

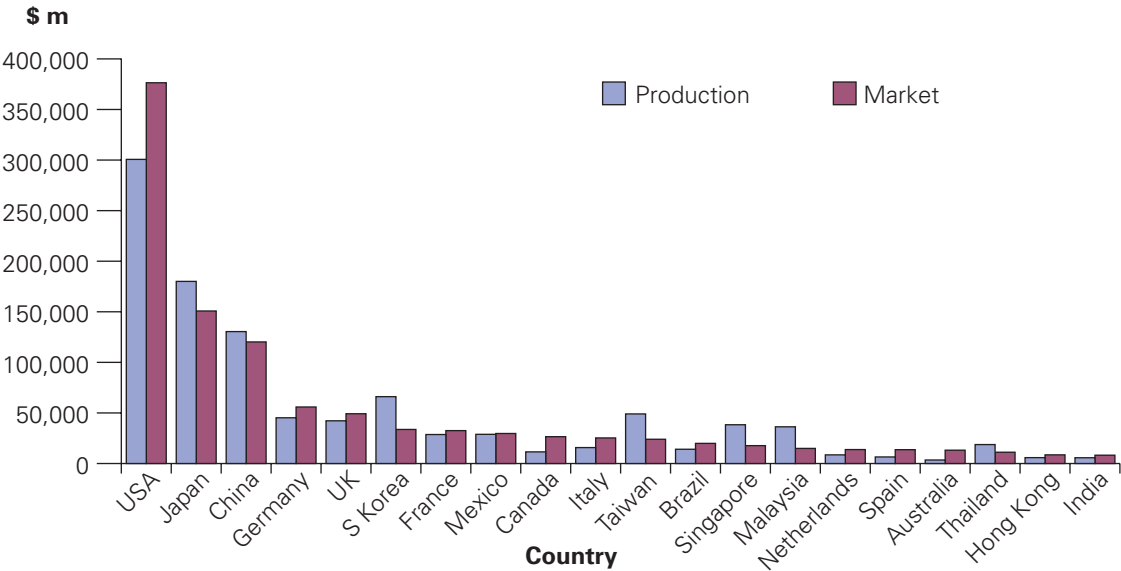
What is the UK electronics industry?

Electronics is a cornerstone of modern society pervading most products and services. However, the UK electronics industry is a difficult sector to define. It tends to be fragmented into silo-like sub-sectors, lacks strong visibility, and hence fails to influence policy that reflects its importance to the economy.

Paradoxically, the UK still has a vibrant electronics sector despite its low key, embedded nature, and the battering it has taken during the recent global downturn. We have world-class academic research and leading edge firms, e.g. in instrumentation, process control, electronics design, systems integration, and other areas.

The low profile belies the fact that UK electronics production ranks seventh in the world, just behind our nearest European rival Germany (Fig 1.1). Once again we are attracting substantial levels of foreign direct investment (FDI) through electronics related projects. All of these enterprises are high value-added activities and offer good quality jobs, many with a strong R&D element.

Fig 1.1: National electronics production and markets 2003



Source: Reed Electronics Research 2004

Nonetheless, we should be very concerned that a sector that is so vital to the health of the UK economy is undervalued, lacks visibility and the ability to influence wider policy development at all levels.

