

In association with:



SECTOR BULLETIN: ELECTRONICS



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MANUFACTURING ROUND UP

Welcome to our seventh Sector Bulletin report in partnership with Santander. This bulletin will cover the UK electronics sector. As always, we will look into the sector’s components, structure, inputs, trade channels, characteristics, risk, opportunities and long-term trends.

Let’s first take a look at how the manufacturing sector as a whole has performed over the past year.

The manufacturing sector, after a positive 2017 when the industry expanded at a faster rate than the wider economy, experienced another year of growth in 2018 but at a slower rate. The sector slowdown was related to a world economy not running as fast as 2017 but also to some of the uncertainties related to Brexit and the overall uncertain political environment in the UK and elsewhere.

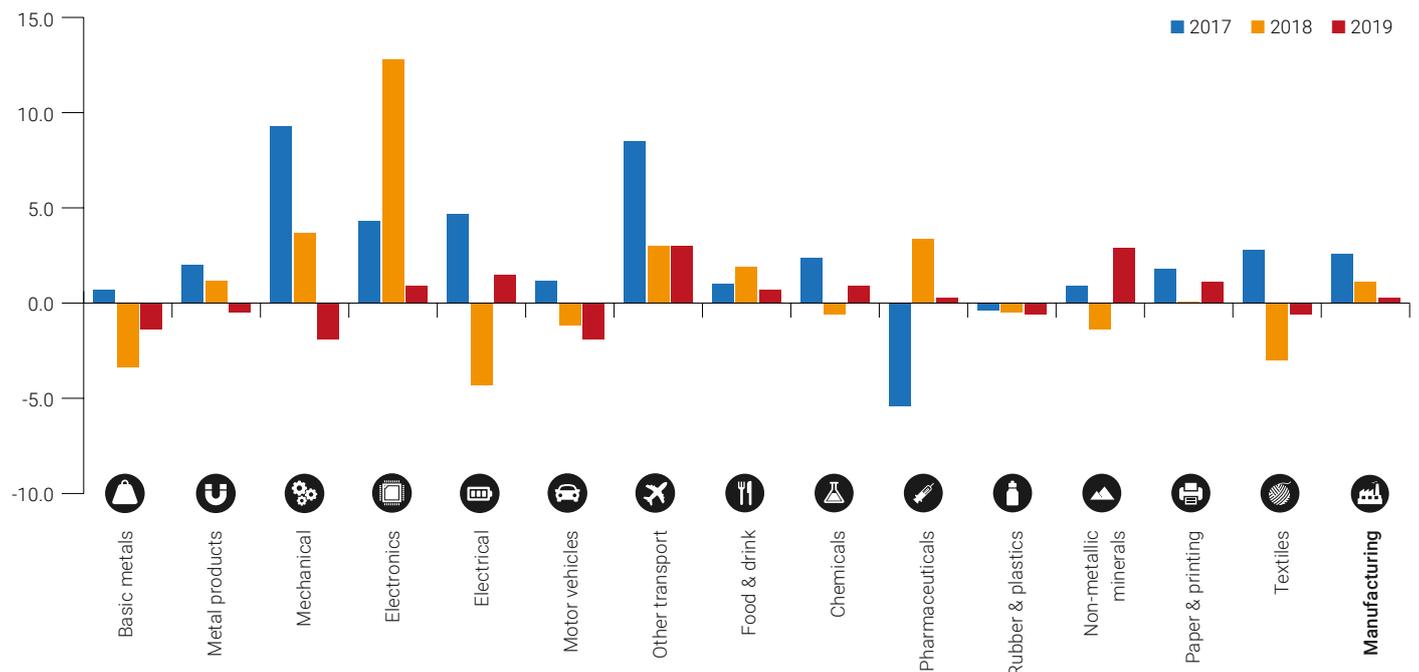
If 2017 was characterised by synchronised growth experienced by almost every single UK manufacturing sub-sector, this year has seen some important differences between sectors running fast such as the one we are going to talk about in this bulletin - the electronics sector - and others contracting sharply such as

the electrical sector and also motor vehicles, a key customer for several UK manufacturers.

2018 recorded positive signs in terms of growth. However there are a number of risks on the horizon which may harm 2019 performance. Top of the list is Brexit related uncertainty and specifically the future of our trading relations with the EU. How Brexit negotiations progress will be key to manufacturers’ future investment plans, which, as we pointed out in our recent *Investment Monitor* in partnership with Santander have been put on hold because of this uncertainty. Moreover, longstanding productivity concerns will continue to represent a further headache for UK manufacturers. The sum of all this is shown in our 2019 forecast which foresees manufacturing expanding by just 0.3% with more than one sector contracting.

Manufacturing round up

% yearly change, GVA output



Source: Make UK & Oxford Economics (2019)

UNDERSTANDING ELECTRONICS

The electronics sector, while not the biggest, is an integral part of UK manufacturing. With £8.4 billion and £19.4 billion generated in gross value added and turnover respectively in 2017, the sector continues to punch above its weight, serving a wide variety of sectors both in the UK and abroad.

Furthermore with the evolution of the digital age, the sector is well placed to cement itself as a core manufacturing sector, while others go into relative decline.

When we consider electronics manufacturing, we often think about the production of smartphones and other consumer electronics. However the manufacture of these typical user products is predominantly focussed in Asia and the US - not the UK. That is not to say we do not produce electronics products in the UK however.

Indeed the UK electronics sector is one of the most diverse in UK manufacturing, producing a wide range of products. From circuit boards and connectors, to computers, watches and medical scanners, the sector is one of the hardest to define. Broadly speaking we can split what the sector makes into eight segments.

What does the sector make? GVA (£ billion) and % of total electronics GVA



GVA: £1.4bn
14.4%

1. ELECTRONICS COMPONENTS AND BOARDS

This class includes the manufacture of semiconductors and other components for electronics applications e.g. connectors, transistors and switches. Much of these products are used in the development of other electronics products (see inputs section) and is an area where UK manufacturing is a key global player.



GVA: £0.5bn
4.8%

2. COMPUTERS AND PERIPHERAL EQUIPMENT

This segment refers to the production and/or assembly of electronics computers including desktops and laptops, and their complementary equipment such as printers, keyboards and monitors.



GVA: £1.6bn
16.6%

3. COMMUNICATION EQUIPMENT

Captured here are two broad strands: the manufacture of telegraph and telephone equipment (e.g. mobile phones, answering machines, pagers) and other non-telegraph and telephone communication equipment such as transmitting and receiving antenna used for television and radio.



GVA: £0.3bn
3.0%

4. CONSUMER ELECTRONICS

As the name suggests this segment includes the manufacture of electronic audio and video equipment for home entertainment e.g. televisions, stereo equipment, video game consoles. The manufacture of smart phones however are focussed predominantly in Asia and the US.



GVA: £5.3bn
53.3%

5. INSTRUMENTS AND APPLIANCES FOR MEASURING, TESTING AND NAVIGATION

The sector's largest segment makes up more than half of output. It includes the manufacture of measuring, testing and navigating equipment for various industrial and non-industrial purposes e.g. emission testing equipment, hydronic limit controls, consumption meters, radar and GPS equipment and motion detectors. It also includes time-based measuring devices such as watches and clocks and related devices.



6. IRRADIATION, ELECTRO-MEDICAL AND ELECTROTHERAPEUTIC EQUIPMENT

These instruments and appliances are predominately used in healthcare. They include a vast array of essential equipment including X-ray equipment, CT scanners, PET scanners, MRI equipment, pacemakers and electrocardiographs.

GVA: £0.4bn
4.3%



7. OPTICAL INSTRUMENTS AND PHOTOGRAPHIC EQUIPMENT

This class includes the manufacture of optical instruments and lenses (e.g. mirrors, magnifying instruments), and the manufacture of photographic equipment including both film and digital cameras.

