



Department for
Digital, Culture,
Media & Sport

DCMS Sectors Economic Estimates: Employment Quality assurance report

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Introduction

The **DCMS Sectors Economic Estimates 2018: Employment** statistics were published on 26 June 2019 and provide an estimate of the number of jobs in DCMS sectors. This document summarises the quality assurance processes applied during the production of these statistics and includes a detailed account of the quality assurance processes and the data checks carried out by our data providers (Office for National Statistics)¹ as well as by DCMS.

Data Sources

The following data sources were used in the production of Employment estimates for DCMS sectors:

1. **The Annual Population Survey (ONS)**, which uses data from two waves of the Labour Force Survey
2. **The UK-Tourism Satellite Account (ONS)**, which uses a variety of data sources to produce direct tourism estimates for employment and GVA.

Estimates of employment are calculated from the ONS Annual Population Survey. As with other statistics in the Economic Estimates series, categorisation of DCMS sectors is based on the Standard Industrial Classification (SIC) codes. Data are available for each DCMS sector; and also for sub-sectors within the Creative Industries, Digital Sector, and the Cultural Sector.

Quality assurance processes at ONS

Quality assurance at ONS takes place at a number of stages. The various stages and the processes in place to ensure quality for the data sources are outlined below. It is worth noting that information presented here on the data sources are taken from the Annual Population survey Quality Methodology Information (QMI) and the Tourism Satellite Account quality and methodology section of the latest publication and should be credited to colleagues at the ONS.

ONS Annual Population Survey

The Annual Population Survey (APS) is a continuous household survey, covering the UK. The topics covered include employment and unemployment, as well as housing, ethnicity, religion, health and education.

The purpose of the APS is to provide information on important social and socio-economic variables at local levels. The published statistics enable monitoring of estimates between censuses for a range of policy purposes and provide local area information for labour market estimates. The APS is not a stand-alone survey, but uses data combined from two waves of the main Labour Force Survey (LFS) with data collected on a local sample boost.

Sampling frame

The sampling frame for the survey in Great Britain is the Royal Mail Postcode Address File (PAF) and the National Health Service (NHS) communal accommodation list. Due to the very low population density in the far north of Scotland (north of the Caledonian Canal), telephone directories are used as sampling frames. A systematic sample is drawn each quarter from these three sampling bases, and as the PAF is broken down geographically, the systematic sampling ensures that the sample is representative at regional level.

In Northern Ireland, the Rating and Valuation Lists (which serve for the administration of land taxes) are used.

Sample design

The APS survey year is divided into quarters of 13 weeks. From January 2006, the APS has been conducted on the basis of calendar quarters: January to March (Quarter 1), April to June (Quarter 2), July to September (Quarter 3) and October to December (Quarter 4). The APS design is not stratified.

The APS combines data from 4 successive quarters of the Labour Force Survey (LFS) with rolling-year data from the English, Welsh and Scottish Local Labour Force Survey (LLFS). Each quarter's LFS sample of private households is made up of 5 waves, each of approximately 12,000 households. Each cohort is interviewed in 5 successive quarters, so that in any one quarter, one cohort will be receiving their first interview (this is wave 1), another cohort their second (this is wave 2), and so on.

The APS data set is created by taking waves 1 and 5 from 4 successive quarters to obtain an annually representative sample of around 80,000 households. Over the period of the 4 quarters, waves 1 and 5 will never contain the same households to avoid the inclusion of responses from any household more than once in the dataset.

Data collection

Interviews in all waves are carried out either on a face-to-face basis with the help of laptops, known as Computer Assisted Personal Interviews (CAPI) or on the telephone, known as Computer Assisted Telephone Interviews (CATI). Information is collected using a software package called Blaise.

