

# JEDHub Annual Economic Report 2024, Methodology and Quality Report

**JEDHub**  
Joint Economic Data Hub



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# JEDHub Survey and Report Analysis

## Annex A



# Overview

## 1. Background and Context

- The JEDHub is a collaborative initiative hosted at the UK Defence Solutions Centre (UKDSC) and sponsored by UK MOD, it is supported by other government departments, industry partners, and academia. The JEDHub team refers to the members of the MOD Industrial Programmes team, and analysts in the UKDSC Prosperity and Economic Data (PED) team who have worked on the JEDHub project.
- The report has been produced by the UKDSC with support from the UK MOD and the JEDHub Delivery and Industry Working Groups (DWG and IWG), based on analysis of data provided through the JEDHub Industry Survey 2023 and from other data sources such as the Office for National Statistics (ONS), ADS Facts and Figures and the Ministry of Defence (MOD).
- The methodologies included in this annex explain the processes followed by the UKDSC and MOD Industrial Programmes (Ind Progs) teams to collect data using the JEDHub Industry Survey through to producing the outputs in the report. The methodologies are presented according to the five chapters of the report.
- The purpose of the Industry Survey was to draw out new insights on the economic impact of the defence industrial base on the UK economy by collecting data directly from industry, especially the key defence producers. In contrast, other publicly available data on the economic impact of the defence sector, such as employment, is largely based on estimation and modelling. For instance, estimates on how many jobs the MOD supports in the UK is based on estimating the impact of defence spending in the UK.
- Areas surveyed by this year's report include: Revenue, Employment, Demographics, Supply Chain Spending, and Research & Development.

- When referring to the defence sector and/or defence activity, a working definition was agreed between the JEDHub Delivery Working Group, which included relevant cross-government and trade body experts:

**‘...the UK defence sector refers to all elements of operations within an organisation which are either a result of, or dependent on, contracts that are deemed to be supported by the MOD’s or foreign defence ministries’ operations. This involves classifying a firm’s operations as part of the UK defence sector if they benefit significantly from domestic and/or export defence sales of the 11 military industrial capabilities (as defined by the JEDHub) or if their operations are important to the development of those 11 military industrial capabilities through research and development.’**

- This definition, especially regarding the capability areas, underpinned the survey questions. Companies were asked to consider this when evaluating which elements of their business constituted defence activity.
- The survey was shared with a list of companies made up of UK companies only, including members of the Defence Growth Partnership (DGP) as well as companies which were deemed to be key suppliers to the UK defence industrial base. In total, we received 22 responses to the survey.

# Overview

## 2. Methodology

- The JEDHub has relied heavily on data provided by the JEDHub Industry Survey 2023 to provide specific insights about the UK defence sector. The data supplied by companies was anonymised and aggregated for analysis; further details about this tool can be found in Annex B (Slide 19).
- The analysis methodology for each chapter of the report can be found in the subsequent pages of this annex. Separate annexes are included for the analysis of DGP indirect jobs and ONS supply chain analysis as they were completed by government representatives on the JEDHub DWG.

The survey sought to gather data on:

- Company Revenue
  - Of which, defence
  - Source (by location and customer type)
  - Capability Breakdown (breakdown by domestic and international)
- National and Local Employment
- Supply-Chain data (by total/defence, and how much in the UK)
- Employment demographics (age, gender, wages, experience)
- Skills (including recruitment and employment of apprentices/graduate trainees)
- Research and Development (investment by capability, and funding sources)

- The following capability segments were agreed with DWG and IWG Members:
  - Air (Combat Air)
  - Air (Rotary Wing)
  - Air (Fixed Wing Other)
  - Cross-cutting and enabling capabilities
  - Cyber
  - Land
  - Maritime (Surface)
  - Maritime (Sub-surface)
  - Military C3 (Command, Control and Communications, including Crypt Key - excluding space and cyber capabilities)
  - Space
  - Weapons and ammunition (including missile systems).

## 3. Quality Assurance

The quality assurance of the analysis began with the data input, where the survey automatically checked for simple errors as the companies responded. The UKDCS and UK MOD worked closely with the companies to ensure accuracy and appropriateness of the responses before submission, and a subsequent manual Quality Assurance (QA) activity took place with every companies' submission.

Once the survey returns were in JEDHub team members reviewed responses for errors, comments and missing information. Access to the spreadsheets was kept to direct hires at the UKDSC, and members of the MOD Ind Progs team. Where applicable, the JEDHub team reached out to companies to request updated figures, or clarification of figures provided.