GVA: £0.4bn
3.6%



8. MAGNETIC AND OPTICAL MEDIA

The manufacture of magnetic and optical recording media, such as blank magnetic audio and video tapes makes up a very small proportion of the sector's output.

GVA: £0.0bn*
0.1%

Source: ONS 2017 * GVA is £5m

Inputs

The electronics sector's final goods, while diverse and with many different properties, in general all have one thing in common – the use of electronics circuits, semiconductors and boards to allow them to function. These themselves are manufactured by the sector (segment 1).

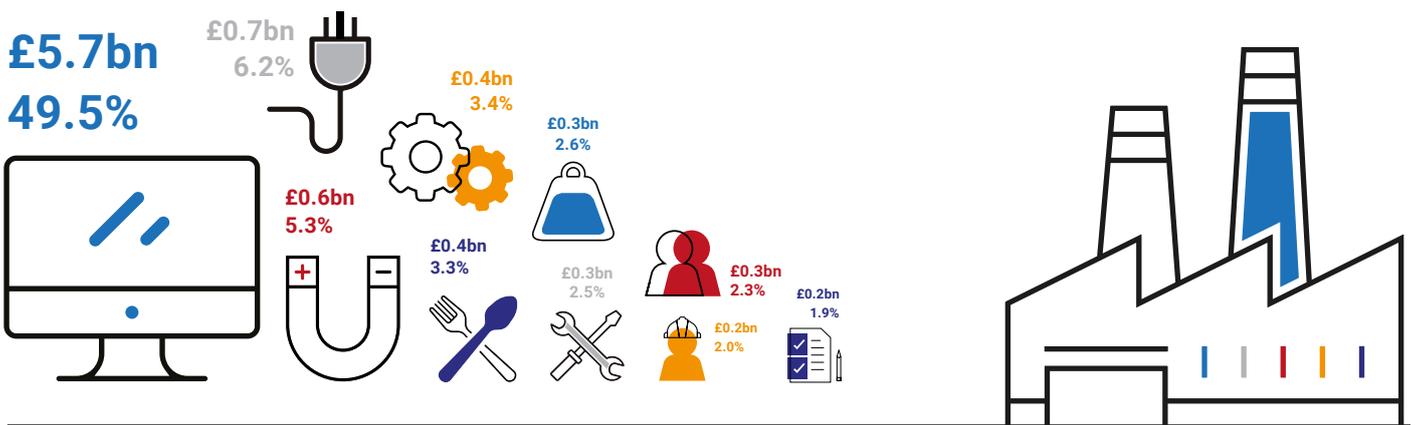
As a result it is unsurprising to find that 50% of all inputs into the sector, come from the sector itself, with electronics components parts produced, and then used as a base

in the production of the vast array of other products the sector makes. Consequentially the sector is one of the most interdependent in UK manufacturing.

The second biggest input comes from the electrical equipment sector, a lot further down with a 6.2% share, followed by metal products – primarily used as a conducting material e.g. copper.

Inputs into the electronics sector

Top 10 products going into electronics sector (£ billion) and % of total



- Computer, electronic and optical products
- Electrical equipment
- Fabricated metal products
- Machinery and equipment
- Food and beverage serving services
- Other basic metals and casting
- Rest of repair; Installation
- Employment services
- Architectural and engineering services
- Other professional, scientific and technical services

Source: ONS 2016

Demand structure

Given the diverse nature of products, the electronics sector also has a hugely varied demand base. Indeed, unlike other manufacturing sectors where demand stems primarily from one source (e.g. food and drink for final consumption; pharmaceuticals for exports) electronics has a healthy portion of demand emanating from all four core demand groups.

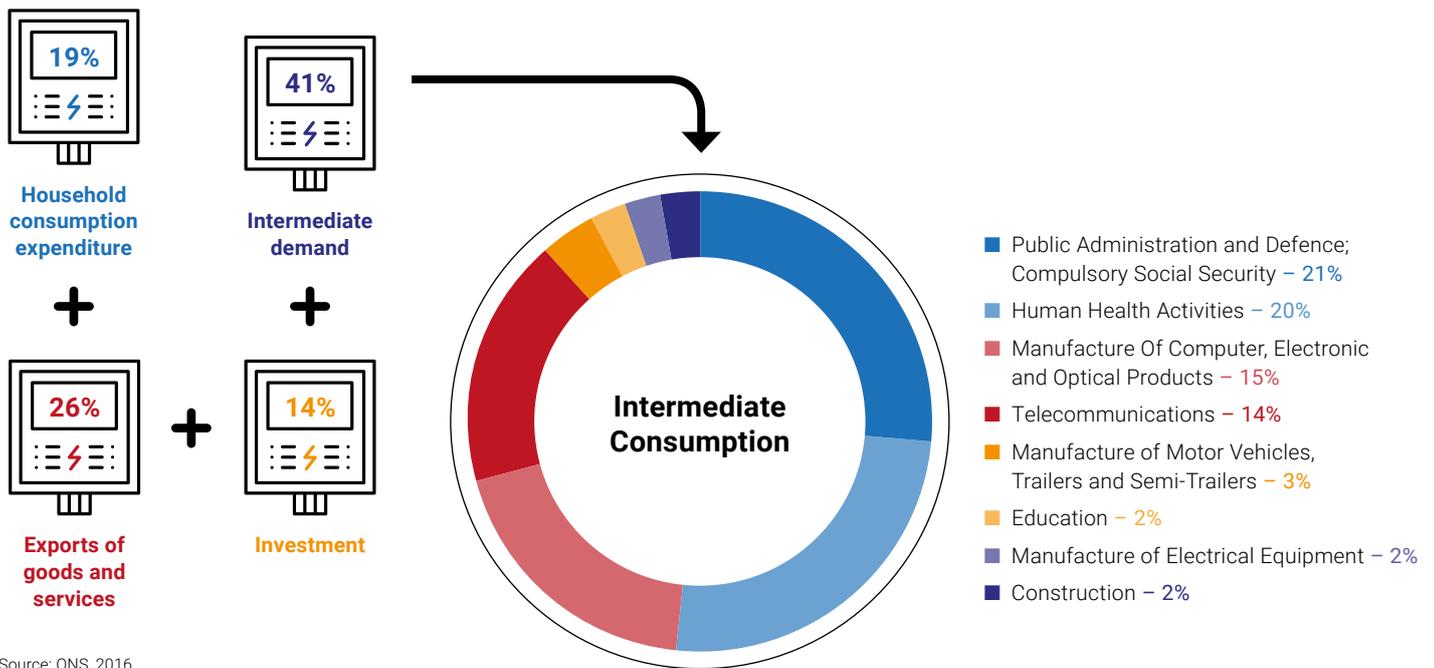
The sector primarily produces intermediate goods (40% of final demand). These include components and precision instruments used in sectors such as healthcare, public administration and defence, motor vehicles and the electronics sector itself. For example MRI and CT scanners will be destined for use in the healthcare sector, while smaller components such as circuit boards will be used in automotive.

A healthy portion of final demand comes straight from consumers (19%). This includes the demand for consumer electronics such as televisions, video games and audio equipment, while a further 14% of the goods used as an investment by other sectors such as machinery for measuring and testing.

While not one of the most export intensive sectors, electronics does export over a quarter (26%) of output across the world, with key markets in the EU, US, and Asia. However more interesting is the fact the sector imports a whopping 50% of supply, making it the most import intensive in UK manufacturing. We will delve into the implications of this, and the sector's overall trade performance later on in the bulletin.

Electronics demand structure

Demand structure breakdown, % of final demand



Source: ONS, 2016

A sector evolving

As is the case with much of UK manufacturing, the electronics sector has evolved over the last 20 years and is now more oriented towards high-technology, knowledge intensive production processes. In order to understand this evolution it is important to distinguish between the design stage, and manufacture/assembly stage of electronics production.

