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**DTI SECTOR COMPETITIVENESS
STUDIES No.1**

Competitiveness in the UK
Electronics Sector

A REPORT TO DTI

NATIONAL ECONOMICS RESEARCH
ASSOCIATES

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This analytical report was produced to inform the thinking of the Electronics Innovation and Growth Team. It was completed in December 2003. It is being published now to coincide with the publication of the Innovation and Growth Team report.

Competitiveness in the UK Electronics Sector

A Report to DTI

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Executive summary

The Scope of this Report

1. This report, by NERA Economic Consulting, was commissioned by the DTI's Electronics Unit as the first in a series of analyses of sector competitiveness. The purpose of the report is to provide a statistical and literature review of the UK – based electronics industry and to make recommendations for a second study that will help inform policymakers as to what actions they might take to enhance industry productivity and performance.
2. The report assesses the industry's current make-up and how this has evolved over the last ten years. A major part of the study has been a set of cross-country comparisons between the UK and France, Germany and the United States. These comparisons of key factors determining relative productivity performance, and productivity and cost performance through the business cycle, provide evidence on the effects of differences in industry structures and may provide insight as to the effects of past policy choices.

The UK Electronics Industry

3. We describe the structure of the UK electronics industry in detail. Having collected data from various sources, we have built up a picture of how the industry has changed over the last decade in terms of the number of firms and workers, output levels and value added, where in the country the industry is located, export intensity and import penetration, and international ownership and foreign direct investment.
4. Industry turnover fluctuated in the late 1990s around an upward trend, reaching £55 billion at 2001 prices in 2000 but has since shrunk. The average number of workers per firm remains fairly constant, at around 30. The industry is driven by a few multinationals but there are many small and medium sized firms in the sector. The number of firms fell between 1995 and 1997 but has been little changed since. There are now around 10,000 firms in the electronics sector. Sector employment fell moderately in the early 1990s before levelling off, and then increased slowly until 2000, after which employment fell again. Employment costs mirrored the early part of this trend but have fallen less steeply since 2000, suggesting that it may be lower paid workers that have been shed.
5. The electronics industry has its greatest concentration in the South. Over recent years however, there has been a trend towards greater regional equality in the sector. Notably, by 1997 Scotland had become the leading region in computer equipment manufacturing, both in terms of value and productivity.

6. The UK is a net importer of computers and TVs but a net exporter of electronic capital goods with other sub-sectors typically operating in balance. In those sub-sectors with a trade deficit the position has worsened in recent years as high tech manufacturing has become more concentrated. The export position has improved slightly in all other areas however.
7. Foreign ownership of multinationals operating in the electronics sector is high, by international standards, and has continued to increase with the general trend in the wider UK economy. Multinational companies drive the electronics sector in the UK, accounting for a large share of its output. Data are not available to allow us to assess foreign investment in smaller companies, though we understand that such investment is significant.

International Comparisons

8. In regard to total output, UK levels in the manufacture of office machinery and computers have remained fairly stable over the last decade, and have exceeded levels in France, and also levels in Germany since 1992. In TV and communication equipment UK output levels grew, tracking those of France, and also catching up with levels in Germany by the end of the decade. UK output levels in medical, precision and optical equipment have grown, but remain consistently below those in Germany. Total UK electronics output growth rates have matched those in the US, though of course from a much lower base.
9. In regard to value added, value added in manufacture of office machinery and computers has been higher in the UK than in France or Germany since 1994, but has been declining in all four countries. In the manufacture of TVs and communications equipment and apparatus, value added levels have been similar in all three European countries, and have been rising, with fastest growth in the UK. In medical, precision and optical equipment value added has risen most consistently in the UK compared with France and Germany, but levels are significantly below those in Germany. Overall, all three sectors growth in value added has been fastest in the UK, but faltering compared with the US and Germany after 1997.
10. Average Labour Productivity (ALP) in the electronics sector has increased over the 1990s but has levelled off or fallen in each sub-sector since 1997. Typically, the recent performance of France, Germany and the US has been better than that of the UK though trends are broadly similar, except for the performance of France and the US in the electrical and electronics equipment sub-sector where ALP has increased sharply since the mid-1990s.