# Overview

- Manual checks of the key figures were carried out and compared against the aggregator tool to ensure reliability of results. In accordance with the data handling agreement, the aggregated and anonymised data set was saved onto a limited access, secure online platform for analysis purposes only. Access to the aggregated dataset was limited to individuals operating within the JEDHub team, including members in MOD and some direct hires at the UKDSC.
- All resulting data and analysis quoted in the report has been internally peer reviewed at the UKDSC and externally reviewed throughout the report development process by the UK MOD, DWG, IWG and an academic panel.
- In full transparency, all the data presented in the report has been made available publicly, with the permission of the data providers, following reviews for disclosure.
- The JEDHub Annual Economic Report has been written by the UKDSC following its principles of independent, impartial and data-driven analysis.

## 4. Relevance, Timeliness and Accessibility

- **Relevance:** the data from the JEDHub Industry Survey is based on the 22 responses received and so is not representative of all companies that operate in the defence sector, however, due to the size and importance of the companies surveyed, the JEDHub team believes the data presented is valuable and indicative of the wider defence sector's characteristics, particularly when supplemented with the external data sources in the report.

- **Timeliness:** the data from the JEDHub Industry Survey has an annual frequency, covering the calendar years of 2021 and 2022. Data from other sources covers a wider time scale, reaching back as far as 2013 – allowing for long-run trend analysis.
- **Accessibility:** the JEDHub Annual Economic Report has been produced in a visual style to promote ease of understanding and to ensure the key data points are not missed, with notes and explainers where appropriate. The full data tables are publicly available alongside the report on JEDHub.org.

## 5. Comparability

- Where appropriate, the JEDHub Annual Economic Report has made reference to other data and reports regarding other similar sectors. This is intended to contextualise the JEDHub data rather than draw comparative conclusions between different sectors.
- Due to the limited sample size, there is limited scope for drawing comparative conclusions against other data sources representative of different sectors.

# 1. People in Defence





# People in Defence

## 1. Background and Context

The People in Defence chapter of this report draws on JEDHub Industry Survey data and ONS data regarding the UK manufacturing industry to present a picture of employment related to the defence sector. This includes a total employment number for the surveyed sample at a national and regional level, how this compares to wider manufacturing, and the demographics of those employed by defence companies.

### i. Definitions

- *Full Time Equivalents (FTEs)*: a measure of employment that takes into account the total hours worked by both full time and part time employees, standardised by a common measure of full-time hours. We have chosen to base our FTEs on a 37-hour working week.

$$FTEs = (\text{Number of full – time employees} \times \left[ \frac{\text{average full – time weekly hours}}{37} \right]) + (\text{number of part – time employees} \times \left[ \frac{\text{average part – time weekly hours}}{37} \right])$$

- *Defence hours worked*: the total number of labour hours worked in the production of defence goods and services.
- *Indirect Jobs*: jobs supported within companies' supply chains resulting from companies' spending in that supply chain – see Annex D for full methodology (slide 26).
- *International Territorial Level 1 region*: geocode standard regions of the UK defined and recognised internationally for statistical analysis. These do not necessarily equate to political or cultural boundaries.
- *Total costs of wages and salaries of defence FTEs*: the sum of all basic pay relating to the pay period before deductions for PAYE, National Insurance, pension schemes, student loan repayments and voluntary deductions for defence FTEs. Includes paid leave (holiday pay), maternity pay, furlough pay, sick pay, area allowances (e.g. London), bonus or incentive pay, pay for a different pay period, shift premium pay, and overtime pay. This excludes contracted temporary or contingent workers, expenses, the value of salary sacrifice schemes, benefits in kind and all deductions.
- *Mean average salary*: the average annual salary paid to one defence FTE, including all basic pay relating to the pay period before deductions for PAYE, National Insurance, pension schemes, student loan repayments and voluntary deductions. Includes paid leave (holiday pay), maternity pay, furlough pay, sick pay, area allowances (e.g. London), bonus or incentive pay, pay for a different pay period, shift premium pay, and overtime pay.





# People in Defence

- *Median average salary*: the average salary taken by finding annual pay of the 50<sup>th</sup> percentile worker.
- *Linear interpolation*: a method of estimating the position of a third coordinate along a curve given two sets of coordinates.