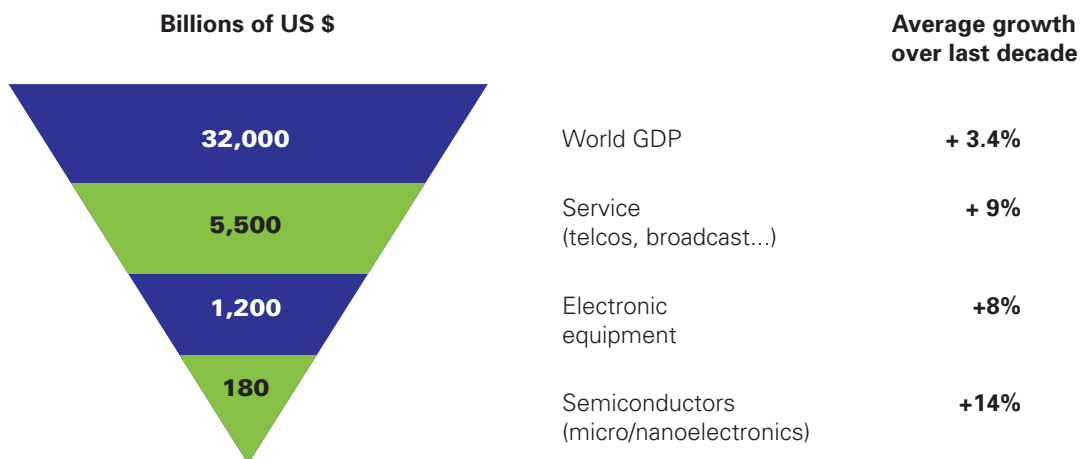
A pervasive global industry

Electronics manufacturing, products and services underpin the Information Age and are critical to our national and international development and success. Despite the importance and growth in value of the electronics sector, there are some marked contradictions.

The world market for electronics-based equipment has grown in recent years at an average of 8% pa (see Fig 1.2) and now exceeds \$1,200bn (£669bn). Consider semiconductors, the building block for all electronic systems, which has grown 17% p.a. on average for the last four decades to represent about 20% of the above value. However, the unit price of semiconductors has fallen by several times this rate, and hides the pervasiveness of electronic components and systems (Fig 1.3).

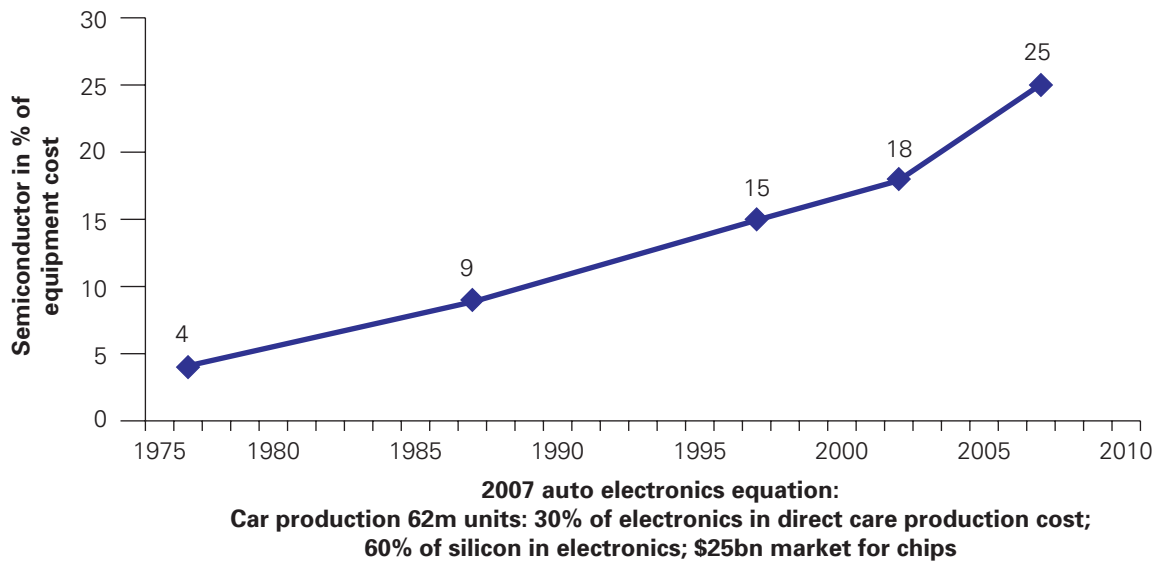


Fig 1.2: The pyramid of value



Source: Future Horizons IFS2004

Electronics and electronic components lie at the heart of most modern products, where they typically represent over 20% of the cost of a product. For example, the massive improvements in car safety and reliability are largely due to the incorporation of electronic systems. Systems integration has been so successful that most drivers are unaware of the 30 or so microprocessors that are hard at work as they drive.

Fig 1.3: Trend of silicon pervasion in electronics

Source: MEDEA+ Office 2003

Electronics is a truly global industry with some very strong national players. Many countries consider that electronics, and semiconductors in particular, are a 'must have' industry and have invested many billions of pounds to join the world leaders. This trend started with the USA, who were then challenged by Japan, and in turn were overtaken by Taiwan and South Korea. Europe has fought back in recent years with the help of large pan-European co-operative R&D programmes, such as the Microelectronics Developments for European Applications (MEDEA) Programme¹, and now has a number of top world-class companies. While China is rapidly emerging as the next world leader in electronics manufacturing.

