities still remain in the home country, and experience suggests that the improvements in competitive position abroad can actually expand home country jobs at the same time as some activities are moved abroad. Finally, outward FDI may sometimes be a necessity to preserve the very vitality of the home country organisation.

The UK is an economy with strong inward and outward investment flows, with net outward FDI balances. The role of foreign-owned companies in UK manufacturing is comparable to France and significantly higher than in Germany or the United States.²³

With a few exceptions the UK outperforms other advanced and emerging economies in terms of FDI inflows as well as in stocks of FDI relative to GDP (Figure 7).²⁴ In the years 1998-2000 the UK's share of world inward FDI stood at 7.8%, exceeding its share of world GDP by 80%, down from an even larger margin.

Figure 7: Comparative Inward Foreign Direct Investment



Note: German inflows in this period are biased upward by the acquisition of Mannesman in 2000
Source: World Investment Report (2002)

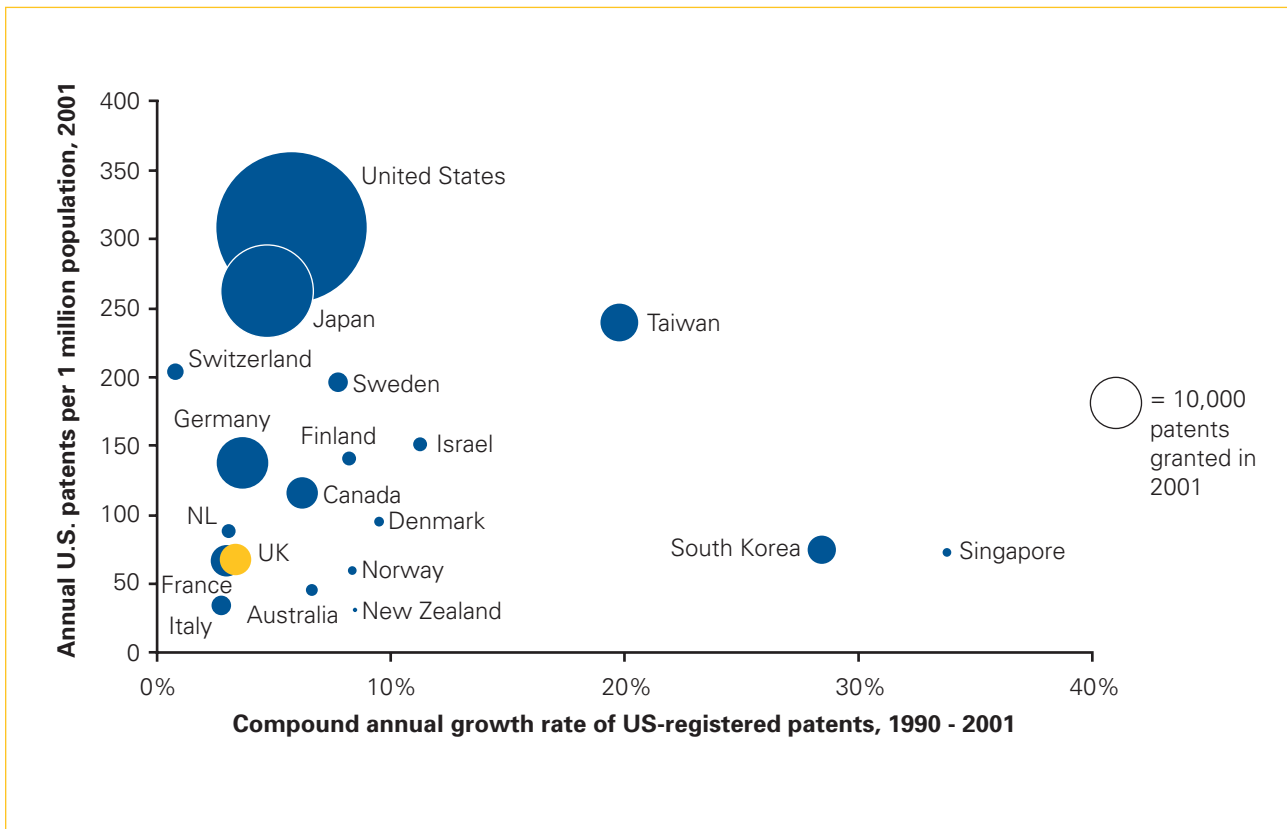
The UK also outperforms most countries in terms of outward FDI. UK companies have a significant investment stock abroad; the value of their foreign investments stood at \$942bn in 2001, about 14% of all countries foreign investment combined.²⁵ They also continue to invest heavily outside the UK: in 2000, UK company investments outside the UK *exceeded* their investments in the UK for the first time.

Innovation

The creation and commercialisation of new knowledge is a final, and crucial source of dynamic improvements in productivity. For advanced economies, innovation is a matter of pushing the world frontier of knowledge. For developing countries technology assimilation is the central challenge.

While the UK has done well in trade and FDI, its innovation performance in the recent past has been disappointing. While others, notably the Nordic countries, Singapore, South Korea, Taiwan, and Israel, significantly increased innovation as measured by U.S. patenting, the UK has grown innovation output only slowly from a relatively low base (Figure 8). The data on US patenting - chosen as a good indicator because most economically important innovations are likely to be patented in the world's largest market - is confirmed by data on European patenting.²⁶

Figure 8: International Patenting Output



Source: US Patent and Trademark Office (2002), author's analysis

The quality of UK patents measured by citations compares well with other European countries, but is still only average in a global perspective.²⁷ Other sources on company innovation often use less robust data,²⁸ but tend to put the UK near the average of the advanced economies. UK manufacturing companies are reported to spend less of their turnover on innovation than their European peers, while the opposite is true for UK service companies.

Overall, the UK has a strong science base, but lags in patenting and commercialisation.²⁹ Also, the UK's strength in the life sciences masks lower performance in other areas of science and technology. Current levels of UK innovation are insufficient to drive UK productivity growth and close the UK productivity gap versus key competitors.

References			
3	Porter (2002a)	20	IMF (2002)
4	For other discussions of recent UK economic performance see Nickell (2002), Nickell/Van Reenen (2002), and Card/Freeman (2002). For a more long-term perspective see Maddison (2001).	11	O'Mahoney/deBoer (2002)
5	IMF (2003)	12	Recent work by the IMF (2003) relates this gap in overall capital intensity to lower investments in non-residential construction. UK investments in machinery, however, are comparable to other OECD countries.
6	OECD (2002), Nickell (2002a)	13	IMF (2003)
7	For example IMF (2003) and European Commission (2002).	14	Oughton (1997)
8	Card/Freeman (2002), OECD (2002a), IMF (2003)	15	The IMF (2003) reports somewhat different gaps for the average of the 1996 - 2000 period with the UK lagging the United States by 33%, France by 25%, and Germany by 12%.
9	The same is true for reducing working time and thus increasing the intensity of work in the remaining hours.	16	US Bureau of Labour Statistics (2002)
10	Bureau of Labour Statistics (2002), IMF (2003)	17	IMF (2003)
		18	DTI (2002)
		19	WTO (2002)
		21	Given this logic, it should be no surprise that multinational companies are everywhere more productive than their local competitors. See, for example, Ashworth (2001), Griffith/Simpson (2000).
		22	Pain (2000)
		23	OECD (2001)
		24	UNCTAD (2002)
		25	UNCTAD (2002)
		26	European Commission (2001)
		27	National Science Foundation (2000) cited in Porter/Van Opstel (2001)
		28	Nickell/Van Reenen (2002) discuss the quality of the European Innovation Survey
		29	Nickell/Van Reenen (2002)

3

Competitiveness and the UK Business Environment: Summary of the Evidence

High and increasing levels of productivity and innovation are manifestations of competitiveness. Their causes are embedded in the *context* provided by a nation or region for competition. Context can be divided into two areas: (1) the macroeconomic, political, legal, and social context, and (2) the microeconomic foundations of competition. These two broad areas are different, but mutually reinforcing.

a) Macroeconomic, Political, Social, and Legal Context

Sound macroeconomic policies and stable political, legal, and social institutions create the potential for improving national prosperity (Figure 9). Appropriate policies in these areas are increasingly well understood, and being pursued in an increasing number of countries.

Figure 9: Determinants of Productivity and Productivity Growth



However, competitiveness ultimately depends on firms and the way they compete. Hence, a sound macroeconomic, political, legal, and social context is necessary for achieving competitiveness, but not sufficient.³⁰

The UK's political and legal system is stable and not a barrier to economic development. The UK has in recent years achieved a higher level of macroeconomic stability than in any other period after 1945. Before 1980, deteriorating public finances, a high level of inflation, and an erosion of the value of the pound hampered the economy. In the early phase of the post-1980 reforms the focus was on reducing the size of government and stabilising public finances. Monetary policy, however, remained volatile and growth erratic. In the last decade, however, fiscal and monetary policy have become much more stable, especially after the independence of the Bank of England. There remains uncertainty about Economic Monetary Union (EMU) membership, but this uncertainty is in itself unlikely to be an important factor affecting the UK's competitiveness.

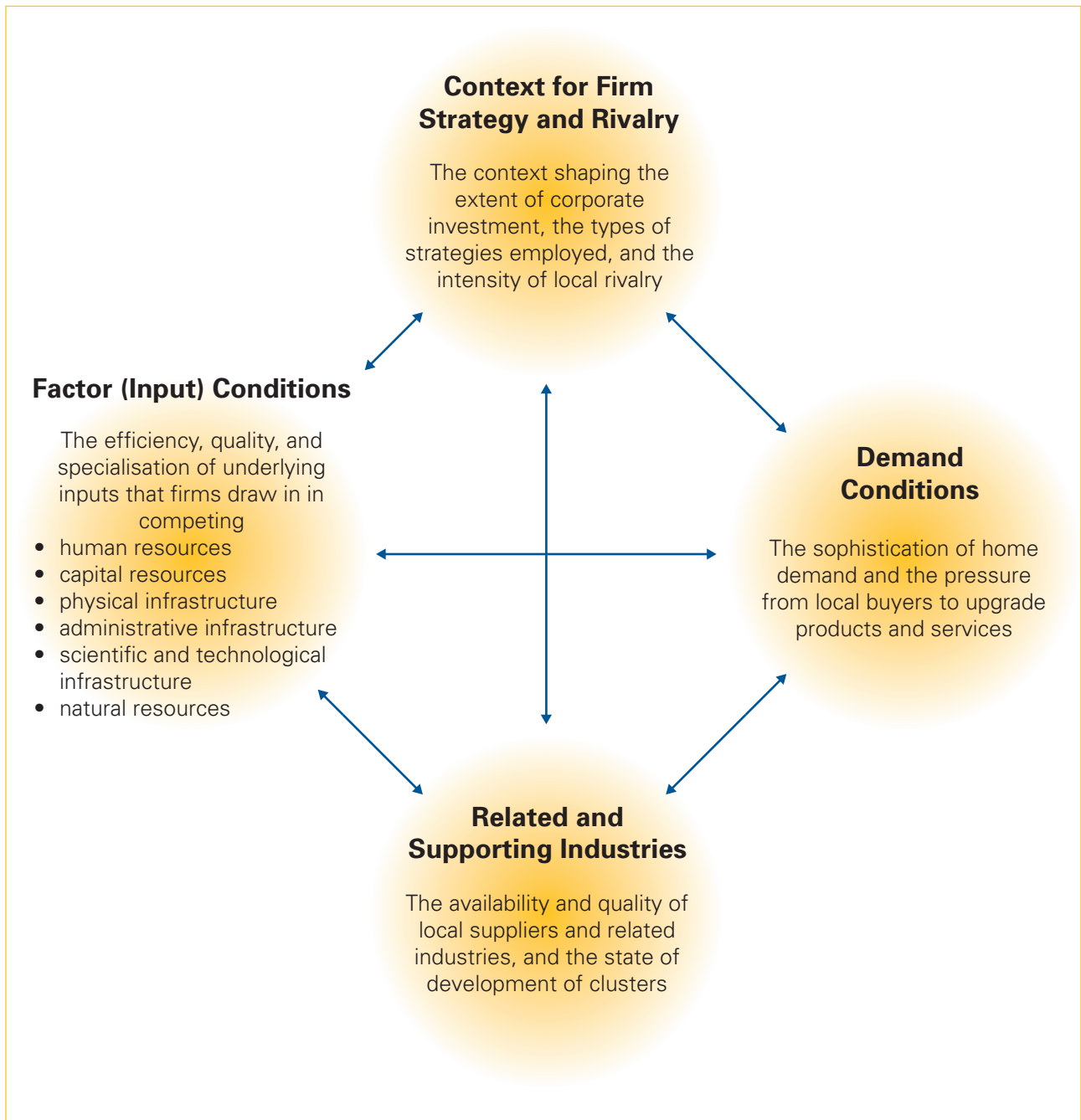
Progress on social issues has been more mixed, and the UK still faces significant economic disparities across regions and population groups. So far, poverty has been seen as more a social than an economic problem, but the demographic shift could in the future increase the economic costs of these social problems.