## 2. Process

### i. Data sources

- JEDHub Industry Survey 2023
- [Region by broad industry group \(Standard Industrial Classification\) – Business Register and Employment Survey \(BRES\): Table 4](#)
- [Earnings and hours worked, UK region by industry by two-digit SIC: ASHE Table 5 - Office for National Statistics](#)

### ii. Method

#### Surveyed Defence FTEs:

- The JEDHub Industry Survey measured *defence FTEs* per company by calculating the total FTEs for the companies (including defence and civil employment) then multiplying the figure by *% total employment allocated to defence*. The individual company defence FTE numbers were then summed to produce a total number of defence FTEs
- The total value of surveyed defence FTEs was then divided by the share of international and domestic revenues as a proportion of total revenue to find the FTE's supported by each area.

#### DGP Indirect Jobs:

- Please see separate methodology annex for full breakdown of indirect jobs methodology.

#### Regional Defence FTEs:

- The JEDHub Industry Survey asked each company for a list of company sites, including postcodes, in the UK. For each of these sites, the companies were then asked for the total number of *defence hours worked* at each site. These postcodes were matched with the appropriate ITL1 region and summed the responses to generate total surveyed defence hours worked per region. This total was then divided by 1924 (equivalent to a 37-hour full-time working week) to generate the regional defence FTEs figure.



# People in Defence

## Demographics:

- All the demographics data in the report is presented as a proportion of the surveyed FTEs per question, no further calculations have been executed. The data might therefore not represent the full survey sample of FTEs.

## Median average salary:

- In the 2023 JEDHub Industry Survey the median salary was not measured directly, thus an estimation was made using linear interpolation with the data on salary bands. The companies in the JEDHub Survey were asked for the number of defence FTEs employed in different salary band (the salary bands were pre-defined with industry partners). The defence FTEs in each salary band in each were compiled together to produce the totals. The salary band with the 50<sup>th</sup> percentile of defence FTEs was identified as the £22,001 to £45,000 salary band, which captures the 12.89 to 55.56 percentiles. The following linear interpolation equation was then used:

$$\text{Median average salary} = \text{£}22,001 + \frac{(50 - 12.89)(45,000 - 22,001)}{55.56 - 12.89}$$

## Mean average salary:

- The JEDHub Industry Survey asked companies for their *total costs of wages and salaries for defence FTEs*, this number was summed by the survey aggregator. The total defence FTEs for the same sample of companies was calculated separately from the survey microdata (due to difference in response rate). The average salary was then calculated by simply dividing the total costs of wages and salaries for defence FTEs by the corresponding number of defence FTEs. Where companies were not able to provide both figures, their data was excluded from the average wage calculation.

## iii. Limitations and Assumptions

- The JEDHub Industry Survey captures responses from 22 companies and is unable to produce data representative of the whole UK defence sector.
- Since no statistical estimations have been made on the JEDHub Survey data, no statistical robustness or confidence testing has been conducted.
- The UK manufacturing sector is often used as a comparator for the defence sector as much of defence activity is manufacturing, however there is a significant element of service delivery in the defence sector which is difficult to define and might not be comparable to manufacturing.
- Whilst data was available on employment at a postcode level, the data is presented at an ITL1 regional level to avoid issues with disclosure.
- Surveyed employment doesn't include contracted temporary and contingent workers.
- Total costs of wages and salaries does not include the wages and salaries of contractors or temporary workers.

## 2. Investment and Skills





# Investment and Skills

## 1. Background and Context

The JEDHub aims to draw attention to the large volume of investment that takes place within the UK defence sector, in particular investment into the skills of the workforce and R&D, developing a specialised workforce and new technologies which might otherwise not exist in the UK economy. As a result, the defence industry should benefit from higher productivity and a higher quality of goods and services. Attention is drawn to this in the JEDHub Annual Economic Report by focusing on investment in people, through apprenticeship and graduate schemes, and investment in technology, through Research & Development.

### i. Definitions

- *Research & Development (R&D) (from the Frascati Manual)*: "creative and systematic work undertaken in order to increase the stock of knowledge - including knowledge of humankind, culture and society - and to devise new applications of available knowledge". Defence R&D activity includes any theoretical or practical research undertaken to develop ideas that might meet future defence or dual-use requirements, as well as any development work on future defence products, regardless of whether they go to market.
- *Production activity*: includes any physical production in the delivery of defence goods. This will include any new product builds as well as upgrade activities. This excludes any R&D activity or support for existing products.
- *Customer Services, Training & Support activity*: defence customer training, services and support activities include any non-manufacturing business services delivered to defence customers. This might include training customers in the use of a defence product, providing logistics and spares support for a defence product, providing consulting services to a defence customer, etc.
- *STEM-related employment*: Employment in Engineer, Scientist, Researcher, Technician and Technologist roles.
- *Production-related employment*: Roles which entail manufacturing production line work, as well as management of goods when in storage and transport.
- *Apprentices*: employees on specific apprenticeship training programmes.
- *Graduates*: employees on specific graduate training programmes.