The design of electronics components and the devices that depend on them is a knowledge-intensive process; requiring extensive R&D and investment to be developed. Once production has been standardised, the manufacture of those components and their assembly into devices is not knowledge-intensive. The latter activities have increasingly been

outsourced to the Far East where labour costs are cheaper, while UK firms have focussed on designing new component parts – specifically semiconductors.

According to the National Microelectronics Institute, the UK is Europe's largest independent semiconductor design producer, accounting for half the market in application-specific integrated circuit design and 40% of Europe's independent electronics design overall. As such, electronics activity in the UK has been transformed from manufacture and assembly to design and innovation of components, with the most obvious example being the major semiconductor and software design company, ARM.

SECTOR CHARACTERISTICS

The electronics sector, together with pharmaceuticals and aerospace, is rightly included in the group at the forefront of high-tech production.

The sector represents 4.7% of UK manufacturing and this share has been fairly stable since the big drop it suffered in the aftermath of the “dot-com” bubble in the early 2000’s. Indeed in the 1990’s, the sector had around a 7-8% of total manufacturing.

Looking at its internal structure in term of business size by employee, this is very similar to the one that can be found in the whole manufacturing sector. Indeed, 93.2% of the companies are below 50 employees (94.6% in total manufacturing) with only 1% in the category over 250 employees (0.9% in the entire sector).

A sector that attracts a lot of foreign direct investment (FDI)

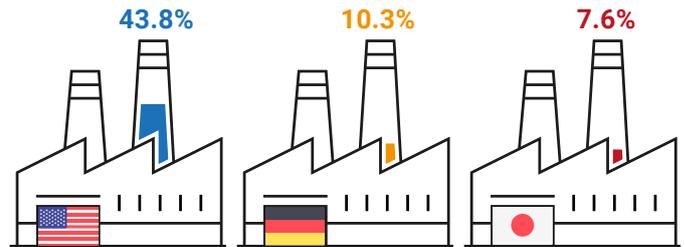
However, even though the structure might be similar, the electronics sector has a higher degree of foreign ownership. Compared to UK manufacturing as a whole, where only 2.8% of the companies are foreign owned, the share of non-domestic owners in the electronics sector is almost double at 5.4%. Amongst foreign investors, the top position is claimed by the US which controls almost 44% of the foreign owned electronics companies in the UK.

Second and third place are held by two other economic giants, Germany and Japan with a share of 10.3% and 7.6% respectively.

The important presence of overseas controlled companies appears to have an impact on the structure of turnover. Indeed, the UK electronics sector is characterised by a higher share of companies with turnover over one million – 22.9% versus 18.8% of the whole manufacturing sector.

Top three countries in terms of foreign ownership

% of foreign ownership in electronics sector



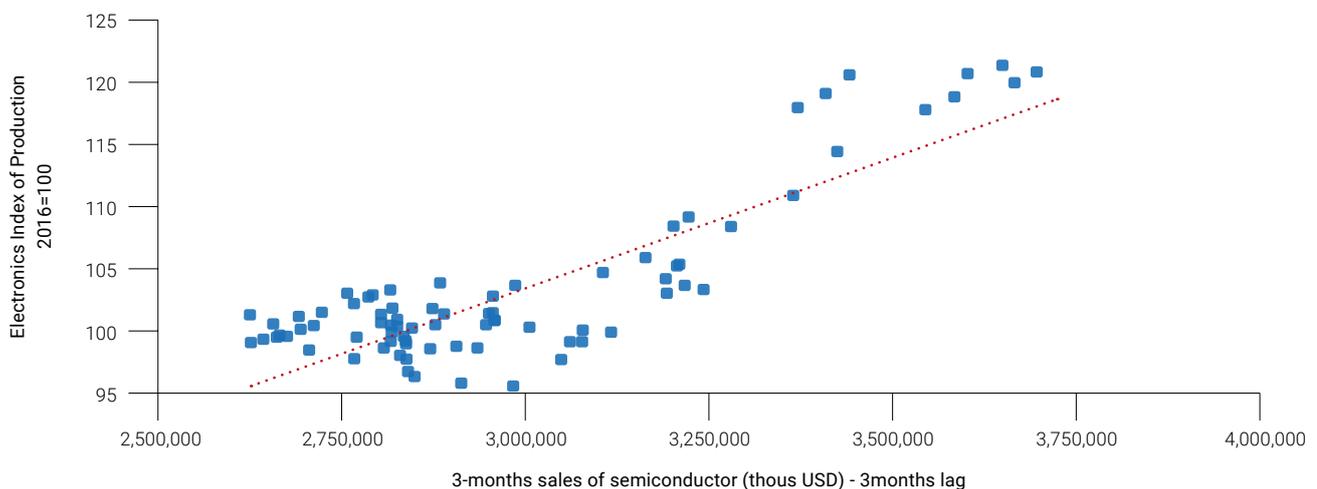
Source: Eurostat, 2015

Semiconductor: a crucial component and a great leading indicator

The SIA (Semiconductor Industry Association), a US trade association, defines semiconductors as the brain of modern electronics. This small component, usually referred as microchip or integrated circuit, is fundamental to fabricate electronics devices from smartphone to TVs, from computers to electro-medical equipment.

Since its components define what an electronics product is, semiconductor sales data are a fundamental leading indicator for electronics production as the graph below shows.

The almost perfect correlation between sales of microchip in Europe and UK electronics output



Source: ONS and SIA

Moore's Law

Thinking about TVs, mobile phones, computers, or any other piece of electronics, what is striking is the difference in size between the devices of the past and those currently available. The first computers used to occupy huge rooms, TVs were not flat and the first mobile phone weighed more than two kilograms. The key behind this shrinkage is linked to what is commonly known as Moore's law. In 1965, Gordon Moore predicted that computing would increase in power and decrease in cost following an exponential path. This prediction

was confirmed by the empirical evidence that the number of transistors on semiconductors doubles every two years.

For example, the *Intel 4004* of 1971 had a capacity of 192 transistors per squared nanometres, whereas the 2018 *Apple A12X Bionic* has a capacity of almost 82,000 transistors per squared nanometres, meaning that the more recent microchip is 427 times more efficient with clear gains in terms of space and cost.

GVA and productivity

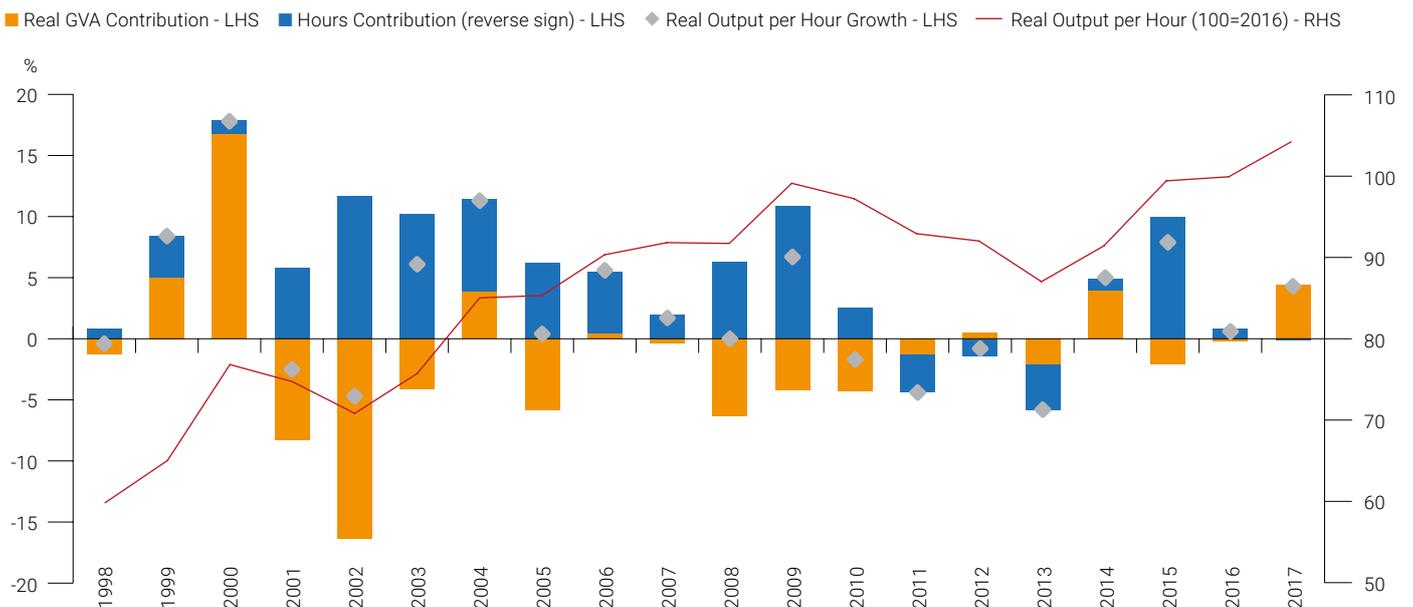
After a long period of decline started after the dot-com bubble of the early 2000s' but also continued for more than a decade, the UK electronics sector experienced an important revival in 2017 and 2018. Indeed, the expansion was 4.4% in 2017 and a whopping 14.1% in 2018¹ which, despite the sector representing only less than 5% of manufacturing, accounts for more than half the total growth of manufacturing in 2018.