b) Microeconomic Business Environment

Wealth is actually created at the microeconomic level – in the ability of firms to create valuable goods and services using efficient methods. Only in this way can a nation support high wages and the attractive returns to capital necessary to support sustained investment. The microeconomic foundations of productivity rest on two interrelated areas: the sophistication with which domestic companies or foreign subsidiaries operating in the country compete, and the quality of the microeconomic business environment.

Increasing productivity through more sophisticated ways of competing depends on parallel changes in the microeconomic business environment. The business environment can be understood in terms of four interrelated areas: the quality of factor (input) conditions, the context for firm strategy and rivalry, the quality of local demand conditions, and the presence of related and supporting industries. Because of their graphical representation the four areas have collectively been referred to as the “diamond” (Figure 10).³¹

Figure 10: Productivity and the Business Environment

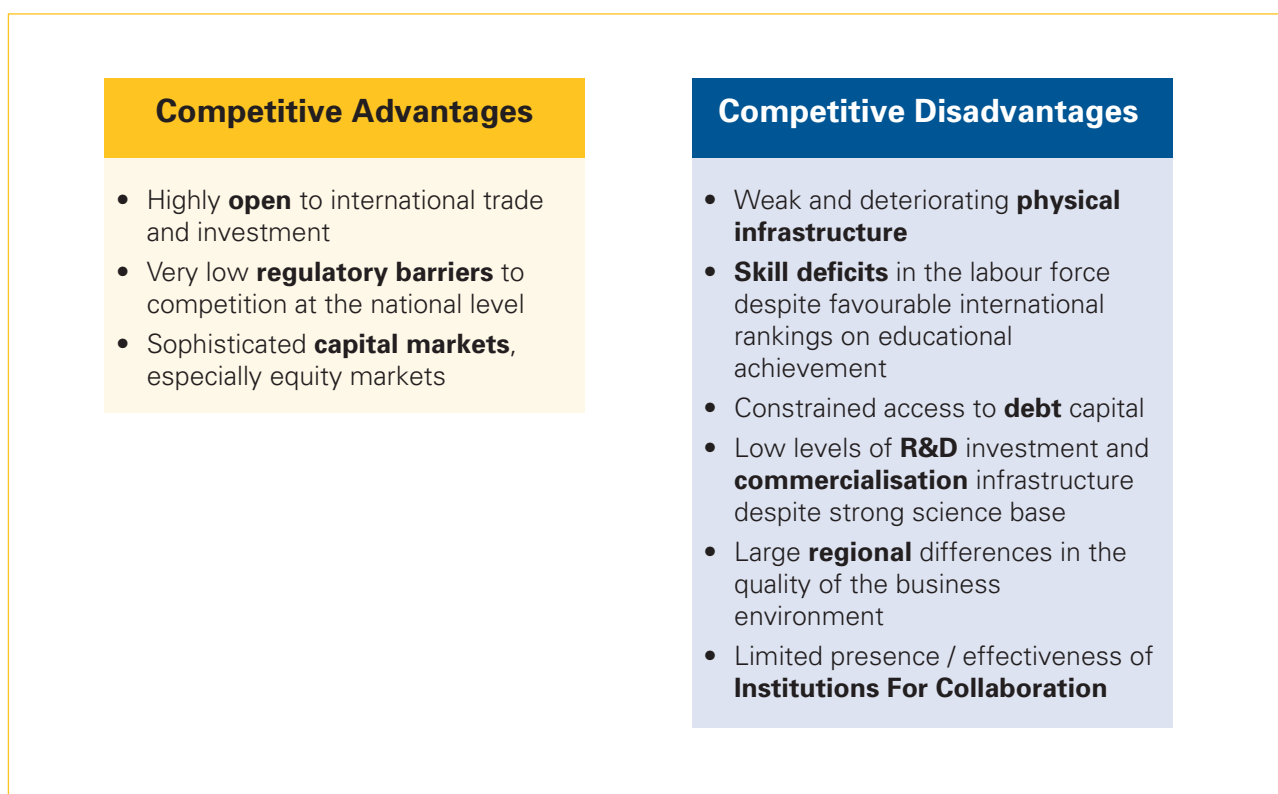


The UK business environment has been *fundamentally upgraded in the last two decades*.³² This has been the result of significant changes in policy starting in the late 1970's,³³ which have made the UK a much more attractive place to do business and have enabled companies located there to achieve much higher levels of productivity.

Overall, the UK has been successful in reducing unproductive roles and distortions of government in the competitive process (Figure 11). In the Global Competitiveness Report (GCR),³⁴ the UK performs especially well in measures of competitive vitality and market incentives; it also performs well on demand conditions and capital markets.

The UK has been less successful in areas that require long-term investments in assets or institutions by the public or private sector.³⁵ Its most significant weaknesses according to the GCR are in physical infrastructure and human resources.

Figure 11: The UK Business Environment - Overview



i) Factor (Input) Conditions

Infrastructure

Physical infrastructure emerges, according to 2002 Global Competitiveness Report (GCR) Survey data, as the UK's most important weakness. The quality of railways ranks particularly low, but the port infrastructure and even the telecommunication infrastructure register as relative disadvantages. In all three areas the UK's ranking has dropped by 5 or more places relative to other countries throughout the last five years.³⁶ These weaknesses reflect the lower rate of public investment in the UK compared to other advanced economies over the last two decades. They may also be affected by the post-privatisation regulatory framework in which, for example, railroad companies have operated. UK public investment relative to GDP has been roughly 50% below the United States, France, and Germany, although the gap with Germany has decreased in the last decade.³⁷

Skills

Labour force skills continue to be an area of competitive disadvantage for the UK, although the picture is mixed. In terms of education, in the GCR the UK receives low marks on the quality of its schools and specifically on the quality of its maths and

science education. This is consistent with the comparatively low spending on education in the UK; on a per student basis the UK ranks 15th among all OECD countries on this measure. However, UK students have performed well in the recent PISA study on educational performance across countries where the UK ranks between 4 and 6 on different educational areas.³⁸

In terms of general labour force skills, the UK still falls behind competing economies, especially because of a high share of the population with low levels of educational attainment.³⁹ UK companies report significant skill shortages that are consistent with these deficits.⁴⁰

In terms of advanced skills, the UK ranks well in the GCR on management education, an area in which the country attracts many foreign students. The UK receives low GCR marks on the availability of scientists and engineers. The UK has, however, registered a higher increase in the number of researchers per employees in the workforce than most other advanced economies, although it still is at a low level.⁴¹

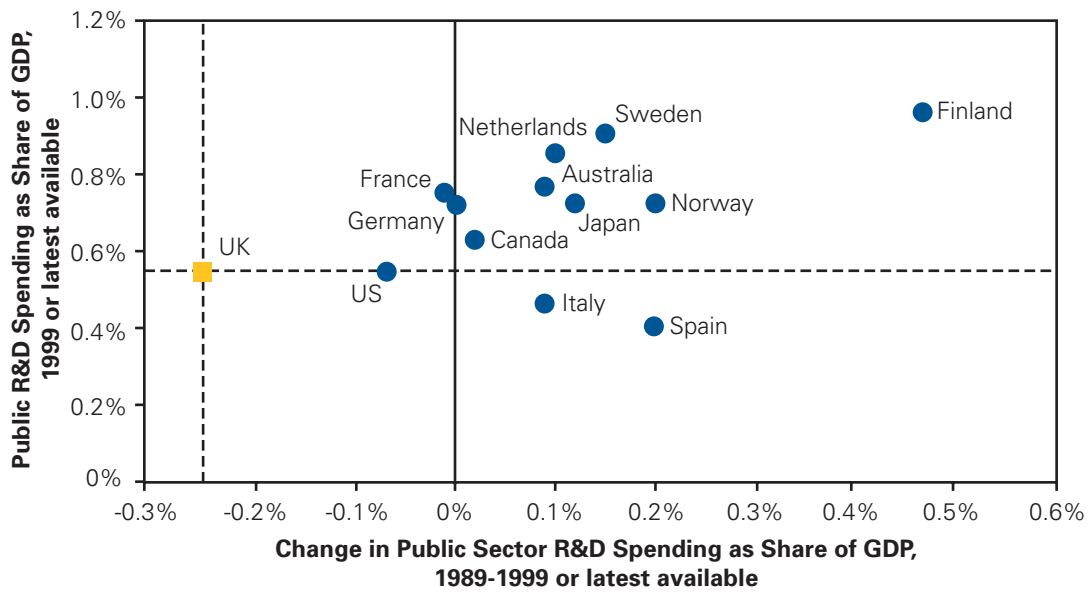
Financial markets

The City of London is one of the most competitive financial services clusters in the world. The UK ranks 1 in the GCR on the sophistication of its financial markets. Its equity markets in particular are rated highly, although there is anecdotal evidence of companies going private to avoid the markets short-term scrutiny.⁴² Venture capital availability is the highest in Europe behind the Netherlands,⁴³ although some observers are concerned about the relatively greater focus on later stage investments. While equity financing is competitive, it tends to be more expensive than debt financing. There are signs that the environment for debt financing is not as competitive: Investments of UK companies react more strongly to cash-flow changes, indicating constrained access to external financing.⁴⁴ This would be particularly harmful to the growth prospects of small and medium sized companies.

Science & Technology

The UK has in the recent past invested less public sector money into R&D than most other advanced economies. And over the last decade, the UK's position on public R&D spending relative to GDP has worsened (Figure 12).⁴⁵ Recent policy changes have started to address this, and the government budgets for the next few years register a significant ramping up of public sector R&D spending. It will take a while, however, until the accumulated effect of years of under investment in, for example, the university infrastructure, will have been overcome.⁴⁶

Figure 12: Public Sector Spending on R&D



Note: Includes spending by government and institutions of higher education.