# Investment and Skills

## 2. Process

### i. Data sources

- JEDHub Industry Survey 2023
- [Business enterprise research and development, UK \(designated as national statistics\) - Office for National Statistics \(ons.gov.uk\)](#) – Table 6

### ii. Method

#### Defence employment by product lifecycle:

- The Survey asked companies for the percentage of their total defence hours allocated to each of the three product lifecycle activities: Research & Development, Manufacturing & Production, Customer Services, Training & Support (and Other for remaining hours that cannot be attributed to the three categories). The number of defence hours worked within each of the lifecycle activities was calculated on a company-by-company basis by the Survey aggregator, and then summed for the total value. The overall percentage for the survey sample was then calculated based on total surveyed hours within each lifecycle activity.

#### Skills and trainee data:

- All the skills and trainee data in the report was collected in terms of defence FTEs, the Survey aggregator summed the values, and the data is presented as an absolute value or as a proportion of the surveyed FTEs per question, no further calculations have been executed. The data might therefore not represent the full survey sample of FTEs.

# 3. Defence Value



# Defence Value



## 1. Background and Context

The JEDHub Industry Survey captures data on turnover and supply chain spending, which together provide a measure of output and value added by the defence sector in the UK. This is important to contextualise the size and contribution of the UK defence sector to the UK economy. The JEDHub Annual Economic Report draws on the survey data to understand in which defence capability areas the surveyed companies operate, which customer sources the sector relies upon, and how productive the sector is relative to other manufacturing industries.

### i. Definitions

- *Total turnover*: the total of adding the values of sales of goods produced, goods purchased and resold without further processing, work done and industrial services rendered, and non-industrial services rendered for the survey year in question. This is before trade discounts, VAT and other taxes. Excludes repatriation of profits from overseas.
- *Defence turnover*: the amount of Total Annual Sales Turnover derived from Defence Related Activities for the survey year in question.
- *Capability area*: defence activities were defined according to 11 distinct capabilities areas as agreed with the DWG and IWG. Survey respondents were asked to apportion their total defence turnover according to these capability areas. Within these capability areas, companies were asked to attribute the proportions of revenue which came from domestic and international sources.
- *Gross Value Added (GVA)*: GVA measures the contribution of a company or a sector to the GDP of the economy. The JEDHub Annual Economic Report calculates GDP using the output approach.
- *Gross Value Added per FTE*: GVA per FTE is used as a proxy for productivity that measures the average gross value added per worker.
- *Output*: the sum of the value of goods and services produced by a company or sector over a given period of time.
- *Intermediate consumption*: the using of goods and services in order to produce other goods and services.
- *Intermediate goods and services*: goods and services which are themselves consumed in the production of other goods and services.



# Defence Value

## 2. Process

### i. Data sources

- JEDHub Industry Survey 2023
- [GDP output approach – low-level aggregates - Office for National Statistics \(ons.gov.uk\)](#)
- [Industry Facts & Figures - ADS Group](#) - (published in 2023, looking at 2022)
- [UK manufacturers' sales by product - Office for National Statistics \(ons.gov.uk\)](#)
- [Industry \(two, three and five-digit Standard Industrial Classification\) – Business Register and Employment Survey \(BRES\): Table 2 - Office for National Statistics \(ons.gov.uk\)](#)
- [Output per job, UK - Office for National Statistics \(ons.gov.uk\)](#)

### ii. Method

#### Total surveyed defence turnover:

- The JEDHub Industry Survey measured *total sales turnover* for the companies, and separately asked for sales turnover derived from defence customers. The Survey ensured that this number was below that of total sales turnover. This was then anonymised, and all company returns were summed together to produce a total figure.

#### Customer turnover:

- Survey respondents were asked to further breakdown the total defence turnover according to whom the associated contract was with; UK MOD, Other UK Government Departments, UK Industry, International Governments, or International Industry. The turnover from International Governments and International Industry was further broken down according to the region in which the customer was located. The company returns were then anonymised and summed together to produce total figures.

