The Contribution of Leonardo to the UK Economy 2020

A report by Oxford Economics

OXFORD ECONOMICS

LEONARDO

Contents

Foreword

The ancestors of Leonardo in the UK, iconic - companies like Marconi, Ferranti and Westland - invented products, built expertise and developed the people that set the foundations for our company. Today, we remain as essential to the fabric of the country and the economy as we have been throughout the last century. Following decades of investment, we proudly stand as a jewel in the crown of British engineering, employing over 7,500 highly skilled people across the country. Our scientists and engineers deliver cutting-edge technologies, solutions and insights that underpin the world-leading capabilities of our Armed Forces and go on to be exported across the globe.

We are proud of our role in making Britain's advanced engineering sector one of the best in its class globally and of the tangible and substantial contribution we are making to the UK every day. As set out in this independent report by Oxford Economics research firm, Leonardo's UK operations contributed £1.9 billion to the economy annually, supporting more than 26,000 British jobs. With our focus on high-value work, our employees are shown to be 80% more productive than the UK average.

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These are impressive figures for us and our industry and, as you would expect, we deliver them as part of a team. To operate successfully as the UK's only on-shore helicopter manufacturer and the biggest supplier of complex electronics to the UK Ministry of Defence, we draw on the skills of a broad supply chain of innovative companies. Two thirds of these are small and medium enterprises (SMEs) and they too are creating opportunities and delivering value right across the UK from Scotland to Somerset.

These achievements demonstrate the contribution which we in British engineering and manufacturing continue to make to national prosperity. As the UK faces the important work of restarting and recovering from the Covid-19 pandemic, and as a Global Britain develops its new place in the world, we can be confident in the strategic significance of our sector. We can ensure that research and development in areas of strategic importance to our national security put us at the forefront of competitive global markets, allowing Britain to maintain sovereign access to specific capabilities, providing vital freedom of action in the long term. As an example of the way we are driven by this understanding, in the six years to 2019, Leonardo invested more than £970 million in UK R&D.

Exports will be the engine room of Britain's future economic power. In working with us in buying products of British design and manufacture, the UK Government gives a high-profile vote of confidence in our national engineering. Our Armed Forces are, quite rightly, highly respected worldwide and so having products "in service with UK Forces" is a powerful and effective way to promote British goods, skills and expertise around the world, boosting exports and our nation's economy at large. This report shows this commitment in action, with Leonardo exporting products and services from the UK worth £880 million in 2018 alone.

Projects, such as Tempest, which are putting UK engineering companies at the heart of the design and development of the next generation of Combat Air technologies, reflect our Government's understanding of the imperative to create partnerships which deliver economic opportunities. Leonardo is proud to be a founding member of Team Tempest, which will provide exciting career opportunities across the UK for a whole new generation of engineers, while also acting as a guiding light for young people considering science, technology, engineering and maths (STEM) subjects for their studies.

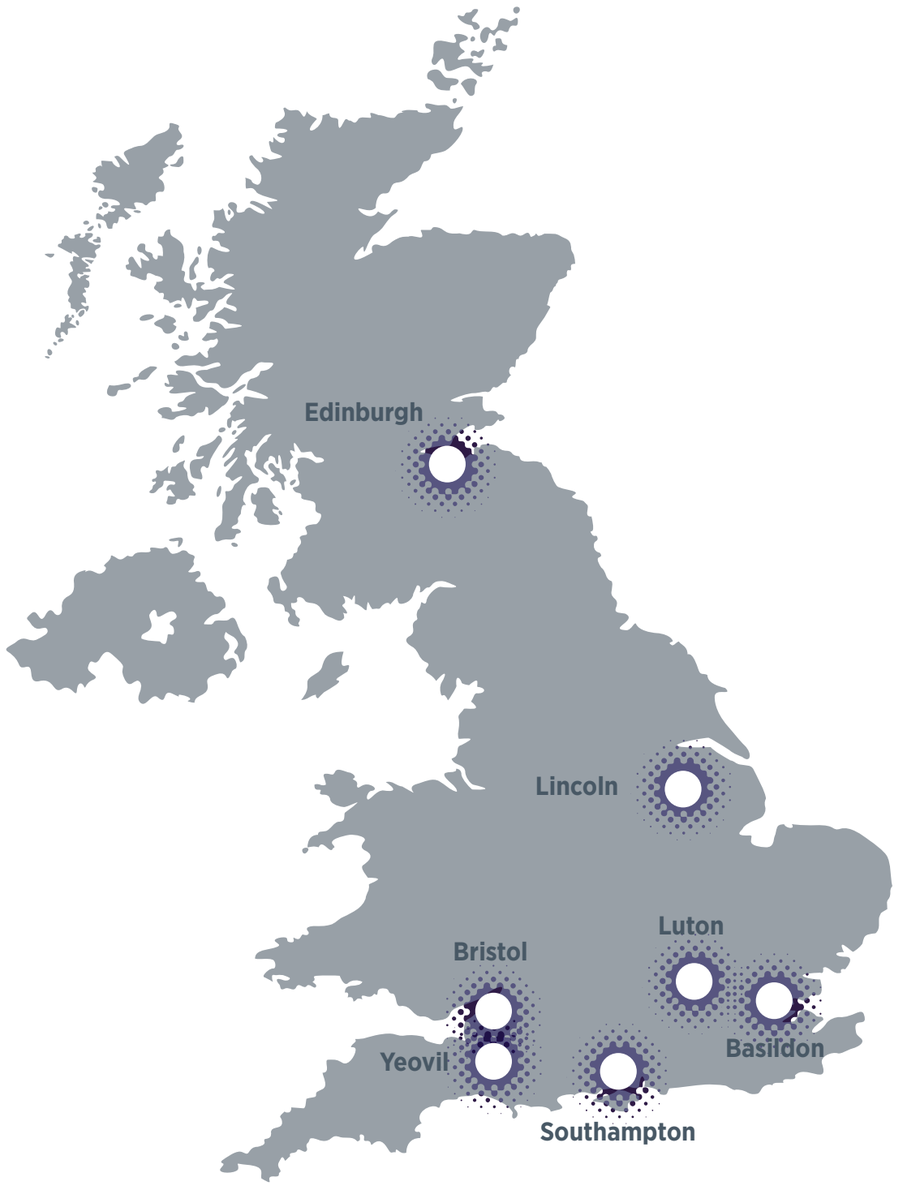
As the UK, and indeed the world, comes to grips with the economic impact of the Covid-19 pandemic, British engineering, manufacturing, innovation and, most importantly, people are going to prove absolutely fundamental to the national recovery. It is about boosting today's economy and also investing in the people, ideas and technology that will strengthen our footing in the new global economy. At Leonardo, we have not furloughed one single employee during the crisis and we've increased our 2020 apprentice intake. It's just one glimpse of how Leonardo and our industry are committed to wider economic growth. As this report outlines, there are many more.

Norman Bone MBE FRaES
Chair and Managing Director, Leonardo UK

Introduction

Leonardo is a global aerospace, defence and security company with significant manufacturing and research and development (R&D) capabilities, employing 46,000 people across 170 sites around the world.

Location of major Leonardo sites in the UK, 2018



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The company has a large presence in the UK—with more than 7,500 workers spread across its seven major sites as well as several smaller facilities and UK armed forces bases. The company has expertise across a diverse portfolio, including an "end-to-end" capability in helicopter design, manufacture and support; producing electronics systems, from the design and development stages through to manufacture and support; and providing cyber security protection services.

In this report we assess the contribution that Leonardo made to the UK economy in 2018, quantifying the impact in terms of GDP and employment. This impact is derived from the company's own operations, as well as the impact of its supply chain spending and the contribution that workers make through their wage spending. A more detailed explanation of our methodology is presented overleaf. Overseas Leonardo entities have a further benefit to the UK economy through purchasing directly from UK suppliers, however this effect is not considered in this report.

As well as these headline economic impacts, we highlight the wider socioeconomic contributions that Leonardo makes to the UK. These include the company's export performance and its investment in capital equipment, staff training and R&D—all important factors in securing the long-term economic success of the country. We also discuss the ways in which Leonardo's innovations and productive capacity deliver strategic benefits for the Ministry of Defence, by allowing the UK to operate and maintain capabilities without being dependent on other nation states (known as "freedom of action"), as well as maintain an edge over potential adversaries (known as "operational advantage").[1]

This report is intended as a reference document for Leonardo, with material to be pulled out and used in other formats, and is structured as follows:

- Chapter 2 highlights the impact of Leonardo's UK operations as a whole on the country's economy.
- Chapters 3 and 4 discuss the contribution of Leonardo's UK helicopter business on the UK economy, and the impact that the company has on the local economy around the site in Yeovil.
- Chapters 5 to 10 assess the contribution of Leonardo's UK electronics business on the UK economy, and the impact that Leonardo has on the local economies around the company's sites in Edinburgh, Luton, Basildon, Southampton and Lincoln.
- Chapters 11 and 12 highlight the impact of Leonardo's UK cyber security business on the national economy, and the contribution of Leonardo to the local economy around the company's site in Bristol.

[1] Definitions from MoD, Refreshing Defence Industrial Policy, 2017 and MoD, National Security Through Technology, 2012

AN INTRODUCTION TO OUR ECONOMIC IMPACT ANALYSIS

In each section of this report we assess Leonardo's impact using a standard means of analysis called an economic impact assessment. This involves quantifying Leonardo's economic impact across three "core" channels:

- Direct impact—relating to Leonardo's own activities in the UK, this encompasses the economic activity and employment supported directly by the company.
- Indirect impact—this encapsulates the economic activity and employment supported in the UK supply chains of Leonardo's UK operations as a result of their procurement of goods and services from other firms. Note: this channel includes the impact of the company's capital investments, such as on new facilities and IT equipment, as well as that of its day-to-day purchases.
- Induced impact—this comprises the wider economic benefits that arise when Leonardo employees in the UK, and those in the company's UK supply chains, spend their earnings—for example, in local retail and leisure establishments.

This approach enables us to build a picture of Leonardo's total contribution to the UK economy across two key metrics:[2]

- GDP—more specifically, Leonardo's "gross value added" (GVA) contribution to GDP. In simple terms, GVA is the sum of income generated by the company, in the form of employee compensation and profits, plus some taxes on production such as business property rates. For brevity, we refer to this as the "economic contribution" throughout the report.
- Employment—the number of jobs supported as a result of the company's activity.

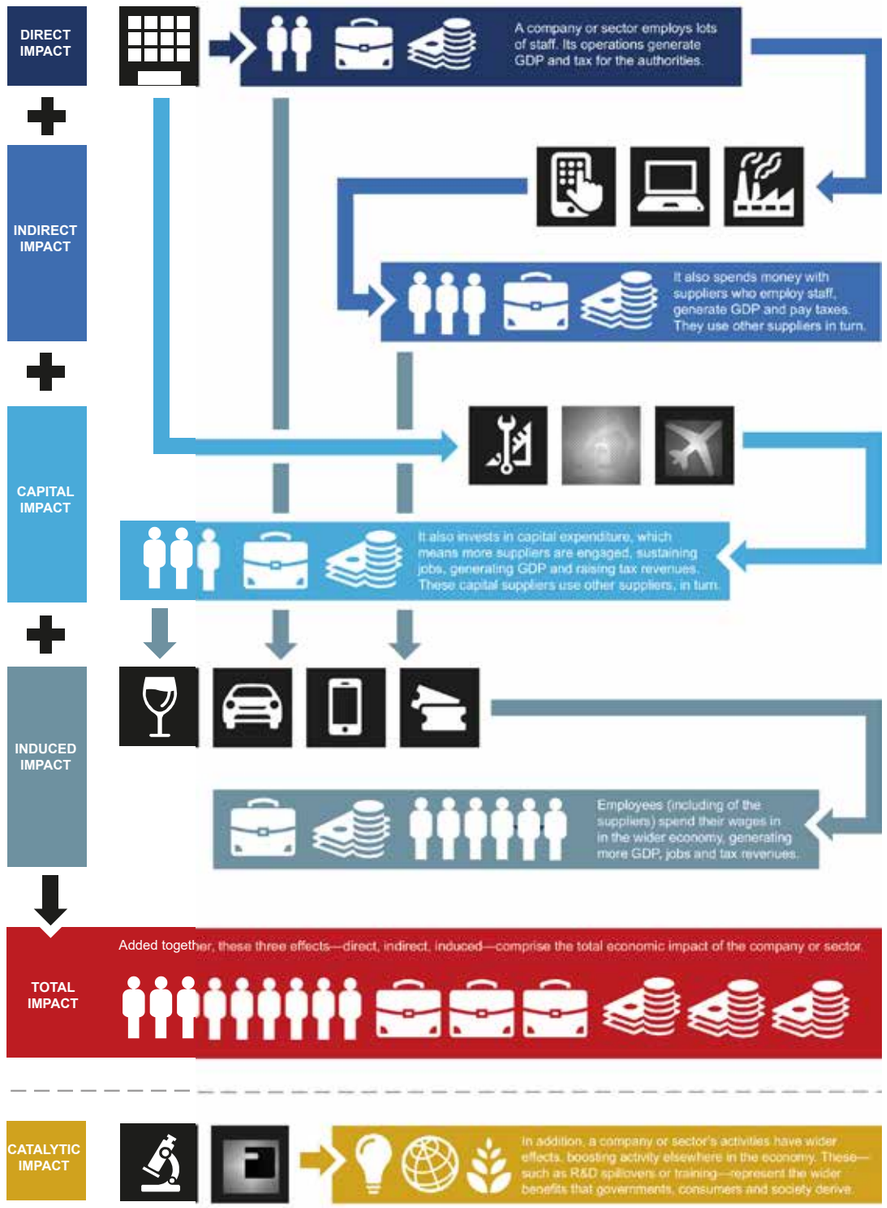
Alongside these core economic impacts, we also consider the wider "catalytic" economic impacts through which Leonardo contributes to the UK's long-term prosperity. These catalytic impacts correspond to a number of the themes identified in recent government publications, such as export growth, skills development, and building future capabilities through R&D.

The modelling upon which this report is based computes the economic footprint of Leonardo in the UK for 2018. Our approach uses financial data for that year from the company's own accounts, plus the latest economic data available at the time of writing.

Additional information on our modelling approach is provided in this report's appendix.

[2] The GDP and employment results are presented on a "gross" basis. They therefore ignore any displacement of activity from Leonardo's competitors or other firms. Nor do they consider what the resources currently used by Leonardo or stimulated by its expenditure could alternatively produce in their second-most productive usage. Our economic impact analysis therefore estimates the actual economic footprint of Leonardo in the UK in each year, but does not estimate the extent to which the size of the UK economy might differ if Leonardo's UK operations did not exist.

THE FIVE CHANNELS OF ECONOMIC IMPACT IN OUR MODEL



WHY CATALYTIC IMPACTS ARE IMPORTANT FOR THE ECONOMY

Leonardo's operations support jobs and economic activity around the UK each year. Alongside this, the company invests in capital equipment, R&D and the skills of its workforce, all of which contribute to the UK's long-term productivity, the key driver of prosperity.

Research and development
Innovation can overcome technological challenges, create better products, yield cost savings, and realise a range of other benefits. The returns from R&D investment accrue to Leonardo itself, but also spread into the wider economy, as knowledge and knowhow is shared more widely. Ultimately, innovation enhances the UK's productivity.

The UK's Department for Business, Energy and Industrial Strategy describes research and innovation as "vital to our country's prosperity, security and wellbeing, and an integral part of delivering the UK's Industrial Strategy". [3] Highlighting the importance of research to the government's growth strategies, the government has a target to increase total private and public R&D spending to 2.4% of as a share of GDP by 2027, up from 1.7% in 2017. The government has also noted that "historically, there has been a strong correlation between defence research and technological advances across society". [4] While the government pledged in March 2020 to significantly increase public spending on research, [5] investments in this area by private companies are also important to reaching this goal.

Capital investment
Alongside R&D, investments in capital equipment and facilities are another key way in which private companies boost the productive capacity of their own operations and the UK economy as a whole. The productivity benefits of these investments typically extend over many years.

[3] Parliament Publications, Level of ambition of 2.4% target
[4] Philip Dunne MP, "Growing the Contribution of Defence to UK Prosperity", A report for the Secretary of State for Defence, July 2018.
[5] BEIS research and development budget allocations

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Skills and training
A highly-skilled workforce is a further determinant in the economic success of a country, with estimates suggesting an increase in GDP per capita of 18-35% for each additional year of education. [6] While the country's schools and universities provide a necessary part in the UK education system, private companies help to further develop the workforce through training courses, on-the-job learning and continuous professional development schemes. The importance of skills development within the defence sector has also been recognised by the government: the report by Philip Dunne MP recommended that "the MoD should focus on technical education, skills and training, in shaping its strategic approach to prosperity". [7]

Exports
Exporting enables a company to increase its volume of sales beyond that which could be sustained through UK demand alone. This, in turn, can drive cost reductions from "economies of scale". These can be realised when it is possible to spread fixed costs across a larger number of units of production, reducing the average cost per unit sold. Larger production volumes might also make it worthwhile for a firm to invest in specialist staff or machinery, meaning that goods and services can be produced more efficiently. As such, the larger scale of production achieved through exporting may enhance both Leonardo's competitiveness, and value for money for the UK taxpayer. Alongside this, a larger scale of production means the company is able to support higher levels of employment in high-value disciplines such as engineering. Exporting can also expose a company to international competition and knowledge-sharing, driving further productivity benefits.

[6] UK Government Office for Science, Economic returns to education, September 2016
[7] Philip Dunne MP, "Growing the Contribution of Defence to UK Prosperity", A report for the Secretary of State for Defence, July 2018.

The Contribution of Leonardo to the UK Economy

This chapter sets out the total impact of Leonardo's UK operations on the UK economy.[8]

Executive summary

Leonardo's UK operations cover several key areas. This includes an "end-to-end" capability in helicopter manufacturing from the design phase through to production and support. The company also designs, produces and supports advanced electronics systems for use across land, sea, air and space applications. Leonardo's UK operations also cover the provision of cyber security technology and services.

Core economic impacts
We calculate that the total contribution to UK GDP of Leonardo's UK operations was £1.9 billion in 2018. Of this, £770 million was contributed directly by the company's business activity. A further £480 million was the result of activity supported by Leonardo's supply chain spending, while £630 million was contributed by the wage spending of Leonardo and supply chain employees.

We estimate that this economic activity supported a total of 26,600 jobs around the UK in 2018. This is made up of 7,500 jobs directly with the business, 9,700 as a result of supply chain spending and 9,400 supported by Leonardo and supply chain workers' wage spending.

Two thirds of Leonardo's 2,100 UK suppliers were small and medium-sized enterprises (SMEs), and more than a quarter (28%) of all Leonardo supply chain spending was spent directly with these SMEs.

Leonardo's workers are 80% more productive than the average UK worker. Leonardo's workers contributed £103,000 a year to GDP in 2018 on average, compared to a UK average of £57,000 that year.

The business sold a total of £880 million in exports in 2018, split between £670 million to external customers and £210 million to overseas Leonardo entities, such as Leonardo's Italian operations. Total exports represented approximately 110% of the company's direct GDP contribution, meaning Leonardo provides a strong boost to the UK government's target for exports of 35% of GDP.[9] The company sold a further £4.5 billion of exports in nominal terms in the five preceding years.

£1.9 billion
The contribution to UK GDP in 2018 of Leonardo's UK's operations

26,600 jobs
Total jobs supported in 2018 by Leonardo's UK operations

28%
Share of Leonardo procurement spent with UK SMEs

[8] Our estimates of the impact of the company as a whole exclude sales and purchases between the company's different UK business units. In contrast, the impact of each separate business and site in the UK includes the effect of intra-company transactions. As such, the sum of impacts for the business units is greater than the impact of the company as a whole.
[9] It is possible for exports to be larger than GDP contribution as exports are a revenue measure while GDP represents the added value generated by the company from this revenue.

£180 million
Value of R&D activity carried out in 2018 by Leonardo's UK operations

Catalytic Impacts: Leonardo's Contribution to the Uk's Long-Term Prosperity

Leonardo's UK operations performed a total of just under £180 million of R&D activity in 2018 alone. Of this, £125 million was carried out in support of, and funded by, customer contracts, while a further £52 million was funded by Leonardo itself. This latter figure represents 7% of the company's direct GDP contribution and as such, provides support to the UK government's aim of raising total R&D spending to 2.4% of GDP by 2027. The company also carried out a total of £790 million of R&D activity over the five preceding years. We estimate that the accumulation of R&D assets following this activity increased UK GDP by £580 million in 2018, due to productivity improvements enabled among diverse sectors across the economy.

Leonardo has close relationships with a number of UK universities to carry out R&D projects, including through the Vertical Lift Network. This is an association set up by Leonardo in conjunction with a group of universities in 2013, with aims that include facilitating collaborative research on helicopter technologies.

Leonardo's research and development activity generates innovative new products and components. This includes more effective helicopters that can travel further and carry heavier loads, as well as cutting-edge electronic devices such as lightweight airborne radar systems, high-powered military lasers and ultra-sensitive infra-red detectors. The ability to develop and manufacture this equipment on-shore is of strategic importance to the UK, allowing the Ministry of Defence (MoD) to operate without the intervention of other nation states (known as "freedom of action"), as well as maintain an edge over potential adversaries (known as "operational advantage").

Leonardo contributes to upskilling the UK workforce through its training schemes. For instance, in 2018 the company had 170 graduate trainees and just under 300 apprentices, as well as staff on Further and Higher Education courses and engineers working towards Chartered Engineer status. Leonardo is a member of The 5% Club, a group of employers that aims to have five percent of their workforce in "earn and learn" positions, such as apprenticeships, formalised graduate student training programmes and sponsored students.

As well as training its workers, Leonardo sponsored 22 PhD students at universities around the UK in 2018, contributing to both the education of young engineers and to the UK's R&D output. In 2018, Leonardo was awarded the MoD's Employer Recognition Scheme Gold Award for employing veterans, supporting employees that choose to be members of the Reserve Forces, and supporting local cadet units.

The company also takes part in outreach schemes to support science, technology, engineering and maths (STEM). These include open days and work experiences for school age children, such as sponsoring the Big Bang fair, an annual STEM event. Leonardo's stand at the fair in 2019 hosted interactive activities such as taking selfies with an infra-red camera.

The company's outreach programmes also include challenges and competitions for students of all ages, for instance Cool Aeronautics, a primary school outreach programme that introduces children to the world of aerospace engineering. Similarly, the company also sponsors the Institute of Mechanical Engineers' Unmanned Aerial System (UAS) Challenge, where university teams undertake a full design and build project for a UAS with a specific mission objective, culminating in a three-day competition.

The importance of Leonardo to local economies around the UK
Leonardo has seven major sites around the UK, as well as smaller facilities and a presence on Royal Navy Air Stations, RAF Stations and Army Aviation Centres. As well as the economic and strategic benefits outlined above, these sites are an important source of income and employment for the local areas in which they are based. The table below summarises the findings from our analysis of the local economic contribution of each site.

The economic contribution of Leonardo to the local economies in which it operates[10] 2018

Leonardo site	Direct GDP contribution (£m)	Total GDP (£m) supported in local areas	Direct employment	Total employment supported in local areas
Yeovil	360	450	3,100	5,000
Edinburgh	190	260	2,000	3,300
Luton	120	145	1,000	1,460
Basildon	40	60	620	990
Southampton	33	40	400	530
Bristol	18	30	240	490
Lincoln	1.5	4	25	88

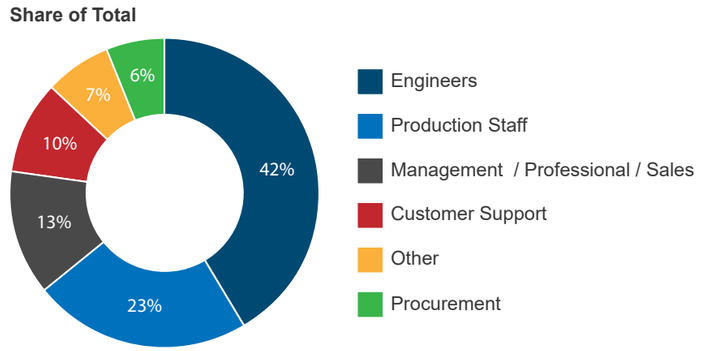
[10] See Appendix for definitions of the local areas used for each site.