Validation and quality assurance

- Accuracy is the degree of closeness between an estimate and the true value. As the Annual Population Survey (APS) is a sample survey, it provides estimates of population characteristics rather than exact measures. Confidence intervals are used to present the sampling variability of the survey. For example, with a 95% confidence interval, it is expected that in 95% of survey samples, the resulting confidence interval will contain the true value that would be obtained by surveying the whole population.
- Comparability is the degree to which data can be compared over time and domain, coherence is the degree to which data are derived from different sources or methods but refer to the same topic and are similar. Some sources provide data that overlap with APS data on employment, unemployment and earnings. More information on these sources are available [here](#).
- [Statistical disclosure control](#) methodology is also applied to the datasets before release. This ensures that information attributable to an individual is not disclosed.
- On each quarterly APS dataset, the variable frequencies are compared with the previous period. This identifies any significant discontinuities at an early stage. All discontinuities judged significant are investigated to determine the reason for the discontinuity. Is it the product of questionnaire revision or processing error, derived variable revision or error or real world change? This process also ensures that the metadata associated with each variable are correct.
- Specific main derived variables are checked in detail by extracting the underlying variables and recalculating in another application, then comparing the results with the values in the dataset. This ensures that the program used to calculate the derived variables is working correctly.

UK-Tourism Satellite Account

Tourism data are based on a different methodology to other DCMS sectors as they are taken from the UK-Tourism Satellite Account (UK-TSA). Information on the UK-TSA is shown below.

The UK-TSA provides information about the demand for goods and services associated with the activity of tourists and the relationship of this demand to the supply of such goods and services within the UK economy.

The UK-TSA sets out the contributions that tourism makes to the economy of the UK as a whole, and to individual “tourism industries” in particular. Such industries invariably serve tourists and non-tourists alike and the UK-TSA includes a series of tourism ratios, which are used to estimate the proportions of products supplied in the UK that are consumed by tourists. The TSA methodology is necessary because tourism is defined by the characteristics of the consumer, in terms of whether they are a tourist or resident, rather than wholly by the characteristics of the industry.

Data sources used to compile the UK-TSA

Data Source	Nature of data	Use in UK-TSA
International Passenger Survey (IPS)	An ONS survey that collects information about passengers entering and leaving the UK, and has been running continuously since 1961.	Estimates of the expenditure on visits by overseas visitors are combined with estimates of expenditure on fares paid to UK carriers for inbound travel to calculate total inbound tourism expenditure.
Input-output supply and use tables	Part of the UK National Accounts system. The tables relate to supply of products, demand of products (split into intermediate and final demand) and households final consumption expenditure (HHFCE).	
Great Britain Tourism Survey (GBTS)	An annual survey jointly sponsored by national tourist boards.	The GBTS total expenditure is used to calculate the total domestic tourism expenditure figure broken down by products, classes of visitor and types of trips.
Great Britain Day Visits Survey (GBDVS)	An annual survey that measures the volume, value and trip characteristics of tourism day visits in Britain.	Analysis of visits from holiday bases using data from the Great Britain Day Visits Survey is used to finalise the product breakdown for total domestic tourism expenditure.
Northern Ireland Continuous Household Survey	An annual survey that asks questions on a variety of topics, such as tourism, sport and education.	The GBTS and GBDVS do not interview residents from Northern Ireland. Data from Northern Ireland day visits are combined with the GBDVS and overnight visits are combined with the

		GBTS to get UK total figures.
Morgan Stanley Survey of Airport Spend	A survey which provides an estimate of expenditure by product in UK airports.	The survey provides an estimate of domestic tourism on outbound trips which are combined with other domestic spend data, as listed above.
Consumer Trends	A quarterly and annual release of the Household final consumption expenditure. The estimate of HHFCE where net tourism expenditure is included is called the UK national estimate.	The data are broken down by product and this has enabled the conversion of expenditure by product from tourism surveys to latest equivalents.
Annual Business Survey (ABS)	An ONS structural business survey, a sample survey of enterprises	Data from the ABS is used to determine the number of enterprises in tourism characteristic activities.
Annual Population Survey (APS)	A continuous household survey that provides information on important social and socio-economic variables at local levels.	APS data are also used to split the output of accommodation services between "accommodation services for visitors" and "food and beverage serving activities" industries. This is done by examining the proportion of people engaged in occupations relating to accommodation, and food and drink in the accommodation industry.
Annual Survey of Hours and Earnings (ASHE)	An annual survey that provides information about the levels. Distribution and make-up of earnings and hours paid for employees within industries, occupations and regions in the UK.	ASHE data is used to determine the average hours worked in tourism characteristic industries to better determine the full-time equivalents estimates
Input-output and supply and use tables: Make Matrix (MM)	A detailed supply table showing the value of products produced by each industry.	Results derived from the MM are used solely to apportion industry, or activity, output across tourism products.