#### Capability turnover:

- Survey respondents were asked to breakdown their defence turnover into the 11 capability areas, and for each of these capability areas, the percentage from domestic and international customers. Using this data, it was calculated, for each company: the revenue from each capability area and how much of that revenue came from domestic/ international sources. These individual company values were then summed together to produce total figures.





# Defence Value

## Surveyed GVA:

- GVA was estimated for the surveyed companies using the production (output) approach, based on the following equation:

$$GVA = Output - Intermediate Consumption + Increase in Capital Inventories$$

Where *Output* is proxied by total defence turnover, *Intermediate Consumption* is proxied by total value of purchases used in the production of defence goods and services (see Defence Supply Chain methodology), and *Increase in Capital Inventories* is assumed to be zero. This calculation used the anonymised aggregated dataset to calculate GVA for the total surveyed sample. This calculation was only carried out with companies that had provided all the necessary data points.

## Surveyed GVA per FTE:

- Surveyed GVA per FTE was estimated using the estimated surveyed GVA and the total defence FTE figure calculated from the companies which had provided enough data for this calculation to be carried out fully. Total GVA in these companies was divided by total FTEs.

## Output per Job (ONS Manufacturing):

- The ONS UK manufacturing productivity average was used as a reference to contextualise the surveyed GVA per FTE. ONS output per job was calculated using table 12 (Annual Output per job by section-level industry aggregations, Current price (CP)), which estimates the output per job by section level industry by Standard Industrial Classification (SIC). We made the comparison to the figure calculated at current prices as this is the same approach that we use when calculating the JEDHub figure.

### iii. Limitations and Assumptions

- The productivity measure of surveyed GVA per FTE uses FTEs rather than a total jobs headcount, which is used in the ONS analysis of the manufacturing sector. This is to allow an accurate measure of defence-specific productivity. Therefore, whilst the ONS data is provided for context and reference a footnote is included in order to ensure readers are aware of differing methodologies. All turnover data is in nominal terms and has not been adjusted for inflation.
- No data has been provided on the levels of capital stock/inventory. Thus, the effects of changes in the capital stock have not been included in GVA calculations. The GVA estimate does not reflect the total survey sample.

## 4. Defence Trade





# Defence Trade

## 1. Background and Context

The Defence Trade chapter of this report draws on two different data sources; the UK Defence and Security Exports (UK DSE) organisation within the Department for Business and Trade (DBT), and the Janes Global Platforms and Systems (GPS) database. The chapter aims to provide an overview of the economic value generated by the sector through the export of UK materiel. The chapter also explores which countries and capabilities are important to UK defence trade, and any trends in those areas.

### Definitions

- *Value of Defence Orders*: The value of defence orders placed, in a given year
- *Value of Defence Deliveries*: The value of defence goods delivered to a customer, in a given year

## 2. Process

### i. Data sources

- [UK defence export statistics 2022 - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/statistics/uk-defence-export-statistics-2022)
- Janes GPS

### ii. Method

- DBT DSE: A comprehensive methodology is provided by UK DSE, accompanying the annual release of these statistics. This can be found [here](#). This data are the Official Statistics on trade in defence for the UK, and should be treated as the primary source of information in this area. These statistics assess the value of defence orders placed.
- Janes GPS: Janes describe the GPS database as covering ‘the 70 largest defence markets that Western-oriented firms can address’, accounting for over 98% of this Western addressable defence market space. The database provides a 10-year forecast of procurement and R&D programmes, as well as prior years’ actuals dating back to 2012. The dataset is pulled together using a web-scraping process conducted by a team of analysts, alongside inputs from country and regional experts. This is a similar methodology that is used elsewhere to produce export data. Where possible, Janes GPS uses official government sources (budgets, strategy reviews, contract data etc.). It also draws on trade press reporting and company press releases. US data is primarily sourced from US DoD procurement and RDT&E justification documents. The dataset measures exports and imports as sales from the systems and components source country to final product end-customer, regardless of any intermediary transactions or international movements. This method ensures there is no double-accounting and allows for more accurate tracking of UK-produced components of platforms.

# 5. Defence Supply Chain



# Defence Supply Chain



## 1. Background and Context

The purpose of the Defence Supply Chain chapter in this report is to investigate the structure and spending within the UK defence supply chain. An analysis of MOD expenditure looks at the key figures, but also considers how attributes like spending by competition type, and spending with SMEs has evolved over time. The JEDHub data helps to explain the interconnectedness of the UK defence industrial base, by examining how much spending has occurred in the UK and abroad, and with how many domestic and international companies.