Employment Contribution

Leonardo's direct employment
In 2018, 7,500 people worked for Leonardo in the UK. Of these, 6,600 were direct employees, including 170 graduate trainees and nearly 300 apprentices. In addition, the company employed approximately 250 contractors and 650 agency workers on long-term contracts.[11]

Two thirds of the company's employees worked in engineering and production roles, with the remainder split across roles such as customer support, management, sales and marketing, and professional roles such as legal, accounting and commercial roles.

Leonardo's UK employees by job role, 2018



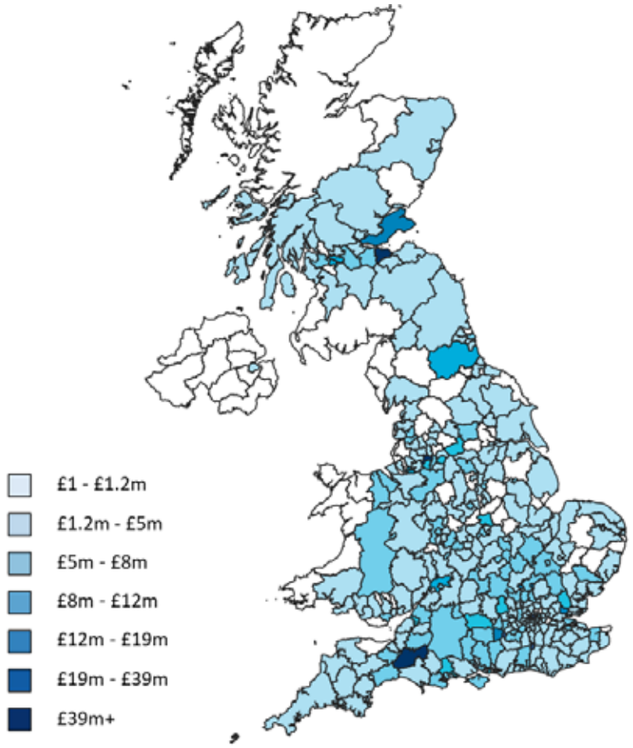
Source: Leonardo

Supply chain contribution to employment
Leonardo made £600 million worth of UK supply chain purchases in 2018 with 2,100 suppliers across the country, of which approximately 28% was spent directly with 1,400 UK small and medium-sized enterprises (SMEs). Spending on computer, electronic and optical products was the largest category.

In total we estimate that this procurement spending indirectly supported 9,700 jobs in the company's UK supply chain.

[11] For the purposes of this report, we consider these workers under "direct employment", as they perform very similar operational roles to the company's employees and a Leonardo site is their usual place of work.

Leonardo's total procurement spending by local authority district, 2018



Employment supported by worker spending

Leonardo made £330 million of wage and salary payments to its UK employees and long-term contractors in 2018, plus an estimated further £68 million paid to long-term agency staff. While these workers are typically concentrated around the company's major worksites, many are situated further afield, helping to support local economic impacts around much of the country. In total, wage payments were made to workers in 300 of the UK's approximately 400 local authority districts and council areas.

These wages and salaries paid to Leonardo employees, as well the salaries of workers in the company's supply chains, help to support a further 9,400 jobs around the UK in 2018. This occurs through spending in local shops and other consumer-facing businesses and is known as the "induced" impact.

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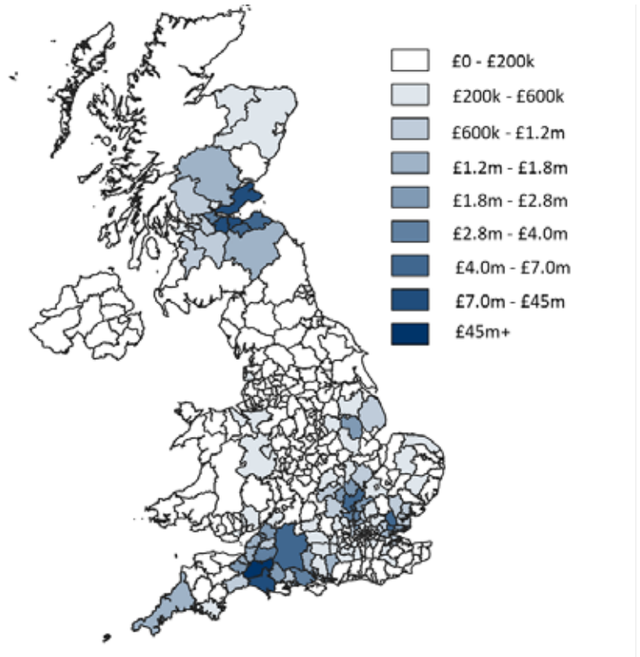
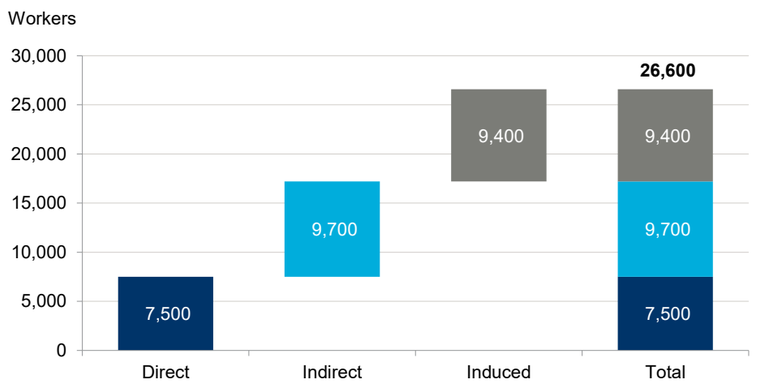
Leonardo's total wage spending, by local authority district of each employee's residence, 2018



Total employment contribution

Bringing together the direct, indirect and induced impacts, we estimate that Leonardo's UK operations supported a total of 26,600 jobs in 2018. This means that for every 100 jobs at Leonardo itself, a total of 355 jobs were supported around the economy.

Leonardo's UK total employment impact, 2018



Source: Leonardo

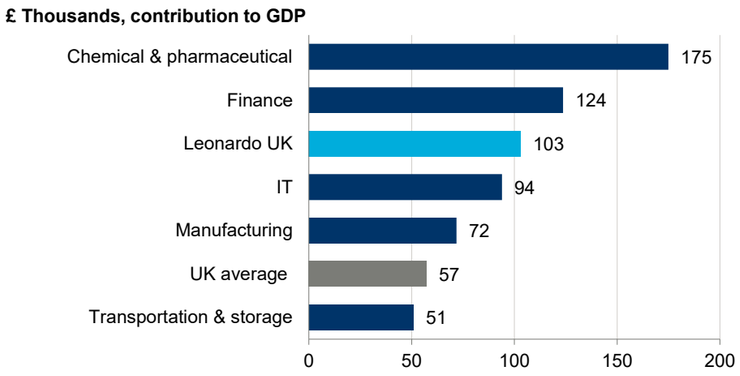
GDP Contribution

Leonardo's direct contribution to UK GDP
Leonardo's UK operations generated over £2 billion of revenue in 2018. Over half of this came from UK customers, with the remainder from export customers and other Leonardo entities, such as the company's Italian operations.

We estimate that in generating this revenue, the company directly contributed £770 million to UK GDP in 2018. This was composed of approximately £500 million in employee compensation, which includes wages and salaries, employer pension and national insurance contributions; £260 million in EBITDA[12] and £6 million in business property taxes.

Leonardo's UK workers were 80% more productive than the UK average: they each contributed £103,000 to GDP, while the average UK worker contributed £57,000.

Average productivity for selected UK industries, 2018



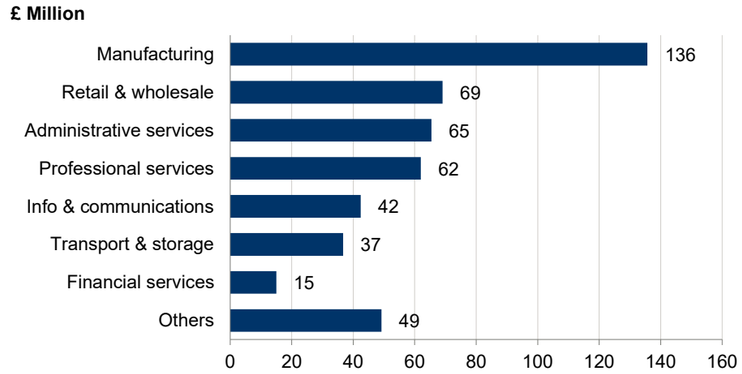
Source: Oxford Economics, Office for National Statistics, Leonardo

Supply chain contribution to UK GDP
We estimate that Leonardo's supply chain purchases supported a £480 million contribution to UK GDP in 2018.

Reflecting the nature of the company's supply chain, the largest indirect impact was in the manufacturing sector, with a £140 million contribution to GDP, or 29% of the total.

[12] Earnings before interest, taxes, depreciation and amortisation, a standard proxy for a company's current operating profitability.

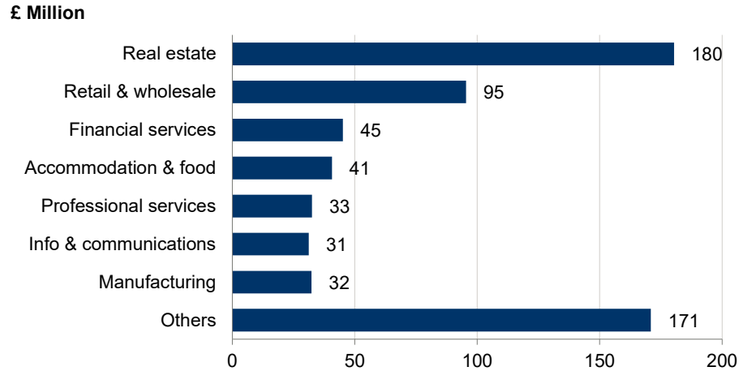
Leonardo's UK indirect GDP impact by sector, 2018



Source: Oxford Economics

UK GDP supported by worker spending
The spending of Leonardo's employees and those in its UK supply chain supported a further £630 million contribution to GDP in 2018. The real estate and the retail and wholesale industries were the two most significant contributors, supporting £180 million and £95 million in GDP, respectively.

Leonardo's UK induced GDP impact by sector, 2018

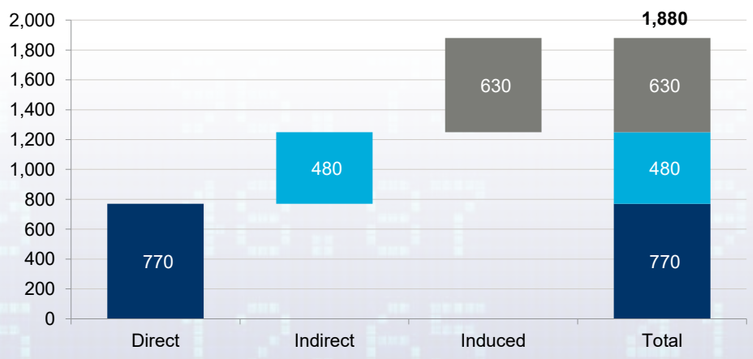


Source: Oxford Economics

Total GDP contribution
By combining Leonardo's direct contribution with the supply chain and worker spending impacts, we estimate that Leonardo's UK operations contributed approximately £1.9 billion to the UK economy in 2018.

This means that for every £1 of GDP that the company contributes itself, a total of £2.40 of economic activity is supported across the UK economy as a whole.

Leonardo's UK total GDP impact, 2018



Source: Oxford Economics

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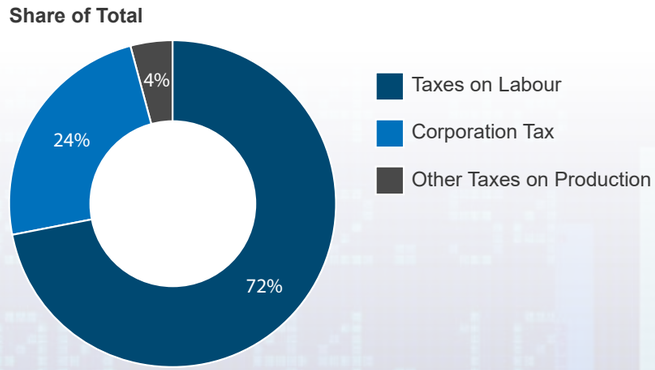
Direct Tax Contribution

Leonardo's UK operations contributed a total of approximately £160 million in tax revenue in 2018. Nearly three quarters of this was made up of taxes on labour, including employee income tax as well as employer and employee National Insurance contributions. The remainder came from corporation tax and other taxes on production, predominantly consisting of business property rates.

Leonardo's direct tax contribution by type of tax, 2018

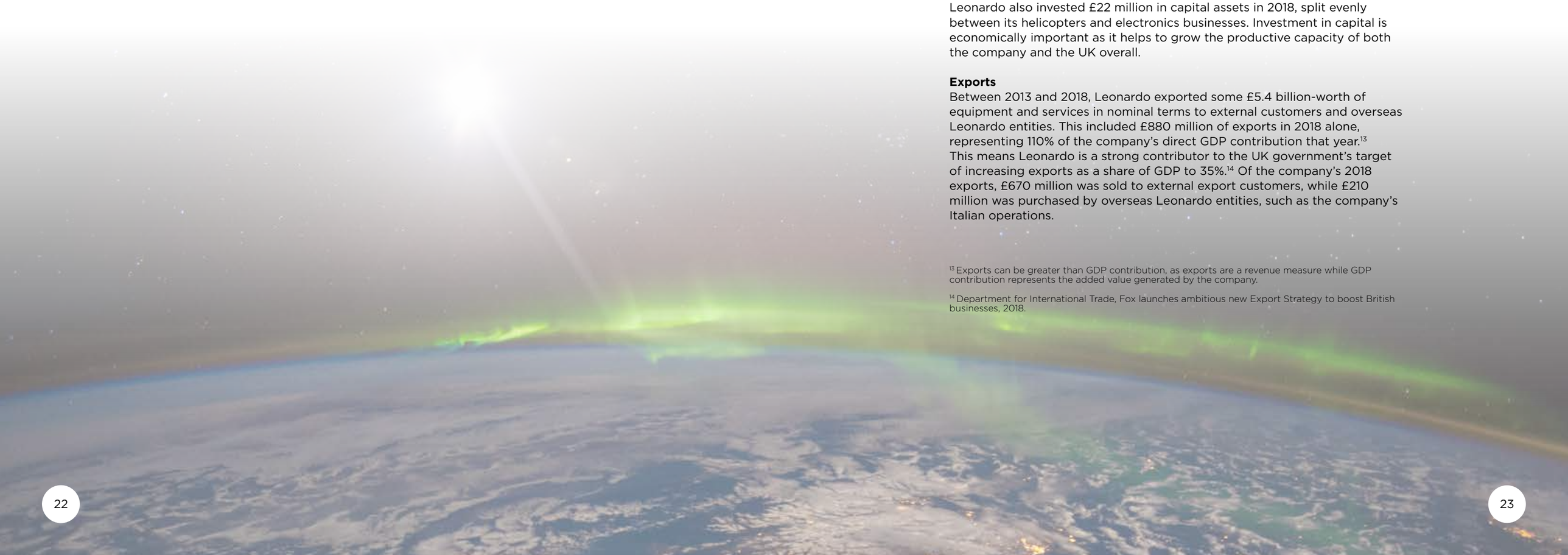


Source: Leonardo

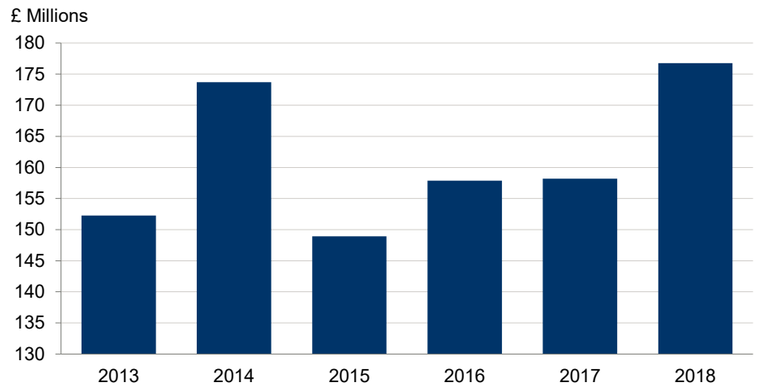
The Catalytic Contribution to the UK's Long-Term Prosperity

Investment in capital and R&D
Leonardo carried out a total of approximately £180 million worth of R&D in 2018 alone, including £125 million of research activity funded by and in support of customer contracts. The company also self-funded £52 million of R&D activity, equivalent to 7% of the company's direct GDP contribution that year. This research activity helps to boost overall UK R&D spending, for which the government has set the target of reaching 2.4% of GDP by 2027. In 2018, Leonardo's UK businesses applied for 17 patents arising from new innovations, adding to the 190 patents the company already held.

Spending in 2018 followed R&D investments totalling £790 million over the preceding five years in nominal terms. Leonardo's R&D activity between 2013 and 2018 has accumulated a "stock" of innovations, in the form of practical knowledge that will have dispersed and enhanced productivity in the wider economy. We estimate that these accrued R&D assets increased UK GDP by £580 million in 2018. This higher output was delivered through productivity improvements enabled among different sectors in the economy.



Total value of R&D activity carried out by Leonardo in the UK



Source: Leonardo

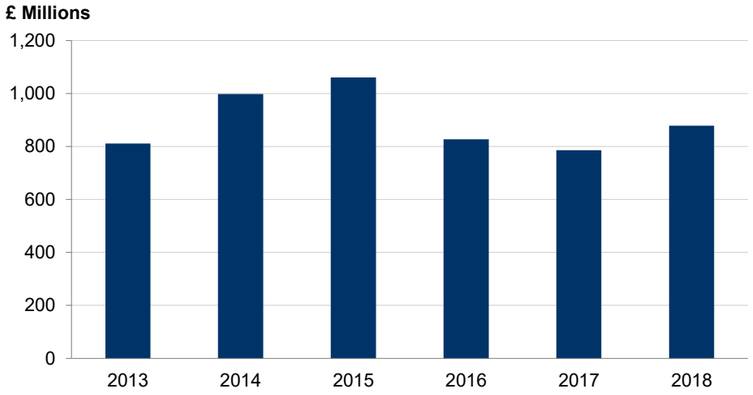
Leonardo also invested £22 million in capital assets in 2018, split evenly between its helicopters and electronics businesses. Investment in capital is economically important as it helps to grow the productive capacity of both the company and the UK overall.

Exports
Between 2013 and 2018, Leonardo exported some £5.4 billion-worth of equipment and services in nominal terms to external customers and overseas Leonardo entities. This included £880 million of exports in 2018 alone, representing 110% of the company's direct GDP contribution that year.[13] This means Leonardo is a strong contributor to the UK government's target of increasing exports as a share of GDP to 35%.[14] Of the company's 2018 exports, £670 million was sold to external export customers, while £210 million was purchased by overseas Leonardo entities, such as the company's Italian operations.

[13] Exports can be greater than GDP contribution, as exports are a revenue measure while GDP contribution represents the added value generated by the company.

[14] Department for International Trade, Fox launches ambitious new Export Strategy to boost British businesses, 2018.

Total annual export sales by Leonardo's UK operations



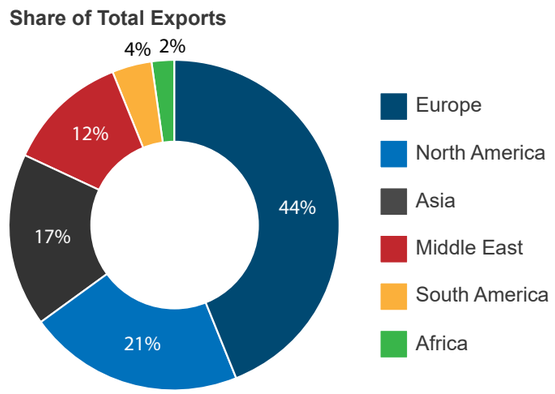
Source: Leonardo

Europe is the largest market for Leonardo's £670 million exports to external customers, representing nearly half of all overseas sales by value in 2018, with Norway the continent's largest single customer. Its next largest market is North America, with 21% of total exports.

One specific example of a large export deal is Leonardo's provision of search and rescue helicopters to the Norwegian government, including ongoing support services for these aircraft.

Leonardo's impact on the UK economy
OXFORD ECONOMICS

Total exports split by destination market, 2018



Source: Leonardo

Skills and training

Leonardo is a member of The 5% Club, a group of employers that aim to have five percent of their workforce in "earn and learn" positions. Upskilling and reskilling initiatives offered at the company include online and workshop training, degree and professional qualification sponsorships and vocational training schemes, as well as apprenticeships and formalised graduate student training programmes. These initiatives help to promote career progression within Leonardo, supporting social mobility and helping to train a productive UK manufacturing workforce.

In 2018, the company employed 170 graduate trainees and 295 apprentices, as well as having staff on Further and Higher Education courses and working towards Chartered Engineering status. Leonardo also contributed to the funding of 22 PhD students at universities around the UK in 2018.

One example of a career path through Leonardo is Clive Higgins, Director of Government Affairs, who joined the company on a four year apprenticeship in Mechanical Engineering at the Yeovil site in 1994. Clive subsequently graduated with a BEng in Design Engineering while working for the company and spent time in Italy with Leonardo's helicopters business, before being appointed as a Director in the UK in 2017.

The Environmental and Social Contribution of Leonardo

Environmental sustainability
In 2019, Leonardo's worldwide operations became the aerospace and defence sector leader, according to S&P's SAM Corporate Sustainability Assessment (CSA) used by the Dow Jones Sustainability Indices.[15] The CSA evaluates companies for 20 sustainability criteria across economic, environmental, and social dimensions.

Leonardo has a target to reach carbon neutral status by 2030.[16] In support of this goal, the company has invested in energy saving systems at its sites around the UK, for instance installing LED lamps at its Yeovil facility that alone save more than 400 tonnes of CO2 per year. A new logistics centre is also planned for the Yeovil site that will improve the efficiency of transporting supplies and products, resulting in an estimated 20,000 fewer vehicle trips per year.

The company is also the only aerospace, defence and security company to have joined the Task Force on Climate-related Financial Disclosures, an initiative set up by the Financial Stability Board[17] to encourage reporting on the management of risks and opportunities related to climate change.

[15] S&P Global, Corporate Sustainability Assessment Industry Leaders, 2019
[16] See the sustainability report for Leonardo's worldwide operations https://www.leonardocompany.com/en/about-us/sustainability/approach-and-reporting/reporting
[17] An international body that monitors and makes recommendations about the global financial system.

Leonardo's impact on the UK economy
OXFORD ECONOMICS

Diversity and inclusion
In recent years, Leonardo's UK business has focused on attracting a broad pool of talent among its employees—and in particular, more women in engineering roles. To lead on this goal, the company created a Head of Diversity & Inclusion in 2018, with the explicit aim of raising the number of female employees from 17% of its workforce to more than 30% by 2025.

One step taken to achieve this objective is with Leonardo's UK apprenticeship scheme. The company now aims for at least 30% of the candidates sourced and shortlisted for this programme to be women—and to apply the same target to its succession plans and promotions. Furthermore, Leonardo has established a bursary scheme for high-performing apprentices, with the aim that 50% of its recipients are women. Another bursary, launched in 2020, will provide educational support to 10 students (with at least 50% female participation) in STEM subjects from underprivileged schools in the local areas around Leonardo's UK locations. Leonardo is also a signatory to the Women in Defence and Women in Aviation and Aerospace charters.

Other steps include closing the company's gender pay gap to 16% in 2019 from 18.5% in April 2017, when the UK government introduced regulations requiring companies with more than 250 employees to report on this issue.

The company is a member of Inclusive Employers, a membership organisation for organisations looking to build inclusive workplaces, and has established networks across its UK sites to encourage a collaborative working environment. These include the Pride Network Group, Equalise Network Group and Carers Network Group, as well as site-specific career and development network groups. The company is a signatory to the Armed Forces Covenant and in 2018 was awarded the MoD's Employer Recognition Scheme Gold Award for employing veterans, supporting employees that choose to be members of the Reserve Forces, and supporting local cadet units.

As a result of the COVID-19 crisis, Leonardo is also aiming to permanently change working practices to allow for greater inclusivity, such as more opportunities to work from home. Prayer rooms at company sites including Yeovil have also been expanded to allow for social distancing.