A matter of definition

The electronics sector is broad and complex. The industry tends to see the sector more in terms of product types, e.g. semiconductors, printed circuit boards (PCBs) or markets², e.g. automotive, telecoms, medical, defence. Market forecasts are readily available for most sub-sectors and market sectors. However, the only official annual data is published by the Office of National Statistics (ONS) Annual Business Inquiry, which lags up to two years.



¹ See 'European R&D programmes', page 65.

² Key electronics markets include: aerospace & defence, automotive, EDP and office equipment, control & instrumentation, medical & industrial, telecommunications, consumer electronics, semiconductors, and other components.

For the purpose of the EIGT analysis, electronics manufacturing (including embedded software) and design were defined using Standard Industry Classification (SIC) codes 30, 32, and 33, and distribution by SIC 51.4³. The automotive and aerospace & defence markets were not included in the consultation exercise as they have recently been involved in separate IGT reports.

During the research and consultation process, the EIGT realised that available statistical and other data was neither reliable nor sufficiently up-to-date to describe the sector adequately. There is good evidence that the industry's size and economic importance is significantly understated in available statistics. The important issue of measurement is considered further in *Chapter 3*, which addresses Government and business engagement.

Where does the UK stand?

There is a widespread and harmful perception that the UK is not seriously involved in electronics. In part this is due to electronics content being 'hidden' in key industry markets, such as automotive, aerospace and defence. The UK electronics sector is characterised by many inter-dependent sub-sectors, with strong individual identities (e.g. semiconductors, PCBs, design), as can be seen from the supply chain diagram in *Annex 1* of this report.

The main areas of activity in the supply chain are raw material suppliers, component/sub-component manufacturers, design, production, distribution and logistics, R&D, and quality control.

There are interesting variations between sub-sectors, as shown in *Table 1.4*, which gives a broad feel for the shape of the sector. The UK electronics sector is dominated by small and micro-sized companies, which account for 80-90% of total UK enterprises, but contribute only about 10% of total turnover. Most firms are

micro-sized, with the exception of electronic component and process control equipment manufacturers, where there is a higher concentration in the small-to-medium range. The few large UK-based companies employ about 50% of the workforce, and generate about three quarters of the wealth. Only a handful of firms have over 1,000 employees, and most of these are non-UK owned.



³ SIC definitions used by the EIGT for electronics industry analysis:

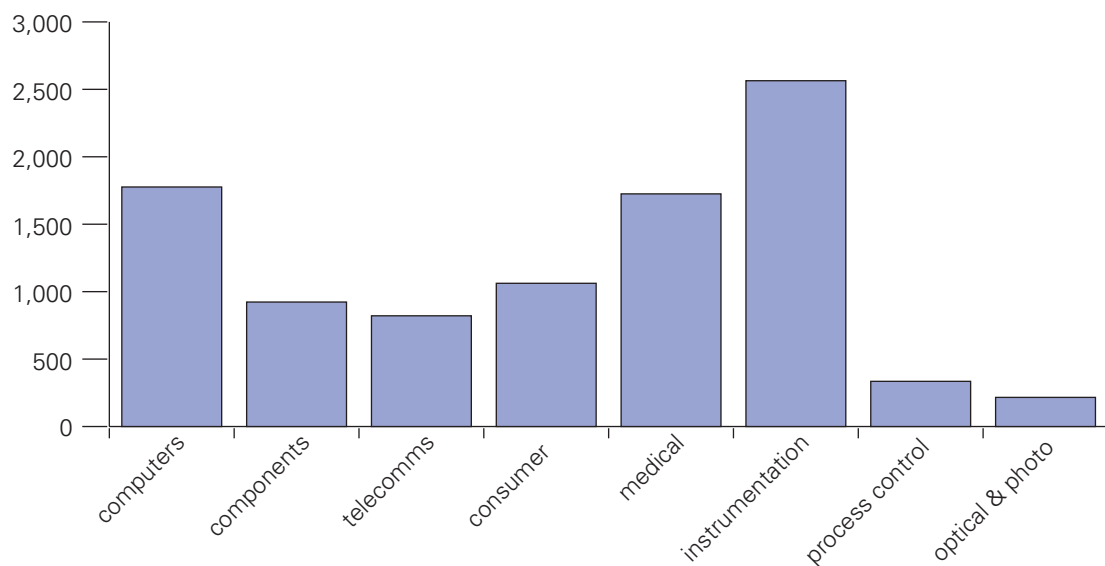
3000	Manufacture of office machinery & computers
32.10	Manufacture of electronic components
32.20/1	Manufacture of telecommunications equipment
32.20/2	Manufacture of other radio & electronic capital goods
32.30	Manufacture of consumer electronics goods
33.20/1	Manufacture of electronic instrumentation
33.30/1	Manufacture of electronic industrial process control equipment
33.40/2	Manufacture of optical and photographic equipment
51.64	Wholesale of office machinery and equipment