Source: OECD (2002)

U.S. patenting by UK-based entities, a reliable indicator of world-class innovation output, is characterised by a strong representation of international companies (Figure 13). This finding is consistent with the view that the UK is a relatively cost efficient location for foreign companies to conduct research.

Figure 13: Top 25 UK patenting institutions in the US

	Organisation	U.S. Patents Issued from 1997 to 2001
1	ASTRA ZENECA LIMITED (PREVIOUSLY ZENECA)	398
2	BRITISH TELECOMMUNICATION, PLC	335
3	IBM CORP.	280
4	U.S. PHILIPS CORPORATION	257
5	SMITHKLINE BEECHAM PLC	244
6	EASTMAN KODAK COMPANY	206
7	LUCAS INDUSTRIES PUBLIC LTD. COMPANY	204
8	MINISTRY OF DEFENCE	183
9	ROLLS-ROYCE PLC	174
10	MERCK SHARP & DOHME LIMITED	167
11	IMPERIAL CHEMICAL INDUSTRIES PLC	160
12	NORTHERN TELECOM LIMITED	154
13	PROCTER + GAMBLE COMPANY	154
14	NORTEL NETWORKS CORPORATION	135
15	THE BOC GROUP PLC	131
16	SHARP KABUSHIKI KAISHA (SHARP CORPORATION)	117
17	PFIZER INC.	115
18	BRITISH TECHNOLOGY GROUP LIMITED	109
19	BP CHEMICALS LIMITED	103
20	HEWLETT-PACKARD COMPANY	103
21	NOKIA MOBILE PHONES LTD.	92
22	SONY CORPORATION	91
23	NCR CORPORATION	89
24	BRITISH NUCLEAR FUELS PLC	88
25	GLAXO GROUP LIMITED	83

Note: Shading indicates government agencies, universities, and research institutions

Source: US Patent and Trademark Office (2002), author's analysis

UK patenting in the U.S. is also characterised by a low representation of universities and other public institutions; a danger sign in modern technology development and commercialisation processes. In comparison, France, a country with a roughly equal level of overall U.S. patenting, registers a significantly larger role for universities and research institutions in patenting. This is consistent with UK universities being less active in commercialisation efforts than their peers in other advanced economies.

ii) Context for Firm Strategy and Rivalry⁴⁷

Market openness

The UK traditionally is an open economy with low barriers to foreign trade and investment, especially towards neighbouring European countries. As a member of the European Union, it falls under the general rules of the common market and the common trade policy.⁴⁸ According to the GCR, the UK has an overall low level of tariffs but some remaining non-tariff barriers to trade.

Domestically, the reforms of the last two decades have left the UK with very low administrative costs for new business formation relative to other countries. However, while the rate of new business formation is high, UK start-ups have a significantly lower likelihood to survive the initial years than their peers in other European countries and the United States.⁴⁹

Government regulations

The UK has the lowest level of product and labour market regulations in the OECD. The level of distortive government subsidies in the UK is low, and the subsidies paid tend to be horizontal rather than industry specific.⁵⁰ While the UK outperforms many other European countries on the level of distortive government subsidies, it ranks only 12 in the global comparison of the GCR. Specific local regulations, such as zoning laws, are also mentioned as barriers to more investment and productivity.⁵¹ There is also some concern in the business community about an increasing level of European Union-driven regulation that the UK will be subject to.

Incentives

The UK has a generally competitive system of business taxation with incentives for R&D investments and investments in economically distressed areas. The overall level of taxation is slightly lower than in many other advanced economies; this relative advantage of the UK has, however, decreased in recent years.⁵² According to the GCR survey data, the UK has very strong intellectual property rights protection, providing a good environment for innovation and technology transfer.

Competition

Relatively low levels of competitive intensity in some parts of the UK economy are repeatedly mentioned in the literature. The examples often tend to be in the non-traded sector of the economy. Reasons mentioned include the effects of past privatisation that are argued to have been driven too heavily by fiscal considerations. The competition policy in the UK was historically perceived to be more lenient than in other OECD countries.⁵³ Recent policy changes have markedly improved the policy context but will take considerable time to be fully reflected in companies competitive behaviour.⁵⁴

While there is no conclusive data, there is evidence that UK price levels in many sectors are higher than in other European countries and, in some sectors, above US levels as well.⁵⁵ The lower UK ranking on GDP per capita measured by purchasing power parity versus by current exchange rate is consistent with this view (Figure 14). However, the data is not conclusive: the divergence between purchasing power parity and exchange rate could be explained by other factors unrelated to the level of competition in the UK.

Figure 14: The Effect of Purchasing Power on National Prosperity

Rank	Country by 2001 GDP per Capita (FX)	Country by 2001 GDP per Capita (PPP)
1	US	US
2	Norway	Ireland
3	Switzerland	Norway
4	Japan	Switzerland
5	Denmark	Iceland
6	Iceland	Denmark
7	Ireland	Canada
8	Netherlands	Netherlands
9	UK	Austria
10	Sweden	Belgium
11	Finland	Australia
12	Austria	Japan
13	Germany	Germany
14	Belgium	Italy
15	Canada	Finland
16	France	Sweden
17	Italy	UK
18	Australia	France
19	Spain	Spain
20	New Zealand	New Zealand

Source: OECD (2002)

iii) Demand Conditions

The importance of advanced and sophisticated domestic demand grows as advanced economies progress. Sophisticated local customers educate local companies about future needs and pressure them to produce superior goods and services. Home demand is influenced not only by consumers and corporate customers but also by the stringency of local regulatory standards in areas such as energy, safety, and environmental impacts. Given the priority for the UK to overcome current weaknesses in innovation, demand conditions are an increasingly important influence on the country’s competitiveness.

Demand sophistication

The UK ranks high on overall buyer sophistication in the GCR. Specific examples are

related to individual clusters such as oil & gas, financial services, media, and others, but there is little hard data available.

Standards and regulations

The regulatory context in the UK provides average incentives for companies to address sophisticated consumer needs. On environmental regulations, for example, the UK performs less well than Scandinavia, Germany, or France, but still outperforms the average of the advanced economies.⁵⁶

Government procurement

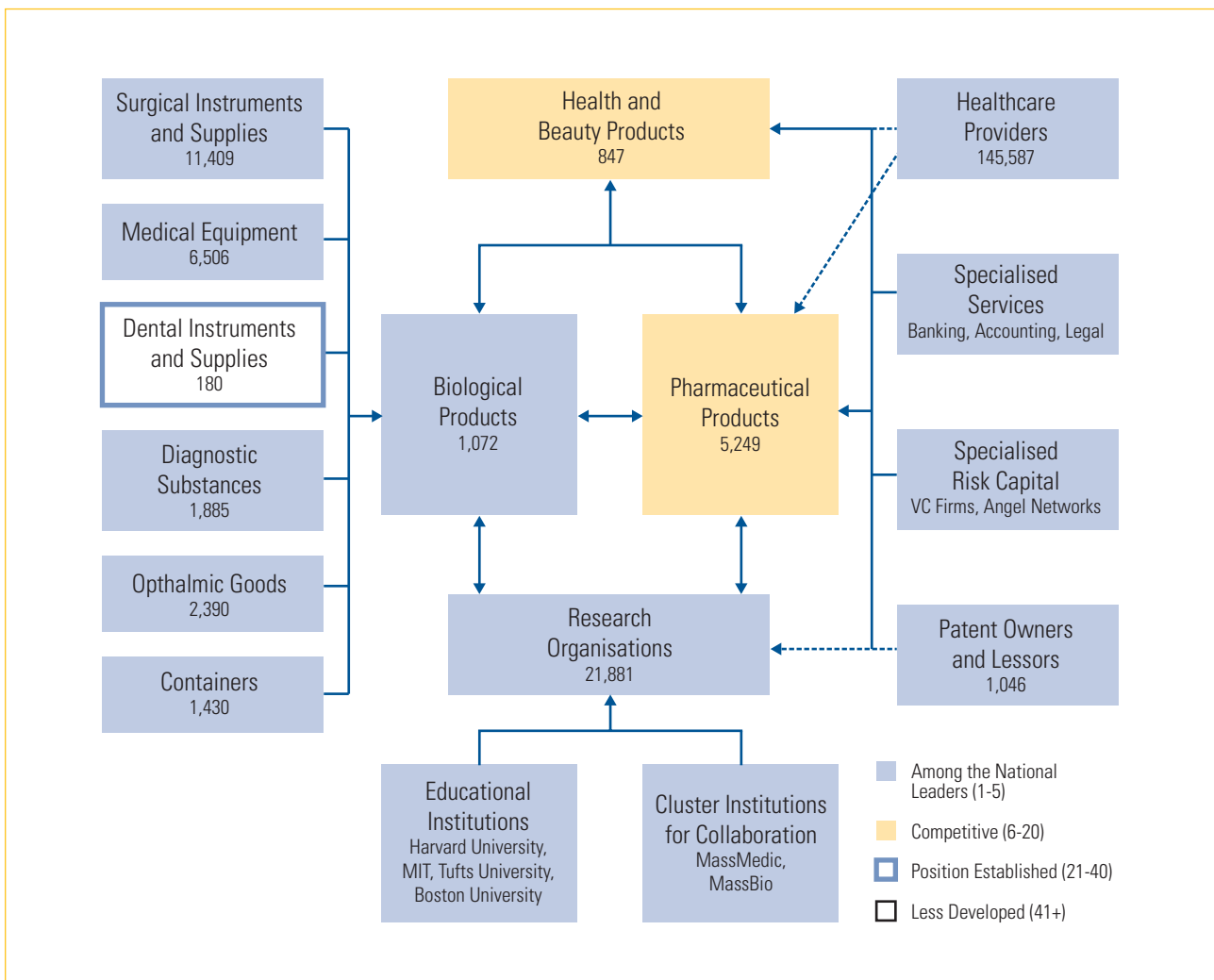
The UK ranks low on the sophistication of government procurement in the GCR. There is little other hard data available on this subject.

c) Clusters

Clusters constitute one facet of the diamond, but they are best seen as a manifestation of the interaction of all the diamond's elements.⁵⁷ Clusters are geographically proximate groups of interconnected companies, suppliers, service providers, and associated institutions in a particular field, linked by commonalities and complementarities. Clusters such as IT in Silicon Valley or high performance cars in Southern Germany can be concentrated in a particular region within a larger nation, and sometimes in a single town. Other clusters are national and sometimes stretch across borders into adjacent countries, such as Southern Germany and German-speaking Switzerland. Proximity must be sufficient to allow efficient interaction and flow of goods, services, ideas, and skills across the cluster.

Clusters affect competitiveness in three broad ways: First, clusters increase the *level of productivity* at which constituent firms can operate. Firms can, for example, operate with lower levels of stock due to the local presence of suppliers. And they can reduce downtime in cases of technical failures in the production process due to the quick access to local service providers that can solve such problems quickly. Second, clusters increase the capacity for *innovation and productivity growth*. In the Boston Life Sciences Cluster (Figure 15), for example, the presence of world-class research universities, teaching hospitals, competing biotech companies, and cluster institutions that facilitate interaction among all these foster the dissemination of knowledge and provide a fertile ground for new ideas: Boston has between 1996 and 2000 generated the highest number of life science patents of all economic areas in the United States. Third, clusters stimulate and enable *new business formation* that further supports innovation and expands the cluster. In Boston, the availability of highly experienced researchers and laboratory technicians, the access to specialized Venture Capital providers and lawyers, and the many options for employment in other cluster companies in case of failure all reduce the costs and risks of starting a new life sciences company.