Community outreach and STEM engagement
Leonardo supports a range of charities and community projects throughout the UK. For example, the company organised the Ride of Steel cycling event in 2019, raising £46,000 in support of the UK's Armed Forces Para-Snowsport Team. The event saw 48 Leonardo staff from its Yeovil, Basildon, Luton, Lincoln, Southampton, and Bristol sites each ride several hundred miles to Sheffield ahead of the opening ceremony of the Invictus Trials—a five-day, nine-sport event for wounded, injured and sick British armed forces veterans and personnel.

Leonardo also takes part in numerous educational outreach activities. In early 2020, amid the coronavirus pandemic, the company established "STEM @ Home" [18]— a website with original content for all ages, supporting its commitment to science, technology, engineering, and mathematics education. These free resources are designed to offer stimulating activities that can be easily prepared at home, such as a printable colouring book with iconic aircraft, and instructions on how to build a helicopter using paper and straws.

STEM @ Home also includes a list of free online courses on an array of subjects for both children and adults.

Leonardo also takes part in a wide range of outreach activities for young people and local schools. This includes sponsoring and attending the Big Bang fair, an annual celebration of science, technology, engineering and mathematics (STEM) attended by up to 80,000 young people aged seven to 19.[19] Leonardo's stand at the fair hosts interactive activities such as selfies taken with an infra-red camera, a wind table to experiment with rotorblade design, and mechanical engineering with one of the company's STEM charities, the Smallpeice Trust.

Leonardo also helps to run challenges and competitions aimed at getting students engaged with engineering. One example is Cool Aeronautics, a primary school outreach programme that introduces children to the world of aerospace engineering. Another is the Rampaging Chariots Robotic Games, which involves hundreds of teams from schools, STEM clubs and local Air Cadet squadrons. Teams build a radio-controlled robot from a kit provided by Leonardo and use it to take part in challenges such as football and an assault course. Company graduates and apprentices from Leonardo's Yeovil site come together with graduates from other aerospace sector companies to run the Flying Start Challenge aimed at pupils in Years 7 to 9, who are tasked with designing and building a glider using recycled materials to compete on flight distance.

[18] https://uk.leonardocompany.com/en/covid19/stem-from-home
[19] EngineeringUK, The Big Bang Fair

Leonardo's impact on the UK economy
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Conclusion

Leonardo made a significant contribution to the UK economy in 2018, with a direct workforce of 7,500 and direct contribution to GDP of £770 million.

This direct impact combined with the impact of the company's procurement spending, plus the effect of workers at Leonardo and in the supply chain spending their wages, means that Leonardo supported a total of 26,600 UK jobs and a GDP contribution of £1.9 billion in 2018.

This means that for every 100 jobs directly with Leonardo, the company supports a total of 355 jobs across the UK. For every £1 of direct GDP impact, the company supported a total GDP contribution of £2.40 across the UK.

The company also makes a contribution to the long-term prosperity of the UK through its R&D activity: in 2018, Leonardo carried out £180 million worth of R&D. This included £52 million of self-funded research, equivalent to 7% of the company's direct GDP contribution, boosting overall UK R&D spending as a share of GDP towards the government's target of 2.4% by 2027.

Leonardo also invests in the country's human capital, with 300 apprentices and 170 graduate trainees in 2018, as well as many staff involved in different education schemes. Further, the company engages in many outreach programmes for school students and local communities each year, helping to interest the next generation of potential engineers in STEM subjects.

The Economic Impact of Leonardo's UK Helicopters Business

£880 million
The contribution to UK GDP in 2018 of Leonardo's UK helicopters business

12,200 jobs
Total jobs supported in 2018 by Leonardo's UK helicopter business

23%
Share of Leonardo's UK helicopter business procurement spent with UK SMEs

Executive summary
Leonardo's UK helicopter business produces helicopters from the initial design phase, through development, manufacturing and assembly, to delivery to the customer and through-life support. This capability is unique within the UK as the country's only on-shore helicopter original equipment manufacturer. The business is an important supplier to the government, helping to support the Ministry of Defence's strategic aims and in 2016, the Ministry of Defence (MoD) and Leonardo renewed a ten year Strategic Partnering Arrangement.

This chapter examines the ways that the helicopter business delivers economic benefits to the UK.

Core economic impacts
We calculate that Leonardo's UK helicopter business's total contribution to UK GDP was £880 million in 2018. This consists of £360 million from the operations of the business itself, £240 million as a result of procurement spending and £280 million as a result of consumer spending by employees of Leonardo and its supply chain.

We estimate that this economic activity supported a total of 12,200 jobs around the UK in 2018. This is made up of 3,100 jobs directly with the business, 4,900 as a result of supply chain spending and 4,200 supported by Leonardo and supply chain workers' wage spending.

Of the 580 suppliers to Leonardo's UK helicopters business, 58% were small or medium-sized enterprises (SMEs) in 2018, with 23% of the business's procurement spent with these firms.

Workers at Leonardo's helicopter business are twice as productive as the average UK worker. Leonardo's workers contributed £116,000 a year to GDP in 2018 on average, compared to a UK average of £57,000 that year.

The business made over £500 million of export sales in 2018 alone, and £2.4 billion of exports in the five preceding years.

Leonardo's impact on the UK economy
OXFORD ECONOMICS

£50 million
Total R&D activity performed in 2018 by Leonardo's UK helicopter business

£500 million
Total exports in 2018 by Leonardo's UK helicopter business

Catalytic impacts: Leonardo's contribution to the UK's long-term prosperity
Leonardo's UK helicopter business carried out £50 million of R&D activity in 2018 and a total of £260 million in the five preceding years. This includes self-funded research as well as that carried out in support of customer contracts. We estimate that the accumulation of R&D assets following this activity increased UK GDP by £170 million in 2018, due to productivity improvements enabled among diverse sectors across the economy.

Through its research, Leonardo creates innovative new technologies that boost the effectiveness and efficiency of its helicopters, such as rotorblade designs that reduce vibrations and provide more lifting capacity, or helicopters able to carry out long-distance search and rescue missions in hostile weather conditions.

Through training schemes, the business is contributing to boosting the skills of the UK workforce, such as employing 30 graduate trainees and 120 apprentices in 2018. Other staff are on Further and Higher Education courses and working towards Chartered Engineer status. Many of Leonardo's helicopter engineers have technical skills crucial to rotor design that can only be gained from years of in-house training and experience.

The business also takes part in outreach schemes to support science, technology, engineering and maths in local primary and secondary schools as well as universities, hosting open days, work experience, and competitions throughout the local community.

Introduction

Leonardo's UK-based helicopter business provides helicopter engineering expertise from initial research and development, design and testing; through component production and helicopter assembly; to training and post-sales support, repairs and upgrades. Indeed, it is the only company in the UK with the capability to produce helicopters from the initial design phase right through to certification and delivery to the customer.[20] [21] The company also integrates complex systems from various manufacturers to work together in the helicopter.

The company's UK helicopter facility is based in Yeovil, Somerset, on a site that has aircraft manufacturing links dating back more than a century. The Westland Aircraft Works was established there in 1915 to support the country's First World War operations. The first aircraft built onsite, a Short 184 seaplane, left by horse and cart on January 1st, 1916. During World War Two, the site produced more than 2,000 Spitfires and Seafires. Today the site produces a range of helicopters (also known as rotorcraft) including the medium-to-heavy AW101 and the intermediate-weight AW159 multi-role aircraft, known in their service with the UK's Ministry of Defence (MoD) as the Merlin and Wildcat respectively. The on-site airfield allows aircraft to go through the full suite of flight test activity, from the first flight of a new type of aircraft to flight testing modifications made to existing customer aircraft.

In addition, the business has staff at Royal Naval Air Stations Yeovilton and Culdrose, and at Army Aviation Centres Middle Wallop and Wattisham.

This chapter sets out the total economic impact that Leonardo's UK helicopters business makes to the UK economy, including its contribution to the country's long-term prosperity through exports, funding research and development (R&D), and maintaining a specialised, high-value engineering skills base.

[20] House of Commons library, UK defence rotary strategy debate, 2020
[21] In addition, Leonardo states that it is the UK's only in-country facility for designing and manufacturing helicopter transmission systems and advanced rotor blades, and for integrating complex weapon systems and avionics into helicopters.

LEONARDO ACTIVELY SUPPORTING UK NATIONAL SECURITY
As an entirely in-country operation, the full extent of Leonardo's UK helicopter engineering expertise is on-hand domestically whenever needed. This is particularly important given that as well as building helicopters for the MoD, the company is a major supplier of helicopter repair and maintenance services to the UK government[22] — including responding to rotorcraft-based Urgent Operational Requirements (UORs), an MoD process for rapidly acquiring the additional capability needed for specific operations.

Leonardo fulfilled more than 50 UORs during the conflicts in Iraq and Afghanistan—spanning helicopter performance, communications, weapons, and defensive aids, for its own products and those of other manufacturers. Through such expertise, the company contributes significantly to the MoD's ability to act in the UK's interests without the intervention of other nation states (known as "freedom of action"), as well as maintain an edge over potential adversaries (known as "operational advantage").[23] Both are key pillars of the UK's defence industrial policy.[24] As an MoD report highlighted,[25] without ready access to this specialised knowledge, the country would lose the ability to react quickly to operational requirements.

More recently, Leonardo helicopters have been deployed by the Royal Navy and Joint Helicopter Command in the UK to assist the Ministry of Defence's response to the COVID-19 outbreak. Three AW159 Wildcats have been used to transport key personnel and supplies to where they were needed, while AW101 Merlins have been used in an air ambulance role. Leonardo test pilots have been equipped with respiratory protection equipment, rapidly invented by the company by adding a filter to existing oxygen masks to ensure the pilots breathe uncontaminated air. This allows the company to continue with MoD critical programmes while protecting staff from the virus.

Leonardo's helicopters have also been instrumental in the UK's overseas aid efforts following natural disasters. Recent examples include a Royal Navy Wildcat crew evacuating casualties following Hurricane Dorian in the Bahamas in September 2019, and another Wildcat was used to lift personnel and aid packages ashore from a support ship in the Caribbean in 2017, following Hurricane Irma.

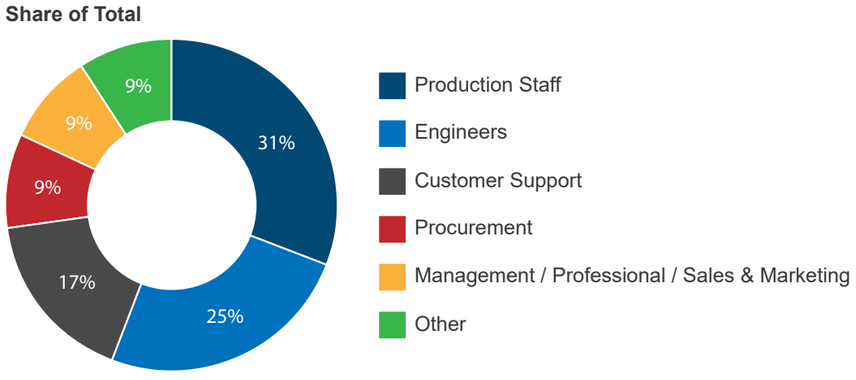
[22] House of Commons library, UK defence rotary strategy debate, 2020.
[23] Definitions from MoD, Refreshing Defence Industrial Policy, 2017 and MoD, National Security Through Technology, 2012.
[24] Ministry of Defence, Industry for Defence and Prosperous Britain, 2017.
[25] Ministry of Defence, National Security through Technology, 2012.

Employment Contribution

Direct employment
In 2018, 3,100 people worked for Leonardo's UK helicopter business. Of these, 2,500 were direct employees, including 30 graduate trainees and 120 apprentices. The business also employed 170 fixed-term contractors and 420 long-term agency staff. As these typically work long term in engineering and production roles and act in a very similar manner operationally to Leonardo employees, we classify these under direct employment for the company.

Nearly 820 workers (31% of the total excluding agency workers) were production workers building Leonardo products, while a further 680 (25%) were engineers, in roles such as design or research and development. The remaining 44% of staff were split across customer support, procurement and other roles.

Breakdown of Leonardo's UK helicopter business employees and long-term contractors by role, 2018



Source: Leonardo

Most of these workers were based on site at Yeovil, however 30 staff were placed on armed forces bases, at Royal Naval Air Stations Yeovilton and Culdrose, and at Army Aviation Centres Middle Wallop and Wattisham.

Training and skills
Of the business's 680 engineers, more than 400 are in high value design engineering roles, possessing unique and specific skills across 89 different engineering skillsets. These jobs are crucial for sustaining Leonardo's position as an original equipment manufacturer in the helicopter sector and a developer of intellectual property for the UK: some of these roles are so specialised and critical to helicopter engineering that the expertise can only be developed internally. Rotor systems themselves are the largest area where this specialist expertise is required, with workers taking an estimated six years to reach "skilled practitioner" status and 12 years to reach "expert" level.

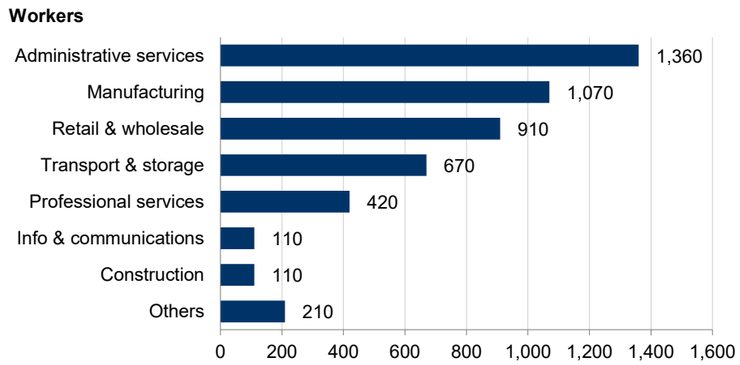
To help maintain its status as a global aerospace firm, Leonardo provides a significant amount of training to its employees each year. In 2019, the company spent £1.9 million on training, providing nearly 54,500 training hours across the year to staff at its UK helicopters business. In 2019, the business also had 58 employees sponsored on further education and higher education courses, 45 staff working towards gaining Chartered Engineer status and 145 full-time trainees, including 29 graduate trainees.

The upskilling and reskilling opportunities that the company provides helps to support internal career progression as well as overall social mobility and the training of the UK's manufacturing workforce. One example of a career path through the business is Clive Higgins, Director of Government Affairs in the UK for Leonardo. Clive joined the company on a four year apprenticeship in Mechanical Engineering at the Yeovil site in 1994, and subsequently achieved a BEng in Design Engineering alongside working for Leonardo, before being made a Director in the UK in 2017.

Supply chain contribution to employment
In 2018, Leonardo's UK helicopter business made £300 million of supply chain purchases. Approximately 23% was spent with 340 UK SMEs, who comprised 58% of the business's 580 UK suppliers.

We estimate that this spending supported 4,900 jobs around the economy. The largest impact was felt in the administrative services industries, which includes various business support activities. Reflecting the company's activities in helicopter assembly and production, the second largest impact was felt in the UK's manufacturing sector.

Leonardo's UK-based helicopter business indirect employment impact, 2018

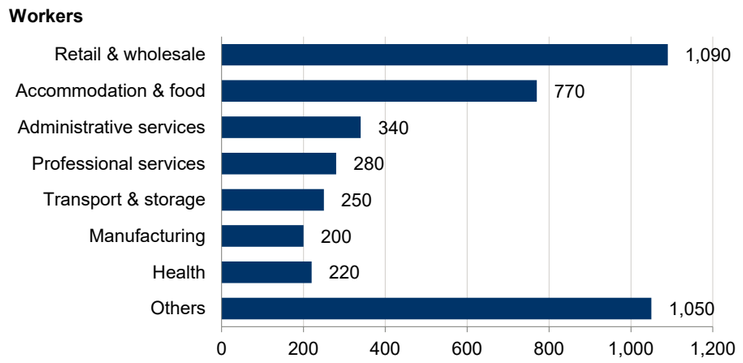


Source: Oxford Economics

Employment supported by workers' spending
Leonardo's UK helicopter business paid a total of £170 million in wages to employees, long-term contractors and agency staff. We estimate that spending by these workers and in the company's supply chain supported 4,200 jobs across the UK.

Consumer-facing businesses such as the retail and wholesale sector and the accommodation and food services industry received the largest impact, at 42% of the total.

Leonardo's UK-based helicopter business induced employment impact, 2018

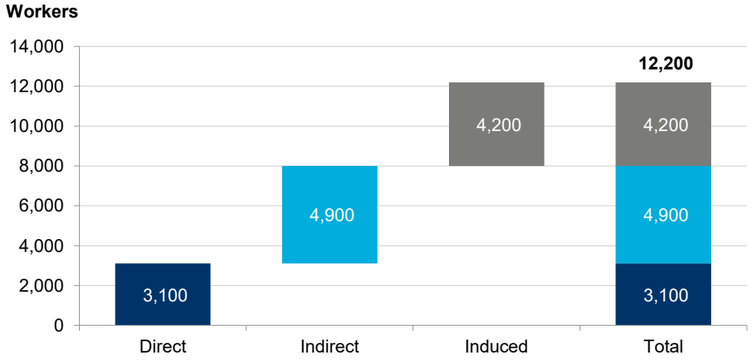


Source: Oxford Economics

Total employment contribution
Bringing together the direct, indirect and induced impacts, we estimate that Leonardo's UK helicopter business supported 12,200 jobs in 2018 across the UK.

This means that for every 100 jobs directly with the company, a total of 390 were supported across the economy.

Leonardo's UK-based helicopter business total employment impact, 2018

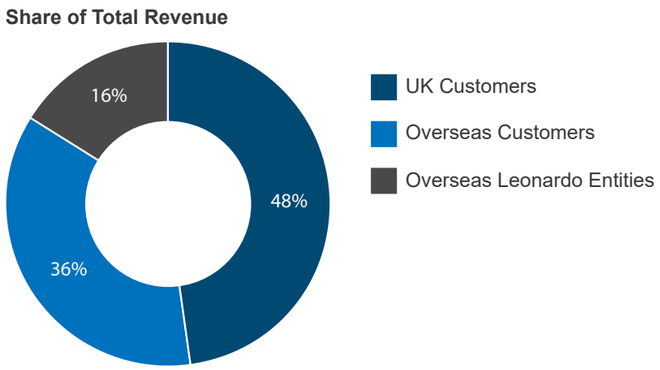


Source: Oxford Economics

GDP Contribution

Direct contribution to GDP
Leonardo's UK helicopters business generated just under £1 billion of revenue in 2018. This was approximately evenly split between domestic and export customers, including £150 million to overseas Leonardo entities, such as the company's Italian operations.

Breakdown of Leonardo's UK helicopters business revenue, by source of demand, 2018

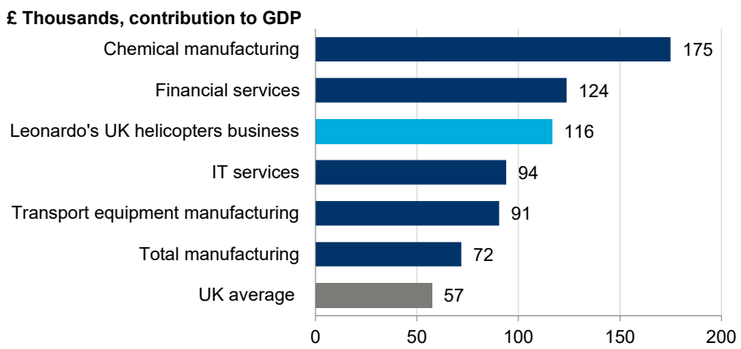


Source: Leonardo

From this revenue, the business contributed approximately £360 million of gross value added (GVA) to GDP. The largest component of this was £210 million in employee compensation, including wages and salaries and employer pension and national insurance contributions. The remainder consisted of EBITDA and a small amount of business property taxes.

Leonardo's helicopter business workers are highly productive, contributing an average of £116,000 to GDP. This is more than double the overall UK average, which stood at £57,000 per worker in 2018.

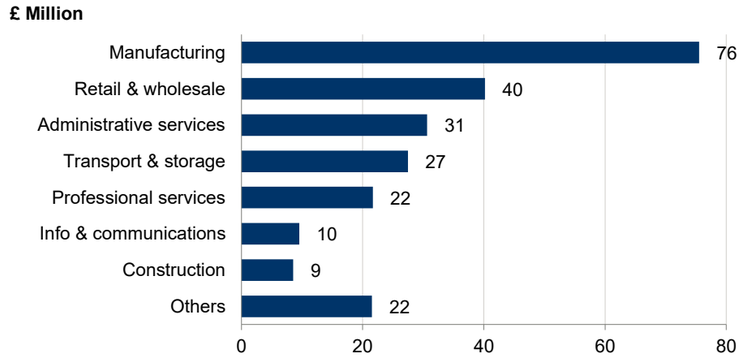
Average GVA per worker levels for selected UK industries, 2018



Source: Oxford Economics, Office for National Statistics, Leonardo

Supply chain contribution to GDP
Leonardo's helicopter business' supply chain spending drove a £240 million indirect GDP impact in 2018. The largest impact was felt in the manufacturing sector, at 32% of the total.

Leonardo's UK-based helicopter business indirect GDP impact, 2018



Source: Oxford Economics

Driving innovation through SME partnerships
A team from Leonardo and Smith Myers, a Bedfordshire-based SME, won a Royal Aeronautical Society award in late 2018 for their work in developing the Redstreak Mobile Phone Detection and Location System.

This equipment enables search and rescue (SAR) helicopters to locate and communicate with a person in distress in remote marine or wilderness environments using just their standard mobile phone. The system works in areas with no cellular network coverage and effectively turns the phone into a rescue beacon with a detection range of 32km—demonstrated to 100m accuracy.

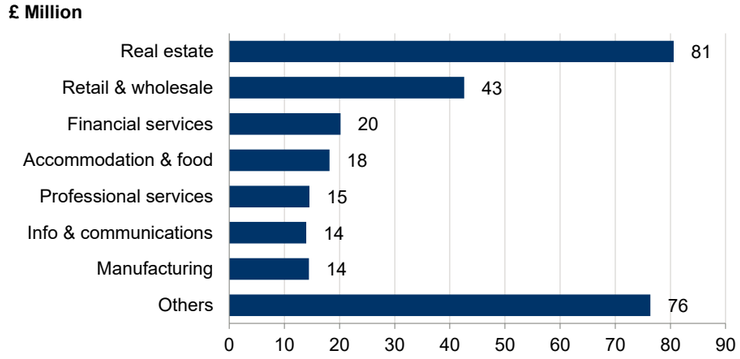
While Smith Myers had already created a similar system for use at ground level, Leonardo approached the firm to develop an airborne version to fit to the Norwegian All-Weather SAR helicopter for the Norwegian Ministry of Justice. The Redstreak team combined Smith Myers' expertise in designing electronic equipment for the cellular industry with Leonardo's air sector experience. Leonardo staff provided advice to Smith Myers engineers on the rigorous quality assurance processes required for supplying avionics, and provided an AW101 helicopter and pilots for testing the equipment in the field. Multiple flight trials were conducted to simulate real-life rescue situations both on land and at sea.

The relationship with Leonardo "accelerated Smith Myers' journey into the airspace sector", according to the company's co-founder, Peter Myers. The contract with the Norwegian Ministry of Justice provided a significant source of development focus for the four years of engineer time and costly testing processes that were required that would otherwise have taken much longer. It was also a unique opportunity to contribute to Leonardo's development of one of the most advanced SAR helicopters in the world.

The two companies have continued working together on a further development programme for the Redstreak system, which aims to enable the system to locate multiple phones in disaster scenarios such as avalanches, air crashes, wildfires, earthquakes, and tsunamis. Meanwhile, further orders have been placed both by the original customer and other companies, providing Smith Myers with contracted orders for years ahead. This revenue assurance has allowed it to take on more staff, and the company is also look into starting an apprenticeship scheme.

GDP supported by worker spending
The wages distributed by Leonardo and its suppliers had a further induced impact on the UK GDP which in 2018, amounted to a £280 million contribution to GDP. Almost a third (29%) of this impact was felt in the real estate industry through workers spending on rent and mortgage payments for their homes, while the retail and wholesale industry felt a £43 million impact.