11. Studies of Total Factor Productivity (TFP) show a broadly similar patterns of trends compared to those for ALP, but TFP rises more slowly than ALP because of the effect of increased use of capital.
12. Comparisons of skills levels show a bias towards lower skilled workers in the UK compared with Germany, but not compared with the US. However, while the US employs a higher proportion of low skill workers compared with the UK, it also uses a lower proportion of intermediate and a higher proportion of highly skilled workers in the electronics sector.
13. Trade performance in terms of export/import ratios shows clear contrast between the three sectors. In office machinery and computers all four countries have a trade deficit, but the export/import ratio for the UK has fluctuated around 0.8, which is higher than the ratios in the other three countries. In the case of manufacture of TVs and communications equipment the ratios have risen in all four countries, with the UK not far below one by the end of the decade. In contrast, ratios for medical, precision and optical equipment are flat.

Key Factors Driving Relative Productivity Performance

14. We have assessed what drives the UK electronics sector's relative productivity performance by drawing information from the DTI's Community Innovation survey, which gives an up to date view from across the industry and a comparison with other sectors of UK industry. Additionally, we have considered information from published research that we use to supplement the international statistical data. Together these sources allow us to assess the key factors and how they impact on performance.
15. We find that the UK industry has prepared itself well by developing strengths in key areas. UK electronics compares favourably in some areas to the other countries' electronics sectors and in most areas to the manufacturing sector of the UK economy, which we use as a comparator for the information drawn from the Innovation Survey. Despite this, there are a number of weaknesses in the UK electronics sector. Particularly, we find that there is not enough research and development (R&D). What R&D there is is not effectively commercialised: UK companies tend to follow rather than lead, doing little novel product or process innovation. Firms in the sector rely too heavily on internal capability and have not developed enough successful R&D collaborations through the supply chain. Another area where the UK electronics sector compares unfavourably with its foreign peers is in the skill-base of the labour force. This is surprising because the UK is strong in the provision of relevant training and education but has a greater proportion of low skilled workers than France, Germany or the US and seems also to be weak in the medium skills area.

Interactions between Electronics and Other Sectors

16. Using data from the ONS Input-Output tables we have analysed inter-sector trade flows between UK electronics and other sectors and have established which of these are most important to the sector. We have also looked at how these linkages have evolved through the 1990's. Considering this and evidence from earlier research we understand that productivity and competitiveness trends in the sector do impact on other sectors within the economy.
17. It is difficult to establish the degree to which changes in competitiveness and productivity in the electronics sector impact on other sectors however. This is particularly the case because the relationship is likely to change substantially over time as new technologies are adopted and prices fall. The evidence available to us suggests that there is little market power held by firms within the sector suggesting that much of the benefits will accrue to customers.

The Performance of the Electronics Sector through the Business Cycle

18. Over the period under consideration there was a recession in the early 1990s followed by a sustained period of growth. We observe that trend GDP does not seem to influence competitiveness or productivity. What the data show is that international factors have greater influence on the UK electronics sector than does the domestic economy. From the available evidence we believe that the UK leads the way – with the US – while France and Germany respond more slowly to economic changes; this is consistent with the lags that we have observed. One possible reason is that the UK has a more flexible labour market.

Implications of the Study for Part B

19. The DTI's original Terms of Reference for the Part A study indicated that it would be a precursor to a more detailed Part B study which would primarily consist of field research, generating new data and ideas, and making use of part of the data assembled in Part A. We believe that the main basis of Part B work should be a set of semi-structured interviews with specific firms and other organisations. These should be carried out by experienced interviews who would probe the answers to specific questions in detail. We do not recommend the use of any general questionnaire approach because we believe that the response rates would be low and the level of detail and explanation in the answers received would be low.

20. Our recommended targets include:
 - Branches of some of the main multi-nationals operating in this country. One issue of particular interest would be how their UK operations interact with their global ones.
 - A number of UK-owned SMEs in the sector, particularly targeting those that are regarded as successful.
 - The major university research establishments in electronics, particularly targeting those that are known to have good working relationships with the sector.
21. We also recommend that the study consider specialist niches in the industry linked to UK research organisations. It will be particularly important to consider the impact of internationalisation of supply. In addition, we recommend investigation of more recent sources on the present regional pattern of activity in the sector.
22. In addition the Part B study should consider, in co-operation with DTI officials and government statisticians, how best to ensure that the most up-to-date data on key statistics (turnover, value added, employment, employment costs, imports, exports and capital stock) could be made available as soon as possible on a quarterly basis to potential users. This investigation should also consider availability of up-to-date turnover, value added and employment data by Standard Region.