Figure 15: The Boston Life Science Cluster



Note: Employment numbers for 2000 given inside boxes when available

Source: Cluster Mapping Project, Institute for Strategy and Competitiveness, Harvard Business School

It is rare that there is only a single cluster in the world in a given field. In most cases there are several clusters in different locations with different levels of sophistication and specialisation. Clusters in one location often involve foreign direct investment by firms based in other clusters.

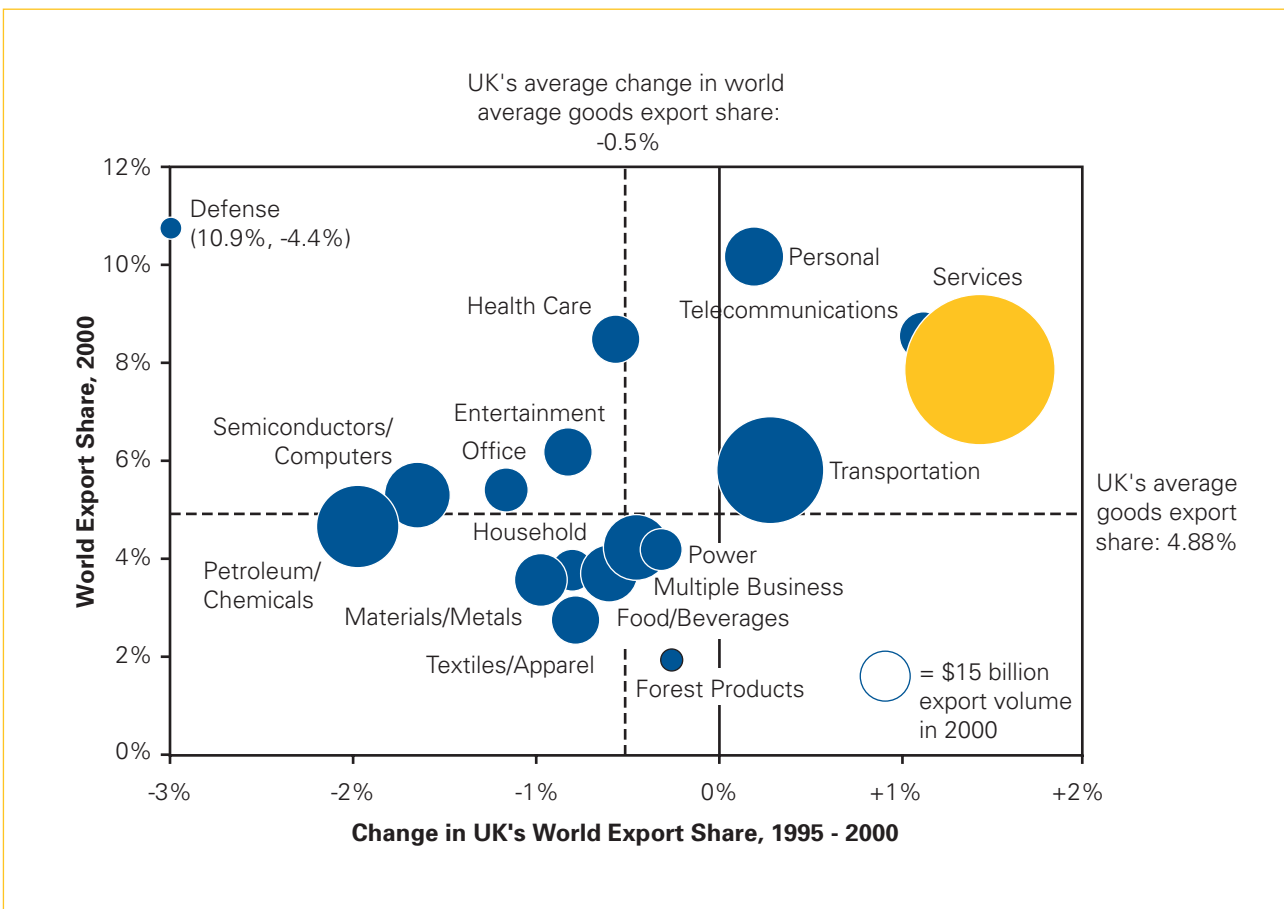
Only a small number of clusters tend to be true innovation centers. Others may tend to specialise in producing products aimed at particular market segments, or be manufacturing centers. Still other clusters can be regional assembly and service centers. Firms based in the most advanced clusters often seed or enhance clusters in other locations as they disperse some activities to reduce risk, access cheaper inputs, or seek to better serve particular regional markets. The challenge for an economy is to move first from isolated firms to an array of clusters, and then *to upgrade the sophistication of clusters to more advanced activities*.

National economies tend to specialise in particular clusters, which account for a disproportionate share of their output and exports. Export data is a particular useful way to identify broad clusters across a wide set of countries, because strong export positions

in specific clusters indicate a base of internationally competitive companies or subsidiaries in these areas.

Overall, the UK does not rank high on measures of cluster development. It has strong positions in services, for example financial services and media, but there is little systematic data on these clusters available. Outside of services, the UK has clusters with strong export positions in defence, products for personal use, health care, and telecommunications (Figure 16). Other clusters with significant presence include entertainment, semiconductors and computers, transportation, and office products.⁵⁸ On a more granular level, the UK has clusters with significant potential in biotechnology⁵⁹ and motor sports, for example.⁶⁰

Figure 16: UK's Export Performance by Broad Sector



Source: UNCTAD, WTO, author's analysis

The UK government has undertaken an effort to map the regional structure of clusters within the country.⁶¹ This effort analysed detailed data on the location of economic activity across the UK, but suffered from ad-hoc cluster definitions. The analysis failed to make the crucial distinction between local and "traded" industries. According to U.S. data, local industries distributed equally across geographies account for about two thirds of employment, but have lower productivity and lower rates of innovation. Traded industries are far more concentrated geographically and serve markets outside their location. They account for only one third of employment but have much higher productivity, innovation, and wages.⁶² While there are a number of initiatives for cluster

activation throughout the UK, often initiated by the Regional Development Agencies (RDA's), the data provided by the existing cluster mapping effort seems to have had only limited practical value.

d) Roles, Institutions, and Processes

Competitiveness increasingly relies on a country's appropriate structure of roles, institutions and processes to enable, organise, and drive efforts to improve business environments and clusters. In the past, government, often at the national level, was in charge of improving competitiveness through policy decisions and incentives. Firms competed in the marketplace and took their environment as given. In modern competition, however, improving competitiveness becomes a collaborative process involving multiple levels of government, companies, educational institutions, and institutions for collaboration (IFC). At the microeconomic level a large number of factors impact on competitiveness and hence only a broad coalition can hope to improve a nation's foundations of competitiveness.

Government continues to play an important role because it affects many aspects of the business environment. Government shapes factor conditions, for example, through its training and infrastructure policies and similar policy influences are present in all elements of the diamond. There are distinct roles for government in improving the business environment at the national, state, and local level as well as among neighbouring countries. Government at all levels also has a central role in convening and supporting competitiveness efforts, even though these efforts will tend to be led by the private sector or other institutions. Without government involvement, initiatives lack legitimacy and they fail to address those competitiveness issues government policy can directly affect.

Companies play an increasingly important role for the competitiveness of their locations. Competitive advantage resides not only within the firm, but is also shaped by the external context firms operate in. Individual companies can improve their external context by individual actions such as establishing schools, attracting suppliers, or defining standards that not only benefit themselves but also improve the overall environment for competition. Companies can also take collective steps to enhance the ability of individual companies to improve operating practices and strategies, such as quality certification programs and manufacturing assistance centers.

Universities and other educational and research institutions have also become increasingly important factors for national and regional competitiveness. Traditionally, they have been important in improving the skill base of the economy. But a shift in the way research and development (R&D) is organised is now also strengthening their role in commercial R&D. In the past, universities did basic science, while companies worked separately on applications for commercial use. Today, these boundaries have blurred, and successful R&D often involves cooperation throughout the innovation process.

A wide variety of other organisations also have a significant effect on competitiveness. These entities, which we refer to as institutions for collaboration (IFC's)⁶³, are neither firms, government entities, nor universities. They include, for example, chambers of commerce, industry associations, professional associations, trade unions, technology transfer organisations, quality centers, think tanks, university alumni associations, and others. IFC's perform important roles as intermediaries that organise and perform collective action and enable more effective collaboration between parts of a cluster.

The Australian Wine cluster, a success story with a world export market share more than doubling within the last five years,⁶⁴ provides a vivid example of the key role such institutions can play in improving competitiveness (Figure 17).

Figure 17: Institutions for Collaboration in the Australian Wine Cluster

<p>Winemakers' Federation of Australia</p> <ul style="list-style-type: none"> Established in 1990 Focus: Public policy representation of companies in the wine cluster Funding: Member companies 	<p>Cooperative Centre for Viticulture</p> <ul style="list-style-type: none"> Established in 1991 Focus: Coordination of research and education policy in viticulture Funding: other cluster organisations
<p>Australian Wine Export Council</p> <ul style="list-style-type: none"> Established in 1992 Focus: Wine export promotion through international offices in London and San Francisco Funding: Government; cluster organisations 	<p>Grape and Wine R&D Corporation</p> <ul style="list-style-type: none"> Established in 1991 as statutory body Focus: Funding of research and development activities Funding: Government; statutory levy
<p>Wine Industry Information Service</p> <ul style="list-style-type: none"> Established in 1998 Focus: Information collection, organisation, and dissemination Funding: Cluster organisations 	<p>Wine Industry National Education and Training Council</p> <ul style="list-style-type: none"> Established in 1995 Focus: Coordination, integration, and standard maintenance for vocational training and education Funding: Government; other cluster organisations

Source: UNCTAD, WTO, author's analysis

In the UK, there is anecdotal evidence that these critical institutions are less numerous and less effective than in competing locations.⁶⁵ The government effort to create a network of industry forums, for example, is believed to have had some success in the

automotive cluster, but little impact elsewhere. However, there is no systematic evidence on these efforts.

e) Influences of Different Geographical Levels

In the past, analysis of competitiveness has focused on the nation and national-level policies. Increasingly it is becoming clear that this perspective is too limited: competitiveness is affected by assets and policies at many different geographic levels. These range from cross-national, e.g. the Baltic Rim or the European Union, to national, to regional, to local. Indeed, the most significant spillovers and interactions take place at the regional and local level. A clear indication of the importance of regional business environments is the sharp performance difference across regions within given countries, even though they are all exposed to the same national level policies.

Across UK regions, as in many other countries, there are strong differences in regional economic prosperity that are consistent with differences in the quality of regional business environments.⁶⁶ In countries such as the United States there is convergence of prosperity across regions. In the UK, there is *divergence* of regional prosperity.⁶⁷ The rich are getting richer and the poor are getting poorer. In France and Germany there is no significant relationship between regional prosperity and prosperity growth, or no change in dispersion of performance. While GDP per capita differences in UK regions appear to be more persistent than in other European countries, unemployment rates in the UK are more similar across regions.⁶⁸ This is consistent with flexible labour markets in the UK. Labour mobility and wage flexibility are effective, and regional differences in income reflect the quality of the regional business environments.