Table 1.4: The shape of the UK electronics industry 2003

	% of total number of enterprises	% of total employment	% of total turnover
Micro (1-9 employees)	80 – 90	5 – 15	2 – 12
Small (10 – 49 employees)	10 – 20	6 – 18	6 – 12
Medium (50 – 249 employees)	6 – 8	17 – 30	10 – 20
Large (250 or more employees)	2 – 4	45 – 55	60 – 80

Source: Small Business Service database 2004

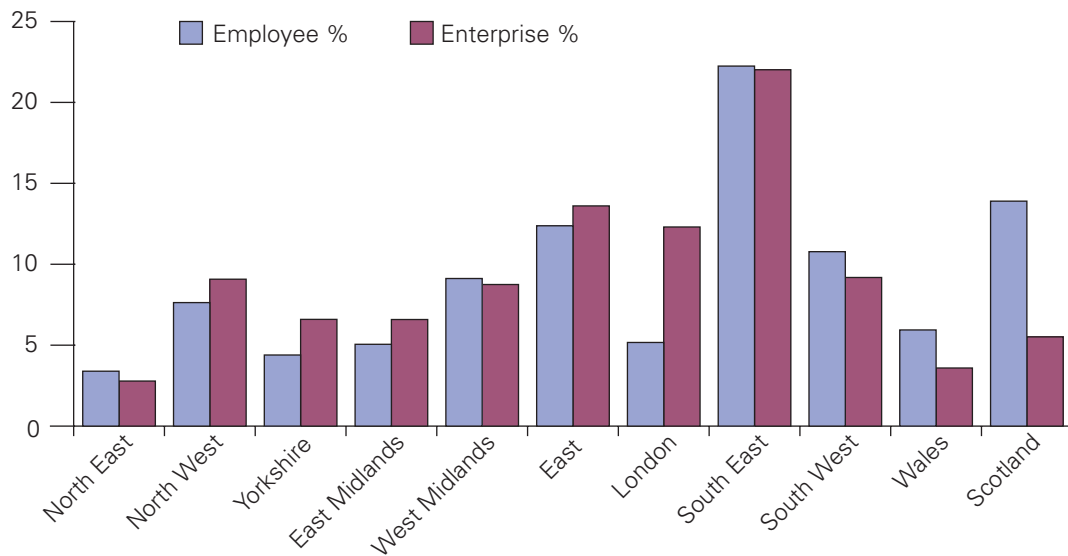
In 2002, the electronics manufacturing sector employed about 249,000 plus a further 230,000 in distribution, contributing more than £21bn (or 2%) to UK GDP. This is the equivalent to 6% of all UK manufacturing. The sector generated total sales of manufactured electronics products of about £37bn, from 9,400 enterprises (*Fig 1.5*) that employed about 26 people on average. According to the latest figures, Reed Electronics Research estimates that UK electronics production sales exceeded £29bn (\$42bn) p.a. in 2003 (see *Fig 1.1*).

Fig 1.5: Number of enterprises per sector

Source: ONS Annual Business Inquiry 2004

An analysis of the regional distribution of electronics establishments⁴ (*Figs 1.6*) and their employees shows the industry is well represented across all regions, with no obvious clusters.

⁴ Source: SEMTA 2003, excluding Northern Ireland

Figs 1.6: Regional employment and establishments 2001

Source: SEMTA 2003

As mentioned, the UK no longer has indigenous heavyweights in this sector. However, we have many small but world-class companies, e.g. in opto-electronics and electronic design. These companies are often powerhouses for creativity and exploitation of highly respected UK university technology and research. Many of the medium-to-large firms in this sector are inward investors. Though most have traditionally carried out R&D in their home countries, they increasingly consider the R&D capabilities of host countries in their investment decisions. This represents both a threat and an opportunity for the UK.