Leonardo's UK-based helicopter business induced GDP impact, 2018

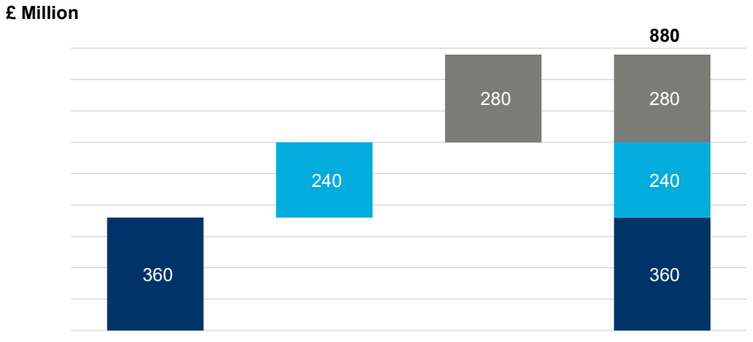


Source: Oxford Economics

Total GDP contribution
In 2018, the activity of Leonardo's helicopter business contributed an estimated £880 million to the UK economy.

This means that for every £1 that the company directly contributes, a total of £2.40 of economic activity is supported across the UK economy as a whole.

Leonardo's UK-based helicopter business total GDP impact, 2018



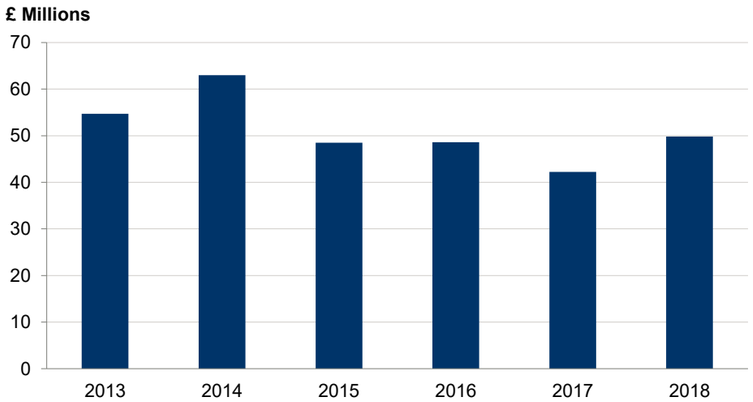
Source: Oxford Economics

The Catalytic Contribution to the UK's Long-Run Prosperity

Research and development
Leonardo's UK helicopter business unit invests substantial sums in R&D as it seeks to maintain its position as a manufacturer of some of the world's most advanced rotorcraft. Some £11 million was invested by the company in self-funded R&D in 2018 alone. The business also carried out £39 million worth of R&D funded by and in support of customer contracts, equating to research and development worth a total of £50 million that year. This followed total activity worth over £250 million over the preceding five years.

Leonardo's R&D activity between 2013 and 2018 has accumulated a "stock" of innovations, in the form of practical knowledge that will have dispersed and enhanced productivity in the wider economy. We estimate that these accrued R&D assets increased UK GDP by £170 million in 2018. This higher output was delivered through productivity improvements enabled among different sectors in the economy.

Total R&D spending by Leonardo's UK helicopter business



Source: Leonardo

One example of recent R&D work carried out is the Wildcat Weapon Wing, unveiled onboard one of the UK's new aircraft carriers, the HMS Prince of Wales, in early March 2020. The aerodynamic design of the wing provides extra lift, increasing fuel efficiency and therefore improving range, endurance and environmental impact. The additional lift also helps to reduce stress on important components of the helicopter, reducing long term maintenance costs and increasing the proportion of the time the aircraft is available for operations. Currently the wing can be loaded with four types of weapon, enabling the AW159 Wildcat to provide protection for the Royal Navy's aircraft carrier groups from surface-based threats. The technology also has the potential to be developed and exported for wider uses and customers, in both civil and military applications.

Leonardo's UK helicopter business also actively engages with universities around the UK through R&D projects, PhD projects and through the UK Vertical Lift Network.[26] The VLN is an association of universities[27] and industry partners set up in 2013 in conjunction with Leonardo's UK helicopter business with the aim of facilitating collaborative research, attracting research funding and to sponsor and develop future helicopter engineers. For instance, the VLN hosts an annual workshop for research students and young Leonardo engineers to present technical papers.

One example of an ongoing VLN research project is known as MENtOR, or "Methods and Experiments for Novel Rotorcraft". This project, funded by grants from the Engineering and Physical Sciences Research Council, began in late 2018 and focusses on design methods and tools for the next generation of helicopters. Leonardo supports this project by providing contributions-in-kind through specialist feedback and hosting technical review meetings.

[26] Website: https://www.gla.ac.uk/research/az/ukvln/about/
[27] Universities of Bath, Bristol, Coventry, Glasgow, Leicester, Liverpool and Manchester; Cranfield University; Imperial College London and Liverpool John Moore University.

NEW R&D CENTRE WILL LEAD AEROSPACE INNOVATION IN THE SOUTH WEST

Sitting just outside of Leonardo's Yeovil site, a multi-million-pound aerospace research, design, and innovation centre has been commissioned by Somerset County Council (SCC) and is scheduled to open in 2021, complementing the existing Yeovil Innovation Centre less than a mile away. The new facility, to be known as the Yeovil iAero Centre, will become an important asset for the South West of England's aerospace community, which includes the 14 largest aerospace companies in the world and hundreds of SMEs represented by the West of England Aerospace Forum. The project is backed by more than £10 million of investment from the European Regional Development Fund, the Heart of the South West Local Enterprise Partnership, SCC and Leonardo.

The new Centre will enable a range of collaborative projects focusing on design, development, and prototyping—all based in a state-of-the-art centre that is accessible directly from Leonardo's airfield. This is a unique advantage in aerospace research, allowing innovations to be quickly and easily tested in the air, without lengthy or costly transfers to another site.

The location of the research centre is also advantageous for Leonardo, allowing efficient interaction between project teams based at iAero and other colleagues and departments. In return, the company is providing the land to Somerset County Council for a nominal rent.

Furthermore, Leonardo is sponsoring the provision of hardware such as 3D printers and computer simulators, and encouraging academic residencies that use student sponsorship opportunities to conduct work. Beyond stimulating local innovation, it is expected that the capability offered by the centre will attract innovators and partners from outside the region.

Leonardo's impact on the UK economy
OXFORD ECONOMICS

A potential second phase of investment is also under discussion, including an adjacent Institute of Technology training centre for young people hoping to progress to higher technical education, adult learners wanting further training, and employees looking to develop new skills.

DIGITAL SIMULATION DRIVING FASTER, SAFER TECHNOLOGY DEVELOPMENT

Leonardo operates an advanced Engineering Simulation Facility (ESF) at its Yeovil site. This enables the company and its customers to experiment with digital simulations of future concepts, making it possible to virtually prototype and test novel technologies, and to make crucial design decisions at an earlier stage of the development process.

In partnership with the academic community and industry, as well as Leonardo's global business, the company's Yeovil-based simulation engineers created the ESF by digitally modelling every element of each simulated helicopter's systems—including integrating aircraft-grade software directly from the company's technical teams. This provides the UK with the ability to test new equipment and rotorcraft designs, and to collect customer feedback, long before anything is integrated onto a physical helicopter—reducing development times and costs, and creating a safe environment for testing.

The ESF is a key contributor to Leonardo's — and the UK's—training capabilities, driving efficiency by creating a digital training programme that can be repeatedly used without the need for live trainers and real equipment. For example, Royal Navy aircrews have begun training for the Future Anti-Surface Guided Weapon programme, three years before training on a real-life Wildcat helicopter is made available.

LEONARDO RESEARCH AND INNOVATION IMPROVES HELICOPTER EFFICIENCY

Leonardo's engineering R&D teams help to develop new products and components that enable the company's helicopters to operate more efficiently and effectively, and allow new missions types entirely. One historical example of this innovation is "G-LYNX", a specially modified variant of the Lynx helicopter that pre-dated the modern Wildcat, which in 1986 set the still-standing helicopter airspeed record of 401km/h (249mph). Two more recent examples are given below.

Cutting-edge rotorblade designs help increase helicopter speed and lift capability

Leonardo helicopter rotorblades are made with a paddle-shaped tip not seen on helicopters manufactured elsewhere, an innovative design to increase the aircraft's maximum speed and lifting capability. The company's R&D in this field dates back to the British Experimental Rotor Programme in the late 1970s, as a joint venture between the-then Westland Helicopters and the Royal Aircraft Establishment. The third iteration of designs from this programme ("BERP III") were first demonstrated on the G-LYNX, while the latest iteration ("BERP IV", with first production units delivered in 2008) reduces power needs in hover and forward flight, provides 600kg of extra payload capacity, and decreases vibrations in the helicopter.

Leonardo is also working to produce new "active" rotorblade technologies that introduce moving or shape-changing elements into the blade. These will offer significant advantages over passive blades, cutting vibration in the helicopter by up to 90%. This reduction significantly cuts the need for unscheduled maintenance by reducing stress on critical parts. Limiting vibration also improves working conditions for pilots and crew, reducing fatigue, while the blade technology also allows the helicopter to operate with heavier payloads in hotter climates.

AW101 innovation allows long-distance rescues

Design innovation in the AW101 means that it has one of the longest operational ranges in its class. For example, in 2015 a Portuguese Air Force AW101 rescued four sailors from a stricken yacht in the North Atlantic. The mission involved a total journey of 770 nautical miles and a flight time of seven-and-a-half hours, including 40 minutes in adverse wind conditions above the vessel, arriving at base with just 30 minutes of fuel left.

The AW101 is also one of few rotorcraft with three main engines—allowing it to operate more effectively in harsh environments (such as long-range overwater operations in freezing conditions), where a failure of one engine on a two-engine craft would require an immediate return to land, or in combat search-and-rescue missions where small arms fire could disable an engine.

These features help to drive export demand for the AW101, with more than 220 of these rotorcraft now operating in 12 countries around the world.

Leonardo's impact on the UK economy

Capital investment

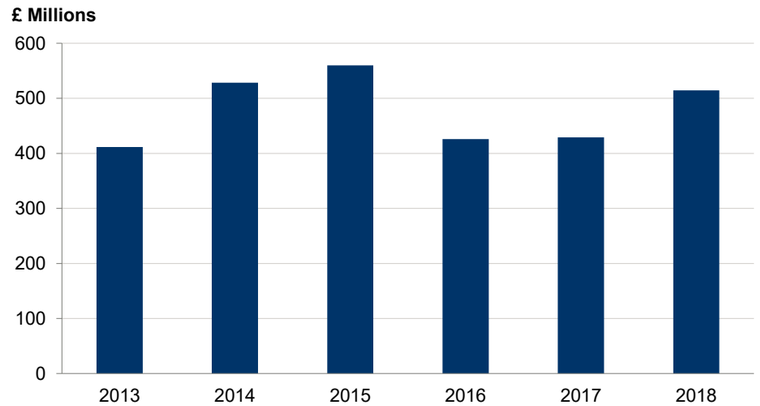
Annual capital investment by Leonardo's UK helicopter business at its Yeovil site doubled between 2014 and 2018, with investment programmes including spending on production facilities, on-site infrastructure and ICT equipment.

Annual investment is projected to double again to £20 million by 2023, including a programme to substantially upgrade Yeovil's aerodrome. A significant component of the expected works is upgrading the runway to a hard surface from the existing grass runway installed in the World War II era. Other upgrades include lighting and the navigational aids that help with landing in poor conditions. This investment project will enable Leonardo to remain competitive with other major European rotorcraft manufacturers, all of who have access to airstrips. It will also provide a more permanent location for the pilot training currently carried out at Newquay Cornwall Airport.

Exports

Leonardo's UK helicopters business makes a major contribution to the UK's export performance, with over £500 million in overseas sales in 2018 alone. This includes nearly £160 million to overseas Leonardo entities and nearly £360 million to other overseas customers. In total, since 2013, the business has made approximately £2.9 billion worth of export sales.[28]

Total annual export sales by Leonardo's UK Helicopters Business

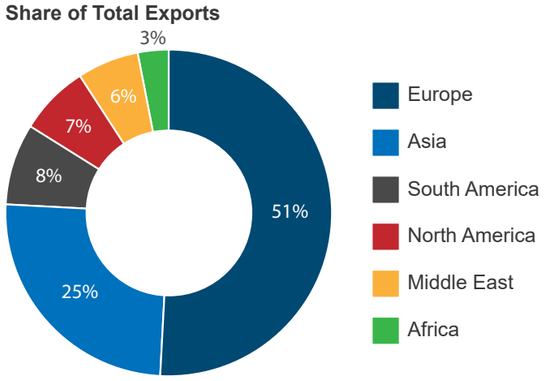


Source: Leonardo

Just over half of Leonardo's £360 million exports to external customers were sold to Europe, with Norway the single largest customer. Other large export markets for 2018 included the Philippines, Brazil and Canada.

[28] In nominal terms.

Total exports split by destination market, 2018



Source: Leonardo

Leonardo's Yeovil site has longstanding export ties with many countries, including Norway. A recent example from this relationship, which dates back nearly 50 years,[29] includes a £1 billion contract signed in late 2013 for the delivery of 16 AW101 aircraft for the Norwegian All-Weather Search and Rescue Helicopter programme. This contract includes 15 years of support and training—such as the operation of a Leonardo full flight simulator in Norway—and at its peak, required 150 engineers working full-time on delivery.

The company also has an exporting relationship dating back to the 1980s with South Korea: to date, total export orders with this trading partner have been worth approximately £1 billion in nominal terms, and there remains ongoing interest for future orders of the Wildcat. This relationship began with an export order for 12 Mk.99 Super Lynx equipped for anti-ship and anti-submarine roles, followed by an upgrade to these craft and a further order of 13 upgraded Mk.99A helicopters.

More recently, in 2013 South Korea was the first export customer for the AW159 Lynx Wildcat, the 21st-century replacement for the original Lynx variants. Leonardo supplied eight of these helicopters in the first half of 2017.

[29] Aviation News Online, "Westland provided Sea Kings to Norway in the 1970s", 2013

Conclusion

Leonardo's UK helicopter business directly supported 3,100 jobs in 2018 and made a direct GDP contribution of £360 million. In total, the business supported 12,200 jobs and an £880 million contribution to GDP around the UK, through its direct impact plus the impact of its procurement spending and Leonardo and supply chain workers spending their wages.

This means that for every 100 jobs Leonardo supports directly, the business supports a total of 390 jobs around the economy. For every £1 that Leonardo contributes directly to UK GDP, the business supports a total GDP contribution of £2.40.

Leonardo's UK helicopters business also supports the long-term prosperity of the UK through investment in R&D and in training and outreach programmes. In 2018, Leonardo carried out £50 million worth of research activity, with £11 million of this self-funded. The business employed 120 apprentices and 30 graduate trainees in 2018 and in 2019 had 58 employees sponsored on further education and higher education courses, 45 staff working towards gaining Chartered Engineer status and 145 full-time trainees, including 29 graduate trainees. Leonardo also engages with local schools to boost awareness of engineering, including organising competitions and open days.

Leonardo in Yeovil

Leonardo's operations in Yeovil specialise in the design, development, production and support of helicopters.

Leonardo's own employees, 2018

3,100 workers employed on Leonardo's Yeovil site

150 were graduate trainees or apprentices

680 engineers employed on Leonardo's Yeovil site

Wages paid by Leonardo to employees living in each area (£ millions)[30]

26% Leonardo's share of local jobs in engineering roles

40% Leonardo's share of local jobs in the high value manufacturing sector[31]

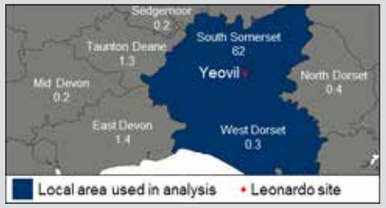
Here we define the local area as the local authorities of South Somerset and West Dorset, as highlighted on the map.

Leonardo's local supply chain spending, 2018

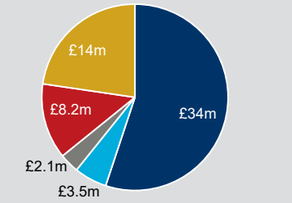
£62m Leonardo's spending with local suppliers

12% of which was with SMEs

Distribution of Leonardo's supply chain spending (£ millions)[32]



Local supply chain spending by type of purchase



[30] Includes all Leonardo employees living in these areas, not exclusively those working at the Yeovil site.
[31] High value manufacturing includes the manufacturing of; computers, electronic and optical products; electrical equipment; machinery and equipment; motor vehicles, trailers and semi-trailers; and other transport equipment.
[32] Includes procurement spending from all of Leonardo's UK sites.

Leonardo's total economic impact on the local area[33], 2018

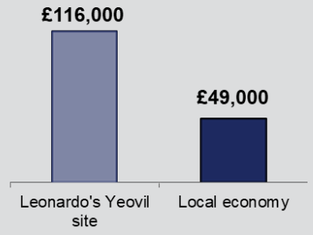
	GDP	Jobs
Direct	£360m	3,100
+	+	+
Indirect - supported by supply chain spending	£35m	700
+	+	+
Induced - supported by employee spending	£55m	1,200
=	=	=
Total impact	£450 million	5,000 jobs

Impact on wages

£93m wages paid to employees and contractors living in local area

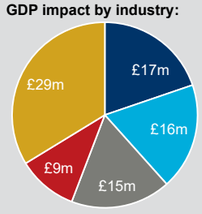
£180m Total wages supported locally, including the above plus agency staff, indirect and induced impacts

Productivity (GDP per worker)[34]



Contribution to local industry

Sum of local indirect and induced GDP impact by industry:



[33] The local authorities of South Somerset and West Dorset.
[34] Leonardo's Yeovil site productivity represents the site's direct GDP impact divided by its number of employees, while the local economy's productivity represents local GDP divided by local employment.

Yeovil site supports non-Leonardo workers

As well as Leonardo's direct employees, agency workers and long-term contractors, a further 1,400 people have site access. These include third-party firms carrying out work on site as a result of Leonardo's operations, such as the company's logistics partner Kuehne and Nagel, and smaller firms performing sundry services.

This figure also includes approximately 500 staff from the MoD's Defence Equipment and Support (DE&S) organisation, which maintains a permanent presence on the Yeovil site, enabling more efficient working in supporting the MoD's fleet of Wildcat, Merlin and Apache helicopters.

We estimate that the impact of these individuals spending their wages in the local economy[35] is £6 million on top of the impact estimated for Leonardo's operations.[36]

Leonardo's Wider Impact on the Local Community

Leonardo's Yeovil site has a significant, quantifiable impact on the local economy as detailed above. However, the company also has a wider socioeconomic impact on the community, which we describe in this section.

STEM outreach
Ambassadors drawn from the company's trainee workforce take part in many outreach initiatives to promote STEM (science, technology, engineering and mathematics) engagement in the local region, as well as attending major air shows and engineering fairs across the country. However, there are also opportunities for a more flexible approach. In early 2020, an eight-year-old Yeovil resident wrote to Leonardo asking for a visit, after seeing job adverts for apprenticeships. The company arranged a tour of the production line for her and gave her the chance to fly a helicopter in a virtual simulator.

Primary school level activities
Each winter since 2016, Leonardo and the Royal Aeronautical Society's Yeovil Branch have hosted Cool Aeronautics, a primary school outreach programme that introduces children to the world of aerospace engineering. The latest event took place in November 2019 at the Fleet Air Arm Museum in Yeovilton, with 43 volunteers from Leonardo and the Royal Navy hosting 173 pupils from six local schools. Children were given sustainability-themed tasks, including building wind-powered vehicles and lunar landers from recyclable materials, and had the opportunity to take tours inside an AW101 Merlin and an AW159 Wildcat.

[35] Defined here as the local authority districts of South Somerset and West Dorset.
[36] See Appendix for further details on calculation approach.

Secondary school level activities
For older schoolchildren, Leonardo is involved with the South West's Flying Start Challenge. This programme is aimed at pupils in Years 7 to 9, who are tasked with designing and building a glider using recycled materials to compete on flight distance. Supporting companies provided up to 7.5 hours of lessons to 300 pupils in 2018/19, with 27 teams making it through to the grand final.

The Flying Start Challenge is supported by eight of the major aerospace companies in the South West region, with Leonardo graduates and trainees helping to run the Yeovil area heat and chairing the overall committee. Notably, the programme may offer some help in encouraging girls to become engineers: roughly a third of participants were female, while women represent only 12% of the current overall UK engineering labour force.[37]

Leonardo also hosts a work experience programme. In 2019, 45 GCSE students visited its Yeovil site from across Somerset to learn about manufacturing and engineering techniques by building a drone. During the week's experience, they also received training in 3D modelling software and in understanding how decisions made in the engineering function can affect the wider business. A work experience week was also offered to A level students, in which they used 3D modelling and 3D printing to build an elastic band-powered glider to use in a competition.

[37] Engineering UK, 2019: Key facts and figures

University level activities
Since 2019, Leonardo has been a financial sponsor of the Institute of Mechanical Engineers' annual Unmanned Aerial System (UAS) Challenge. This is a year-long project for teams of undergraduates from all over the world to undertake a full design and build cycle of a UAS with a specific mission objective, culminating in a three-day "fly-off" event in the UK. In 2019, Leonardo mentored some 30 students across five teams from the Universities of Southampton, Bath, and Surrey. The UAS Challenge aims to bridge the gap between academia and industry in developing applied UAS-related activities, enhancing employment opportunities for graduates in the aerospace sector in the process.

Local engagement
The AW Apprentice and Student Association (AWASA) is a long-standing initiative at the Yeovil site which elects a committee of trainees each year and decides on local charities to support for the coming 12 months. In 2019, AWASA raised £38,000 for Mind in Somerset, a mental health charity, and Yeovil Opportunity Group (YOG), a specialist pre-school for children with additional needs.

Leonardo graduate trainees also volunteered more than 450 hours to the two charities that year, including building a "sensory garden" at the pre-school. YOG highlighted the impact the company has made, saying it was "amazing to have been chosen as Leonardo's charity in 2019", with the bulk of funds raised going towards the staff costs of running the charity.

Over the last couple of years, Leonardo has run a Graduate Community Project. The initiative involves local community engagement which graduates project manage, with a recent example including the graduates developing a memory book for those living with dementia.

Other examples of recent community engagement and charity work include Leonardo apprentices raising £10,000 in 2020 for Yeovil District Hospital's Breast Cancer Unit appeal, despite the challenges raised by the COVID-19 crisis. The apprentice team ultimately aims to raise a total of £75,000, and the hospital's leading breast surgeon said she has been "blown away by the generosity of the Leonardo team". AWASA have also been raising money for Mind in Somerset, a mental health charity. Donations raised have helped the organisation to continue to provide one-to-one support for young people during COVID-19, as well as enabled an increase in the number of peer support groups to cover more of the county following an easing of lockdown conditions.

Leonardo also participates in a range of local business groups including Yeovil Chamber, the county's Growth Board, the Local Enterprise Partnership and the Regional CBI Council. This ensures stakeholder engagement, knowledge-sharing and enhancing the local business community.

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Environmental sustainability
Leonardo has carried out numerous works on its Yeovil site to improve energy efficiency and sustainability. This includes investment in LED lamps, which alone save more than 400 tonnes of CO2 per year. Wastewater treatment plants have been installed on manufacturing process lines, saving 50,000m^3 of water per year, and 100% of the site's electricity supply comes from renewable sources. Further investment to reduce waste energy usage is underway, including infra-red sensors to control lighting, heating and cooling of unoccupied areas, with the aim of reducing energy consumption by 2% in 2020, and the entire site becoming carbon neutral by 2030, well in advance of the UK government's requirement for the country to become carbon neutral by 2050.[38]

A new £34 million logistics centre is planned on the Yeovil site, built by Leonardo's logistics partner Kuehne and Nagel. The 20,000-square-metre building will bring together all of Leonardo's storage locations from various locations around the rest of the site and in Yeovil town. This consolidation of logistics operations means that 20,000 fewer vehicle trips will be required per year, increasing efficiency and reducing environmental emissions.

The company is also helping to reduce energy usage in its helicopters. For example, new engine health and usage monitoring software improves the balance of rotor blades, reducing helicopter test-flying time.