### i. Definitions

- *Direct suppliers*: suppliers with which companies directly source goods and services from, this may include parent companies and subsidiaries.
- *Supply chain spending*: the value of goods and services purchased by the UK entity of a surveyed company. Measured as the sum of money paid into a supplier's bank account over a given period of time.
- *Supply chain purchases used in the production of defence goods and services*: the value of goods and services purchased which are consumed in the production of defence outputs by the purchasing company. These purchases are taken to be the amount of intermediate consumption in defence production.
- *Supply chain purchases on defence goods and services*: the value of other defence goods and services bought by the purchasing company from other defence suppliers. These goods may or may not then be used in the production of further defence goods and services.

## 2. Process

### i. Data sources

JEDHub Industry Survey 2023

[MOD trade, industry and contracts 2022 - GOV.UK](#)

# Defence Supply Chain



## ii. Method

Total supply chain purchases, and derivative data points:

- All supply chain data from the JEDHub Survey was first calculated on a company-by-company basis, before aggregation for the total surveyed values. No further data manipulation was required.

JEDHub Industry Survey Microdata Analysis:

- The UKDSC Analysis team looked at the anonymised microdata for the JEDHub Industry Survey. In some analysis, the responses were split into two groups, those with defence turnover greater than £1bn and those with turnover less than £1bn, to proxy for large and small companies.
- Median data points for the number of suppliers were used within the supply chain dataset. The median was preferred over the mean due to it being more representative of the typical company.

For ONS Microdata Analysis please see Annex C.

## iii. Limitations and Assumptions

- Due to the relatively small sample size, it was not possible to identify Small to Medium Enterprises (SMEs) within the JEDHub Survey, and thus comparisons cannot be made with other data on SMEs.
- The jobs identified in the ONS BRES dataset are not limited to defence-specific employment. Instead, they relate to all employees in companies which have at least some defence activity.

# Industry Survey Aggregation

## Annex B



# Survey Response Aggregation

## 1. Context

- Survey responses were collected using a secure online platform which has been tested and security-assured. This was implemented in support of response security, response validation, ease of completion and ease of aggregation.
- To enhance respondent anonymity, responses were tagged with a ‘token’, a unique code representing a respondent. This ensured that any information stored locally relating to company responses would not be directly attributable to the companies.
- Data was aggregated following quality assurance by the JEDHub team.

## 2. Approach

- Aggregation was carried out by compiling all company responses into a “master sheet”. In this master sheet, all identifiers relating to the data were removed, to ensure anonymity.
- Questions were aggregated in one of 3 ways;
  - Wholly; a count and total were calculated based upon all responses. This aggregation approach was utilised for calculations such as total defence revenue.
  - Per-company; calculations were made on a per-company basis, before being aggregated by the ‘Wholly’ method above. This approach was utilised for sections such as supply chain, where calculations involving multiple question responses were required. This ensured appropriate weightings.
  - Lookup; postcode-based responses were matched against an International Territorial Level (ITL) dataset, and grouped based upon these responses using the ‘Wholly’ aggregation.

## 3. Aggregation Handling

- The master spreadsheet, which was the base from which the aggregation was carried out, was stored on a secure online platform, which could only be accessed by select UKDSC direct hires, and select members of the MOD Industrial Programmes team.
- The aggregated dataset, which contained no identifiers, and followed a non-disclosive approach, was shared with select HMG analysts to allow them to make their contributions to the Annual Economic Report.



# Supply Chain Analysis using ONS Microdata

Annex C



# Supply Chain Analysis – ONS Microdata<sup>1</sup>

## 1. Background and Context

The purpose of analysing the ONS microdata obtained under Data Access Agreement by MOD is to provide additional insights and context for the businesses that are identified as selling military manufacturing products,<sup>2</sup> and hence can be seen as being part of the Defence sector. This helps provide an estimate of these businesses' sales and employees broken down by Standard Industrial Classification (SIC) and International Territorial Level (ITL) 1 region. This complements the analysis of the JEDHub survey responses contained elsewhere in this Report and includes a larger group of businesses than responded directly to the survey.

It is important to note that the analysis of ONS microdata in this Report only contains businesses that are identified as selling **manufactured military goods** as defined in the UK Manufacturers' sales by product (PRODCOM) dataset.<sup>2,3</sup> Some of these businesses will have responded to the JEDHUB survey but these cannot be identified separately due to the data protection rules of the JEDHUB survey and the microdata Data Access Agreements in place. This analysis does not include sales of services for military purposes, as these data are not contained in PRODCOM.