Compared to the dot-com bubble, the current expansion is slower – despite being impressive – but based on a more solid ground. The good performance of the electronics sector in the UK and worldwide is linked to automation and new technologies. These are in high demand and they have a clear pay-off in the future in terms of efficiency and productivity gains.

Talking about productivity - the engine of growth and prosperity - the recent period has seen an important acceleration in productivity in the electronics sector which has started way before an acceleration in output. Indeed, the period between 2013 and 2017 has seen a productivity growth rate almost as fast as the one seen in the period preceding the dot-com bubble burst. The output growth registered in four of these last five years run together with a decreasing number of hours worked.

This great performance put electronics as the top productivity gainer in manufacturing in 2018.

Productivity started to improve at a rate faster than GVA



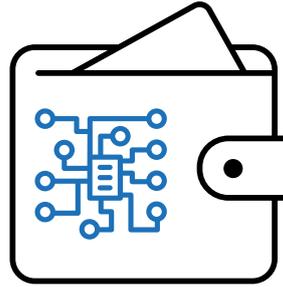
Source: ONS

¹at the time of writing December data were not yet available

R&D spending

The electronics sector is one of the top UK investors on research and development in manufacturing. The sector comes third in after pharmaceuticals sector and the transport sector.

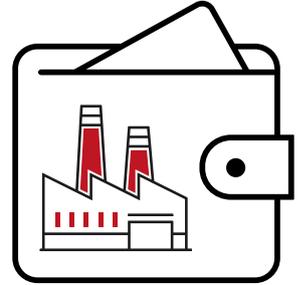
Electronics contributed more than 12% of the total R&D manufacturing expenditure and even if R&D growth has slightly contracted in the last two years, the sector massively expanded its efforts in the research of new solutions and technologies since 2011. To put this effort in numbers, the sector's R&D expenditure grew by 69% between 2010 and 2017. This massive expansion appears to be one of the reasons behind the prosperity the sector has recently experienced in terms of both output and productivity growth.



IN 2017 ELECTRONICS
R&D EXPENDITURE WAS
£1.9bn

WHICH EQUALS

12% OF TOTAL
MANUFACTURING R&D
EXPENDITURE



TRADE

As with any manufacturing sector, trade is an important aspect of the sector’s make-up and performance, especially given the growing integration of global supply chains. Unlike other sectors however, it is the import intensity of the electronics sector which is its defining feature, contributing to its large and growing trade deficit.

The electronics sector has consistently run a trade deficit

Despite very fast output growth recently, the electronics sector continues to register massive trade deficit against the rest of the world. In 2017, the electronics trade deficit stood at

£22.6 billion following a downward trend started since the aftermath of the *Great Recession* of 2008.

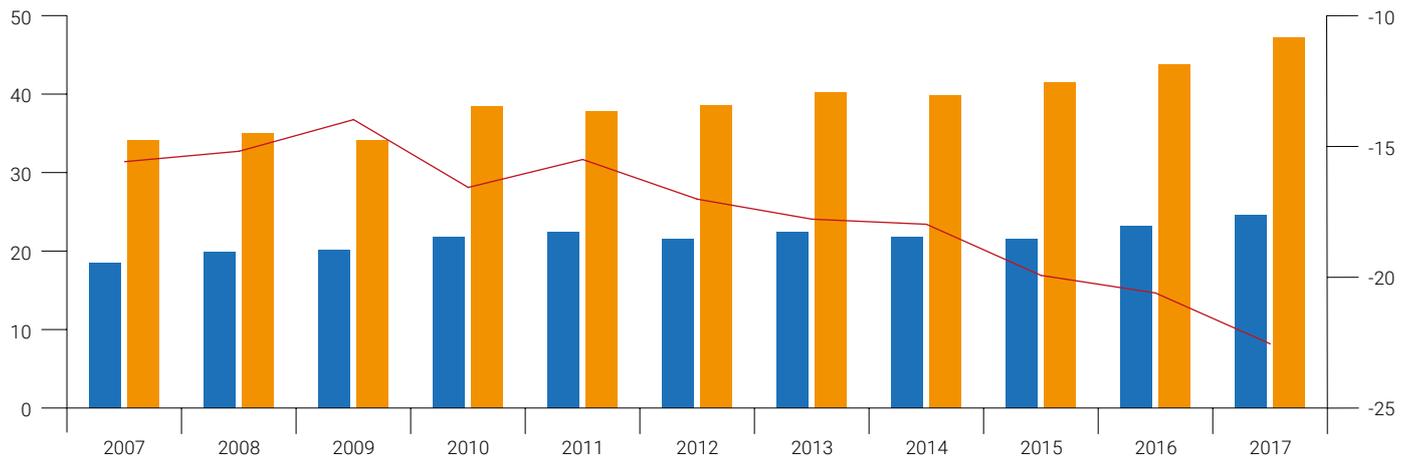
The electronics trade balance has been steadily deteriorating

Electronics sector’s exports, imports and trade balance value (£ billions)

■ Exports (LHS) ■ Imports (LHS) — Trade Balance (RHS)



Electronics sector
In 2017 the trade deficit was £22.6bn



Source: UKtradeinfo

As we have seen in the “understanding electronics” section, the sector is extremely varied and the UK does not produce electronics in very large quantities. Indeed, as pointed out in the “demand structure”, a whopping 50% of final supply comes from overseas. These two characteristics may explain why the UK trade balance in electronics is deteriorating and far away from the perfect equilibrium.

There is no doubt that the last decade has been characterised by consumers willing to spend money on smartphones and similar electronics devices and the UK production of these products is extremely small. As the graph on the next page shows, imports of phones from China – which is not only a big producer, but also the trade port for a lot of Far East producers – exploded since 2006 at an exponential rate.