The electronics sector's importance in terms of the UK's productivity and competitiveness is not just a matter of its own success. The sector has a massive impact on most other sectors, their competitiveness, ability to enhance productivity and add value.

Consider the use of remote labelling and pricing of products in supermarkets today, which enable real-time supply chain and resource management and impacts directly on productivity. Furthermore, a major electronics supplier interviewed by the EIGT estimates that 90% of all future innovations in vehicles will be based on electronic systems, and this view is not inconsistent with the Automotive IGT's own findings. By 2010 electronic systems will account for 40% of the total cost of a vehicle, compared with about 20% today.

How is the market changing?

The electronics industry, and some sub-sectors in particular, e.g. electronic components and semiconductors, are characterised by complex markets and extended supply chains, with high and spiralling capital costs. But dramatically falling product prices are driven by ever-shorter product cycles, rapid commoditisation, and continuous development of new and sometimes disruptive technologies.

The dynamics of the memory market, for example, are vividly displayed by Samsung's prediction that the 60% growth during the summer of 2004 will slump to 5% in early 2005.

The pace of change continues to increase driven, for example, by the recent battles between Intel and AMD for the processor chip market, where talk of megahertz changed to gigahertz almost overnight. Underlying this were billion pound investments in capital equipment and new process manufacturing technologies.

Less visible but even more dramatic and economically important is the fall in the cost of components, e.g. one unit of memory, which cost £20,000 in 1970, now costs the same as a sheet of A4 paper.

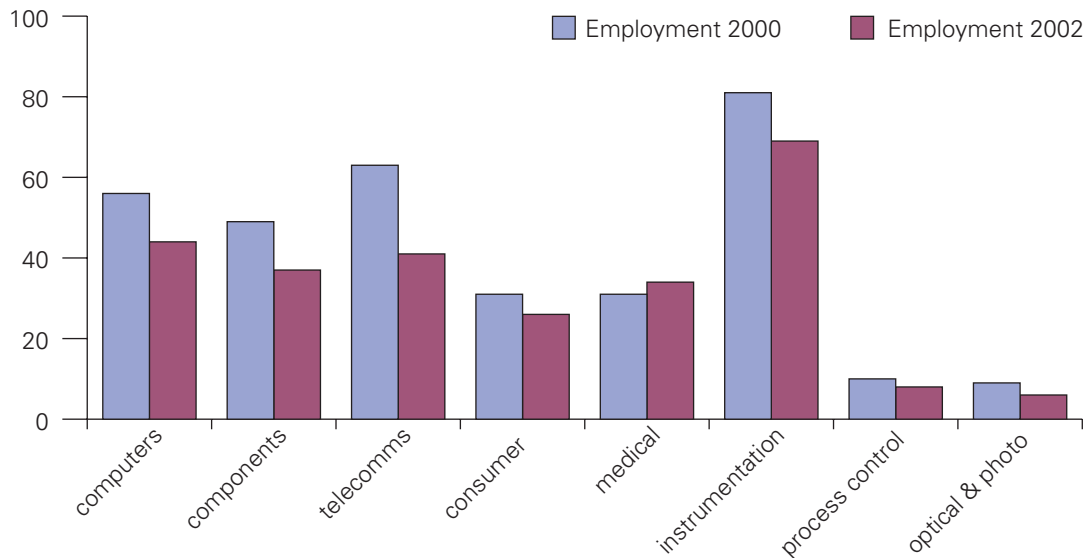
A dramatic impact of globalisation is the commodisation of DVD players, where the price has fallen to such an extent that they can be purchased with groceries in the local supermarket. Nonetheless, there's been considerable increase in functionality at the same time as costs plummet.

Global changes have had a more severe impact on the UK electronics industry than on our European competitors, because we have fewer indigenous manufacturers compared with European competitors. The UK electronics industry has undergone significant restructuring, and outflow of manufacturing to lower cost countries. Initially, UK manufacture was outsourced to Eastern Europe, but increasingly the destination is Asia Pacific and China in particular. These moves have decimated the UK's TV, PC and mobile phone manufacturing sectors.

Major changes in employment and GVA between 2000 and 2002 are evident in *Figs 1.7 and 1.8*, during the time when much of the UK electronics sector downsizing occurred. Of course, downsizing also boosted productivity in some enterprises.