## 2. Methodology and Production: General Overview

The analysis in this Report is based on:

- PRODCOM<sup>3</sup> data for UK for 2022; BRES<sup>4</sup> microdata for 2022 for Great Britain.

### PRODCOM Methodology

PRODCOM data for reference period 2022 were analysed in the following ways:

- The data was extracted from PRODCOM on the four Military codes.<sup>2</sup> Data was then checked for duplicates and a flag was marked for volume and values.

Analysis and aggregation of this processed output file was undertaken to produce the charts and visualisations within this Report. There was a focus on the aggregated sales and count of businesses within each of the Military codes.

### Limitations/Assumptions:

The selection of the four Military codes is assumed to include major defence manufacturing businesses and hence represents a significant proportion of the UK defence sector. However, it does not represent the entirety of the UK defence sector as many suppliers of military goods and services, particularly sub-systems and IT and testing services may not be captured by the selection of the four military codes within this analysis.

1. Microdata have been obtained under Data Access Agreements from Office for National Statistics (ONS) to undertake this analysis.
2. The group of businesses included in the analysis is defined by their presence in the microdata for four military-use PRODCOM codes: 30119999 Manufacture, installation and repair of military vessels and parts thereof, 30309999 Manufacture, installation and repair of military aircraft and parts thereof, 30409999 Manufacture of military fighting vehicles and 25408999 Manufacture of military weapons and parts thereof.
3. Manufacturers' Sales by Product Survey (PRODCOM)
4. Business Register and Employment Survey (BRES)

# Supply Chain Analysis – ONS Microdata

## ii) BRES (ONS) Methodology

BRES data for reference period 2022 were analysed in the following ways:

- These data were mapped against the Reporting Units<sup>5</sup> that had a Military code from the PRODCOM data.
- The variables of interest for each Reporting Unit were: i) *weighted\_totempee*; ii) division (the 2 digit SIC classification of the Local Unit<sup>6</sup>); and iii) region (the ITL Level 1 region of the Local Unit).

Analysis and aggregation of this processed output file by Division and Region was undertaken to produce the charts and visualisations within this Report. There was a focus on aggregating the employees of Reporting Units with military products sales and breaking down the employees of Reporting Units by SIC division and ITL 1 region.

### Limitations¥Assumptions:

It is important to note that the BRES analysis contained in this Report cannot be broken down into which jobs are associated with military output within each Reporting Unit. This detail is not included in the BRES business questionnaire.

5. Reporting Unit is the unit of the business which is sent a questionnaire. Responses generally cover the whole enterprise, but can be broken down into separate sub-units (called Local Units)

6. An individual site (for example a factory or shop) in an enterprise is called a **local unit** (ONS).

# Supply Chain Analysis – ONS Microdata

## 3. Quality Management and accuracy

The data processing and outputs from the PRODCOM and two BRES files were independently checked and verified by a statistical team using a different coding language, and any errors were corrected. ONS officials advised on disclosure control issues within the output files. Chart files were independently produced from the processing work, and checked by a third team. Data were compared with ONS published sources for PRODCOM 2021 and where close similarities were found, this was taken as indirect evidence that analysis of ONS microdata contained in this Report had been undertaken correctly and findings in this Report are accurate.

## 4. Relevance, Timeliness and accessibility

**Relevance** - The analysis of ONS microdata linked to businesses that sell manufacturing military products is relevant to users that wish to know more about their estimated product sales and employee totals, industry and ITL Level 1 distribution which is not available in open source, published tables.

This analysis will be of interest to users from media, politicians, policy professionals, students and members of the general public.

**Timeliness** - The analysis in the Supply Chain section uses the latest data available with a reference period of 2022.

**Accessibility** - is maintained by providing visualisations of data with accompanying narrative and any caveats or notes to the charts provided on the same page.

## 5. Comparability

i) These data should not be directly compared with Official Statistics published by MOD on employment supported by MOD expenditure with industry<sup>7</sup>. This is due to a number of source data and methodology differences:

- The data used in the product level supply chain analysis contained in this Report is derived from ONS microdata sources. Published MOD Official Statistics are based on Management information held within internal payment systems.
- Data on total employees in the analysis contained in this Report includes all jobs associated with matched Reporting Units in the Sample Frame whereas MOD statistics estimate direct and indirect jobs associated with MOD direct spending with industry. As such, analysis in this Report will include some jobs associated with civilian output produced by businesses selling military products but MOD statistics on direct and indirect jobs are only those associated with MOD spending. The latter estimates are therefore based on a different definition of the defence sector in the UK to the analysis in this Report. They also do not include export-related employment.
- Both methods and analysis therefore have some limitations and care should be taken with the interpretation of their respective findings. Further background quality information about Official Statistics on employment supported by MOD Expenditure is published by MOD.<sup>8</sup>