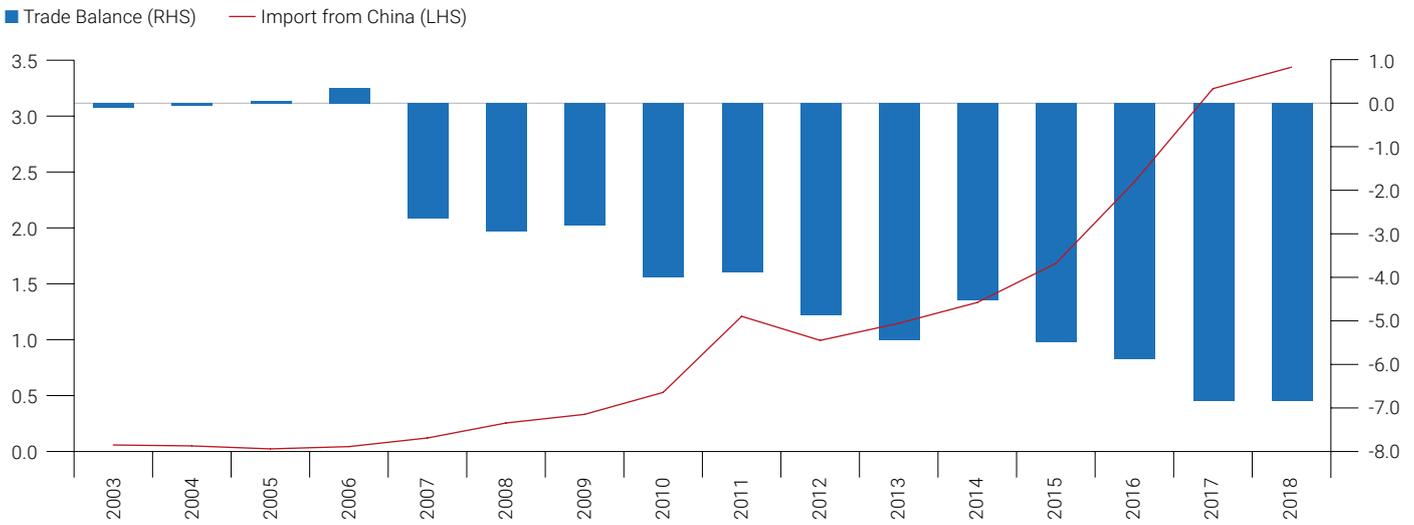
The export numbers from China to the UK in this category moved from £28 million in 2005 to £3.2 billion in 2017 – a value 113 times bigger than the one in 2005.

On the other hand, export of phones have only grown marginally and for the most part this trade is related to re-exporting. Indeed, exports to Ireland – the top export market for phones – grew only by eight times between 2005 and 2017 and it was mostly related to extra-EU goods arriving in UK ports and then being sent on to the “Emerald Isle”.

As a result, the trade balance in graph 10 clearly shows a huge imbalance in this category confirming how the electronics trade deficit has a lot to do with the industry composition.

Telephone and mobile phone market explosion

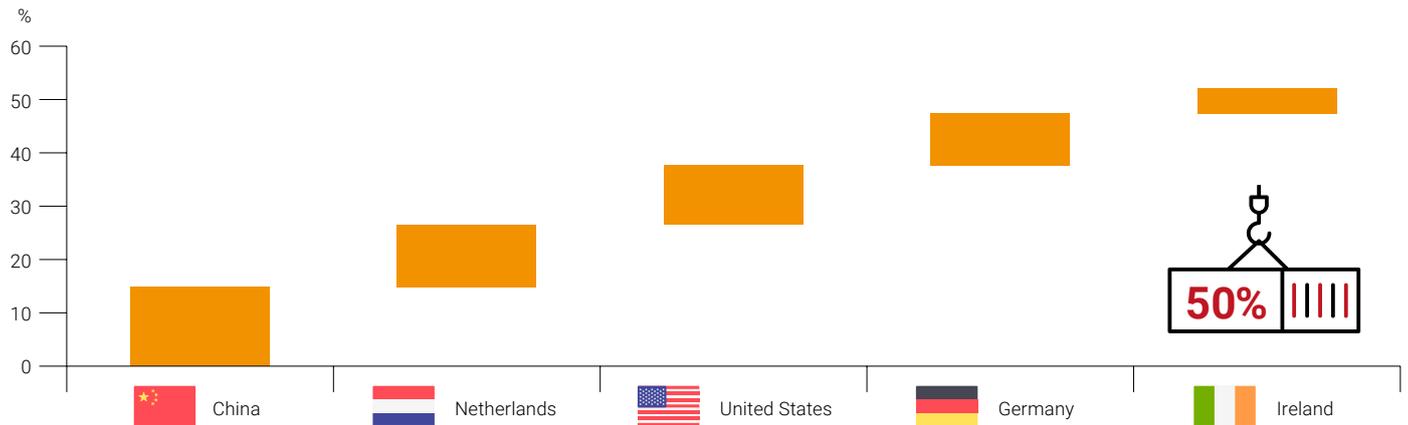
Imports from China and total trade balance value of telephones and mobile phones (£ billions)



Source: UKtradeinfo

More than 50% of total UK trade involves only 5 countries

Share of total trade with selected countries (import+export)



Source: UKtradeinfo

Taking a look at the top partners for the UK, five countries account for more than 50% of the total amount of trade in electronics (imports plus exports) hinting at how the sector is concentrated but also how transport by sea is crucial. This is once again confirmed by total trade with Netherlands which is second only to the one with China. The Netherlands is actually not a huge electronics producer or consumer, however - as we pointed out in some of the previous *Sector Bulletins* - the so called "Rotterdam effect"² boosts trade figures between the UK and the Dutch nation.

Looking at the top five countries with which the UK has a trade deficit for electronics, the Netherlands is also second, with China once again in the top position. The top five is then completed by the biggest European Union economy (Germany) and by two other Asian countries - Vietnam and Hong Kong - which confirms once more the importance of the Asian area for the production of electronics goods.



TOP 5 DEFICIT MARKETS

- China: -£8.6bn
- Netherlands: -£5.8bn
- Germany: -£2.2bn
- Vietnam: -£1.8bn
- Hong Kong: -£1.4bn

TOP 5 SURPLUS MARKETS

- UAE: £0.8bn
- Spain: £0.4bn
- France: £0.3bn
- Saudi Arabia: £0.3bn
- Australia: £0.2bn



Source: UKtradeinfo, 2017

²For more info on the Rotterdam effect see the Make UK and Santander Sector Bulletin: Chemicals, January 2018 Chemicals sector bulleti

EXPORTS

The electronics sector is not the most export intensive manufacturing sector, over a quarter of its demand still comes from across the world.

Often, UK electronics goods (and specifically component parts) are exported, used in production of final consumer goods, before being exported to other parts of the world (or back to the UK in the case of consumer electronics). This illustrates the integrated nature of the sector globally.

