

Developing integrated economic statistics systems - learning from the past: paper for UN workshop on Economic Censuses: July 2005

Stephen Penneck, Statistical Outputs Group Director

Summary

This paper recognises nearly 100 years of economic censuses in the UK. The historical perspective is used to draw themes which have characterised the development of economic surveys over the last century: compliance management; use of sampling; comprehensive industry coverage; greater integration and improved timeliness. The paper shows how these have continued to be the themes for new developments at the ONS: the development of a fully integrated Annual Business Survey.

A historical perspective

The early censuses of production

The first economic census was in 1907, carried out under the 1906 Census of Production Act. The impetus for it came from tariff policy - to enable production levels to be compared with imports - an area that was to continue to stimulate demands for industrial statistics up to the Second World War. The UK had come late by some standards to running a census of production - fifty years behind the USA - and there was deep suspicion from manufacturers. Although the Census Bill was proposed by Lloyd George and had opposition support from Joseph Chamberlain, there was a concern from individual MPs about manufacturers losing trade secrets. 'A great invasion of public liberty'; concern that government 'had got into its hands the possibility of prying into the secrets of trade and commerce'; 'sacrificing their liberty to a gang of clerks in Whitehall'; 'a most important bill of a very far reaching and revolutionary character' are some of the comments in the parliamentary debate. There was lengthy discussion on the need to keep the data confidential, concern about the burden on businesses supplying information and no agreement on whether the census should be held annually or every two or five years. The latter question was not fully resolved until the 1950s.

In its final form the Act severely limited the amount of data that could be collected. The first censuses focused on statistics of output and employment. Such was the importance given to this new development by government, however, that the first meetings of the Census of Production Advisory Committee were chaired by Lloyd George, as President of the Board of Trade.

In 1911 censuses were made quinquennial, and this became the pattern for the next 50 years. The processing of the 1912 census was still in progress during the First World War and it was not published until the results of the first post war census for 1924. Censuses were also held for 1930 and 1935. Each census was designed afresh from its predecessor, making comparability difficult - eg the first two censuses covered the whole of Ireland. Different exemptions were given each time for the smallest businesses.

The 1944 White Paper on Employment policy called for the census to be made annual. This was put into practice by the 1947 Statistics of Trade Act which required the Board of Trade to conduct an annual census. Detailed censuses were conducted for 1948, 51, 54, 58, 63 and 1968, with censuses in intermediate years only collecting summary information. In 1952 sampling was introduced for businesses employing less than 10 people.

In the early 1950s, concern about compliance costs grew and a committee of inquiry under the industrialist Sir Reginald Verdon Smith was set up to determine the policy for future censuses. The 1954 Verdon Smith Report accepted the importance of the censuses and confirmed the pattern of periodic censuses of production every four to five years with censuses of distribution every ten years, supplemented by intermediate sample surveys. It considered the case for collection of data from a wider (more complete) range of service industries but concluded that 'there does not appear to be an immediate need by government.' It called for the use of more sampling and exemption for small businesses, and also recommended that businesses should be given advance notice of the questions to be asked. The committee's recommendations were implemented from 1955 in a series of summary censuses, preliminary results for which were published within a year.

1958 was the first full detailed census to employ sampling methods, with an exemption limit raised to 25 employees. During the late 1950s voluntary short period surveys for stocks and capital expenditure were introduced, and these were co-ordinated with the censuses to exempt these questions for those responding. Summary censuses from 1959 through to the 1960s were on a business unit rather than an establishment basis. This meant that respondents could not be allocated to the detailed industries possible for the full censuses, and restricted the detail of the industry results.

1968 was the last detailed census of the type which had been developed since 1907. Full censuses, which resulted in a series of detailed reports by industry, were still taking five years to publish - as they had sixty years earlier.