7. [MOD regional expenditure with UK industry and commerce and supported employment 2021/22](#)

8. [Background quality report: MOD regional expenditure with UK industry and commerce and supported employment 2021/22](#)

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ii) The ADS Group (Aerospace, Defence, Security & Space) also produce an estimate of direct jobs supported in the Defence Sector in their annual Industry Facts and Figures report<sup>9</sup>.

The ADS method uses MOD spending data as its initial source but excludes elements of spending that aren't considered as defence, and includes an estimate of jobs supported by defence export orders, to produce an overall estimate based on a definition of the 'Defence Sector'.

For similar reasons to the comparability of MOD Official Statistics, the analysis of BRES microdata in this Report should not be directly compared to the ADS estimates. They are using different data sources and methodologies to estimate the number of defence employees in the UK.

## 6. Confidentiality and Security.

This analysis was produced under Data Access Agreements between MOD and ONS, permitting access to PRODCOM and BRES 2022 microdata files.

All data has been held on secure networks and systems which have been accredited by the MOD. Data shared between the ONS, has been via an online secure file transfer platform.

We have ensured appropriate Disclosure Control protocols were used to produce the analysis contained in this Report. These disclosure controls have been checked by ONS, so data is only shown in aggregate and by categories such as SIC classifications and ITL 1 territories of the UK.

In BRES analysis, data have been rounded to the nearest 1,000 employees and to the nearest £ thousand or £ million in PRODCOM to protect individual data points being disclosed.

9. [Facts & Figures 2022 - ADS](#)

# DGP Indirect Jobs Estimate

Annex D



# Supply Chain Analysis – ONS Microdata

## 1. Background and Context:

- The ONS publishes FTE employment multipliers which estimate the number of jobs a given industry supports outside of itself, through its purchases of goods and services. Estimating indirect jobs supported by a sector provides a more comprehensive understanding of the economic impact of the sector in terms of workforce.
- This excludes so-called “induced” jobs supported by the spending of employees of a sector within the economy. This analysis was completed on behalf of the JEDHub by a member of the Department for Business and Trade, Advanced Manufacturing Directorate.

## 2. Methodology:

- These figures are derived using the ONS Analytical Input Output Tables (2019) which gauge where the supply of good and services into the UK economy come from (domestically produced or imported) and where they go to – either to industry, households, capital formation or exports. Where an industry is purchasing goods and services produced within the UK this creates demand for UK production and therefore employment.
- These multipliers are based on a “whole industry” level so do not take any account of jobs that may be supported “within itself” – for example UK automotive manufacturers buying from other UK automotive manufacturing businesses. This is one reason why these multipliers may seem less than what individual businesses themselves might claim to support in terms of indirect jobs.

- To apply a similar process to the members of the Defence Growth Partnership firms we needed their employment level and the SIC code for their company. Using DGP companies defence FTE employment we applied the identified indirect job multiplier for the given SIC code. Following this step, we considered the value of each DGP members defence turnover in the supply chain of other DGP members, and removed associated defence employment to avoid double counting. This resulted in our estimate of indirect jobs supported by DGP members.

## 3. Limitations:

- DGP business are large, often covering wide variety of activities and the SIC codes recorded on their Companies House Records do not always reflect the solely defence aspects of their business.
- For 2 of the 11 DGP members full survey responses were not given. In these instances, imputed figures were calculated using averages from the other DGP companies, as well as past survey responses. This allowed a calculation of an estimate for all 11 DGP companies.

# Capability Areas to Domains

## Annex E





# Defence Capability Areas and their Associated R&D Domains

11 turnover Capability Areas in the 2023 JEDHub Industry Survey	R&D Domain
Land	Land
Maritime: Surface	Maritime
Maritime: Sub-surface	Maritime
Air: Combat Air	Air
Air: Rotary Wing	Air
Air: Fixed Wing Other	Air
Cyber	Cyber
Space	Space
Weapons and Ammunitions (including missile systems)	Most relevant domain. Assign unattributable expenditure to 'Other'
Military C3 (Command, Control and Communications, including Crypt Key - excluding space and cyber capabilities)	Other
Cross-cutting and enabling capabilities (ISR; CBRN; EMA; T&E)	Other