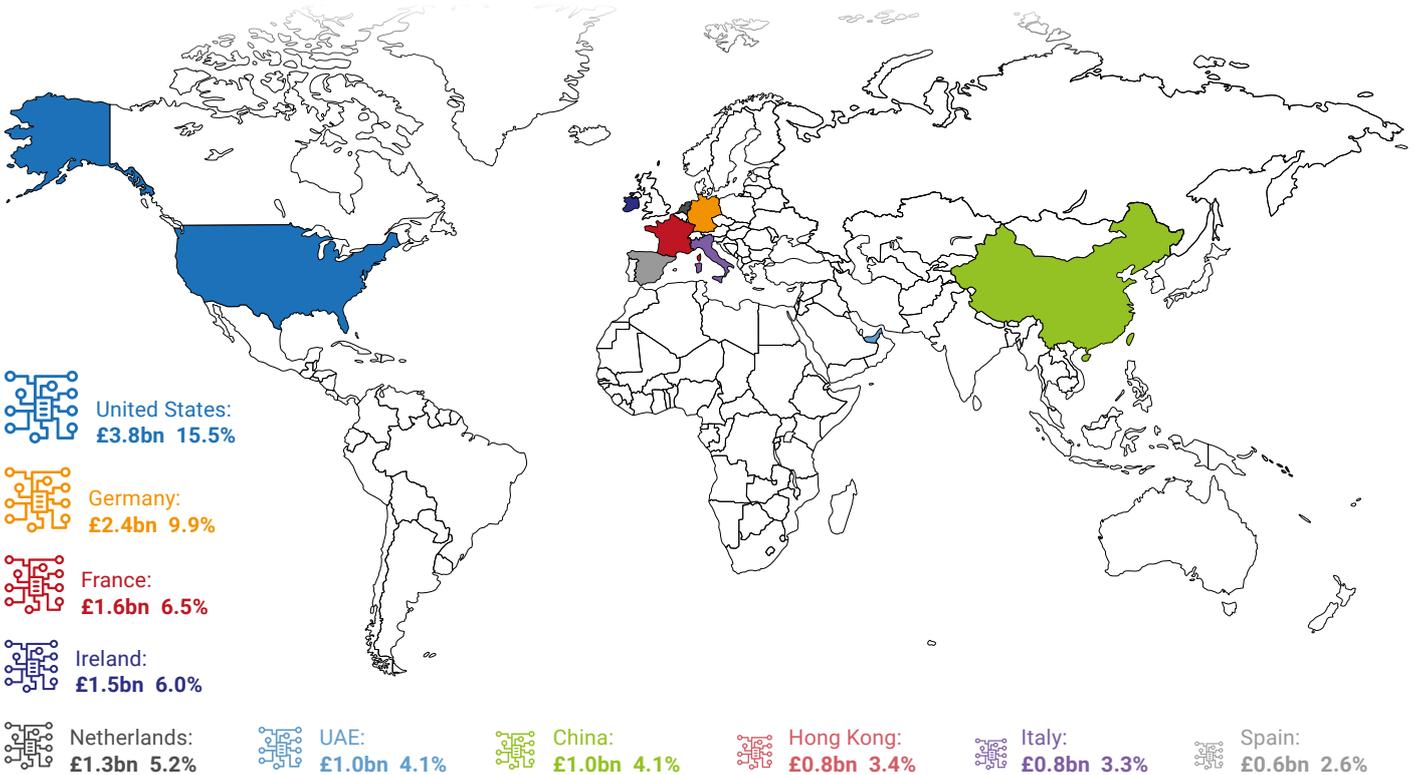
The top 10 export markets are made up of big western economies, as well as nations of growing importance in Asia – namely China, Hong Kong and the UAE. Asia now accounts

for 20% of electronics exports, up from 14% in 2007, and the top 10 high growth export markets are all located in the region. However for now the US takes top spot, with 16% of total exports heading across the Atlantic.

Despite this, the EU as a whole remains the sector’s most important export market, with 45% of exports destined for the bloc and six EU countries making the top 10 ranking for exports.

Top 10 UK export markets

Value of exports (£ billion) and % of total exports



Source: UKtradeinfo

Fastest growing UK export markets

Export growth rate 2012 – 2017* and 2017 % of total exports

	2012-2017 GROWTH RATE*	2017 % OF TOTAL EXPORTS		2012-2017 GROWTH RATE*	2017 % OF TOTAL EXPORTS
Qatar	214.6%	0.8%	UAE	40.3%	4.1%
Oman	110.8%	0.5%	Turkey	39.4%	1.1%
South Korea	48.1%	2.0%	Japan	32.9%	2.3%
China	46.8%	4.1%	Israel	31.1%	0.6%
Thailand	41.6%	1.0%	India	30.4%	1.4%

*>0.5% of share of total exports

Source: UKtradeinfo

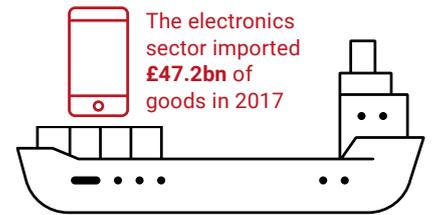
IMPORTS

The UK is not self-sufficient in its production of electronics – importing 50% of final supply. In 2017, the sector imported goods to the value of £47.2 billion.

The majority of these imports are for consumer electronics – namely smartphones and their related devices. The manufacturing hub for these goods is in Asia and the US, given the global scale and reach of companies such as Apple, Samsung and Sony. As a result it is unsurprising that 38% of imports come from Asia, with China leading the way with over a fifth. A further 9% of imports come from the US.

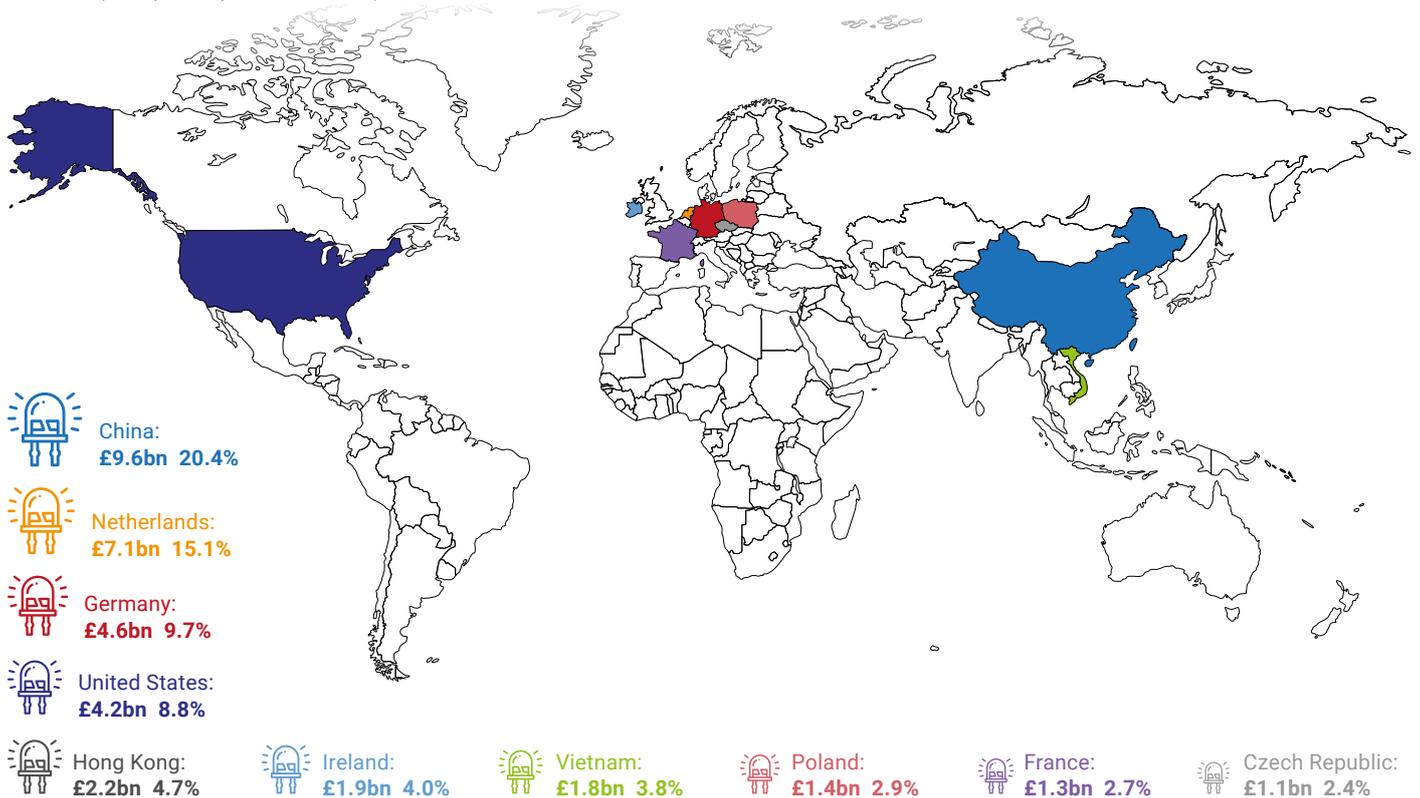
As was the case with exports, the majority of imports (47%) do come from the EU. Even taking into account the

Rotterdam-Antwerp effect, the EU remains an integral market and as such any barriers to trade will have a significant effect on the sector (see “risks” section).