Initial surveys of distributive and services trades

Official surveys of the economic activity of the distributive and service trades did not begin until 1950 with the first Census of Distribution. The first census (and subsequent censuses) took three years to publish. The Verdon Smith report recommended such a census every ten years, and that became the pattern with censuses in 1961 and 1971. Sample surveys were conducted in the mid census years of 1957 and 1966. These censuses were used as the framework and benchmarks for the retail sales index and consumers' expenditure estimates, but the detailed statistics, especially on shops, for each large town, made them exceptionally valuable for research by local authorities and academics.

At that time there was no maintained register of service businesses and the censuses were conducted by field listing premises which were collated and then sent postal questionnaires. The service trades covered were essentially services to consumers provided through shop front premises - hairdressers, caterers, motor trades, repairs, funeral directors, laundries. Initially these surveys were periodic, and became annual, but often with larger scale periodic surveys supporting 'slim line' annual surveys. In the mid 1980s these surveys became the annual Distributive and Service trades Inquiries (DSIs) which provided a more systematic approach to structural data collection for these industries.

The 1966 Estimates Committee report and the new system of industrial statistics

The House of Common Estimates Committee conducted an inquiry into the Government Statistical Service in 1966. The concern was mainly about whether statistical advice was having sufficient impact in decision making and the committee particularly looked at the decentralised structure of the GSS. Their report was instrumental in the creation of additional senior statistician posts in departments in the late 1960s. They expressed a need for greater comparability between data sources, and argued that once collected, statistics should be fully exploited by their use in a large variety of ways. The committee pressed for a common register of businesses across government, to improve comparability and efficiency.

Following that report, significant improvements were made to industrial statistics, including the development of a common business register (later to become the Inter-Departmental Business Register); a new series of quarterly sales inquiries, collecting the product detail previously collected only in the quinquennial Census of Production; and simpler Annual Censuses of Production (ACOP) and Distributive

and Service trades Inquiries. What was envisaged was an integrated reporting system, where through quarterly, annual and periodic surveys, all the information needed could be collected. It was hoped this information would be of commercial value to industry as well as useful to government. The new Business Statistics Office (BSO) - quickly to become established in Newport and now part of the Office for National Statistics - was set up to take this initiative forward. All the new surveys were initially complete censuses, with only the smallest businesses exempt.

The Rayner review

The 1981 Rayner review cut back statistical budgets by 25 per cent. Government concluded that 'the burdens [of data collection] it imposes on the taxpayer and the form fillers are no more than is essential for the efficient discharge of its functions': the so-called 'Rayner doctrine' which identified government as the sole user of government statistics. The savings made included making the Census of Employment triennial instead of annual, and introducing sampling; reducing the quarterly sales inquiries; introducing more sampling in ACOP; and making inquiries into distribution and services biennial instead of annual. The scale of the Rayner reductions had a significant impact on the quality of economic statistics.

Early 1990s - reviews and developments

During the late 1980s concerns had grown about imbalances in the national accounts. The resulting uncertainty was thought to have contributed to poor policy judgements and overheating of the economy. The Pickford report recommended substantial improvements in economic statistics, and changes in organisational structure, transferring the BSO from the Department of Trade and Industry (DTI) to the Central Statistical Office (CSO). The intention was to reinforce the position of the national accounts as a key customer for business surveys and provide a drive for their development.

Much of the focus of the Pickford report is on short term indicators, and it says little about the annual structural surveys. The main role of the annual surveys at that time continued to be to provide weights and detailed structural statistics to support the five yearly national accounts rebasing, rather than providing input into an annual national accounts process. Pickford highlighted the differences between the employment estimates from ACOP and the Census of Employment, which had grown to over 10% by the mid 1980s. At the same time the 1988 Armstrong Rees Review of DTI statistics, set up by the DTI following their concern at the compliance cost for surveys faced by UK businesses, recommended a reduction in the sample size of ACOP from 16,000 to 13,000, and the introduction of rotational sampling in the Distributive and Service trades Inquiries.