Strong regions and regional institutions - from mayors to elected regional and state level administrations with significant decision rights - have proven to be an increasingly important factor for competitiveness in many other countries. Their importance has gone up, because there has been convergence on the policies controlled at the national level, such as macroeconomic policy, taxation, and overall government regulation. The remaining differences in regional business environments affected by the decisions of regional institutions have become more important. In the United States, for example, there is clear evidence that much of the relevant progress in improving the microeconomic foundations of competitiveness occurs on the regional level.⁶⁹

In the UK only about 25% of public sector expenditure is controlled by regional and local governments, below most other OECD countries including Germany (35%) and the United States (42%), but above France (18%).⁷⁰ The UK's centralised organisational structure for government has repercussions for competitiveness: Public spending is inevitably less well adapted to regional and local opportunities and needs. And private sector leaders are less willing to engage in local and regional efforts, if important decisions affecting the quality of their business environment are made in the capital.

The Regional Development Agencies (RDA's),⁷¹ established by order of the Regional Development Agencies Act of 1998, has created new institutions to address regional

competitiveness in the UK. The RDA's are an innovative approach to strengthen regional policy in the UK, but it will take more time to evaluate if they can overcome the inherent challenges they face in the given structure of UK government.⁷²

References		
30	Porter (2002)	46 JM Consulting (2001)
31	Porter (1998)	47 For general information on recent policy changes see HM Treasury (2001a)
32	For a good overview on policy initiatives and outcomes see DTI (2002) and OECD (2002)	48 The research reviewed did not distinguish more between openness to EU members in the common market and openness to countries outside the EU.
33	Beath (2002) argues instead that there has been remarkable consistency in much of the microeconomic policies.	49 Bartelsmann et al. (2003)
34	Porter (2002a)	50 European Commission (2001)
35	The pharmaceutical sector and its ability to draw on the UK science base is a notable examples.	51 McKinsey (1998)
36	Global Competitiveness Report (2002), unpublished data.	52 Bond/Chennells (2000)
37	OECD (2002a), IMF (2003). It is unclear if the higher level of privatization in the UK is important in explaining this difference.	53 Nickell (2002)
38	OECD (2000)	54 OECD (2002a)
39	OECD (2002a)	55 European Commission (2001)
40	Hogarth/Wilson (2001)	56 Porter/Esty (2001)
41	OECD (2001)	57 Porter (1998), Porter (2000)
42	Nickell/Van Reenen (2002)	58 In appendix A we have included a more detailed ranking of subclusters by export performance.
43	European Commission (2002)	59 There is a significant literature on the UK biotechnology cluster. See DTI (1999) for the government perspective. See also European Commission (2001) and OECD (2002b)
44	Ashworth et al. (2001)	60 "Motorsport Valley" in Oxfordshire is claimed to be home to more than 700 motorsport-related companies.
45	OECD (2001)	61 DTI (2001)
		62 Porter (2003), Porter/Council on Competitiveness/Monitor Group (2001).
		63 Porter/Emmons (2003)
		64 Porter/Sölvell (2003)
		65 See, for example, the discussion of the Business Link-scheme in Oughton (1997)
		66 HM Treasury (2001b)
		67 See the results of a statistical analysis in appendix B
		68 Soltwedel (1999) quoted in IMF (2000).
		69 Porter/Council on Competitiveness/Monitor Group (2001), Porter (2001d)
		70 OECD (2002a)
		71 For more information on the RDA's see www.dti.gov.uk/rda . Other regional efforts have been undertaken with EU support in the Innovating Regions in Europe (IRE) network. This effort is promising, but lacks a consistent intellectual framework.
		72 Cockerill (2002)

4

Competitiveness and UK Company Behaviour: The Role of Management

The productivity of a country is ultimately set by the productivity of its companies, both domestic firms and the subsidiaries of foreign companies operating there. However, the sophistication of companies is inextricably intertwined with the quality of the national business environment. More sophisticated company strategies require more highly skilled people, better information, improved infrastructure, more capable suppliers, more advanced research institutions, and stronger competitive pressure, among other things.

Companies in a nation must upgrade their operating practices and strategies if successful economic development is to occur. The competitive advantages of a nation's companies must shift from comparative advantages (low-cost labour or natural resources) to competitive advantages arising from unique products and processes. Companies must move from tapping foreign distribution channels to building their own channels.

a) UK Company Performance

The UK is home to a significant number of large, internationally successful companies. Within Europe, the UK has an equal or higher number of companies in the Fortune 100 relative to GDP than do Germany or France. Among multinational companies (MNC's) with the largest foreign assets (classified as transnational companies by UNCTAD) the UK is home to 14 companies, behind only the United States and Japan and ahead of Germany, France, Italy, and the Netherlands.⁷³ In a dataset of 10,000 large companies from Canada, Germany, Japan, the United States, and the United Kingdom, UK companies reported the highest return on equity in the 1997-2001 period.⁷⁴

Productivity levels of UK multinationals are roughly in line with German and French multinationals, but lag US multinationals.⁷⁵ Productivity of domestic UK companies is lower than that of the MNC's operating in that country, as in other countries. The difference in relative UK productivity across industries is consistent with their competitiveness as revealed in their export positions: strengths in services (retail, banking) and selected manufacturing (oil & gas, pharmaceuticals, food processing) and

weaknesses in many other manufacturing industries.⁷⁶ The hypothesis of a “long tail” of underperforming firms, i.e. the presence of a higher share of companies with very low performance in the UK relative to other countries, finds no support in current research.⁷⁷

b) UK Company Operations and Strategy: Competitive Assessment

UK companies excel in generating high returns from existing assets through efficient, well established business processes, especially in customer relationship and supply chain management (Figure 18). They are less well positioned to innovate, create new assets, and compete on unique market positions.

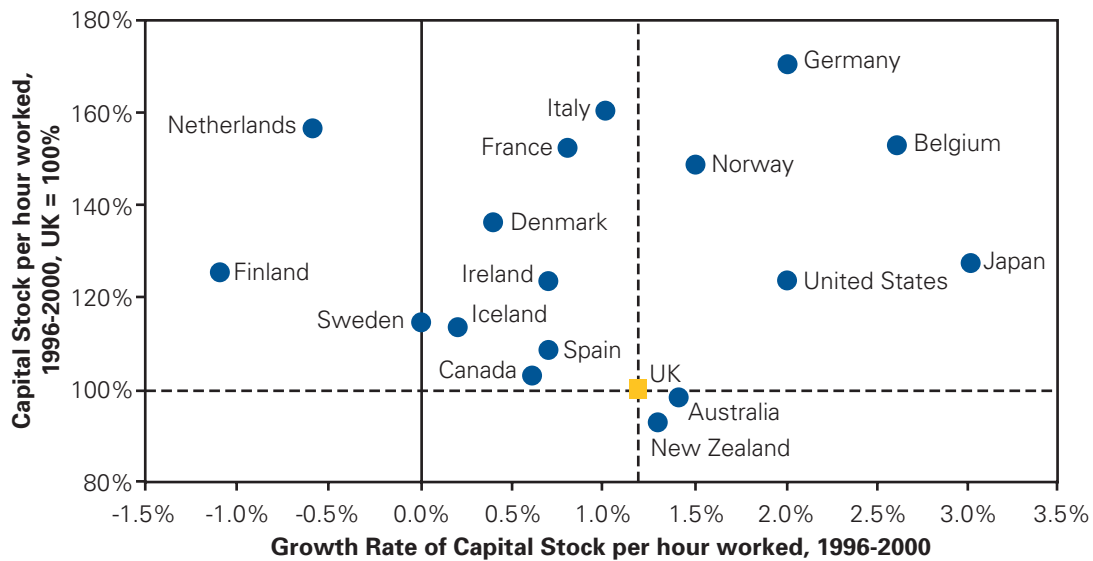
Figure 18: UK Company Operations and Strategy - Overview



Source: Global Competitiveness Report (2002), McKinsey (2002), EEF (2002), COI (2000), WIR (2002)

Capital Stock

UK companies are operating with lower levels of capital intensity than their competitors in Europe and the United States (Figure 19). Business investment has increased to the level of other advanced economies over the past decade, but that has not been enough to close the gap in terms of capital intensity.⁷⁸ Recent analysis by the OECD suggests that the lower investment in the UK over the last decade has been mainly related to investments in buildings and structures. There is no lag in investments in machinery⁷⁹. The OECD report speculates that this results is due to a larger existing building stock in the UK relative to other countries, but the evidence on lower capital investment by UK multinationals independent of location casts doubt on this hypothesis.

Figure 19: Level and Change of Capital Stock, Selected Countries

Source: IMF (2003)

Innovation

UK companies invest significantly less in R&D than their competitors (Figure 20).⁸⁰ For most sectors in the UK this gap is understated due to the strong position of the R&D intensive pharmaceutical sector. In the UK this sector alone accounts for 23% of all manufacturing R&D by companies, ahead of all other OECD countries including France (9%), the United States (7%), and Germany (5%).⁸¹ The R&D gap is increasing; the UK was one of the few advanced economies in which business spending on R&D has fallen relative to GDP in the 1990's. Interestingly, the share of foreign-owned companies research in total private sector R&D expenditures has increased from 16.4% in 1989 to 31.2% in 1999. At the same time, there are indications that UK companies have performed an increasing amount of their R&D abroad.⁸²

Company positioning

There is some evidence that UK companies are competing less on unique value than their advanced economy peers. The UK has, for example, a lower export share in industries that are highly quality-sensitive; it also has been increasing its export share in such industries less than many other European countries.⁸³

However, this evidence is not very conclusive, and differences across industries are likely to be significant. One of the possible explanations for the recent appreciation of the UK real exchange rate, for example, is the improvement in the unit value of UK exports relative to other countries.⁸⁴ This would indicate that, at least for the companies that are successful in exporting, competing on value is increasingly becoming the norm.