Top 10 import markets

Value of imports (£ billion) and % of total imports



Source: UKtradeinfo

REGIONAL

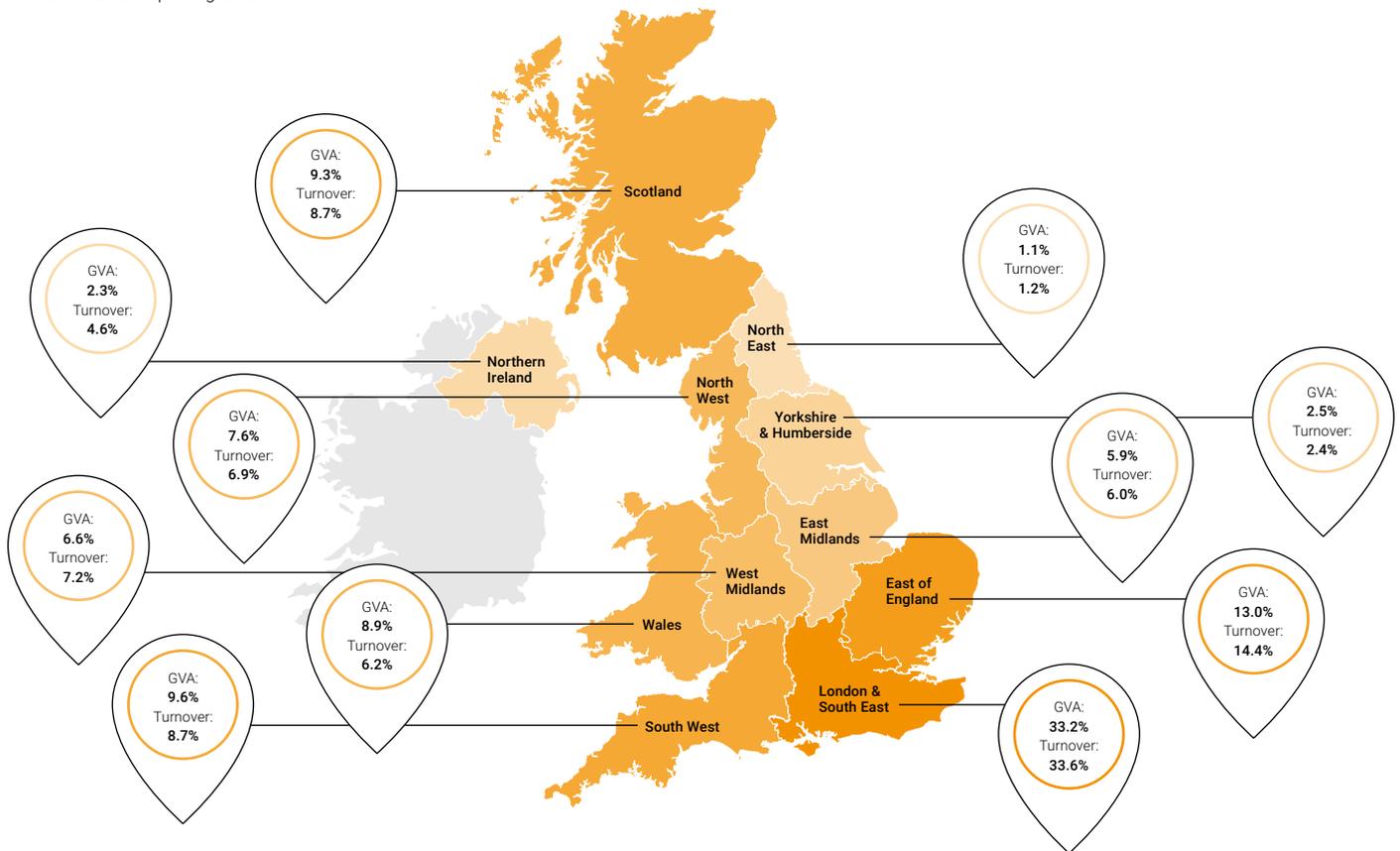
The electronics sector has a presence across the UK, however there is one region which is the sector’s geographic and operational hub – London and the South East. The capital and surrounding area accounts for one third of the sector’s output and turnover, and is home to some of the sector’s biggest companies including Racal and Mullard.

While we group the two areas together, the South East is the more dominant, with manufacturers effectively benefiting from being close to London with its large pool of highly qualified workers and a high degree of attractiveness for professionals from abroad, without the higher operational costs that being in the capital would involve.

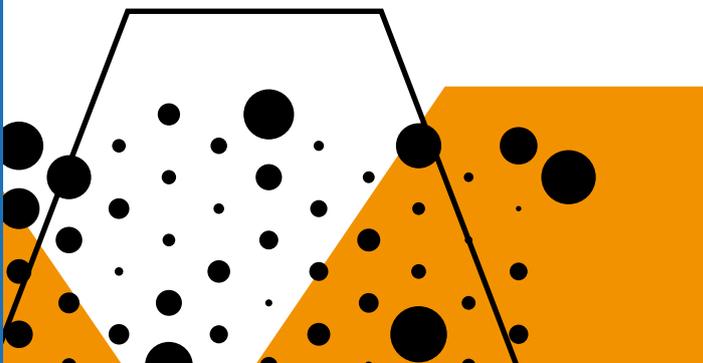
This geographical spread is quite unusual. Indeed the electronics sector is one of the few sectors which has a proportionally large presence in southern regions, and conversely is under represented in the North of England and Midlands. Other notable areas include the East of England and South West, home to 13% and 10% of output respectively.

Output and turnover in electronics sector across UK regions

GVA and turnover per region as % of UK



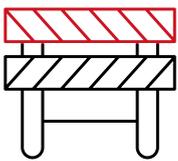
Source: ONS 2016



RISKS

As with all manufacturing subsectors, the UK's upcoming departure from the European Union has thrown up a number of potential risks if a favourable deal cannot be reached. It's not just Brexit however that will be occupying manufacturers' minds, with the issue of cybersecurity becoming ever more prevalent in the digital age.

Brexit



Barriers to trade

The global electronics market is one of the most integrated in the world, with component parts designed and developed all over the world, before being shipped to major assembly hubs to be assembled

(typically, in the case of consumer electronics, in the Far East).

In the case of the UK market in particular, component electronics parts often move back and forth across EU markets before being finalised. As a result the electronics sector has benefitted substantially from the ability to move component parts across borders without restrictions and concerns over the imposition of customs checks or any other measures that might delay the movement of goods. The potential introduction of non-tariff barriers would therefore seriously harm the sector, and its ability to perform just-in-time manufacturing.

In addition the prospect of tariffs is a further concern for the sector, and the ability of consumers to buy products given the high import intensity of the sector.



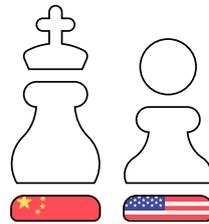
R&D funding

The electronics sector punches above its weight when it comes to research and development, with major players such as ARM investing heavily in order to evolve the design of electronic component parts.

As is the case with many manufacturing sectors, electronics has benefited from EU funding programs, specifically Horizon 2020. The loss of access to such funding for research and innovation could significantly impede the sector.

Indeed it is no secret that the UK receives more in funding than it puts in and there are concerns that the UK's reputation for world leading design and innovation could be damaged and we could be at risk of playing catch up if we aren't extremely careful.

Trade war



The US-China trade war that has filled the pages of newspapers worldwide has not been just about soya beans, steel and cars. A lot has to do with micro-chip, electronics and the intellectual property around it. US used to rule the semiconductor market, however, the growing importance of this product

pushed China to invest in the sector to play an important role in this market. As a result, recent news on the trade war had important Chinese firms such as ZTE and Huawei as protagonist.

The implication of an electronics trade war on a global scale may have an important impact far beyond the Chinese and American market. As we saw in the "characteristics" section, several UK companies are foreign owned with US topping this special ranking. Moreover, the electronics sector is composed by several super-specialised companies which creates a very intricate global supply chain which is likely to suffer in the event of constraint decided by international politics.