[38] Gov.UK, UK becomes first major economy to pass net zero emissions law, 2019

The Economic Impact of Leonardo's UK Electronics Business

£990 million
The contribution to UK GDP in 2018 of Leonardo's UK electronics business

14,300 jobs
Total jobs supported in 2018 by Leonardo's UK electronics business

30%
Share of Leonardo's UK electronics business procurement spent with UK SMEs

Executive summary
Leonardo's UK electronics business operates across diverse technologies, developing and producing products such as airborne radar systems, infra-red detectors and cameras, aircraft defence systems and high-power lasers. Along with Leonardo's helicopters business, these products put the company as one of the largest suppliers to the Ministry of Defence.

This chapter examines the ways that the electronics business delivers economic benefits to the UK.

Core economic impacts
We estimate that Leonardo's UK electronics business's total contribution to UK GDP was £990 million in 2018. This consisted of £390 million contributed directly though the business's operations, £260 million as a result of procurement spending and £340 million from employees of Leonardo and its supply chain spending their wages in the consumer economy.

We estimate that this economic activity supported a total of 14,300 jobs around the UK in 2018. This is made up of 4,200 jobs directly with the business, 5,000 as a result of supply chain spending and 5,100 supported by Leonardo and supply chain workers' wage spending.

Nearly three quarters (72%) of the 1,400 suppliers to Leonardo's UK electronics business were small or medium-sized enterprises (SMEs) in 2018, with 30% of the business's procurement spent with these firms.

Workers at Leonardo's electronics business have a high level of productivity compared to the UK economy as whole. On average, Leonardo's workers contributed £94,000 a year to GDP in 2018, compared to a UK average of £57,000 that year.

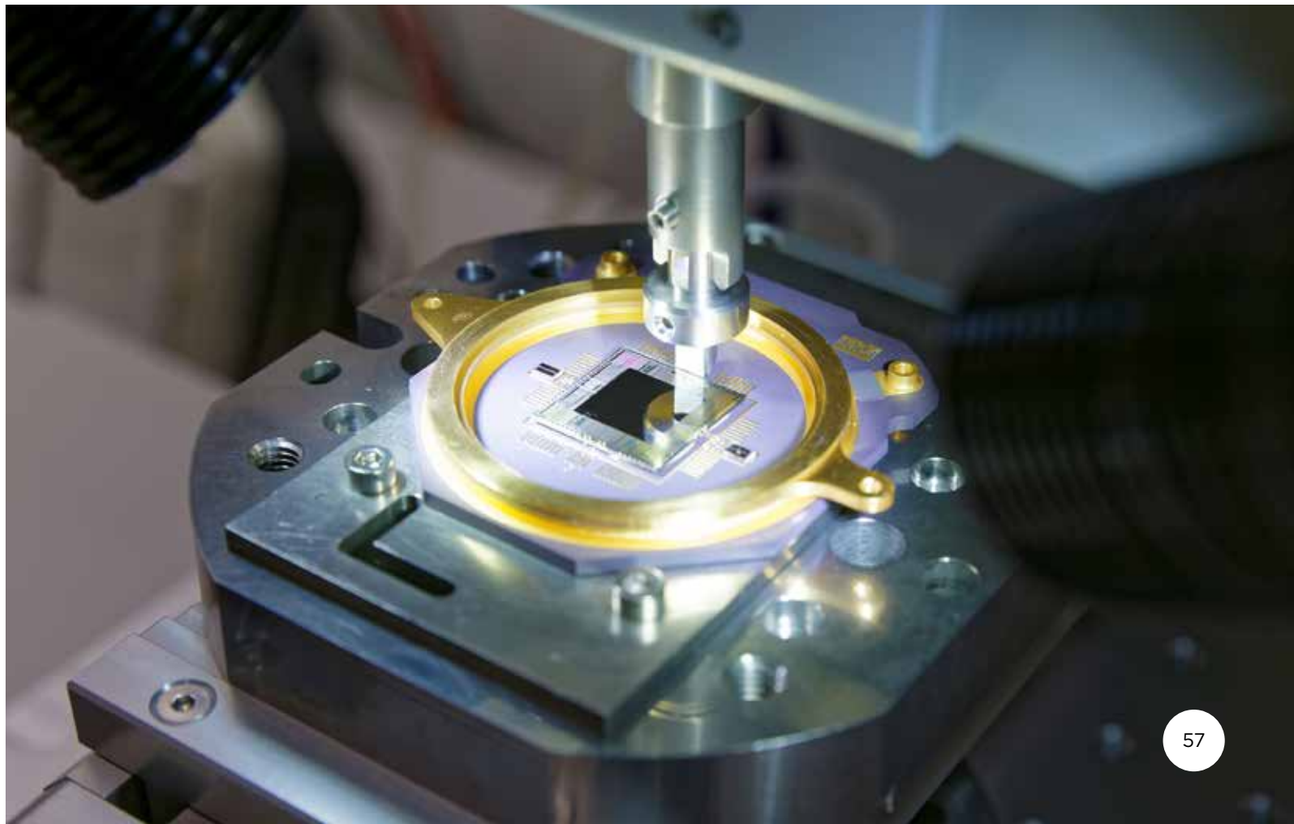
The business made £350 million of export sales in 2018 alone, and £2 billion of exports in five preceding years in nominal terms.

Catalytic impacts: Leonardo's contribution to the UK's long-term prosperity

Leonardo's UK electronics business performed over £120 million of R&D activity in 2018 and over £500 million in nominal terms in the five preceding years. This includes self-funded research as well as that carried out in support of customer contracts. We estimate that the accumulation of R&D assets following this activity increased UK GDP by £390 million in 2018, due to productivity improvements enabled around the economy.

The outcomes of this research include cutting-edge products such as lightweight airborne radar systems; a first-of-its-kind radar-guided-missile countermeasure to protect aircraft; and high-resolution infra-red detectors able to spot people from 30km away. The on-shore capability to develop and manufacture this equipment enables the Ministry of Defence and the UK to operate independently of other nations.

The business is helping to boost the skills of the UK workforce, with 135 graduate trainees and 165 apprentices in 2018. The business also aims to support the next generation of engineers through local outreach schemes such as family open days at its sites across the UK, and sixth form students in Basildon working with Leonardo volunteers to create a "robotic medic".



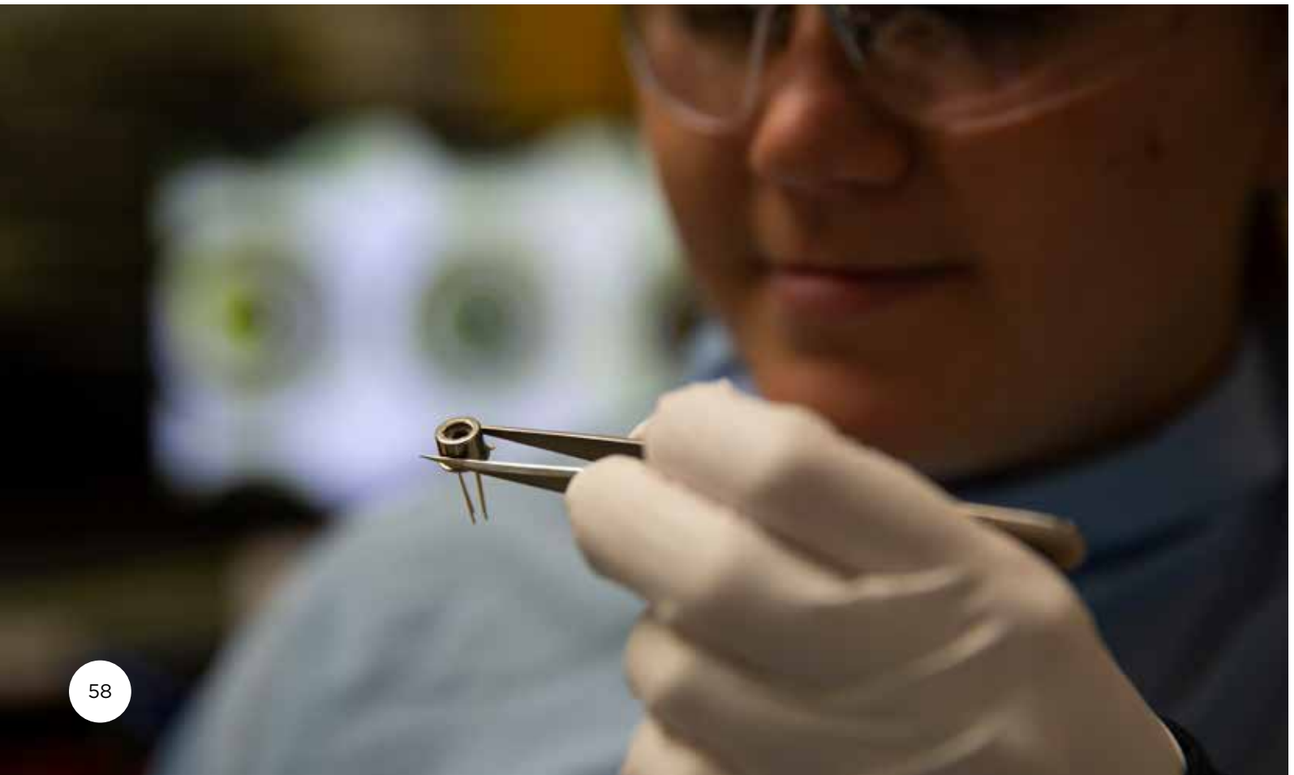
Introduction

Leonardo's UK electronics business provides R&D, design, manufacturing, and support services for a wide range of technologies with civil and defence applications, which are sold both domestically and overseas. Its UK roots date back more than a century, growing out of companies including Ferranti and Marconi's Wireless Telegraph Company, which were both founded in the late 1800s.

The electronics business now operates at five main sites across the UK, in Basildon, Edinburgh, Lincoln, Luton, and Southampton. Each specialises in different technologies, including radars, lasers, electronic warfare systems, and thermal cameras. Many of the technologies are fully designed and manufactured in the UK, contributing to the Ministry of Defence's freedom to act in the country's interests without the intervention of other nation states.

Leonardo's research in areas such as aircraft defence has generated products that are the first-of-their-kind in the world. In other areas, the company's UK electronics sites produce some of the world's most commonly used products of their type (for example, military lasers), or are among only a few locations worldwide where such items are produced (e.g. infra-red detectors).

This chapter sets out the overall impact of Leonardo's UK electronics business on the country's economy. Alongside the results from our economic modelling we include case studies which describe the impact of selected Leonardo innovations in qualitative terms. In addition, we explore the contribution to the UK's long-term prosperity made by Leonardo's electronic exports, and also by capital and R&D investments in its UK electronics business.



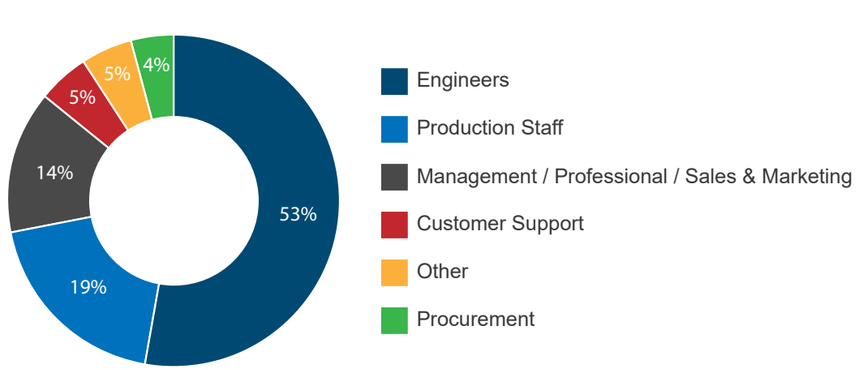
Employment Contribution

Direct employment
In 2018, approximately 4,200 people worked directly for Leonardo's UK electronics business. This included approximately 3,900 employees, of which 135 were graduate trainees and 165 were apprentices. In addition, 67 long-term contractors and 197 long-term agency staff worked for the business—since these were typically engaged in long-term roles operationally similar to Leonardo's employees, we have included them within "direct employment" in our results.

The largest of the five UK electronics facilities is in Edinburgh, with approximately 2,000 workers in 2018—followed by Luton with approximately 1,000 workers, Basildon (620), and Southampton (400). Some 25 workers are based at a small satellite location in Lincoln.

More than half (2,100) of the electronics business's total employees and contractors work in engineering roles such as design and R&D. A further 750 are production workers, with the remaining staff largely split across support roles including management, procurement and professional roles such as legal, accounting and commercial.

Breakdown of Leonardo's UK electronics employment and long-term contractors by role, 2018

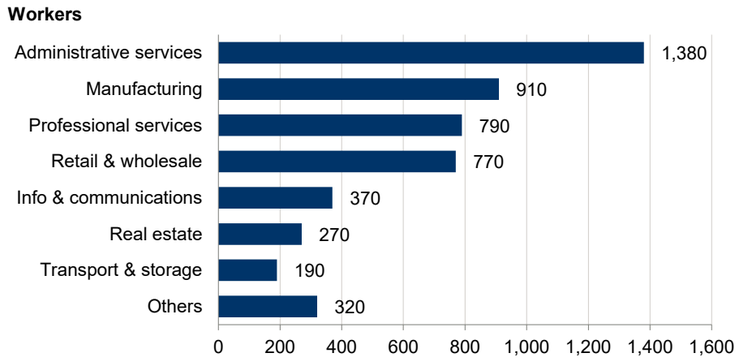


Source: Leonardo

Supply chain contribution to employment
In 2018, Leonardo's electronic business in the UK spent £327 million throughout its UK supply chain. Approximately 30% of Leonardo's procurement was spent with SMEs, who comprised 72% of the business's 1,400 UK suppliers.

This spending supported 5,000 jobs through the supply chain, with the largest impact felt in the administrative services sector, which includes various business support activities.

Leonardo's UK-based electronics business indirect impact by sector, 2018

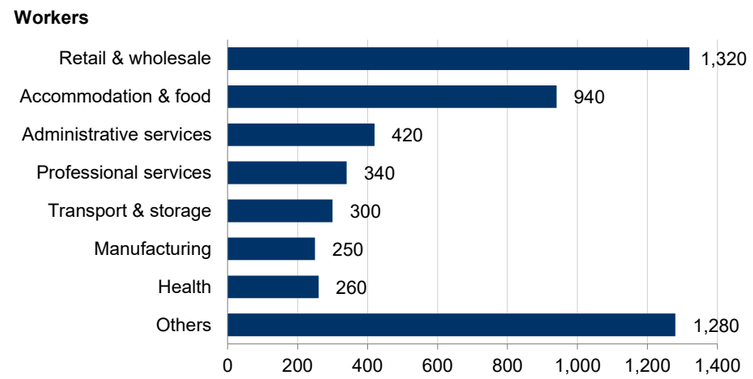


Source: Oxford Economics

Employment supported by worker spending
Leonardo's UK electronics business paid a total of £210 million to its employees, contractors and agency staff. We estimate that this supported 5,100 jobs through the impact of the company's workers spending these wages, as well as the consumer spending of workers supported in the supply chain. The retail and wholesale and the accommodation and food sectors were the two largest contributors to that number, with 44% of the total indirectly-supported jobs.

Leonardo's impact on the UK economy

Leonardo's UK-based electronics business induced employment impact by sector, 2018

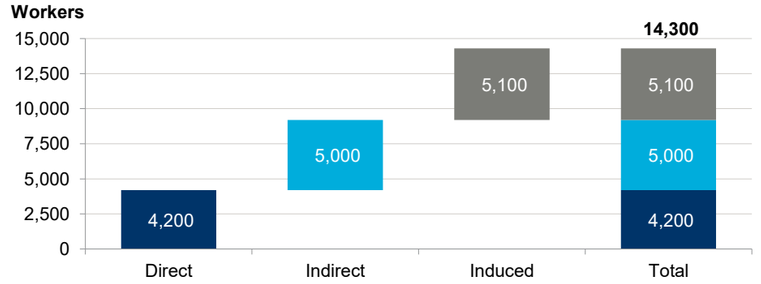


Source: Oxford Economics

Total employment contribution
In 2018, Leonardo's UK electronics business supported a total of 14,300 jobs in the country across the direct, indirect and induced channels of impact.

This means that for every 100 jobs at the business, a total of 340 were supported around the economy.

Leonardo's UK-based electronics business total employment impact, 2018



Source: Oxford Economics

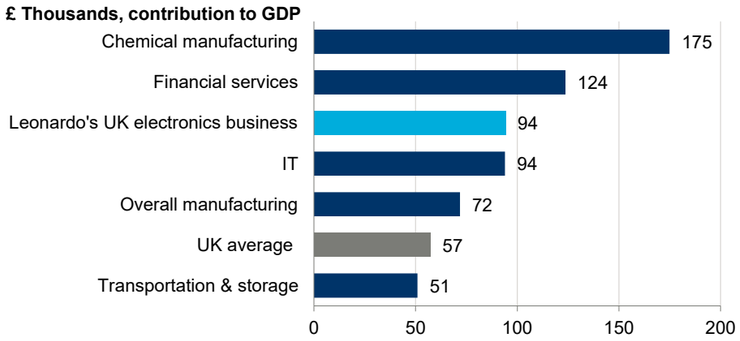
GDP Contribution

Direct contribution to GDP
Leonardo's UK electronics business generated just over £1 billion of revenue in 2018, with £660 million coming from UK customers and £300 million from overseas firms. The business also sold £60 million of products and services to other UK-based Leonardo entities, and £40 million to overseas Leonardo entities.

From this revenue, we estimate the business generated £390 million in contribution to GDP, through £270 million in worker compensation, £115 million in EBITDA, and £5 million in business property rates.

Worker at Leonardo's UK electronics business contributed an average of £94,000 to GDP. This means they were much more productive than the average for the UK, at £57,000 per worker.

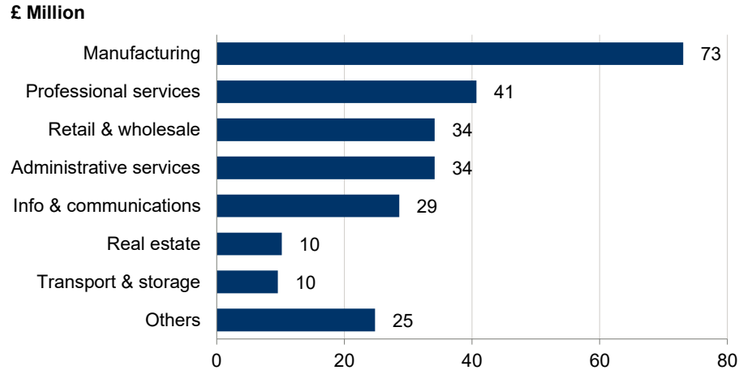
Average GVA per worker levels for selected UK industries, 2018



Source: Oxford Economics, Office for National Statistics, Leonardo

Supply chain contribution to GDP
An estimated further £260 million of GDP was supported along the supply chain of Leonardo's UK electronics business. Just over 40% of this impact was felt in the manufacturing and the professional services industries, the latter of which includes sectors such as legal, accounting and engineering.

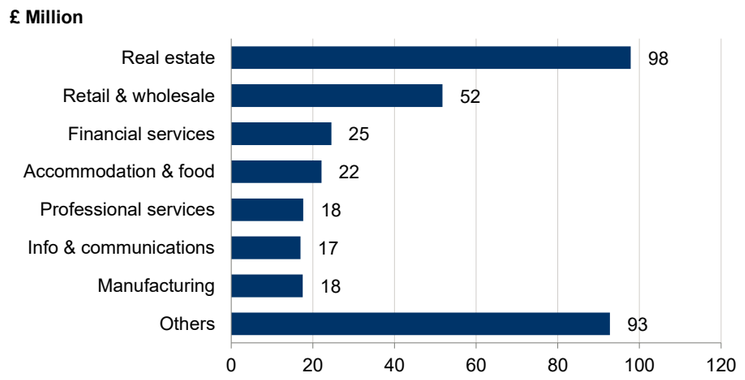
Leonardo's UK-based electronics business indirect GDP impact by sector, 2018



Source: Oxford Economics

GDP supported by worker spending
The third channel through which Leonardo's activities supported GDP was the wage spending of workers employed directly and indirectly by the company. By using their salaries to purchase various goods and services throughout the economy, these workers supported a further £340 million in GDP. The real estate and the retail and wholesale sectors were the two industries supporting the largest impact, reflecting workers' rent and mortgage payments and shopping activity.

Leonardo's UK-based electronics business induced GDP impact by sector, 2018

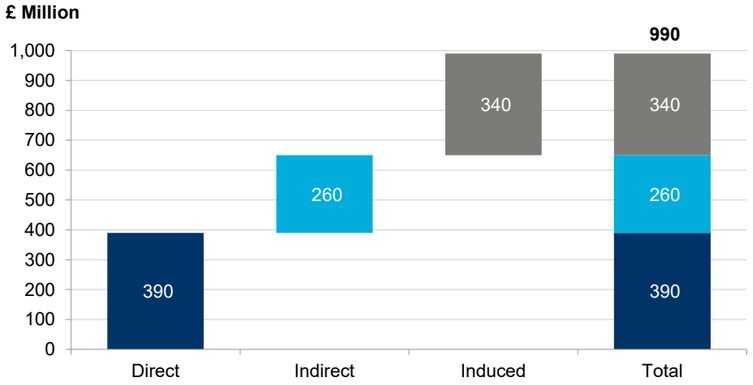


Source: Oxford Economics

Total economic contribution
Leonardo's UK electronics business unit's total GDP impact across the direct, indirect and induced channels was £990 million in 2018.

This means that for every £1 of GDP supported by the business's own operations, a total of £2.50 of economic activity was supported across the economy as a whole.

Leonardo's UK-based electronics business total GDP impact, 2018



Source: Oxford Economics

The Catalytic Contribution to the UK's Long-Run Prosperity

In addition to the annual impacts on the UK economy quantified so far in this chapter, Leonardo's UK electronics business makes a number of other important contributions which would be expected to contribute to the UK's long-term prosperity.

DEVELOPING AND MANUFACTURING INNOVATIVE DECOY TECHNOLOGY
Leonardo's BriteCloud is the first of a new kind of "expendable active decoy" technology, which plays a major role in ensuring the safety of aircraft and flight crew. Existing similar devices draw enemy radar-guided missiles towards the decoy and away from the original target, but they perform this function whilst being towed behind the aircraft, meaning there is a limited distance between the original and decoy targets.

In contrast, BriteCloud rounds are self-contained and autonomous of the aircraft. The drinks-can-sized active decoy is ejected, drawing threats a significant distance away from the aircraft. No substantial aircraft modifications are required to use this system as it is designed to fit in the standard dispensers used for chaff (a decoy cloud of metal which is designed to confuse radar) and flares (a pyrotechnic decoy used against heat-seeking missiles).

The technology was first tested with the RAF in 2014 and with the Swedish Gripen aircraft in 2015, moving rapidly into operational service in the UK four years later. Leonardo reports that no other manufacturers have yet announced a successful prototype and as such, several other allied nations have requested trials of the system.

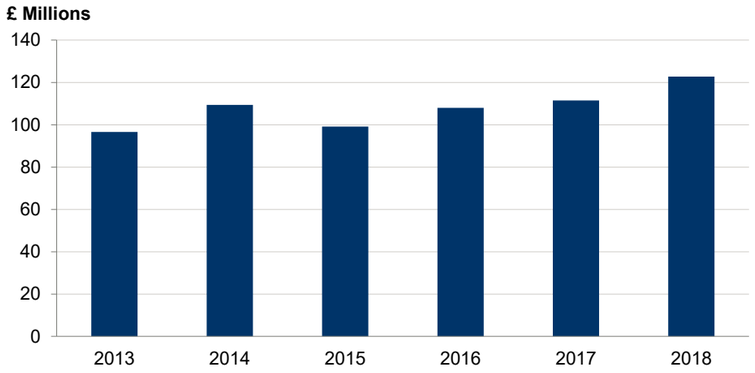
BriteCloud was developed at Leonardo's Luton site and required significant investments, notably £27 million from the Ministry of Defence and £10 million from Leonardo itself. The site now has 50 employees working to further develop and produce this technology.

R&D and capital investment
Leonardo's UK electronics business carried out over £120 million of R&D activity in 2018, including over £80 million funded by and carried out in support of customer contracts. Leonardo also directly funded over £40 million of R&D activity, equivalent to approximately 10% of the business's direct contribution to GDP. As such, Leonardo provides a significant boost towards the government's target for total UK R&D spending as a share of GDP of 2.4% by 2027.