Management

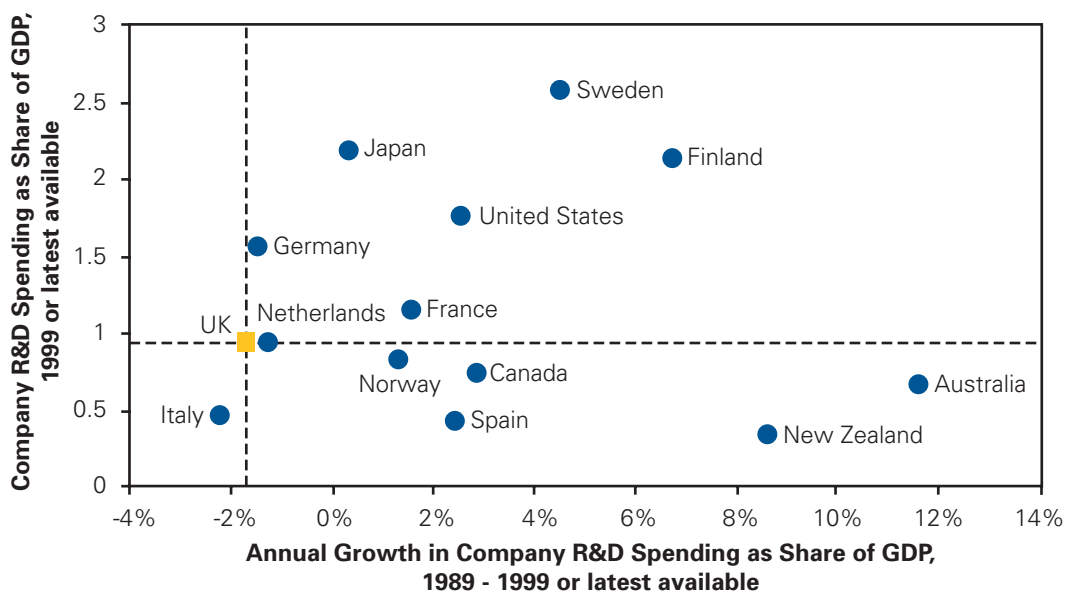
UK companies rely on professional managers versus management by family members of company owners. Modern compensation techniques such as incentive compensation for company executives are used more widely than in most other countries with the exception of the United States. However, there is some evidence, especially from the manufacturing sector, that UK companies adopt modern management techniques such as total quality management (TQM) later and less often than their competitors.⁸⁵ They also seem to achieve lower returns from implementing them. However, there is conflicting evidence from other studies that find UK companies to be average in the use of management techniques.⁸⁶

The UK has a lower share of managers with advanced formal education versus peer countries. However, this could be a statistical artefact due to the very high number of employees classified as managers in the UK. The supply of the most skilled managers in the UK is likely to be competitive. UK management schools get high ratings and attract many strong foreign students. The UK also is at least as attractive a location for expatriate managers as any other European country. Problems with managerial skills in the UK seem likely to be concentrated at the lower and middle management level, reflecting the overall skill deficit in the UK labour force.⁸⁷ However, there is no conclusive comparative data available to measure such differences.⁸⁸

Manufacturing

There are some indications that the UK manufacturing sector is performing below the rest of the economy.⁸⁹ Labour productivity in UK manufacturing relative to the United

Figure 20: Company Spending on R&D



Source: OECD (2002)

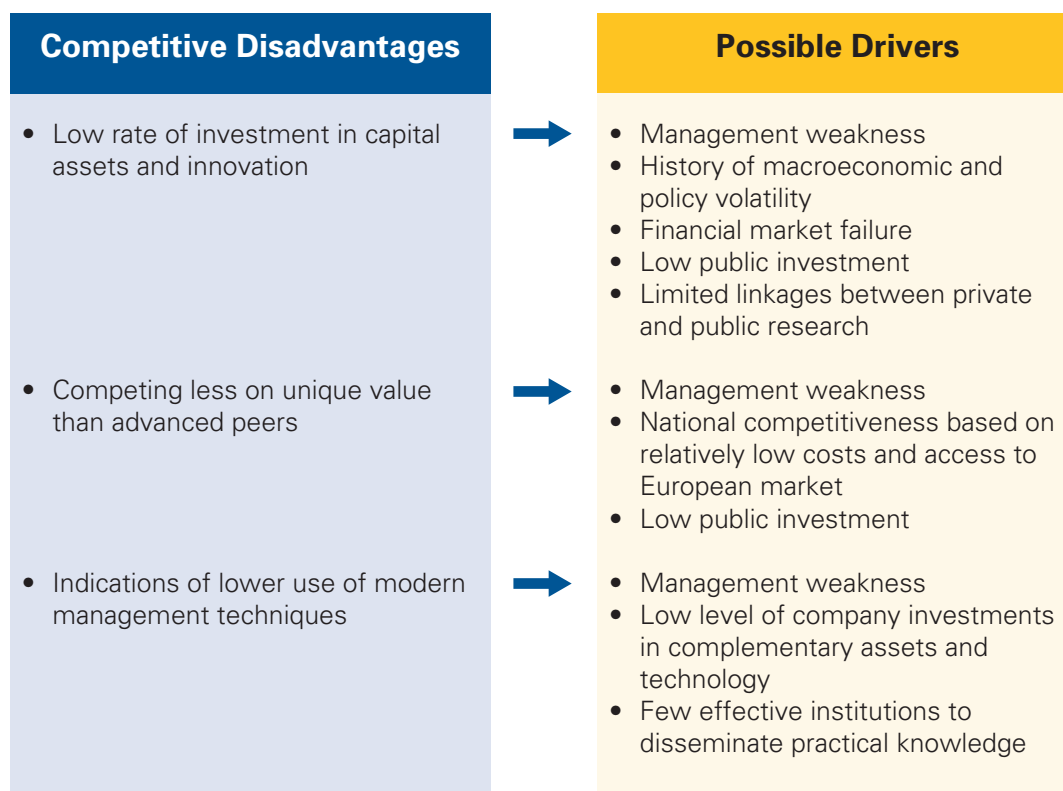
States underperforms the overall economy.⁹⁰ However, the same is true for France and, to some extent, for Germany.⁹¹ Labour productivity growth in UK manufacturing was lower than in the overall economy and below manufacturing labour productivity growth in the United States, France, and Germany after 1995. This was in contrast to the prior years when UK manufacturing growth was significantly stronger than in peer countries.⁹² In total factor productivity, the UK manufacturing sector lags other countries and also the UK economy average productivity in level and recent growth rate.⁹³

The lower UK productivity in manufacturing relative to the United States is, according to some observers, related to the presence of economies of scale and smaller home market size.⁹⁴ Data on the average size of manufacturing companies does indicate that UK companies indeed are smaller than their US peers. However, the data also shows that UK companies are *larger* than companies from other European countries that still achieve higher manufacturing productivity.⁹⁵ The low productivity performance of UK manufacturing in recent years is consistent with lower spending on capital investment and R&D relative to competitors from other locations.⁹⁶

c) Understanding UK Company Behaviour

Management choices are a function of the following main factors: management capabilities, company capabilities, and the company's business environment. These factors in turn are mutually dependent over time. There is no simple relationship between any one factor and management choices to drive company competitiveness and ultimately country performance.

For the UK, there are three areas that are perceived to result in competitive disadvantages for UK companies: insufficient investment in capital assets and innovation, positioning on low input cost rather than high value, and lagging adoption of modern management techniques (Figure 21). Together, these areas could explain the persistent productivity gap and the low level of innovation of the UK economy relative to the United States and the leading Continental European economies.

Figure 21: Competitive Company Weaknesses in the UK - Potential Explanations

Explanations for low investments in capital and innovation

There is clear evidence that UK companies on average operate with a smaller capital stock and invest less in R&D than their peers in Europe and the United States. The literature proposes a number of possible explanations. The first possible explanation is management failure to react to economic opportunities. However, in terms of capital assets the lower investment rate in the UK is consistent with the UK's low capital productivity (the real anomaly is France which has a high capital stock despite the same capital productivity as the UK).⁹⁷ There are also indications that UK companies earned a lower return from investments in information technology than their US peers.⁹⁸ What explains the lower capital productivity despite the low capital stock in the UK is not addressed in the literature. Management failure is again a possible explanation, but it is far from being the only one.

The second possible explanation is the UK's history of relatively high macroeconomic volatility.⁹⁹ There is clear evidence showing that higher macroeconomic volatility depresses investment rates. However, past macroeconomic volatility in the UK was higher than in Continental Europe, but lower than in the United States. More importantly, the UK has enjoyed a number of years of increased stability, and it has put institutional structures in place, such as the independence of the Bank of England, that create more stable macroeconomic expectations. If macroeconomic volatility is indeed the driver of lower investment rates, this would indicate a significant time lag in management adjusting to the new context in the UK economy.

The third possible explanation is the UK's equity based financial market structure that, it is argued, favours short-term management outlook.¹⁰⁰ There is clear evidence that the value of financial assets can be mis-priced for extended periods of time.¹⁰¹ There is, however, no systematic evidence that ties this to management behaviour. The anecdotal evidence on firms going private to enable more long-term strategies indicates that this might be the case, but it also indicates that companies have a choice and that there is no determinism. The evidence from more general studies on the relationship between financial systems and economic performance indicates a more complex relationship with relative advantages and disadvantages for the Anglo-Saxon versus Continental European system but no obvious superiority of any one model.

The fourth possible explanation for the low level of investment in capital stock and innovation is the UK's low level of complementary public capital assets and labour force skills.¹⁰² There is clear evidence that the UK has weaknesses in the general infrastructure, such as the transportation networks, in public sector R&D spending, and in the overall skill base of its labour force. General economic research indicates that these factors will drive down the profitability of investments in capital assets and R&D. There is no specific data on the quantitative effect of these factors in the UK.¹⁰³

The fifth explanation, related to the lower level of R&D investments, is the institutional structure and lagging financing of the university and public research sector. Private sector research is increasingly related to public sector research.¹⁰⁴ Low university R&D spending and low levels of university interactions with companies are factors that directly effect companies incentives to invest in R&D. The relatively low level of financing for UK universities as well as universities' low levels of patenting are indications that such deficits exists, at least outside of the life sciences.¹⁰⁵

Explanations for company positioning on efficiency and low costs

There is some evidence that, on average, UK companies compete less on unique value and innovation than their peers from other advanced countries.¹⁰⁶ However, current research provides no systematic explanation of why that might be the case. One candidate is management failure, especially in the area of strategy and innovation.¹⁰⁷ UK managers might either fail to understand the opportunities of competing in premium segments, or might indeed be better at low cost processes, products, and services.

The alternative candidate to explain UK company positioning, however, is again the business environment. The weaknesses in the infrastructure, science and technology system, and labour force skills make it harder for companies to compete on innovation and unique value. In contrast, historically the relatively low costs of labour and other costs of doing business compared to peer countries made it attractive to compete on efficiency and lower cost.

Explanations for slow adoption of modern management practices

There is evidence from the manufacturing sector that UK companies are less active in adopting modern management practices. Given the success of UK retailers attributed to leading supply-chain management systems, it is unclear as to how broadly this

observation holds. Accepting the notion that UK companies fall behind their peers in modern management practices, management failure in the sense of resistance to change or inadequate training in such practices are possible candidates for explanation.

However, another candidate to explain lower adoption of modern management techniques is the lower level of private and public investment in capital assets and R&D. Many of the new techniques need, it is argued, modern machinery and skilled employees to reach their full potential. If those are missing, it might explain why managers decide not to migrate to these new techniques. The ultimate cause, then, would be the factors that drive low investment. Tackling those problems would then lead managers to adopt the new management techniques.

The third candidate for the slow adoption of modern management practices is the insufficient presence of institutions for collaboration in the UK economy. These institutions, such as cluster organisation or university-linked networking institutions, often play a particularly important role in the diffusion of new management best practice. Some of these techniques are hard to communicate in an abstract form, and are best learned in direct interaction with other professionals in the same cluster or industry.

While all of these individual explanations have some credibility, there is no systematic evidence evaluating their relative importance in explaining the facets of company behaviour that underlie the UK productivity and innovation gap relative to its peers.