Improvements in economic statistics introduced in 1991 and 1992 (the 'Chancellors' initiatives) were aimed at improving the accuracy of the quarterly national accounts and focused on short period surveys, introducing new surveys of services and strengthening the balance of payments statistics. During the early 1990s, as a result of these initiatives, there had been substantial progress in improving the quality of economic statistics. However concern remained around the effectiveness and efficiency of the CSO's business surveys. Many had developed independently over time, often on a pragmatic and ad hoc basis. There was a well established mechanism for reviewing each survey separately, but there had been no review of the surveys as a whole, with a view to greater integration, coherence and standardisation. The CSO set up an efficiency review of this area which reported in November 1993.

The scrutiny examined a number of key issues: standardisation, conduct and best practice, integration of surveys and expertise. The review recommended standard methods and practices, common definitions and common survey processing software. The review considered the possibility of a single national accounts survey, but rejected the option as to meet UK national accounts needs this would have to be quarterly, which would be too expensive in resource costs and for respondents. The review looked at further integration between surveys some of which were then carried out by national accounts areas. The review argued for a single survey organisation within the CSO to conduct work through from data collection to publication of survey results. The scrutiny recommended that data collection be integrated

across survey areas to maximise the efficiencies and spread common practices, and the separation of data collection from analysis and publication

The scrutiny was followed by an intensive period of methodological development designed to harmonise practices across business surveys. This was stimulated by the bringing together of economic and employment surveys into the new Office for National Statistics (ONS), and by the introduction of the Inter-Departmental Business Register (IDBR). The introduction of the IDBR in 1995 was the first major initiative to harmonise sampling frames for UK business surveys. Until then CSO had used a VAT based register while the Employment Department statistics were based on Inland Revenue sources, with incompatible results. The IDBR enabled improvements in sampling to be made and the introduction of survey 'holidays' for businesses - whereby small business which had responded to surveys were rotated out of the sample and given a 'holiday' after a period of compliance.

During the mid 1990s, surveys were moved into a common processing software, using standard methods. Due to time pressures it was not possible to take this opportunity to develop best practices or to ensure that all the work was harmonised. One of the most significant developments in processing was the rewriting of the ACOP system into SAS in 1995. This enabled more statistical techniques to be used for estimation and weighting using methods developed by Statistics Canada. Until that time processing of the ACOP had been numerical rather than statistical. At the same time surveys were moved from a sampling scheme that completely covered businesses above a threshold, and covered none below (cut off sampling), to stratified random sampling.

Data collection areas were able to exploit new technologies of scanning and telephone data capture and share information about respondents on central databases; initiatives which are only possible when data capture is developed on a large scale. Savings of over 40 per cent were achieved in data capture costs through integration and technology advance, and the relationship with business respondents was significantly enhanced. Bringing together data collection into one management area enabled common processes and working practices to be instituted. Larger teams working flexibly over more than one survey enabled work flow to be smoothed and further efficiencies to be gained. At this time automated approaches to data validation were introduced, enabling automatic correction for simple errors. Following pilot studies, selective editing, whereby editing is prioritised according to its impact on published results, was introduced for some short term surveys, reducing the number of edits required on one survey by around 50 per cent.

Creation of the Office for National Statistics

The ONS was formed in 1996 by merging the Central Statistical Office, which had responsibility for economic statistics, with the Office of Population Censuses and Surveys (social surveys, the census of population and civil registration) and employment and earnings statistics from the Employment Department. Organisational consolidation has provided the common strategic vision and the management capability to promote integration. The previous management of surveys by their respective policy departments had not helped their methodological development. Departments had not managed to build the methodological teams needed for this work, so that methodological development of economic surveys had been piecemeal and disparate. The creation of the ONS had provided much of the spur for the work described above.