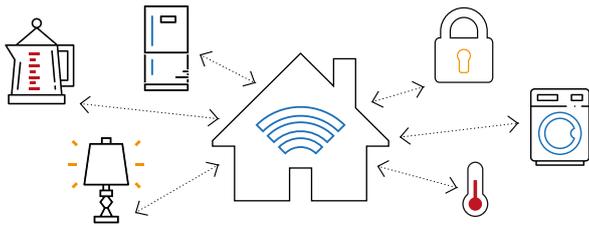


Cybersecurity

Our *2019 Annual Executive Survey* in partnership with AIG confirmed that cybersecurity is a top concern for modern businesses. Manufacturers said it is the top non-Brexit related risk for 2019 and the share of respondents selecting this option has increased since the 2018 survey. The electronics sector is particularly exposed to this risk considering how their products may be affected by cybercriminals and it therefore needs to invest a conspicuous amount of money to provide safe products. This is a crucial aspect to make sure that consumers and businesses do not refrain from investing in new technology. Our 2018 report found that 35% of manufacturers were inhibited from fully investing in digital innovation owing to cybersecurity concerns.

OPPORTUNITIES

Despite the risks highlighted the evolution of the digital age, and in particular the rise of 4th Industrial Revolution (4IR) technologies and the Internet of Things (IoT), means there are countless opportunities on offer for electronics manufacturers to grow and diversify their product base.



Domestic demand for smart devices continues to rise

The demand for smart devices is set to grow in the coming years, bringing additional demand for the specialised electronics products and components manufactured in the UK. While devices like smartphones have been around for years now, and are well established, consumers are increasingly looking for the same connectivity in other areas of their lives. Everything from vehicles (as we highlighted in our automotive bulletin) to more general day to day products such as TV's, microwaves and thermostats will soon all be connected.

Indeed with automation and the Internet of Things, we are increasingly moving towards the "connected and smart home", the market for which is expected to reach an estimated \$107.4 billion by 2023³. It is believed this trend will lead to the development of new partnerships, as electronics manufacturers seek to liaise with more established technology experts to aid in the building in of the connectivity required by smart devices.



Medical device technology

As we highlighted in our pharmaceutical bulletin, the field of medicine is always looking to evolve and innovate, particularly when it comes to medical devices that can improve healthcare delivery or enable patients to manage healthcare needs at home rather than in clinical settings. One of the prime examples is the emergence of "digital medicine". Digital medicine, or digital pills, are drugs with an ingestible sensor embedded in them that records when the medication was taken. The development of this technology represents a growing opportunity for electronics manufacturers who will have to develop safe and useable products for a growing demand base.



³Smart Home Market Report: Trends, Forecast and Competitive Analysis (2018)
⁴Global Market Insights



Asia represents a growing market

While market penetration in "technology rich" Europe and North America is high for consumer electronics, developing countries in Asia in particular represent a growing and relatively untapped market for electronics manufacturers. A growing middle class in these regions, and consequentially improved purchasing power, is increasing demand for smart technologies such as smartphones, as well as more recently Bluetooth and NFC technology devices. The demand for air conditioners is the other major household appliance which is set to see demand rise in developing countries.

These will be some of the major driving forces behind the global consumer electronics market, which is predicted to surpass \$1,500 billion by 2024⁴. Manufacturers in the UK will need to position themselves to take advantage of this opportunity, building relationships with retailers in this part of the world.

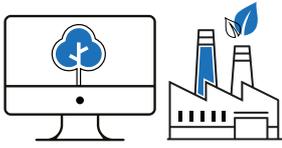
5G is coming



The fifth generation of mobile communication - known as 5G - is coming to the UK and it has already been launched in 19 countries during 2018. Most of these launches were small scale/pilot projects and the full implementation will actually happen between 2019 and 2020. The UK should launch 5G in 2019 in major cities and continue the implementation of the system in the following year.

5G will bring important improvement to the communication system. It is estimated that download speed will move from the 300 Mbit/s of the 4G LTE-Advanced to 10Gbit/s – a whopping 33 times improvement. This will not only translate to a quicker access to video streaming and internet search but also to important industrial opportunities, which we will explore further in the next section dedicated to automation and the Internet of Things. A higher connectivity would also mean the possibility to improve monitoring in industrial process or for smart cities. The 5G system will also allow virtual reality, for both personal and industrial use, to improve and expand.

LONG RUN TRENDS



Energy efficient electronics

As with all areas of manufacturing, environmental concerns are becoming increasingly paramount. Indeed the rise of “green manufacturing” to cater to evolving customer demands, businesses and governments has seen manufacturers increasingly look to more eco-friendly manufacturing solutions, as we have highlighted across our other sector bulletins.

However environmental concerns are vital not only during the manufacturing process, but also throughout the lifespan of electronics devices. Reducing energy consumption is an effective way to cut costs, leading both businesses and consumers to opt for energy-efficient electronics. The pressure is on manufacturers therefore to adopt green manufacturing processes while simultaneously producing electronics that are less expensive to use thanks to lower energy demands.

Evolving and developing more energy efficient products will be a key driver of the sector in the coming years, with more and more investment destined for research and development in energy saving technology.



Automation

As pointed out in the “characteristics” section, the current expansion that the electronics sector is experiencing is highly related to the rush towards automation and, in broader terms, to new technologies.

Automation has become, and will continue to be, more and more important for companies. This process is crucial for various reasons: it enables workers to improve their productivity and it may help them to avoid repetitive, tedious - and consequently – dangerous jobs.

Automation is also potentially useful to helping solve labour and skill shortages. An ageing workforce and the fact the post-Brexit world will likely to be less open to immigration may mean employers need to invest in technology to fulfil tasks that staff have historically undertaken.



Internet of Things

“Data are the oil of the future”. This analogy which has become increasingly popular in recent times tells a lot about where the world is going. We are living in an interconnected world where everything has a sensor and can become “smart”. The potential of the Internet of Things is huge and it may change drastically how our cities and our houses work reducing energy consumption and making our streets safer.

The Internet of Things also has an industrial application (IIoT) where machines and devices “talk” to each other to improve performance and to reduce downtime. As an example, several producers are now installing sensors in the machinery they sell to monitor its performance and know when maintenance is needed. This smart use of technology is a win-win situation with suppliers able to instantaneously schedule maintenance duties and customers able to minimise disruption to their production process.



Virtual reality and augmented reality

In the era of 4IR technologies virtual reality technology is being increasingly adopted by electronics manufacturing companies to improve manufacturing efficiency.

The technology, often referred to as digital design, simulation, and integration, enables companies to inspect and design objects at all conceivable scales at the design stage. This in theory should eliminate defects earlier on in the production process, preventing problems further down the line, which inevitably are more expensive and difficult to rectify.

Moreover, the use of VR and AR, may help companies to reduce the impact of repair, maintenance and installation costs. Indeed, some companies are already experimenting with potential solutions for remote assistance: once the machinery is delivered to the site or needs repair, a local engineer may be guided with the use of VR or AR by another engineer remotely. This use of technology is once again a clear win-win situation for customer and supplier in terms of time and costs.

ABOUT OUR SECTOR BULLETINS

Our sector bulletins give an insight into individual manufacturing sub-sectors. They offer commentary and data on how the sector breaks down, its geographic spread across the UK, as well as their outlook with regards to the UK and global economy. They provide an easy to read, and informative document, which should help to build understanding of specific sectors and how they connect to the rest of the economy.

Please note that all data cited in the report are correct as of January 2019.

If there is anything else you would like to see in our next bulletin, please email your suggestions and comments to farcangeli@MakeUK.org

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Our extensive knowledge of manufacturing that means we're able to influence policy-making at local, national and international levels. We push for the policy changes that our members want to see. We are the voice of manufacturing.

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