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73 UNCTAD (2002). UK companies come primarily from the oil & gas and the food & beverages sector, while for example German companies tend to be from manufacturing sectors.	74 Conversely, Oughton (1997) notes that historically the profitability of UK companies was lower than by companies in other advanced economies. It is unclear if this data is conflicting with the evidence mentioned in the main text, or if a change in the profitability patterns has occurred.
75 Griffith/Simpson (2000) and ongoing research work at CERIBA (Center for Research into Business Activity)	76 DTI (2002)
77 Haskel (2002), unpublished	78 Ashworth et al. (2001)
79 OECD (2003)	80 Oughton (1997) argues that even these aggregate numbers create a too positive
81 PICTF (2001)	82 Pain (2000)
83 Aiginger (2001)	84 IMF (2003)
85 EEF (2001), McKinsey (2002)	86 Nickell/Van Reenen (2002), OECD (1999)
87 See also Department for Education and Skills (2001)	88 The Council for Excellence in Leadership and Management (2002) provides interesting data on the UK situation. Comparative data on other countries, however, is unfortunately not available.
89 McKinsey (2002), EEF (2001)	90 Pilat (1996), O'Mahoney/De Boer (2002)
91 Germany has higher labour productivity if measured by GDP per hour worked.	92 Bureau of Labour Statistics (2002), European Commission
(2001), O'Mahoney/deBoer (2002)	93 O'Mahoney/deBoer (2002)
94 EEF (2001)	95 Bartelsmann et al. (2003)
96 DTI (2001c)	97 McKinsey (1998)
98 Nickell (2002a)	99 Ashworth et al. (2001), Oughton (1997)
100 Nickell/Van Reenen (2002), Oughton (1997)	101 Myners-Report (2001)
102 Nickell (2002)	103 See Ford/Poret (1991) for some earlier empirical work on this general issue.
104 OECD (2002b)	105 In the life sciences, the UK has a significant position, and in the university-based clusters around Oxford and Cambridge significant university-company interaction does take place.
106 Aiginger (2000)	107 TUC (2002)

5

Implications for Policy and Future Research

These findings, taken together, allow us to see the overall competitiveness of the UK and its stage of economic development. Successful economic development is a process of successive upgrading, in which a nation's business environment evolves to support and encourage increasingly sophisticated and productive ways of competing by firms based there. This process takes a long time, stretching far beyond the administration of any individual government. Assets must be built, behaviour has to change, and investments have to feed through to generate results.¹⁰⁸

As nations develop, they progress in terms of their characteristic competitive advantages and modes of competing. This process can be described as a sequence of stages, each with a different set of economic characteristics and challenges. The first stage is the *Factor-Driven Stage*, in which competitive advantage is based exclusively on endowments of labour and natural resources. This supports only relatively low wages. In the *Investment-Driven Stage*, efficiency in producing standard products and services becomes the dominant source of competitive advantage. Economies at this stage concentrate on manufacturing and on outsourced service exports. They achieve higher wages, but are susceptible to financial crises' and external, sector-specific demand shocks. In the *Innovation-Driven Stage* the ability to produce innovative products and services at the global technology frontier using the most advanced methods becomes the dominant source of competitive advantage. At this stage, the national business environment is characterised by strengths in all areas of the diamond together with the presence of deep clusters. Clusters become critical motors in generating not only productivity but innovation at the world frontier. Institutions and incentives supporting innovation are also well developed, increasing the efficiency of cluster interaction. Companies compete with unique strategies that are often global in scope, and invest strongly in advanced skills, the latest technology, and innovative capacity.

Seeing economic development as a sequential process of building interdependent microeconomic capabilities, shifting company strategies, improving incentives, and increasing rivalry exposes important pitfalls in economic policy. The influence of one part of the microeconomic business environment *depends on the state of the other parts*. Lack of improvement in any important area can lead to a plateau in productivity growth and stalled development.

This analysis also begins to make clear why countries find the transition to a new stage of development so difficult. Such inflection points require wholesale transformation of many interdependent dimensions of competition. This is a slow process however, as companies need to move to new types of strategies, investment priorities must change, and new institutions must be developed.¹⁰⁹ While government policy can have relatively rapid effects at the Investment-Driven Stage, the transition to the Innovation-Driven Stage is a slow process in which government must rely more on the private sector.

a) UK Competitiveness at the Transition to a New Stage

The UK economy has achieved a significant improvement in its competitiveness over the last two decades. The decline in the international prosperity ranking has been halted and, to some degree, reversed. Labour productivity growth is relatively strong; and the country attracts significant amounts of foreign direct investment and has a stable position on world export markets. These achievements were made possible by improvements in the business environment that will continue to drive further advances. Markets were opened up, the government role in the economy was cut back, and the macroeconomic context was stabilised.

This successful phase of UK economic policy is now coming to an end. The returns from past policy choices are becoming smaller, and the very success of the UK economy is undermining some of its past success factors. In the past, the UK competed as a relatively more efficient and less costly location than elsewhere in Europe to do business in an advanced economy with access to the European market. Today, UK relative wages are rising, the sign of an improving UK business environment and rising competitiveness: between 1996 and 2001, hourly wages in UK manufacturing, for example, have risen as fast as U.S. manufacturing wages, while wages in all other European countries in the dataset of the U.S. Bureau of Labour Statistics have risen much less.¹¹⁰ Also, other European countries have reduced some of their inefficiencies, and European Union rules and regulation are increasingly being implemented in the UK as well. As the past policy approach is both becoming less effective and is being modified, a sense of uncertainty about the future competitiveness of the UK is developing.

In our view, the current phase is a natural progression in the transition to the next stage of UK competitiveness. It is not indicating a failure of the past approach, nor is it signalling imminent danger to the UK's competitive position. As countries develop and increase their prosperity, they have to upgrade their competitiveness. This upgrading process is especially evident in a transition, where the basis of a country's competitive advantage has to be redefined. Factors that were important for past success become barriers to further growth.

The UK has now reached such a transition point. Competing on relatively low input costs and an efficient business environment is no longer sufficient to achieve the levels of prosperity the country is aiming for. Lower taxes, less regulation, and an even smaller role for the government are no longer the most critical elements for UK competitiveness.

To achieve higher prosperity, UK companies will need to upgrade their productivity by competing on more unique and more innovative products and services. This will require changes in management behaviour, but it will also require targeted investments in the business environment, and the development and strengthening of new types of institutions. It will no longer be sufficient to just increase the efficiency of the existing infrastructure, the educational institutions, and the science and technology system; it will require the commitment of additional resources.

The need for a revision of policy priorities is widely accepted in the public debate in the UK. Much of the relevant data is made available publicly, for example through the Competitiveness Indicators published by the DTI.¹¹¹ What seems to be missing, however, is a consistent, broad-based effort that gives direction to the significant number of existing efforts and initiatives.

Broad consensus and shared direction, embodied in an economic “strategy” are critical for two reasons. One is in setting policy in the public sector: new trade-offs need to be made about competing objectives. Without a broad consensus, these trade-offs will be made inconsistently. What should the balance be between public investments and tax cuts? Where should incentives be created? These questions are much more important now than they were in the past when budget consolidation was the undisputed priority. A consensus on the overall policy direction is needed to answer them consistently.

A strategic perspective will also benefit the private sector. Many companies will have to make choices, both individually and jointly, to upgrade their strategies and invest in improving the business environment. An overall consensus on the country’s direction is needed to guide these many individual choices. To implement a new stage of economic policy in the UK, both the public and private sector will have to review their traditional roles. In the UK the challenge is not solely private sector management is sometimes assumed; it is how the public and private sector can jointly make the leap to the next stage. This is different from, for example, Australia, where the onus is much more on the private sector to adjust to the business environment improvements the public sector has achieved.¹¹²

The public sector will need to facilitate the transition to the new stage while accepting increasingly *less control* over critical elements of the competitiveness agenda. Power needs to be delegated to new regional institutions, a process that has already started to some degree but will need to go a good deal further. In some ways the most important shift will come from the need to give others, mainly in the private sector, the leading role in competitiveness efforts and in identifying priorities for action.

Letting go of control over policy choices will be challenging for a government that over the last two decades has seen competitiveness as its unique responsibility and competence. But tight government control of the competitiveness agenda will now make success less likely. It will “crowd out” private sector leadership and runs the risk of picking bad priorities.

The private sector, too, is facing a transition in its ways of operating within companies and in its role in shaping UK competitiveness. Companies need to realise that their competitive success is a function of the business environment they operate in as well as of their own decision. And the quality of the business environment is not only a responsibility of the public sector; it is their responsibility, too. Companies will have to play an increasingly central role in setting policy priorities, becoming involved in cluster development initiatives, and making their own contributions to upgrading competitiveness.¹¹³ The private sector needs to share the overall direction and be an important part of the process. Otherwise company efforts will fail to be coordinated, and government efforts will lack effectiveness.

b) The UK Competitiveness Agenda 2003

For the UK to make the transition to higher productivity and higher levels of prosperity, the country will need to create a national consensus about its competitive distinctiveness in the world economy. We have identified six priority areas on the UK competitiveness agenda in 2003. Addressing these areas is not solely the job of government. Indeed, the central government needs to moderate and evolve its role. Instead action needs to come from a broad coalition of government entities at different levels, private businesses, trade associations and professional organisations, universities and research institutions, and many other institutions that have an impact on the business environment.

Public investment

The UK has been successful in increasing the effectiveness of its existing capital stock and making public sector investments more efficient. For example, educational spending is more effective because of the creation of more competition, from school league tables to higher education assessment efforts. Now, however, the focus needs to include ramping up the rate of investment in the educational system, the transportation infrastructure, and in the nation's scientific and technological capacity. In areas that have been privatised, the next stage might require a review of existing regulatory structures.

Some budget decisions to step up investment have already been made, for example in the science and technology budget. We commend these steps, but what is required is a sustained commitment. As part of a consistent strategy to upgrade UK competitiveness, such a commitment can be reconciled with the fiscal prudence also required.

Productivity-driven regulatory context

The UK needs to create a policy context that raises the pressures and incentives for investment and upgrading. This includes continued efforts to enhance competition policy, a reform of the science and technology system to increase interaction between universities and private businesses, a comprehensive strategy for training in advanced managerial skills, and raising regulatory standards that enable rather than constrain competition.

Clusters

The UK needs to mount a sustained programme of cluster development to create a more conducive environment for productivity growth and innovation through the collective action of companies and other institutions. Such a programme can build on previous efforts to map the UK cluster landscape, but will have to utilise enhanced methodology and include more of an action component. It will be essential to mobilise businesses and business institutions that are willing and able to engage in the upgrading of their clusters.

Regions

The UK needs to further strengthen the regional focus of its economic policy. The creation of the Regional Development Agencies (RDA's) has been an important step in the right direction. However, more is needed to empower regional and local leaders, develop actionable regional economic strategies, and, address specific issues such as land use planning and zoning. Examples from other countries and regions in Europe and the United States can provide helpful ideas on how to mobilise such regional efforts.

The UK also needs to continue its laudable efforts to revitalise disadvantaged communities¹¹⁴ using market based approaches. UK companies need to realise their self-interest and the economic potential of such communities, and play a bigger role in such efforts.

Roles and institutions

New roles for the existing players as well as a new set of institutions are necessary in economic policy. At the center will have to be a shift in the role of government; government-led development must be transformed into private sector-led development. New and more effective institutions for collaboration will be needed to enable a stronger private collective action, and to strengthen the development and the interaction within clusters. Universities and public research institutions need new structures to strengthen their roles as active parts of the regional business environment of which they are part.

Management

UK managers need to reorientate company strategies towards a greater level of innovation and the provision of higher value goods and services. This will require stepped up investments in R&D, skills, modern production and logistics technology, and IT to support more sustainable competitive advantages. These investments will also require a change of perspective. The challenge is no longer to only drive down cost but to create assets that support unique value propositions.