The Annual Business Inquiry

The bringing together of employment surveys and business surveys into the ONS gave an immediate opportunity for survey integration. It had become clear that many of the advantages of integration secured for registers and for data collection could be realised for survey processing. In 1998 the Annual Business Inquiry (ABI) replaced the Annual Employment Survey (AES) which had provided the main estimates of employment (and itself had replaced the earlier censuses of employment), and the range of ACOP and Distributive and Service trades Inquiries. It replaced nine surveys in total. The old AES and

ACOP had used quite different methods and samples, making it not possible to compare these data. It was shown that the AES had been undercounting the number of jobs by around half a million, mainly because businesses had not been providing employment details for each of the sites needed for the site based AES (the ABI is at enterprise level),

The ABI was first conducted for 1998, with results first published in early 2000. It is designed as a whole economy survey, collecting employment and economic activity from a common sample of companies thereby improving consistency between these variables. Its aim was to produce more coherent and consistent annual statistics for practically the whole economy. It has provided a major contribution to the supply use tables used as the foundation of the annual national accounts GDP estimates, as well as providing benchmarks for final consumption and fixed investment estimates, and improved the quality of productivity estimates.

It replaced a range of surveys with a single integrated system, with the aim of improving consistency, standardisation and methodology; and providing new analyses - especially of the service industries. The integration of a number of surveys avoided the problems of omissions and double counting, which had occurred in the past. It also enabled standard definitions to be used, and a common methodology to be applied. Timeliness is relatively good for a structural survey: ABI2 provisional results are produced after 12 months, and final results after 18 months.

The Annual Business Inquiry is split into two questionnaires - ABI1 covering employment and ABI2 covering economic variables. This allows the first questionnaire to be returned more quickly. ABI2 does not cover all the industries covered by ABI1, but where it does it uses a common sample. Retaining a common sample and common methodologies for ABI1 and ABI2 allows the consistency of productivity estimates to be improved. A rotational sampling strategy is applied to the smaller businesses, so that the respondent load is spread as far as possible while retaining continuity from year to year in the results. Methodological improvements included changing the stratification variable from turnover to employment for service industries; the introduction of standard data collection software; a review of all questionnaires, and use of standard variable definitions.

The ABI (ABI1) now covers all sectors except agriculture, private households and extra territorial organisations. ABI2 collects a number of detailed questions designed to contribute to the estimate of value added and the expenditure estimates of GDP. In addition it includes a number of filter questions designed to identify businesses active in specific activities relevant to other surveys - retail turnover; research and development and international trade in services. As well as meeting UK requirements it enables us to meet many of the requirements of the EU Regulation on Structural Business Statistics.

Although a considerable improvement in methodology, consistency and comprehensiveness compared with previous surveys, the ABI still suffers from a number of weaknesses:

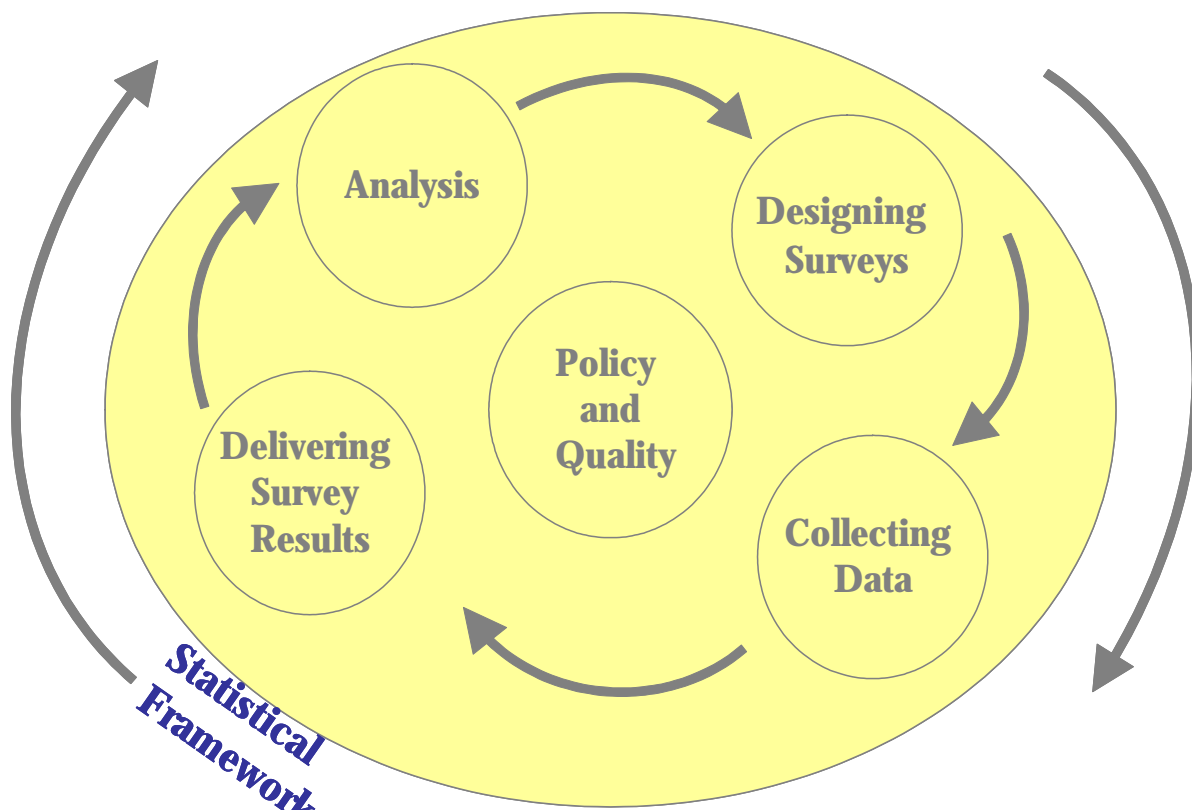
- the processing system is complex
- the method of allocation of reported data to local units to provide regional results could be improved
- the separate survey for Northern Ireland reduces comparability with the rest of the UK

Setting up of Sources in 2003

In recent years the development of surveys has been driven through a change in organisational structure. The ONS was reorganised on functional lines in June 2003. The purpose of the reorganisation was to provide a greater focus on the systematisation of statistical processes, provide leadership for modernisation of these processes and release resources through efficiencies that would enhance the office's analytical capability. Previously the office had been organised in a traditional way in two statistical directorates: Economic Statistics, and Social Statistics. The office is now organised into a sources directorate and two analytical directorates.

The Surveys and Administrative Sources Directorate (known as Sources) is headed by Karen Dunnell. The Directorate has responsibility for all primary statistical outputs - whether derived from administrative sources or from surveys. The main organisational units with Sources (and the separate analysis function) are shown below.

Fig 1



The Sources Directorate was set up through recognition that the next stage of integration for the ONS required the strong management lead that comes with functional accountability. Hence all data collection is managed in a separate management area from survey processing and results, and both areas are separate from design of new surveys.

Some common themes

Over the 100 years of development of economic censuses and surveys in the UK some common themes have emerged:

1. concern about compliance costs

From the first Census of Production Act in 1906 it is clear that the government was concerned to limit the load on businesses supplying information for statistical purposes.

2. greater use of sampling

This partly follows from the desire to reduce compliance costs, but also follows an increasing importance given to the need for efficiency and cost reduction in the statistical office. It also follows from methodological improvements and the ability of computers to ease the introduction of sampling schemes in official statistics. Sampling in the UK was progressively introduced from the 1950s. First by using simple cut off samples; then by introducing stratified random samples. More lately, more complex rotational sampling to ensure survey 'holidays' for small businesses has been introduced. The trend is toward greater sampling complexity to enable survey loads to be reduced.

3. more comprehensive coverage of services

Although not recognised until the 1980s, the move since then has been for more comprehensive coverage of industrial sectors, and towards surveys which cover the whole economy in a uniform way. This has largely replaced the industry specific surveys of early history. It has enabled the use of filter questions for 'rare' variable such as trade in services and research and development, hence ensuring maximum coverage of these phenomena.