The business also carried out a total of £525 million of R&D activity over the five years between 2013 and 2017, in nominal terms.

Leonardo's R&D activity between 2013 and 2018 has accumulated a "stock" of innovations, in the form of practical knowledge that will have dispersed and enhanced productivity in the wider economy. We estimate that these accrued R&D assets increased UK GDP by £390 million in 2018. This higher output was delivered through productivity improvements enabled among different sectors in the economy.

Leonardo's UK electronics business annual value of R&D activity



Source: Leonardo

An important facet of Leonardo's current R&D work is its collaboration with the RAF, BAE Systems, MBDA, and Rolls-Royce as a founding partner of Team Tempest. The aim of this consortium is to develop the UK's future combat air capabilities, due to enter service from 2035. Leonardo's work on this project focuses on the development of advanced sensors and their integration into the complete system.

A recent high-profile example of Leonardo's technology in action was the deployment of the company's Falcon Shield Counter-UAV[39] System by the RAF at London Gatwick and Heathrow airports in late 2018 and early 2019, in response to reports of rogue drones operating nearby. Leonardo's Falcon Shield detects, locates, and mitigates drones being flown in unauthorised airspace. The deployment of this equipment ultimately confirmed the absence of any drones, providing assurance to airport authorities that passenger aircraft could safely operate.

Leonardo's UK electronics business also has long relationships with universities across the country, including sponsoring professorial chairs, research degrees and undergraduate industrial projects. The company has hosted long-term fellowships for academics, while Leonardo staff provide lectures to university students and advice to the academic sector through positions on boards such as the Quantum Technologies Hub and the Scottish Universities Physics Alliance International Advisory Committee. As well as supporting the company's R&D activity, Leonardo's work with universities helps to upskill the researchers involved and to disseminate new scientific knowledge throughout the economy, as researchers go on to use their skills elsewhere in academia or industry.

The most significant relationship is between the company and the combination of the University of Edinburgh and Heriot-Watt University. This three-way relationship has led to the universities forming a research partnership (the Edinburgh Research Partnership in Engineering), joint leadership of the University Defence Research Collaboration in Signal Processing, and multiple PhD and EngD qualifications for Leonardo staff.

As well as R&D spending, Leonardo's UK electronics business made more than £11 million of capital investment in the UK in 2018, including £5.1 million spent with small and medium-sized enterprises.

[39] Unmanned aerial vehicle.

A WORLD EXPERT IN HIGH-PERFORMANCE INFRA-RED TECHNOLOGIES

Building on its tradition of developing leading-edge surveillance systems dating back more than 60 years, Leonardo's Southampton site is one of only a handful of facilites worldwide with the ability to develop and manufacture high-performance cooled infra-red (IR) detectors and advanced thermal imaging systems.

This cryogenically-cooled imaging equipment detects heat from any object that is warmer than absolute zero (-273°C), and can pick up temperature differences as small as one 50th of a centigrade, allowing for extremely sharp images.

The technology is used in many applications, such as on the RAF's Chinook helicopter fleet, where its ability to operate in absolute darkness and provide surveillance capabilities around the clock contributed to the success of many operations in Afghanistan. The company's surveillance technology plays a key role in border protection around the world, with one system able to detect vehicles up to 50km away and people up to 30km away, enabling a single camera to monitor hundreds of square kilometres of terrain.

Leonardo infra-red technology is also used to measure temperature and water vapour in the Earth's atmosphere. In 2022, Leonardo devices are scheduled to be launched aboard a new generation of European weather satellites, with the intention of improving short-range weather forecasts. The company's technology has also enabled wildlife cameras to capture footage of previously unseen nocturnal animal behaviour, while more novel applications include cricket umpires using the company's detectors to assess whether the ball has struck batsman or bat.

A significant share of Leonardo's UK infra-red technology products are sold overseas, either as detectors or in more complex systems, adding to the UK's overall exports. To ensure that Leonardo and the UK remain at the forefront of this high-tech field, the company's detector business invests 5% of its revenues directly back into R&D—while also attracting research funding from customers seeking customised detectors.

Leonardo's impact on the UK economy
OXFORD ECONOMICS

NEW RADAR TECHNOLOGIES DRIVING LEONARDO EXPORTS

Leonardo's UK electronics business is an established contributor to UK exports through its cutting-edge airborne radar technologies. In 2005, the company became the first exporter of electronically scanning radars (E-Scan) to the US after securing a deal with the US Coast Guard for its Seaspray 7500E equipment—replacing older, purely mechanically-steered systems. The business has sold more than 500 radars from the Seaspray family to 30 international customers.

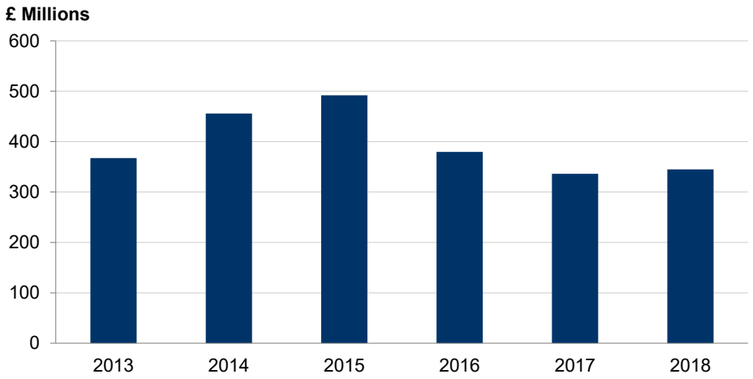
Building on that export success, Leonardo launched Osprey (its second-generation E-scan radar) in 2014 with a contract to supply the Norwegian Ministry of Justice. Now counting 12 customers globally, this new line of equipment delivers full "spherical" coverage with no moving parts, meaning the radar can jump from target to target in any direction in a fraction of a second. According to Leonardo, Osprey is the only system in the lightweight airborne surveillance market that offers this capability.

The Osprey radar gives the customer the option to keep the underside of the aircraft free, increasing its ground clearance for landing on difficult terrain, or saving space for the installation of other equipment. Because of Osprey's high reliability, its target detection performance from high altitude, and its light weight, the radar is particularly well suited for unmanned air systems, and is installed on the US Navy's autonomous Fire Scout helicopter.

Leonardo's UK electronics business employs some 250 engineers and technicians to work on its surveillance radars. The business provides "full lifecycle" design, manufacture, and support of complex radar systems, giving the UK complete on-shore capability in this strategic technology area.

Exports
Leonardo's UK electronics business sold over £300 million of goods to external overseas customers in 2018, as well as over £40 million to overseas Leonardo entities, for a total of approximately £350 million exports sales that year. During the previous five years, the business sold a total of £2 billion worth of exports in nominal terms.

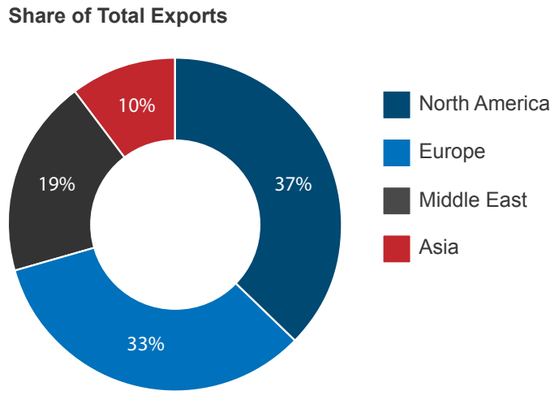
Total annual exports by Leonardo's UK electronics business



Source: Leonardo

North America was the single largest market for the business's exports to external customers, with 37% of sales in 2018, with a further third of exports sold to Europe.

Leonardo's UK electronics exports to external customers by destination market, 2018



Source: Leonardo

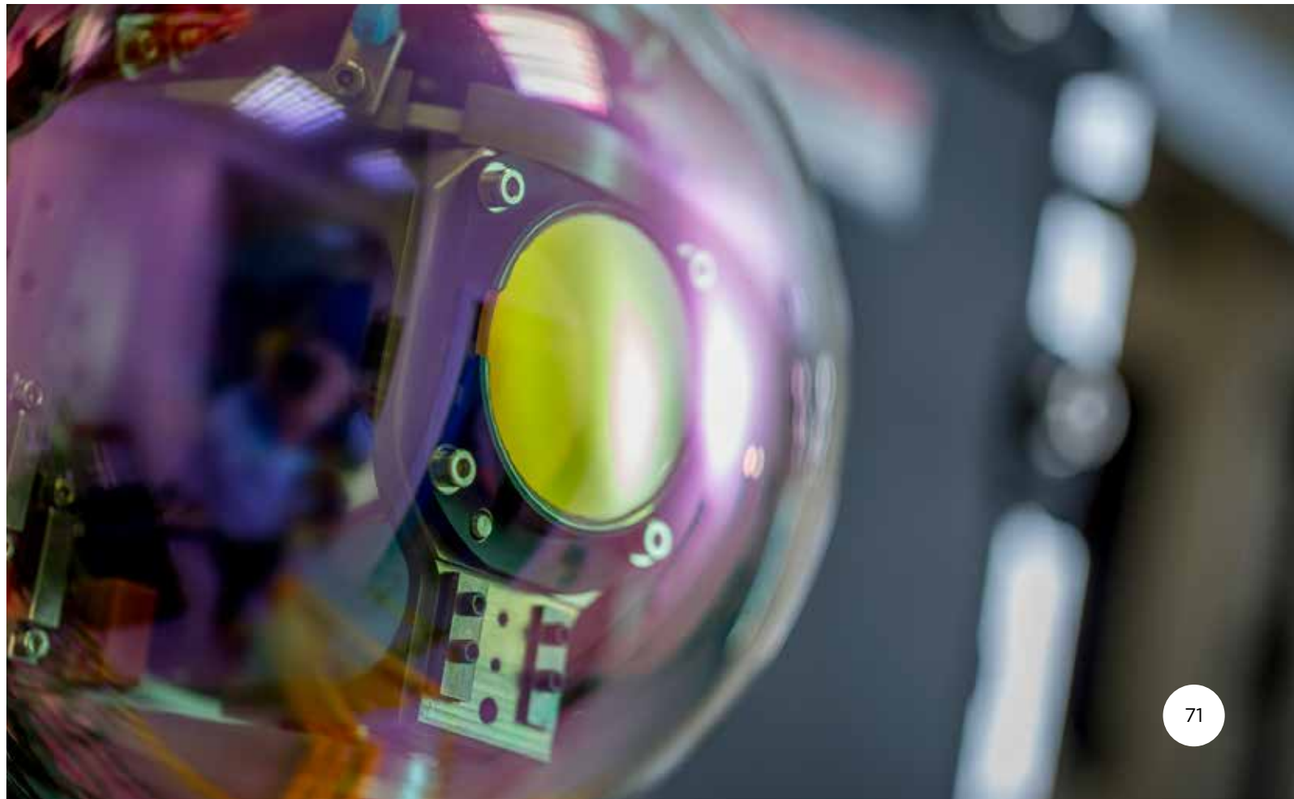
LEADING THE GLOBAL MILITARY LASER MARKET
Leonardo's UK electronics business is a world leader in the high-energy military laser market, which includes products such as ground-based target designators and airborne electro-optical targetting systems. Leonardo's products, built at the company's Edinburgh facility, account for around 70% of global sales of military lasers for airborne use, and 60% for all applications.[40] All of Leonardo's laser products are designed and manufactured in the UK,[41] once again giving the country full on-shore capability in this area.

Across all programmes, the company has delivered close to 10,000 laser units since it started significant investment in their development in the 1970s. Many are exported to the US, generating more than £80 million in revenue a year for the UK electronics business over the last five years.

One specific recent export success is the Type 163 Laser Target Designator, a device designed for precision targeting over ranges of several kilometres. More than 600 units of this handheld designator have been sold to 16 nations including Italy, US, Australia, and other NATO member and partner countries.

Underpinning Leonardo's success in the high-energy military laser market are a number of applied research programmes built on strong links with Scottish universities.

[40] UK Defence Journal, Leonardo announces sales of over 600 man portable laser designators, September 2019
[41] Aside from one minor component on one product.



Skills and training
Since 2009, Leonardo has operated an electronic warfare training facility in Lincoln that caters to UK armed forces at the nearby Air Warfare Centre at RAF Waddington, as well as visiting delegates from allied nations.

This facility plays a key role in meeting demand for the skills needed to operate in today's electronics-driven battlespace. It delivers a wide range of academic and operational training modules across the Cyber and Electromagnetic Activities (CEMA) field, including University of Lincoln-accredited Master of Science-level courses—a unique offering in the UK, according to Leonardo. In addition, it ensures that UK forces are equipped with the latest electronic warfare knowledge, the Training Academy also exports UK expertise around the world, with the aim of 70% of its students coming from allied nations.

The capacity of the Academy was tripled in 2018 following a £2 million investment, and today the site is equipped to upskill up to 150 technical specialists in CEMA at one time.

The Environmental and Social Contribution of Leonardo

STEM outreach and engagement
To promote science, technology, engineering and maths (STEM) subjects within schools, Leonardo's UK electronics business has a group of "STEM Ambassadors" drawn mainly from the company's trainees and graduates.

A recent example at the business's Basildon site includes mentoring of sixth form students by STEM Ambassadors to create a robot medic for use in hazardous environments, developing their engineering skills in the process. Over six months through to early 2020, students were tasked with the design and development of a robot that could provide automated medical support to a soldier in an environment where it wouldn't be possible to send a human medic.

Another example comes from Scottish Apprenticeship Week in March 2020, when a team of girls from a school in Fife presented a prototype of an autonomous car that they had developed with support from Leonardo Apprentices at the business's Edinburgh site. The Apprentices also helped to fund-raise £740 for the school to buy education materials following a recent fire.

At the Luton site, an event was held in January 2020 for 20 Year 8 school students and their parents to learn what a career in engineering looks like. The Family STEM Careers Awareness Event began with a two-hour challenge to design and build a speaker, with many students getting their first experience in using a soldering iron.

An ongoing example of STEM engagement is the Rampaging Chariots Robotic Games, which every year sees hundreds of teams from schools, colleges and Air Training Cadet groups taking part in events hosted at the business's UK sites. The Games involve building a radio-controlled robot from a kit provided by Leonardo, which is then modified by the young teams, and taking part in challenges such as an assault course, sumo battle, tug of war and football.

Environmental sustainability
Leonardo's UK electronics business has reduced its environmental impact in recent years, in part by ensuring that all electricity supplied to all its sites has come from renewable sources and sending no waste to landfill.

Other sustainability schemes include reducing energy consumption, for example by modernising all office lighting to LED technology. The company's Edinburgh, Southampton and Basildon sites significantly reduced their energy consumption between 2015 and 2018, with the latter facility seeing a decline in energy use of almost 50%.

Conclusion

Leonardo's UK electronics business made a sizeable contribution to the UK economy in 2018. In total, the business supported 14,300 jobs around the economy and a £990 million contribution to UK GDP. Of this, 4,200 jobs and a £390 million GDP impact were supported directly by Leonardo's operations, with the remainder being the result of procurement spending and Leonardo and supply chain workers spending their wages.

This means that for every 100 jobs directly with the company 340 jobs were supported across the economy, and for every £1 in direct GDP contribution a total of £2.50 was supported around the UK.

The business also contributed to the long-term prosperity of the UK through its investment in R&D, training and community outreach. In 2018, Leonardo carried out £120 million of R&D activity. Of this, £40 million was self-funded, equivalent to 10% of the business's direct GDP contribution, helping drive the UK towards the government's target of 2.4% R&D spending as a share of GDP by 2027.

In 2018, Leonardo's UK electronics business employed 135 graduate trainees and 165 apprentices and sponsored 22 PhD students at universities around the UK. In addition, the business's outreach programmes and STEM engagement schemes aim to get the next generation interested in an engineering career.

Leonardo in Edinburgh

Leonardo's operations in Edinburgh specialise in technologies such as radar and lasers.

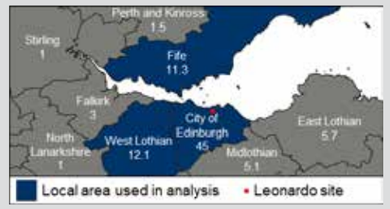
Leonardo's own employees, 2018

2,000 workers employed on Leonardo's Edinburgh site

180 were graduate trainees or apprentices

1,100 engineers employed on Leonardo's Edinburgh site

Wages paid by Leonardo to employees living in each area (£ millions)[42]



12% Leonardo's share of local jobs in engineering roles

16% Leonardo's share of local jobs in the high value manufacturing sector[43]

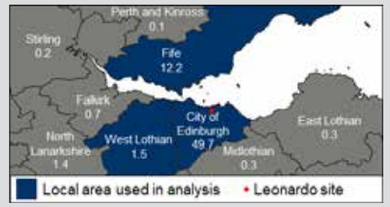
Here we define the local area as the local authorities of the city of Edinburgh, West Lothian and Fife, as highlighted on the map.

Leonardo's local supply chain spending, 2018

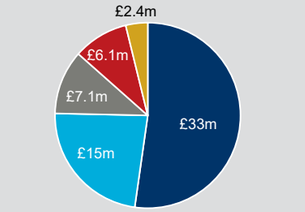
£63m Leonardo's spending with local suppliers

9% of which was with SMEs

Distribution of Leonardo's supply chain spending (£ millions)[44]



Local supply chain spending by type of purchase



[42] Includes all Leonardo employees living in these areas, not exclusively those working at the Edinburgh site
[43] High value manufacturing includes the manufacturing of; computers, electronic and optical products; electrical equipment; machinery and equipment; motor vehicles, trailers and semi-trailers; and other transport equipment
[44] Includes procurement spending from all of Leonardo's UK sites

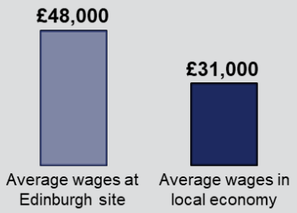
Leonardo's total economic impact on the local area[45], 2018

	GDP	Jobs
Direct	£190m	2,000
+		
Indirect - supported by supply chain spending	£35m	610
+		
Induced - supported by employee spending	£35m	690
=		
Total impact	£260 million	3,300 jobs

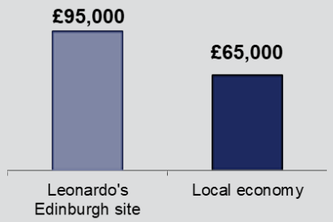
Impact on wages

£68m
wages paid to employees and contractors living in local area

£104m
Total wages supported locally, including the above plus agency staff, indirect and induced impacts

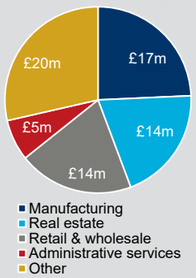


Productivity (GDP per worker)[46]



Contribution to local industry

Sum of local indirect and induced GDP impact by industry:



[45] The local authorities of the city of Edinburgh, West Lothian and Fife.
[46] Leonardo's Edinburgh site productivity represents the site's direct GDP impact divided by its number of employees, while the local economy's productivity represents local GDP divided by local employment.

Leonardo in Luton

Leonardo's operations in Luton specialise in electronic warfare technologies.

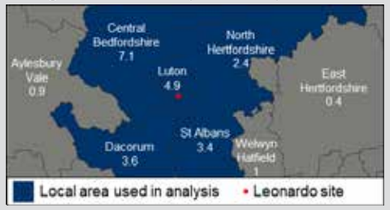
Leonardo's own employees, 2018

1,000
workers employed on Leonardo's Luton site

80
were graduate trainees or apprentices

560
engineers employed on Leonardo's Luton site

Wages paid by Leonardo to employees living in each area (£ millions)[47]



8%
Leonardo's share of local jobs in the high value manufacturing sector[48]

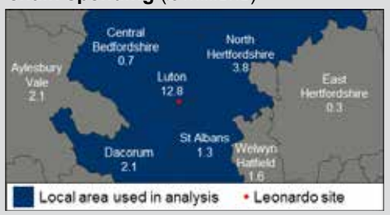
Here we define the local area as the local authorities of Luton, Central Bedfordshire, Dacorum, St Albans and North Hertfordshire, as highlighted on the map.

Leonardo's local supply chain spending, 2018

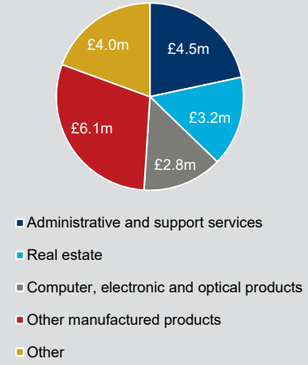
£21m
Leonardo's spending with local suppliers

33%
of which was with SMEs

Distribution of Leonardo's supply chain spending (£ millions)[49]



Local supply chain spending by type of purchase



[47] Includes all Leonardo employees living in these areas, not exclusively those working at the Luton site.
[48] High value manufacturing includes the manufacturing of; computers, electronic and optical products; electrical equipment; machinery and equipment; motor vehicles, trailers and semi-trailers; and other transport equipment.
[49] Includes procurement spending from all of Leonardo's UK sites.

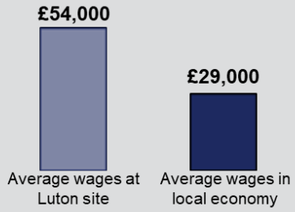
Leonardo's total economic impact on the local area[50], 2018

	GDP	Jobs
Direct	£123m	1,000
+		
Indirect - supported by supply chain spending	£12m	260
+		
Induced - supported by employee spending	£10m	200
=		
Total impact	£145 million	1,460 jobs

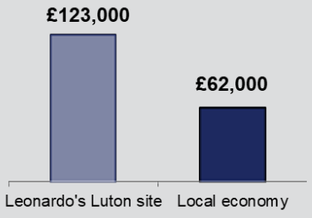
Impact on wages

£21m wages paid to employees and contractors living in local area

£35m Total wages supported locally including the above, agency staff and indirect and induced impacts

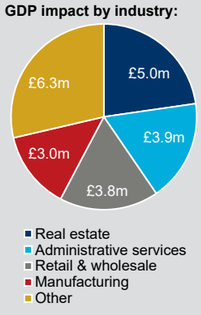


Productivity (GDP per worker)[51]



Contribution to local industry

Sum of local indirect and induced GDP impact by industry:



[50] The local authorities of Luton, Central Bedfordshire, Dacorum, St Albans and North Hertfordshire.
[51] Leonardo's Luton site productivity represents the site's direct GDP impact divided by its number of employees, while the local economy's productivity represents local GDP divided by local employment.

Leonardo in Basildon

Leonardo's operations in Basildon specialise in thermal imaging systems, radar systems, radio communications and infra-red detectors.

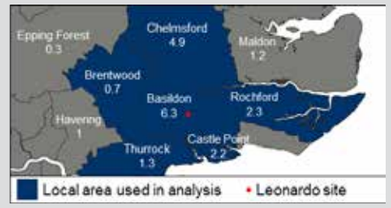
Leonardo's own employees, 2018

620 workers employed on Leonardo's Basildon site

20 were graduate trainees or apprentices

190 engineers employed on Leonardo's Basildon site

Wages paid by Leonardo to employees living in each area (£ millions)[52]



12% Leonardo's share of local jobs in the high value manufacturing sector[53]

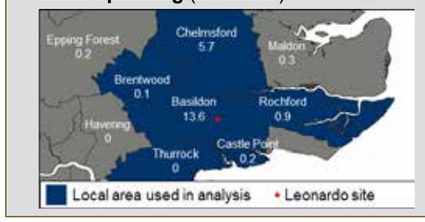
Here we define the local area as the local authorities of Basildon, Chelmsford, Rochford, Castle Point, Thurrock and Brentwood, as highlighted on the map.

Leonardo's local supply chain spending, 2018

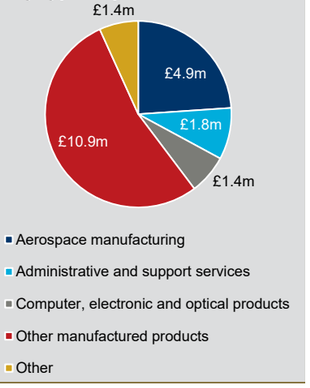
£20m Leonardo's spending with local suppliers

55% of which was with SMEs

Distribution of Leonardo's supply chain spending (£ millions)[54]



Local supply chain spending by type of purchase



[52] Includes all Leonardo employees living in these areas, not exclusively those working at the Basildon site.
[53] High value manufacturing includes the manufacturing of; computers, electronic and optical products; electrical equipment; machinery and equipment; motor vehicles, trailers and semi-trailers; and other transport equipment.
[54] Includes procurement spending from all of Leonardo's UK sites.