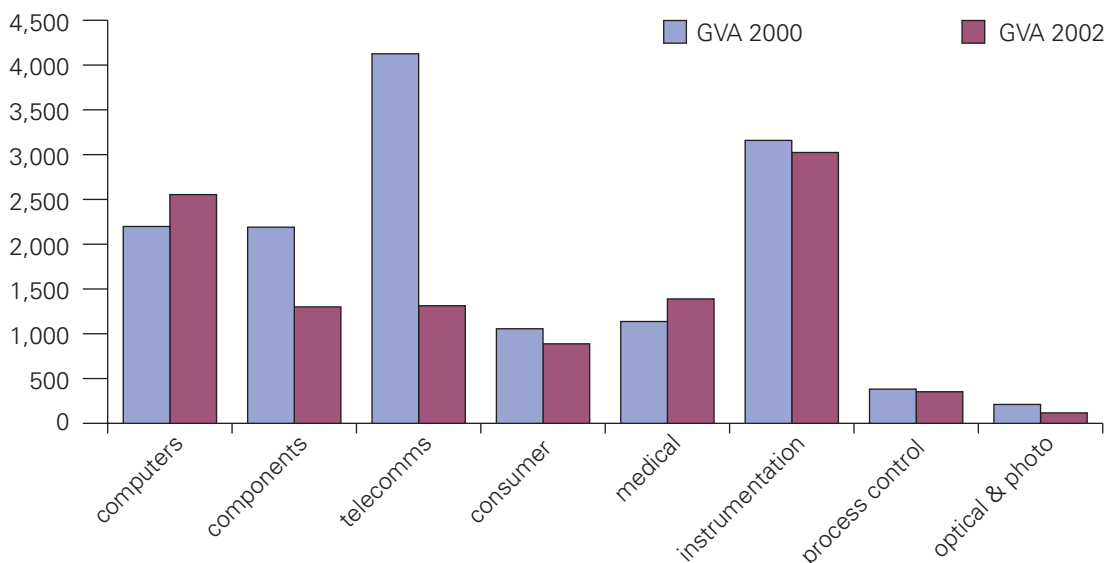


Fig 1.7: UK employment changes (by SIC) 2000-2002



Source: ONS Annual Business Inquiry 2004

Fig 1.8: Electronics gross value-added (GVA) changes (by SIC code) 2000-2002



Source: ONS Annual Business Inquiry 2004

The UK electronics sector is at a particular disadvantage from a global perspective, due to the preponderance of SMEs, and few large firms – most of whom are inward investors – compared to its European competition.

Between 2000 and 2002 the electronics sector’s contribution to UK GDP was slashed by £3.5bn. The EIGT is particularly concerned about trends in electronics design. In the last three years, our design sector has shrunk by 19%. Most of this loss was attributed to an 80% reduction by large companies.⁵ Many of these

⁵ Source: ‘Report on design employment trends’ for DTI by Findlays 2004

designers have set up small design consultancies. However, this move weakens the UK electronics design community and makes it more vulnerable to globalisation pressures.

Productivity challenges

Assessing the productivity of the UK sector compared to global competitors is challenging, (see *Annex 4*). There is strong evidence that the UK electronics industry is not as economically productive as equivalent firms in Europe, and other sectors in the UK and Europe, which in turn lag behind the USA. However, many UK-based electronics firms are harnessing productivity successfully. According to the DTI's Small Business Service's Benchmark Index, UK electronics SMEs achieve the highest pre-tax profits in terms of turnover and per employee among all other manufacturing sectors. Nonetheless, evidence is compelling that the UK electronics sector has an issue when it comes to productivity.

Fortunately there is some light on the horizon – but no room for complacency. Although official statistics are not yet available, there is good evidence that the UK electronics sector started to pick up in 2003, and will recover significantly throughout 2004 due to rising local and global demand. The signs of recovery and strong UK economy have brought renewed interest in Foreign Direct investment (FDI) by overseas electronics companies. There is also an increase in projects involving R&D and co-operation with UK universities.

One of the main attractions of the UK to overseas investors is the business-friendly environment. The UK has benefited from major inward investments in the past. Though many of these firms have moved elsewhere for manufacture, they have left their footprint, with a legacy of facilities, training and R&D, which continues to impact on our global performance.

The UK electronics industry has to face significant challenges in order to grow and prosper in the years ahead. The EIGT consultation exercise sought to identify the key issues in the most in depth IGT consultation exercise ever undertaken, and sets a thought provoking agenda of recommendations for success for Government and industry in the chapters that follow.