Finally, business leaders must take a more prominent role in cluster development and other efforts to upgrade UK and regional competitiveness. Without improvements in their business environments, companies investments will otherwise be less profitable and effective.

c) Implications for UK Competitiveness Research

Further research is needed in a number of areas identified in our work, both to clarify the UK's competitive position and support the action agenda.

Technology commercialisation

Effective commercialisation of technology is of critical importance in the next stage of UK competitiveness. Documenting and assessing the current state of university-business collaboration in the UK would provide valuable information to devise necessary changes. Ideally, this data would also allow comparison between the UK and other advanced economies that have a proven track record in successful technology commercialisation.

Institutions for Collaboration

Institutions for collaboration are essential actors in increasing the effectiveness of clusters and provide a platform for collective action. There is the impression that in the UK such institutions are less numerous and less effective than in peer countries. An inventory and assessment of UK institutions for collaboration, such as trade associations, quality centers, and standard setting entities, would help to better understand the current situation and to develop appropriate action.

Clusters

Cluster development and upgrading needs to be based on a more rigorous understanding of emerging or established clusters in the UK. Past efforts have been incomplete and rigorous data to support cluster development is not yet available. The UK needs to mount a new, more comprehensive statistical effort on clusters at the national and regional level. New data requirements for companies may be needed to support the new economy.

The broad industries in which the UK has strong export positions are a suitable starting point for cluster case studies. These clusters have proven capabilities, and are good candidates for cluster evaluation and upgrading. Their geographic locations across the UK should be mapped and the quality of their specific business environments evaluated. They can raise our understanding of the role of clusters in the UK relative to other locations. And their experience can help to inform efforts by less developed or narrower clusters.

Management skills

The quality of UK management skills and the effectiveness of management training need to be assessed in a consistent, comparative way at multiple levels of management. Current studies have focused on identifying generic demands on future managers and have developed recommendations on that basis. A better understanding of the current situation would help to make these recommendations more actionable and effective.

Financial markets

The interaction between financial market structure and company behaviour has been looked at on an economy-wide level, but there is little systematic evidence on the impact

of the UK financial market on UK companies strategy and investment choices. More systematic evidence would help to raise the level of the debate.

Investment behaviour

Differences in investment levels between UK and foreign companies have been documented widely, but there is little systematic evidence evaluating the different competing explanations. A matched pair study of UK and foreign firms within and outside the UK could shed more light on this issue, and direct future research.

Corporate involvement

UK companies need to be a central part in the effort to develop clusters and upgrade the UK's business environment. An assessment of the current role of UK companies in these areas would help to identify effective ways to engage them further. Also, a review of UK companies philanthropic activities, an area with significant potential importance for business environment upgrading, could prove useful in this respect.

References

108 Porter (1990)

109 For examples see Porter (2001a), Porter (2001b), and Porter (2001c)

110 BLS (2002b)

111 DTI (2002)

112 Porter (2002b)

113 For the role of corporate philanthropy in this process see Porter/Kramer (2002)

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Appendix A

UK Subcluster Exports by Value, 2000

Rank	Cluster	Sub-cluster	Exp. Value (\$1000)			World Share (%)			Country Share (%)		
			1991	1995	2000	1991	1995	2000	1991	1995	2000
1	Petroleum/Chemicals	Crude Petroleum	7,784,016	10,144,444	15,489,491	14.04	11.42	51.17	4.21	4.23	5.60
2	Transportation	Passenger Motor Vehicles	7,210,084	11,008,466	14,044,078	4.26	4.78	4.71	3.90	4.59	5.08
3	Semiconductors/Computers	Computers	4,389,460	7,621,751	10,200,698	11.61	12.35	10.62	2.37	3.18	3.69
4	Health Care	Medicaments	3,312,823	6,135,241	3,154,034	13.93	14.11	12.32	1.79	2.56	3.31
5	Semiconductors/Computers	Semiconductors	2,388,549	7,731,578	8,825,785	5.21	4.96	3.48	1.61	3.22	3.19
6	Transportation	Aircraft Parts	5,704,747	4,210,851	8,250,767	22.24	16.05	21.00	3.08	1.75	2.98
7	Transportation	Vehicle Body Parts	5,472,562	5,240,416	7,297,701	6.98	4.43	5.25	2.36	2.18	2.64
8	Transportation	Transportation Parts	3,742,220	4,321,195	7,044,375	8.66	7.26	8.92	2.02	1.80	2.55
9	Office	Office Machine Parts	4,103,245	5,849,093	7,036,165	8.33	6.30	5.08	2.22	2.44	2.55
10	Personal	Precious, Semi-P Stones	3,378,355	4,585,168	6,606,016	14.86	15.42	17.49	1.83	1.91	2.39
11	Telecommunications	TV, Radio Equipment	797,537	2,653,119	6,339,032	5.30	3.86	3.81	0.43	1.11	2.29
12	Telecommunications	Telecommunications	560,390	2,144,396	6,149,129	4.74	8.71	12.32	0.30	0.89	2.22
13	Petroleum/Chemicals	Petroleum Products	4,230,723	3,348,760	5,778,904	7.59	5.23	3.92	2.29	1.40	2.09
14	Transportation	Engines, Motors	2,585,318	2,716,416	4,865,952	27.27	25.17	24.01	1.40	1.13	1.76
15	Food/Beverages	Liquor	3,627,357	4,084,583	3,823,302	62.40	50.77	47.50	1.36	1.70	1.38
16	Entertainment/Leisure	Art	2,572,032	2,019,111	3,133,699	36.65	32.13	40.51	1.39	0.84	1.13
17	Multiple Business	Misc Multi Business Gds	2,755,704	2,581,175	3,007,904	3.87	1.83	1.63	1.49	1.08	1.09
18	Personal	Perfumes, Oils	1,604,561	2,397,688	2,349,907	11.59	10.32	9.89	0.87	1.00	1.07
19	Transportation	Piston Engines	2,059,702	2,524,637	2,789,236	9.38	7.55	6.61	1.11	1.05	1.01
20	Multiple Business	Laboratory Equipment	1,883,925	2,429,179	2,731,725	8.41	7.14	6.45	1.02	1.01	0.99
21	Telecommunications	Telecom Parts	1,186,696	1,739,838	2,708,627	6.19	4.68	4.22	0.64	0.73	0.98
22	Petroleum/Chemicals	Fabricated Plastics	2,734,231	2,751,103	2,668,933	5.25	3.49	2.77	1.48	1.15	0.97
23	Petroleum/Chemicals	Organic-Inorganic Compounds	1,028,591	1,509,157	2,604,244	9.09	8.24	8.58	0.56	0.63	0.94
24	Power	Switches, Relays, Breakers	1,487,479	1,993,431	2,511,047	5.51	4.24	4.05	0.80	0.83	0.91
25	Petroleum/Chemicals	Nitrogen Function Compounds	2,059,361	2,108,753	2,221,775	11.93	8.24	6.49	1.11	0.88	0.80
26	Semiconductors/Computers	Storage Units	941,087	2,418,460	2,213,106	8.22	7.30	4.94	0.51	1.01	0.80
27	Semiconductors/Computers	Peripherals	1,551,362	1,958,132	2,189,704	6.81	5.83	4.48	0.84	0.82	0.79
28	Petroleum/Chemicals	Other Chemical Products	720,773	1,743,298	2,126,637	4.77	6.94	6.44	0.39	0.73	0.77
29	Petroleum/Chemicals	Gas, Natural, Manufactured	444,794	719,731	2,073,430	2.39	2.85	2.80	0.24	0.30	0.75
30	Multiple Business	Non-Electric Machinery Parts	1,658,928	2,159,750	1,989,422	7.38	6.40	5.16	0.90	0.90	0.72
31	Forest Products	Other Paper	1,861,060	2,208,799	1,833,576	5.53	4.14	3.30	1.01	0.92	0.66
32	Materials/Metals	Plate Sheet, Flat Rolled	1,593,288	2,244,743	1,734,039	4.69	4.54	3.63	0.86	0.94	0.63
33	Personal	Printed Goods	1,296,316	1,695,032	1,727,471	17.52	17.38	16.78	0.70	0.71	0.62
34	Health Care	Medical Equipment	1,345,733	1,525,963	1,718,026	6.44	5.06	4.32	0.73	0.64	0.62
35	Multiple Business	Fabricated Plastics	1,017,199	1,397,206	1,680,345	6.01	4.81	4.42	0.55	0.58	0.61
36	Multiple Business	Other Trnsprt Machinery	893,464	1,094,415	1,667,209	15.43	11.46	10.61	0.48	0.46	0.60
37	Multiple Business	Electrical Measuring Devices	841,816	1,179,525	1,657,243	8.59	8.36	7.77	0.45	0.49	0.60
38	Entertainment/Leisure	Sound Recording Media	1,296,522	1,648,565	1,582,979	8.04	6.69	5.75	0.70	0.69	0.57
39	Transportation	Aircraft	3,215,022	1,997,702	1,581,733	6.10	4.66	2.31	1.74	0.83	0.57
40	Personal	Tobacco	1,379,230	1,795,553	1,540,192	8.84	8.75	7.96	0.75	0.75	0.56
41	Materials/Metals	Aluminum, Processed	934,139	1,665,939	1,433,588	3.96	4.57	3.20	0.50	0.69	0.52
42	Power	Rotating Electric	969,672	1,217,091	1,407,551	7.33	5.25	5.04	0.52	0.51	0.51
43	Entertainment/Leisure	Phot. Camera Equip, Non Cin	1,278,229	1,605,939	1,397,455	9.61	8.81	7.05	0.69	0.67	0.51
44	Transportation	Other Machinery	952,771	1,168,010	1,394,371	3.87	2.80	2.52	0.51	0.49	0.50
45	Entertainment/Leisure	TV Recievers	1,463,229	1,342,887	1,340,524	9.85	6.63	5.03	0.79	0.56	0.48
46	Transportation	Construction Vehicles	779,748	1,331,693	1,303,020	8.33	9.35	8.69	0.42	0.55	0.47
47	Multiple Business	Meters and Counters	856,452	1,142,499	1,249,621	9.01	7.40	6.69	0.46	0.48	0.45
48	Food/Beverages	Tractors	954,416	1,438,179	1,217,865	20.33	19.39	17.43	0.52	0.60	0.44
49	Transportation	Trucks, Road Vehicles	1,740,854	1,340,426	1,216,821	4.08	2.35	1.82	0.94	0.56	0.44
50	Office	Other Office Machines	983,564	1,157,995	1,212,804	7.43	6.34	7.49	0.53	0.48	0.44

Note: "World Share" is share of total subcluster world export value; "Country Share" is share of total UK export value

Source: UN Trade Data, author's calculation

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Appendix B

Convergence or Divergence Among Regions - Selected Countries

Regional GDP per capita growth regressed on initial level of GDP per capita, 1990-2000

Effect of Initial GDP per Capita	UK	US	Germany	France
Coefficient	Positive (Divergence)	Negative (Convergence)	Negative	Positive
Explanatory Power	18% of Variance	21% of Variance	Approaching zero	Approaching zero
Significance	At 90%	At 95%	Not significant at 90%	Not significant at 90%

Source: European Commission (2001), Cluster Mapping Data Project (2003), author's calculations



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