Leonardo's total economic impact on the local area[55], 2018

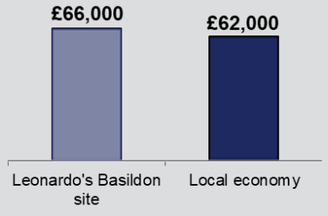
	GDP	Jobs
Direct	£40m	620
Indirect - supported by supply chain spending	£10m	190
Induced - supported by employee spending	£10m	190
Total impact	£60 million	990 jobs

Impact on wages

£18m wages paid to employees and contractors living in local area

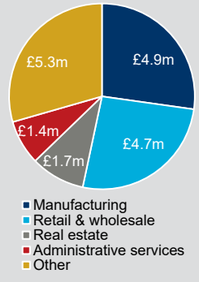
£29m Total wages supported locally including the above, agency staff and indirect and induced impacts

Productivity (GDP per worker)[56]



Contribution to local industry

Sum of local indirect and induced GDP impact by industry:



[55] The local authorities of Basildon, Chelmsford, Rochford, Castle Point, Thurrock and Brentwood.
[56] Leonardo's Basildon site productivity represents the site's direct GDP impact divided by its number of employees, while the local economy's productivity represents local GDP divided by local employment.

Leonardo in Southampton

Leonardo's operations in Southampton specialise in communications, optronics, air traffic management and other airborne and marine technologies.

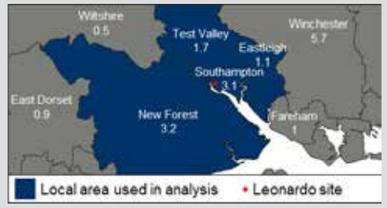
Leonardo's own employees, 2018

400 workers employed on Leonardo's Southampton site

18 were graduate trainees or apprentices

170 engineers employed on Leonardo's Southampton site

Wages paid by Leonardo to employees living in each area (£ millions)[57]



2% Leonardo's share of local jobs in engineering roles

6% Leonardo's share of local jobs in the high value manufacturing sector[58]

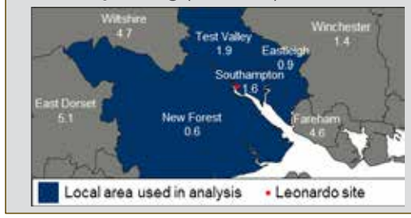
Here we define the local area as the local authorities of Southampton, New Forest, Test Valley and Eastleigh, as highlighted on the map.

Leonardo's local supply chain spending, 2018

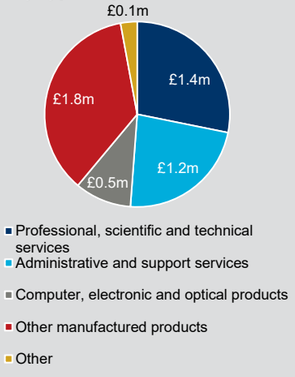
£5m Leonardo's spending with local suppliers

39% of which was with SMEs

Distribution of Leonardo's supply chain spending (£ millions)[59]



Local supply chain spending by type of purchase



[57] Includes all Leonardo employees living in these areas, not exclusively those working at the Southampton site
[58] High value manufacturing includes the manufacturing of; computers, electronic and optical products; electrical equipment; machinery and equipment; motor vehicles, trailers and semi-trailers; and other transport equipment
[59] Includes procurement spending from all of Leonardo's UK sites

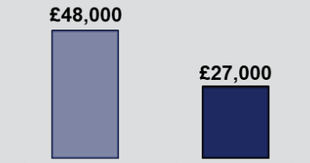
Leonardo's total economic impact on the local area[60], 2018

	GDP	Jobs
Direct	£33m	400
Indirect - supported by supply chain spending	£3m	55
Induced - supported by employee spending	£4m	75
Total impact	£40 million	530 jobs

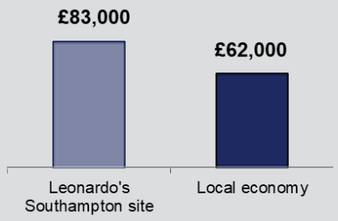
Impact on wages

£9m
wages paid to employees

£13m
Wages supported locally, including supply chain and worker spending impacts

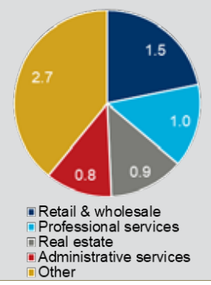


Productivity (GDP per worker)[61]



Contribution to local industry

Sum of local indirect and induced GDP impact by industry (£m):



[60] The local authorities of Southampton, New Forest, Test Valley and Eastleigh.
[61] Leonardo's Southampton site productivity represents the site's direct GDP impact divided by its number of employees, while the local economy's productivity represents local GDP divided by local employment.

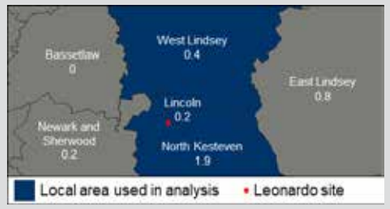
Leonardo in Lincoln

Leonardo's Luton site acts as a satellite for the Luton-based electronic warfare business and houses Leonardo's Training Academy, educating technical specialists on cyber and electromagnetic warfare.

Leonardo's own employees and local supply chain spending, 2018

Leonardo's own employees

Wages paid by Leonardo to employees living in each area (£ millions)[62]



25
workers employed on Leonardo's Lincoln site

18
engineers employed on Leonardo's Lincoln site

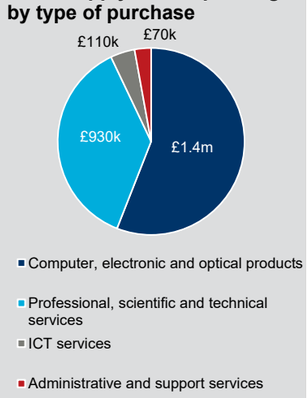
Leonardo's local supply chain spending

£2.5m
Leonardo's spending with local suppliers

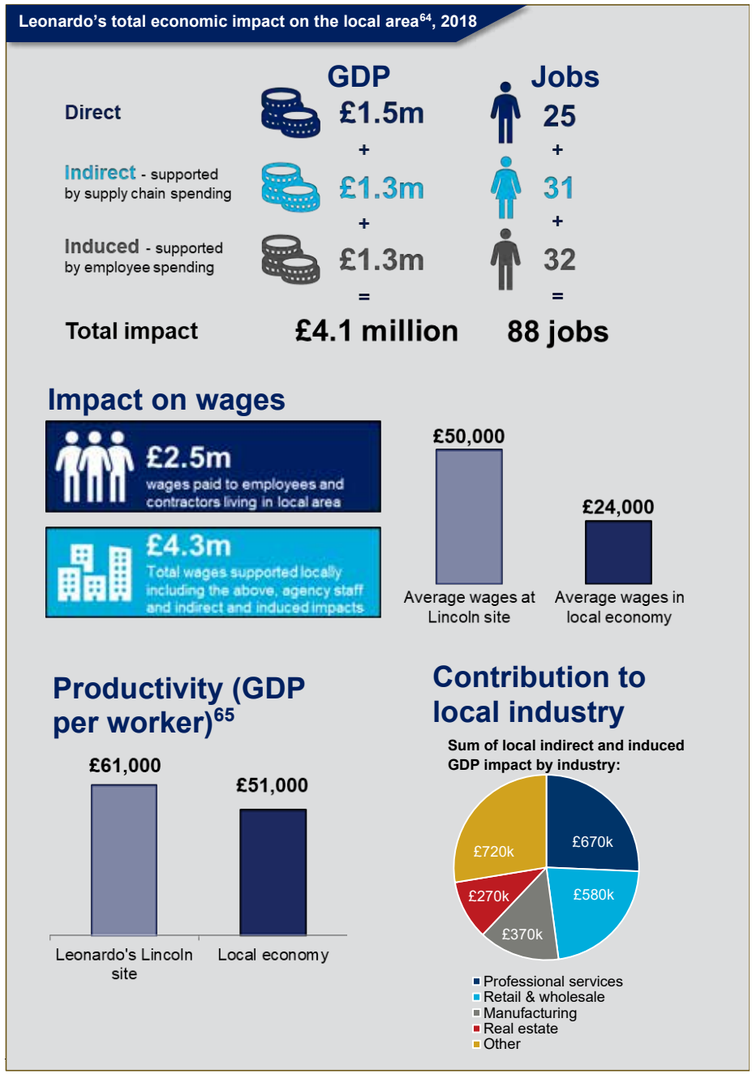
97%
of which was with SMEs

Distribution of Leonardo's supply chain spending (£ millions)[63]

Local supply chain spending by type of purchase



[62] Includes all Leonardo employees living in these areas, not exclusively those working at the Lincoln site.
[63] Includes procurement spending from all of Leonardo's UK sites



[64] The local authorities of Lincoln, West Lindsey and North Kesteven
[65] Leonardo's Lincoln site productivity represents the site's direct GDP impact divided by its number of employees, while the local economy's productivity represents local GDP divided by local employment.

Leonardo's impact on the UK economy

OXFORD ECONOMICS

The Economic Impact of Leonardo's UK Cyber Security Business

£2.60
Total UK GDP supported in 2018 for every £1 in direct GDP contribution

320
Total jobs supported in 2018 for every 100 jobs directly with the company

£4 million
Total R&D spending in 2018 by Leonardo's UK cyber security business

Executive Summary
Leonardo's UK cyber security business provides technology and services to organisations such as the emergency services, critical national infrastructure, large enterprises, government and international agencies.

This chapter examines the ways that the cyber security business delivers economic benefits to the UK.

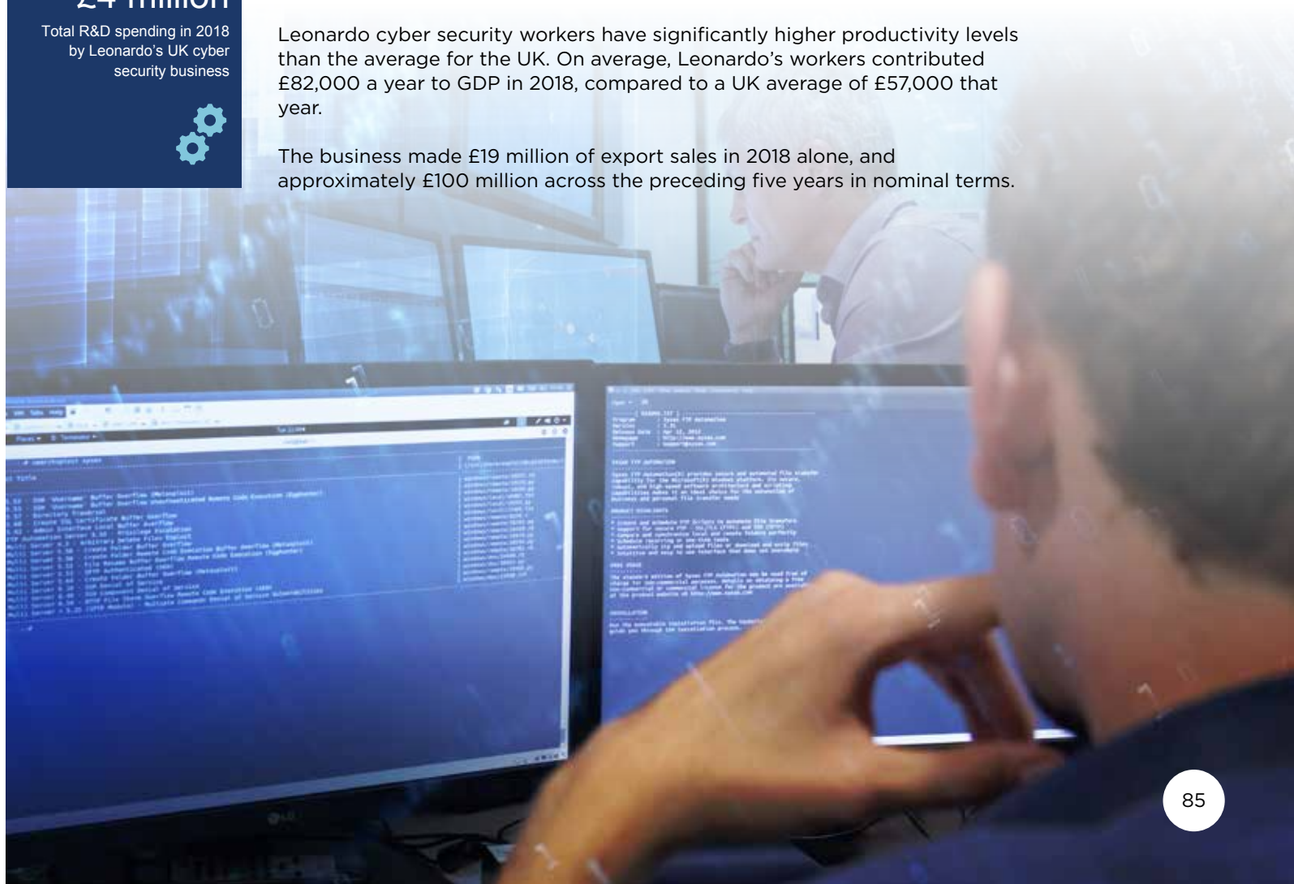
Core Economic Impacts
We estimate that Leonardo's UK cyber security business contributed a total of £51 million to UK GDP in 2018. Of this, £19 million of this came from the business's direct operations, a further £11 million from its supply chain spending, and £21 million from the spending of employees of Leonardo and its supply chain in the consumer economy.

We estimate that this economic activity supported a total of 760 jobs around the UK in 2018. Of these, 240 jobs were directly with Leonardo, while 210 were supported by the business's supply chain spending, and 310 by workers spending their wages.

Over half (55%) of the 104 suppliers to Leonardo's UK cyber security business were small or medium-sized enterprises (SMEs) in 2018, with 24% of the business's procurement spent with these firms.

Leonardo cyber security workers have significantly higher productivity levels than the average for the UK. On average, Leonardo's workers contributed £82,000 a year to GDP in 2018, compared to a UK average of £57,000 that year.

The business made £19 million of export sales in 2018 alone, and approximately £100 million across the preceding five years in nominal terms.



Catalytic Impacts: Leonardo's Contribution to the UK's Long-Term Prosperity

Leonardo's UK cyber security business invested over £4 million in R&D in 2018, an annual figure that has steadily grown from just under £1 million in 2013. This includes self-funded research as well as that carried out in support of customer contracts.

The business contributes to the upskilling of the UK workforce, with five graduate trainees and nine apprentices, as well as secondary school outreach programmes. This includes the Unlock Cyber open day, which had 20 schools attending in 2018 and 24 in 2019, and involved the children solving simulated cyber crimes using cyber security technology.

Introduction

Leonardo's UK-based cyber security business supplies services and technology to government agencies and private firms in both the civil and defence markets, domestically and around the world. The business has in-house R&D and manufacturing capabilities to develop new security options for clients.

The key areas of the business cover police and emergency services; critical national infrastructure and large enterprises; government, defence and international agencies; and cyber security and digital competence.

For instance, Leonardo works alongside NATO[66] and the UK Ministry of Defence (MoD) to provide cyber vulnerability assessments and investigations, as well as working closely with the MoD in developing its approach to cyber activities.

In addition to work for clients, Leonardo's UK cyber security business plays an important internal role for the company by ensuring that the company's networks and systems are protected from cyber attacks.

The headquarters for the business are in Bristol, with a staff of 150 in close proximity to the MoD's Abbey Wood facility. The site includes Leonardo's Service Operations Centre and its "Cyber Range", a training simulator for practical cyber warfare exercises. The business also has staff at other UK Leonardo sites including Basildon, and has a team in Mons, Belgium to support NATO operations.

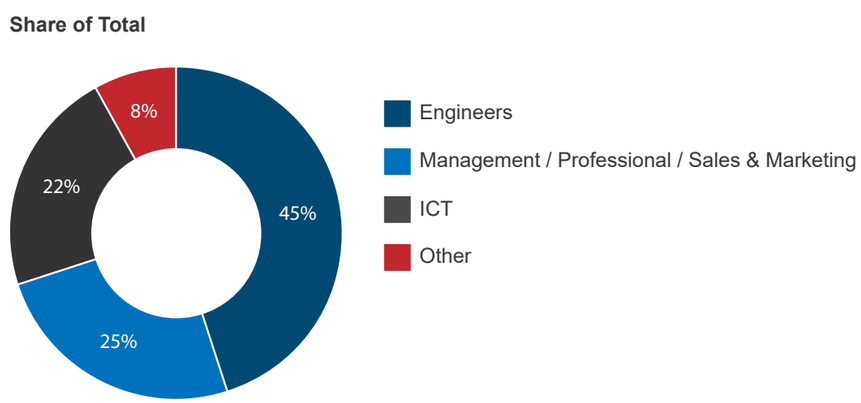
This chapter sets out the total economic impact that the cyber security business has on the UK economy, including its contribution to the country's long-term prosperity through exports and through its innovative products.

[66] The North Atlantic Treaty Organization with (currently) 30 members across North America and Europe.

Employment Contribution

Direct Employment
A total of 240 people worked for Leonardo's UK cyber security business in 2018. Of these, approximately 200 were direct employees, including 5 graduate trainees and 9 apprentices. In addition, the business had 10 long-term contractors and 30 agency workers, which we treat as direct employment in our modelling. Nearly half of staff were in engineering roles, and a further 45 people in ICT.

Breakdown of Leonardo's UK cyber security business employees and long-term contractors by role, 2018



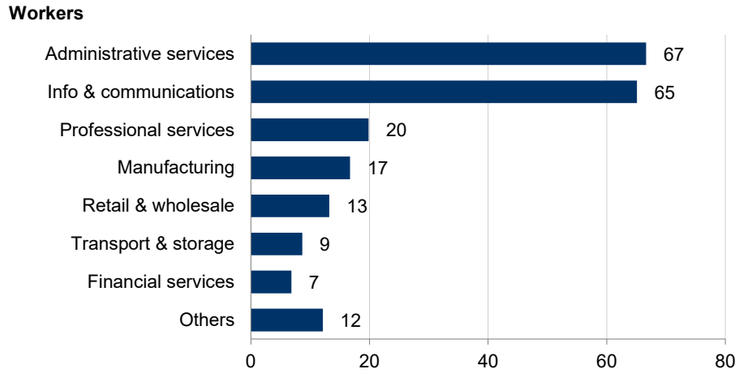
Source: Leonardo

Reflecting the training and education provided to staff, Leonardo was shortlisted in the 2019 Bath and Bristol Apprenticeship Awards in the Large Employer of the Year category. In addition, a Leonardo apprentice won the Outstanding Apprentice of the Year category for the Tech and Creative Industry, thanks in part to a project developing a computer operating system that will be used to help disadvantaged children to learn basic code and about cyber security in general.

Supply Chain Contribution to Employment
Leonardo's UK cyber security business made £17 million of procurement purchases from UK businesses in 2018, including capital investment spending. Just over £4 million of this (or 24% of the total) was spent with nearly 60 UK SMEs, who comprised 55% of the business's total number of UK suppliers.

The supply chain spending of Leonardo's UK cyber security business supported a further 210 jobs across the economy.

Leonardo's UK-based Cyber Security Business indirect impact by Sector, 2018

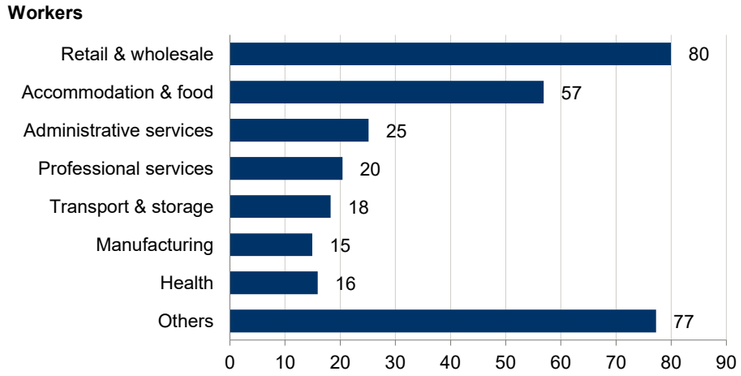


Source: Oxford Economics

Employment supported by worker spending

The spending of Leonardo's direct and supply chain workers supported a further 310 jobs in the UK through the induced impact, with a quarter of this impact in the retail and wholesale sector alone.

Leonardo's UK-based cyber security business induced employment impact by sector, 2018



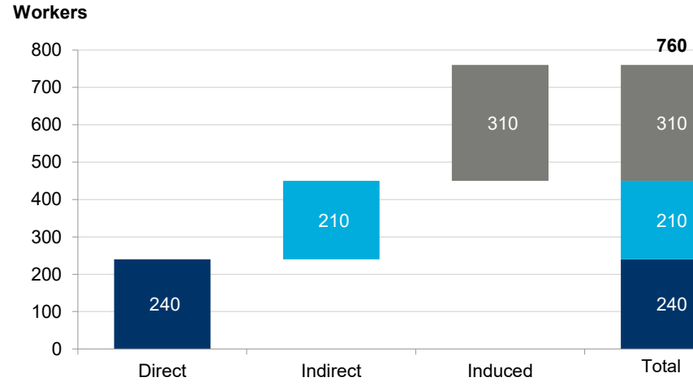
Source: Oxford Economics

Total employment contribution

Through its in-house activities, its supply chain and the activity supported by the spending of workers employed by Leonardo and in its supply chain, Leonardo's UK cyber security business supported 760 jobs in the UK in 2018.

This means that for every 100 jobs directly with Leonardo's UK cyber security business, a total of 320 were supported around the economy.

Leonardo's UK-based cyber security business total employment impact, 2018

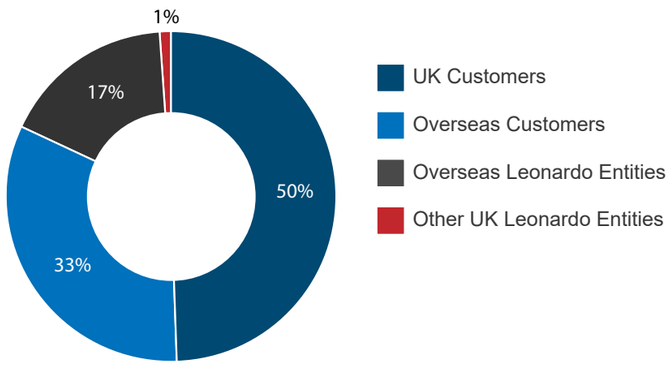


Source: Oxford Economics

GDP Contribution

Direct Contribution to GDP
Leonardo's UK cyber security business generated £37 million in revenue in 2018, of which approximately half came from domestic customers. A further £18.6 million came from overseas customers, including £6.3 million from overseas Leonardo entities.

Split of Leonardo's UK Cyber Security Revenue by Source, 2018

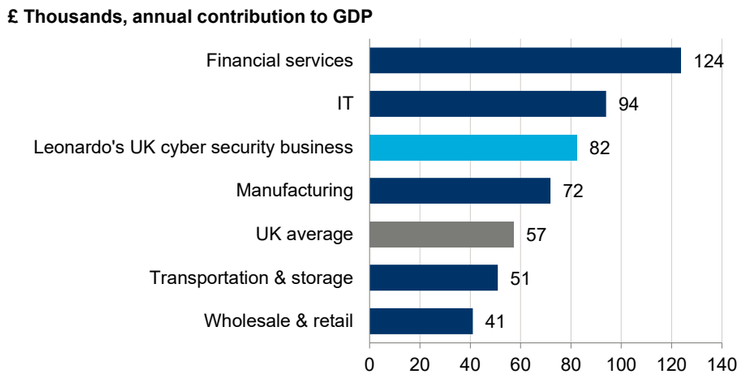


Source: Leonardo

In the generation of this revenue we estimate that Leonardo's UK cyber security business directly generated £19 million in GDP contributions.

Employees of Leonardo's UK cyber security business contributed an average of £82,000 to GDP in 2018, significantly more than the £57,000 average for the UK as a whole.