Quality assurance processes at DCMS

The majority of quality assurance of the data underpinning the DCMS Sectors Economic Estimates Employment release takes place at ONS, through the processes described above. However, further quality assurance checks are carried out within DCMS at various stages.

Production of the report is typically carried out by one member of staff, whilst quality assurance is completed by at least one other, to ensure an independent evaluation of the work.

Data requirements

For the APS data, DCMS discusses its data requirements with ONS and these are formalised as a Data Access Agreement (DAA). The DAA covers which data are required, the purpose of the data, and the conditions under which ONS provide the data. Discussions of requirements and purpose with ONS improve the understanding of the data at DCMS, helping us to ensure we receive the correct data and use it appropriately.

For the UK-TSA data, DCMS has a Memorandum of Understanding (MOU) with the Tourism Intelligence Unit at ONS to record the agreement between DCMS and ONS in relation to the provision of tourism related accounting and analysis of services.

Checking of the data delivery

For the APS data, DCMS checks that the data delivered by ONS match what is listed in the Data Access Agreement (DAA). For this particular release we check that:

- We have received all data at the 4 digit SIC code level, which is required for us to aggregate up to produce estimates for our sectors and sub-sectors.
- Data at the 4 digit SIC code has not been rounded unexpectedly. This would cause rounding errors when aggregating up to produce estimates for our sectors and sub-sectors.

For the UK-TSA, DCMS checks that the data delivered by ONS match what is listed in the MOU, particularly:

- Data at the 4 digit SIC code level has been provided for each tourism characteristic activity
- Any revisions to the previous data have been calculated correctly using the most up to date ratios.

Data analysis

At the analysis stage, data are aggregated up to produce information about DCMS sectors and sub-sectors.

For the 2018 estimates, table production was carried out in the programming language R as part of the automation work being undertaken in DCMS. In order to ensure that these were correct, tables were first produced for the 2017 estimates for comparison with the estimates published in July 2018.

Tourism direct employment data for 2016 and 2017 published in the 2017 Employment release were provisional and were updated in November 2018 when the UK-TSA was published. A data request is made to the Tourism Intelligence Unit at ONS to provide the latest direct employment figures for 2017 and 2018 which are quoted as provisional and subject to change when the UK-TSA is published in November 2019.

Once tables for 2018 were produced the Employment statistics lead also builds in the following checks at this stage:

- Checks that summing up breakdowns gives the same figure as the total they contribute to. E.g.:
 - Do sub-sectors within the Creative Industries sum to the Creative Industries total?
 - Do the individual regional figures sum up to the total for that sector?
- “Sense checks” of the data. E.g.:
 - Are the proportions of each sector and subsectors similar to last year? If not, could this be because of changes to the APS or UK-TSA methodology?
 - Looking at any large differences between the data and possible causes to these.
 - Has the updated UK-TSA direct employment figures been used and revisions have been made to the previous DCMS sectors total employment figure.

Quality assurance of data analysis

Once analysis is complete, DCMS document the checks needed for quality assurers to carry out. The checks cover:

- Ensuring the correct data are used for the analysis. For example:
 - Checking the latest APS and UK-TSA data been used, including the revised back series data.
 - Sense checking whether the data looks sensible i.e. comparing against previous year’s figures.
- Checking that the correct SIC codes have been aggregated together to form DCMS sector (and sub-sector) estimates. Are all SIC codes we require included? Are there any non-DCMS SIC codes that have been included by accident?
- Making sure it is not possible to derive disclosive data from the figures that will be published.
- Making sure the correct data has been pasted to the final tables for publication and are formatted correctly.
- Making sure all charts are linking to the right data and all maps produced are using the correct data.

Dissemination

Finalised figures are disseminated within Excel tables and a written report (which includes written text, graphs, tables and infographics) published on GOV.UK. These are produced by the Employment statistics lead. Before publishing, a quality assurer checks the figures match between the working-level analysis, the tables and the written report. The quality assurer also makes sure any statements made about the figures (e.g. regarding trends) are correct according to the analysis and checks for spelling or grammar errors.

Next steps

We encourage our users to engage with us so that we can improve our statistics and the documentation surrounding them. If you would like to comment on this quality assurance report, or have any enquiries please get in touch at evidence@culture.gov.uk.



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