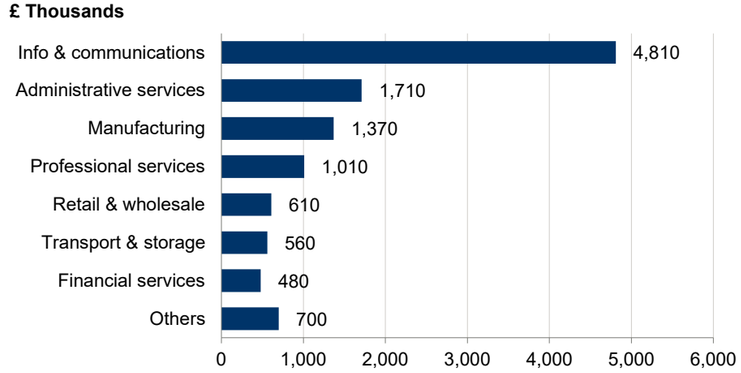
Average GDP per worker levels for selected UK industries, 2018



Source: Oxford Economics, Office for National Statistics, Leonardo

Supply Chain Contribution to GDP
We estimate that the business's supply chain spending supported £11 million in GDP contributions. The information and communications sector was by far the biggest contributor to this indirect impact, supporting 43% of the total.

Leonardo's UK-Based Cyber Security Business indirect GDP impact by Sector, 2018

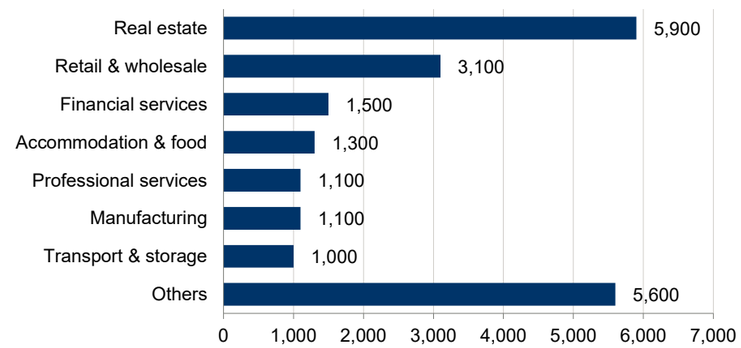


Source: Oxford Economics

GDP Supported by Worker Spending
The business paid £16 million in wages and salaries to employers, contractors and agency staff in 2018.

By using their wages to purchase goods and services throughout the UK economy, Leonardo's employees, as well as workers in the supply chain, supported a further £21 million in GDP contributions in 2018. Most of that impact was felt in the real estate and retail and wholesale sectors, reflecting mortgage and rental payments as well as spending in shops.

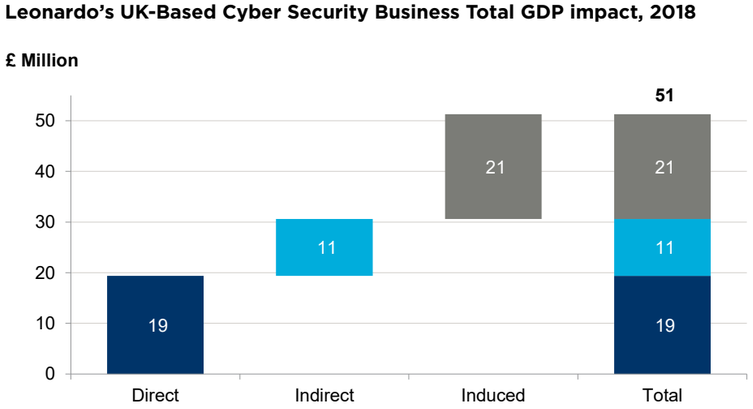
Leonardo's UK-based cyber security business induced GDP impact by sector, 2018



Source: Oxford Economics

Total Economic Contribution
The total GDP impact of Leonardo's UK cyber security business in 2018 was £51 million. This means that for every £100 in GDP contributions directly supported, a total of £260 of economic activity was supported around the economy.

Leonardo's UK-Based Cyber Security Business Total GDP impact, 2018



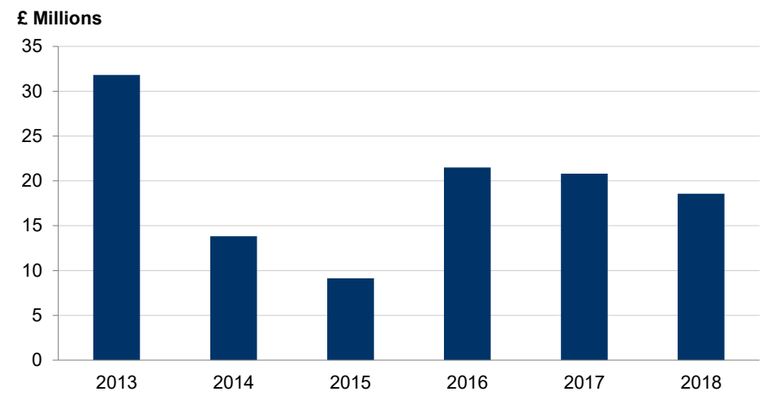
Source: Oxford Economics

Exports
The cyber security business generated over £18 million of exports in 2018, including more than £12 million from external customers and over £6 million to overseas Leonardo entities. The business's total exports for 2018 represent 96% of its direct GDP contribution, providing a boost towards the government's target for exports to 35% of GDP.

The business also generated a further £97 million in total export sales across the prior five years, in nominal terms.

With just under £4 million of imports through procurement spending in 2018, the business helped boost the UK's net exports by more than £14 million that year.

Total Export Sales by Leonardo's UK Cyber Security Business



Source: Leonardo

PROTECTING NATO'S SITES AND OPERATIONS
In 2012, Leonardo's UK cyber security business was hired to create a new cyber security system for NATO's complex ICT networks. The system, known as "NATO's Cyber Incident Response Capability – Full Operational Capability" (NCIRC-FOC) went live in May 2014 and is operated, managed and maintained by Leonardo.

The cyber security provided by this system covers more than 70,000 NATO personnel across 75 sites in 30 countries. It secures everything from individual portable devices to entire networks across the organisation's structure, as well as NATO summits in 2014, 2016 and 2018. As part of the ongoing monitoring and support provided to NATO, Leonardo's UK cyber security business has 20 staff based at Supreme Headquarters Allied Powers Europe (SHAPE), NATO's headquarters in Mons, Belgium.

Following the system's successful the implementation, Leonardo made further export sales to NATO in the form of a 2015 contract to roll out the system to a further 10 sites, and a 2019 contract to provide ongoing support to the end of 2020.

Research and development
Leonardo's UK cyber security business performed over £4 million of R&D activity in 2018 and a total of more than £9 million over the five preceding years in nominal terms.

The Social Contribution of Leonardo

STEM outreach and engagement
Since mid-2018, Leonardo's UK cyber security business has been taking part in STEM outreach activities, beginning with a focus on secondary school students.

This includes an annual cyber security taster day, launched in December 2018, which sees children working together to solve a simulated cyber crime. In 2018, teams consisting of five boys and five girls were brought by each of 20 schools, with 24 schools taking part in 2019. The event is run by Unlock Cyber, an organisation co-founded by Leonardo that brings together cyber representatives from employers, professional bodies and academia to raise understanding among young people of careers in this area.

In early 2019, Leonardo ran a six-week initiative at a local school that involved students playing the role of a cyber responder investigating a cyber-attack that brought down the UK's internet. Over the six weeks, the children investigated how it happened and worked out who was responsible. As a result of this programme, the school entered five teams into the National Cyber Security Centre's CyberFirst competition, an event aimed at inspiring young people to consider a career in the industry.

Conclusion

Leonardo's UK cyber security business support a total GDP impact of £2.60 for every £1 in direct GDP contribution. The business also supports a total of 320 jobs for every 100 jobs with the company. In total in 2018, the business supported £51 million in GDP contributions and 760 jobs across the economy.

The business also supports the longer-term prosperity of the UK through investing in R&D, carrying out £4 million of research activity in 2018, and through investment in staff, with 5 graduate trainees and 9 apprentices, as well as community outreach programmes for the next generation of engineers.

LEONARDO SYSTEMS HELPING TO FIGHT CRIME
In 2019, a new automatic number plate recognition (ANPR) system began operating in the UK, managed by Leonardo's UK cyber security business. The new National ANPR Service is designed to replace the 44 separate systems fed by 11,000 cameras across the country with one system capable of producing joined-up results across police force boundaries. The system is estimated to read up to 50 million number plates a day, resulting in one of the largest datasets in civil government, and helps complex data searches to be returned in minutes rather than hours.

Leonardo's UK cyber security business began the work to develop, supply and support the National ANPR Service in 2015, with initial rollout by the Home Office beginning in 2019 and full deployment achieved in 2020. The new technology can be used by police in real-time to help locate offenders' movements in the aftermath of violent crime. Following an event, NAS provides the capability to identify possible offenders, their associates and witnesses, with ANPR evidence often used to establish an offender's presence at a location. The software can also be used pro-actively to help identify patterns that directly suggest criminality or are useful backdrops to understanding the behaviour of known criminals, such as tracking criminal networks. The system can also be used by other law enforcement organisations, such as the Driver and Vehicle Standards Agency which has trialled the system for enforcing MOT[67] test compliance and dangerous driving offences.

[67] The UK's mandatory annual test of a vehicle's roadworthiness, named for the Ministry of Transport that first introduced it.

Leonardo's impact on the UK economy
OXFORD ECONOMICS

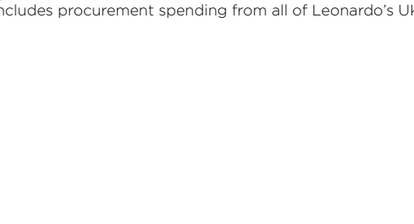
Leonardo in Bristol

Leonardo's Bristol site is the headquarters for the company's UK cyber security team.

Leonardo's own employees and local supply chain spending, 2018

Leonardo's own employees

Wages paid by Leonardo to employees living in each area (£ millions)[68]



240
workers employed on Leonardo's Bristol site

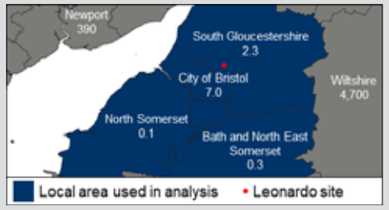
90
engineers employed on Leonardo's Bristol site

Leonardo's local supply chain spending

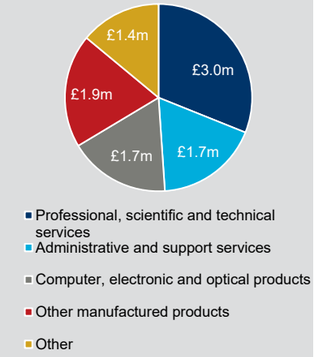
£10m
Leonardo's spending with local suppliers

68%
of which was with SMEs

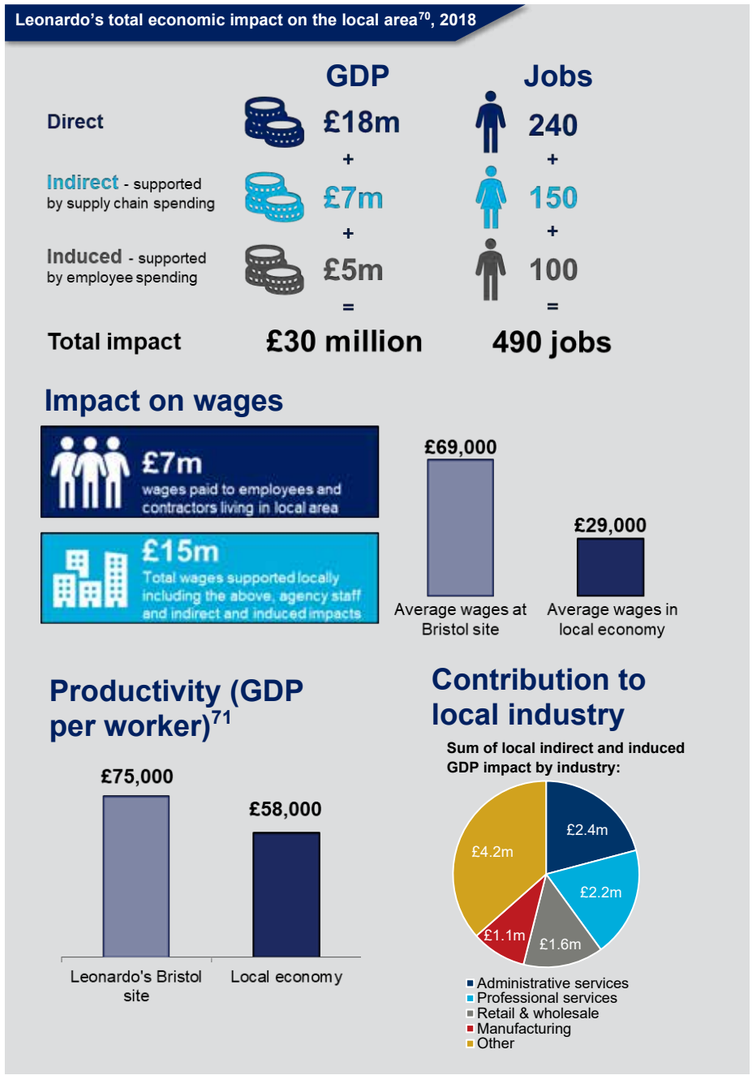
Distribution of Leonardo's supply chain spending (£ millions)[69]



Local supply chain spending by type of purchase



[68] Includes all Leonardo employees living in these areas, not exclusively those working at the Bristol site.
[69] Includes procurement spending from all of Leonardo's UK sites.



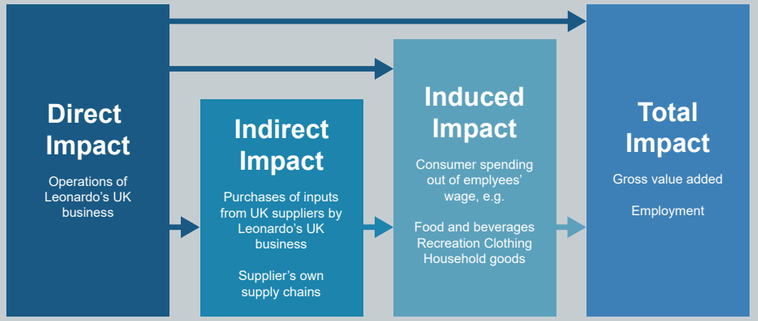
[70] The local authorities of the City of Bristol, South Gloucestershire, North Somerset and Bath & North East Somerset.
[71] Leonardo's Bristol site productivity represents the site's direct GDP impact divided by its number of employees, while the local economy's productivity represents local GDP divided by local employment.

Appendix A – Economic Impact Modelling Methods

Economic Impact Modelling
Economic impact modelling is a standard tool used to quantify the economic contribution of an investment or a company. Impact analysis traces the economic contribution of an investment through three separate channels:

- Direct impact: refers to activity conducted directly by Leonardo in the UK.
- Indirect impact: consists of activity that is supported as a result of the procurement of goods and services by Leonardo in the UK, as well as purchases by those companies, and so on down the supply chain.
- Induced impact: reflects activity supported by the spending of wage income by direct and indirect employees.

Direct, Indirect, Induced and Total Economic Impacts



Direct Impacts
The direct value added of Leonardo is calculated using the "income approach" method for estimating GDP contributions. This means that we sum compensation of employees (including employer pension and national insurance contributions); EBITDA, and taxes on production (largely business property rates).

Indirect and Induced Impacts
Indirect and induced impacts are estimated using an "input-output" model. An input-output model gives a snapshot of an economy at any point in time. The model shows the major spending flows from "final demand" (i.e. consumer spending, government spending investment and exports to the rest of the world); intermediate spending patterns (i.e. what each sector buys from every other sector–the supply chain in other words); how much of that spending stays within the economy; and the distribution of income between employment and other forms such as corporate profits. As these models measure activity within an economy, the direct impact figures will often not match Company annual accounts, which follow accounting standards and rules.

An input-output model uses a matrix representation of a nation's interconnected economy to calculate the effect of changes by consumers, by an industry, or by others, on other industries and therefore on the economy as a whole. These input-output tables ultimately measure "multiplier effects" of an industry by tracing the effects of its inter-industry transactions–that is the number value of goods and services that are needed (inputs) to produce each dollar of output for the individual sector being studied. These models can be used to measure the relationship between an economic change or "shock," and the final outcome across the whole of the economy. In summary, an input-output model is a table which shows who buys what from whom in the economy.

Oxford Economics used the input-output table for the United Kingdom for 2017, published by the ONS in 2019, for this analysis. This is the most recent input-output table for the United Kingdom.

Direct, indirect and induced employment figures in this report have been rounded to the nearest 100 FTE jobs. The multipliers quoted in the report represent the multiple of direct impacts that account for total impacts. For instance, if 20 FTE jobs were direct impacts and the total impact multiplier was 2, then the total impact would be 40 FTE jobs. These multipliers are calculated from the input-output model results.

Indirect jobs are presented including the contingent labour or contractors that Leonardo hires. Data on these workers is obtained from the company's HR systems, and spending on these workers from the company's procurement systems. We assume that 10 percent of the spending on these workers is retained by employment agencies, while the rest is added to the company's indirect GVA contribution.

Industry Breakdowns
The UK 2017 input-output table is divided into 105 different industry sectors, and the table shows how each sector interacts with the 104 other sectors. For purposes of illustration to show value added and employment supported across different sectors, the 105 different industries have been pooled into broad industry categories. For example, the professional services industry amalgamates the following sectors:

- Legal services
- Accounting, bookkeeping and auditing services; tax consulting services
- Services of head offices; management consulting services
- Architectural and engineering services; technical testing and analysis services
- Scientific research and development services
- Advertising and market research services
- Other professional, scientific and technical services

Local Economic Impact Modelling
Our modelling of the impact of Leonardo on the local areas around each of its sites is conducted using a slightly different approach, detailed below.

Direct impact
The direct impact is calculated as the sum of employee compensation (including wages and salaries, employer pension contributions and employer national insurance contributions), EBITDA and taxes on production, the majority of which is business property rates. This information was provided by Leonardo.

Indirect impact
For the first stage of the indirect impact calculation, we used detailed information from Leonardo on the locations of their suppliers, the sums spent with them, and the suppliers' industries (using the Office for National Statistics' Standard Industrial Classification 2007.

We then used I-O modelling to calculate the resultant impact of this spending, over all subsequent rounds of Leonardo's supply chains. For this, we constructed a suite of bespoke regional and sub-regional I-O models.

These models are based on the national UK input-output tables, as published by the ONS. Oxford Economics use official employment data to adjust these, in order to reflect industrial structures and productive capacity. Our methodology uses so-called "Flegg-adjusted Location Quotients (FLQs)",[72] which are consistent with the latest approaches and evidence in regional I-O modelling and regional science.

These I-O models quantify the impact of Leonardo's procurement demands in each local area over the entire length of its supply chain, including its suppliers' suppliers, and so on.

Induced Impact
The first stage of the induced impact calculation uses detailed information from Leonardo on the total amount of wages paid to workers in each local authority area or council district. This allowed us to map consumer spending to the relevant local communities in which Leonardo workers reside. For workers in Leonardo's supply chains, we use our profiles of supply chain production as the starting point. To this, we apply average ratios of wage payments to overall output levels, cut by industry and region.

We then allocate these purchases to the industrial sectors providing goods and services to households (e.g., retail, restaurants, leisure outlets). The allocation follows the distribution of household spending in the UK's national accounts, adjusted for each region, in line with the ONS' regional Family Spending survey. This demand was then inputted into our I-O based impact models, to calculate the total GDP and employment associated with this wage-financed consumption.

Modelling the Ministry Of Defence Impact In Yeovil
We estimate the impact on the Yeovil area of the Ministry of Defence staff that work on-site at Leonardo's Yeovil facility. This is simply the induced impact from the wages of these workers.

We have estimated the total wages of these workers using some rules of thumb, as precise data were not available. An estimated 60% of MoD staff on the Yeovil site are civil servants, while the remaining 40% are armed forces personnel split across the three services (Army, Navy, RAF). To estimate the average MoD staff salary we used published data[73] on civil service wages split by department: we used the mean wage for the MoD's Defence Equipment and Support organisation, which was £34,300 in 2018. To estimate the average armed service wage, we used published data[74] on salary bands by different ranks in the different services' command branches, as well as the number of full-time equivalent people in each rank.

From this, we calculated a weighted average for the Yeovil site, assuming the same split between ranks as in the overall data – however, we included only the range of ranks that are on-site at Yeovil (typically between OR8 and OF5, depending on branch). The overall average salary that we estimated for the armed forces personnel on site was £49,600 for 2018. The weighted average between civil servants and armed forces personnel was then £40,400. We multiplied this by the 512 staff on site in 2018 for a total wage payment of £21 million.

We fed this total wage payment into our local model, making the assumption that all of these people lived in the Yeovil area (South Somerset or West Dorset local authority districts) in 2018. The model then estimated the induced impact of these workers on the local area for that year.

[72] Anthony T. Flegg and Timo Tohmo, "Estimating Regional Input Coefficients and Multipliers", Working Paper, University of the West of England, Faculty of Business and Law, 2013
[73] ONS, Civil Service Statistics, 2018
[74] Gov.UK, MOD roles and salaries, 2018

Modelling the Impact of Accumulated R&D Stock
The economic impact contributed by Leonardo in 2018 is in part attributable to R&D activity that took place in earlier years. Leonardo's history of R&D has accumulated a "stock" of research assets, in the form of practical knowledge that has dispersed and enhanced the wider economy. We estimate the impact of this stock built up since 2013 firstly by aggregating the cumulative value of R&D activity over that time period, depreciated each year to reflect the fact that technologies become obsolete over time. We then estimate the spillover to the rest of the economy from this accumulated R&D stock based on prior literature on the subject.

Local Area Definitions
Our local impact modelling is based around local authority districts in England and council areas in Scotland. The authority areas used to model each site are given below, which were selected as the closest authority areas to the site that captured the majority of employee residences.

Yeovil site
- South Somerset
- West Dorset

Edinburgh site
- City of Edinburgh
- West Lothian
- Fife

Luton site
- Central Bedfordshire
- Luton
- Dacorum
- St Albans
- North Hertfordshire

Southampton site
- Southampton
- New Forest
- Test Valley
- Eastleigh

Lincoln site
- Lincoln
- North Kesteven
- West Lindsey

Basildon site
- Basildon
- Chelmsford
- Rochford
- Castle Point
- Thurrock
- Brentwood

Bristol site
- City of Bristol
- South Gloucestershire
- North Somerset
- Bath and North East Somerset

Appendix B – About Oxford Economics

Oxford Economics was founded in 1981 as a commercial venture with Oxford University's business college to provide economic forecasting and modelling to UK companies and financial institutions expanding abroad. Since then, we have become one of the world's foremost independent global advisory firms, providing reports, forecasts and analytical tools on more than 200 countries, 250 industrial sectors, and 7,000 cities and regions. Our best-in-class global economic and industry models and analytical tools give us an unparalleled ability to forecast external market trends and assess their economic, social and business impact.

Headquartered in Oxford, England, with regional centres in New York, London, Frankfurt, and Singapore, Oxford Economics has offices across the globe in Belfast, Boston, Cape Town, Chicago, Dubai, Dublin, Hong Kong, Los Angeles, Melbourne, Mexico City, Milan, Paris, Philadelphia, Stockholm, Sydney, Tokyo, and Toronto. We employ 400 full-time staff, including more than 250 professional economists, industry experts, and business editors—one of the largest teams of macroeconomists and thought leadership specialists. Our global team is highly skilled in a full range of research techniques and thought leadership capabilities from econometric modelling, scenario framing, and economic impact analysis to market surveys, case studies, expert panels, and web analytics.

Oxford Economics is a key adviser to corporate, financial and government decision-makers and thought leaders. Our worldwide client base now comprises over 1,500 international organisations, including leading multinational companies and financial institutions; key government bodies and trade associations; and top universities, consultancies, and think tanks.

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The modelling and results presented here are based on information provided by third parties, upon which Oxford Economics has relied in producing its report and forecasts in good faith. Any subsequent revision or update of those data will affect the assessments and projections shown.

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