4. greater integration

This is a growing theme from the 1966 Estimates Committee report and the 1993 Efficiency Scrutiny, especially the need for more consistent definitions, methods and practices. The driver is not only the need by users for greater clarity and consistency in outputs, but also a producer need to achieve efficiencies through common practices. The difficulty has always been the need for investment to implement the changes needed, where they are bedded into systems. In more recent periods the drive for consistency has been underpinned by organisational change: the introduction of the IDBR in 1995 as a common register for all business surveys; the separation of data collection as a functional unit in 1999; and the setting up of the Sources Directorate in 2003.

5. improved timeliness

The periodic 5 yearly full censuses of production had not achieved much improvement in timeliness between 1907 and 1968: they were all published five years after the event. Improvement in timeliness was a big driver in the improvements in statistics in the early 1970s and again in the early 1990s, driven by the needs of macro-economic policy. These needs have been more recently been restated at European level.

The future vision

The current business strategy

The current business strategy derives from work started in 2000 to identify the drivers and pressures which impact on the UK statistical system.

Drivers and pressures

These include a mix of strategic developments, supplier pressures and customer drivers. Many build on the themes developed above. The strategic developments cover those we have to take forward to maintain our long term position as a relevant and trusted statistical office, by preserving our independence and safeguarding the quality of our statistics. They include our need to use world class methods and tools; the ONS modernisation strategy which updates our system and our organisation; the need to secure efficiencies and to relocate much of our work to Newport in south Wales.

Supplier pressures include the need to reduce the regulatory and compliance load on businesses; the growing fragmentation in data collection that is emerging following devolution of authority to the national assemblies and parliaments of Scotland and Wales; the growing expectations of business that e-collection should be readily available; growing concerns about the protection and confidentiality of unit record data and the out-of-date nature of UK statistical legislation.

Customer drivers identified include pressure for more statistics on the regions and for the service sector; a need to exploit data sets through data linking, driven forward partly by increased computational ability, but also increased user interest in cross-cutting issues (impact of company size on productivity, etc.) which can be best analysed through data linking studies; a stronger Europe focus; the need to provide statistics for new policy areas such as public sector performance, pensions; the growing complexity of the economy we are measuring; and a demand for greater transparency of methods.

The ONS statistical modernisation programme

Our conclusion from this analysis is that we need a statistical system that is:

- robust and secure
- efficient to operate
- provides real time analysis
- easy to migrate when tools / classifications change

but

- can quickly respond to changing user needs.

The ONS statistical modernisation programme, now underway, is designed to respond to these challenges by delivering a world class statistical infrastructure using:

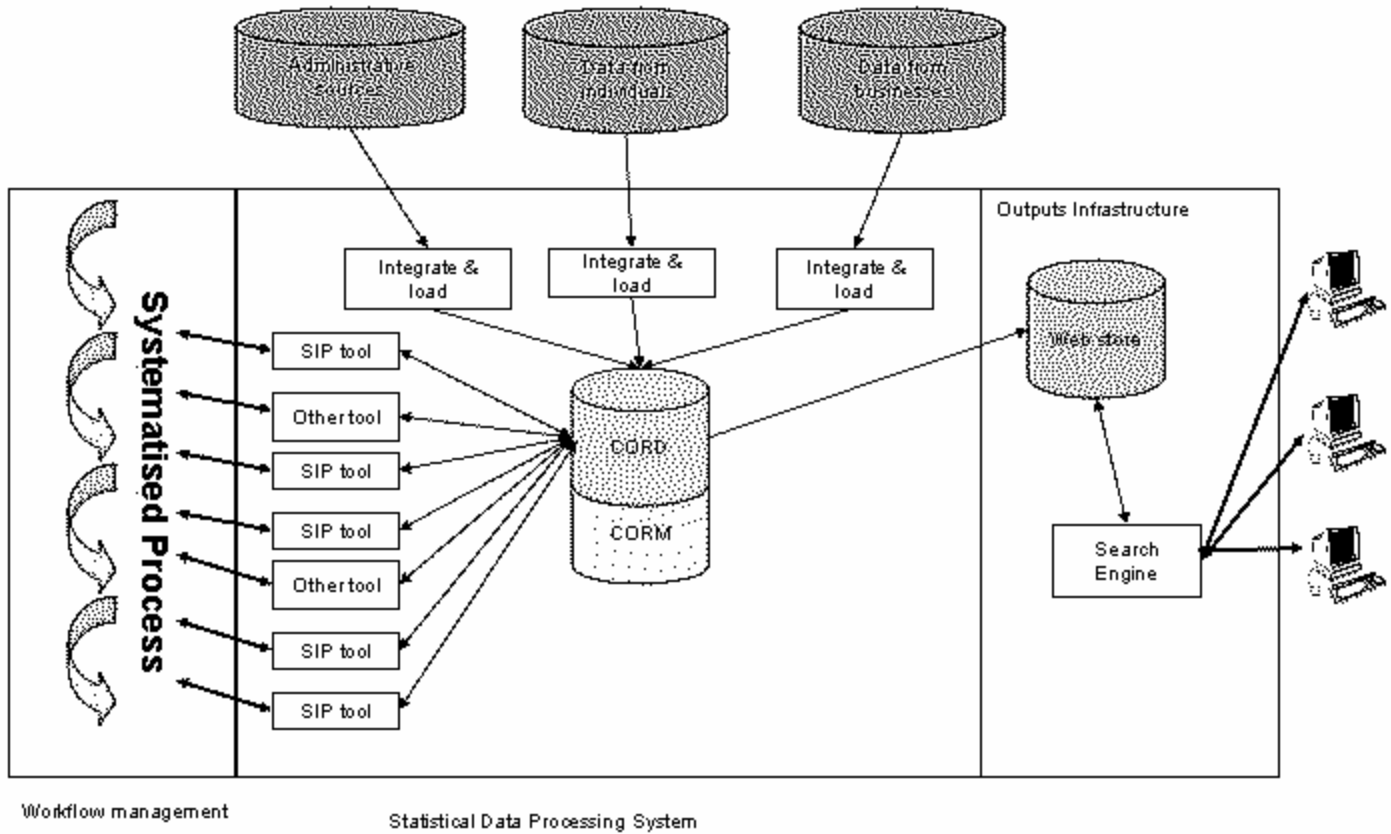
A corporate database system (CORD)

Re-engineered key statistical systems

A set of standard tools

Standardised and systematised processing and presentation of statistical outputs

Fig 2.



Note: SIP tools are standard tools [statistical infrastructure project tools]

This large scale cross-ONS modernisation programme has provided the strategic vision and the resources to enable UK business surveys to continue to develop in the directions begun in previous years. There are two major projects which will realise these additional gains for business surveys:

Re-engineering the Inter-Departmental Business Register (IDBR)

The Business Surveys Integration Project (BSIP)

Re-engineering the IDBR will enable business surveys to meet the challenges of improved regional estimates, allow advances in sampling capability and improve our statistics of business demography. The BSIP project will provide a redesigned and integrated portfolio of business surveys. The BSIP objectives are to:

Develop a world class integrated portfolio of business surveys
Better quality, more coherent and reliable information

More flexible and responsive service to key customers
Increased value for money
Use administrative data to minimise compliance costs to businesses
Provide improved regional outputs and more detail of services industries sector

Fig 3. [for acronyms please see the glossary]

The new Annual Business Survey

The two main survey vehicles will be an integrated annual survey - the Annual Business Survey - and a similarly integrated Monthly Business Survey.

The new Annual Business Survey would have the following features:

- core questions - focusing on value added
- filter questions - to identifying rare variables - R&D, International Trade in Services etc.
- modular questions: some businesses asked one set, others another

The sample will be structured in a way that will ensure that all user needs are met, while minimising the load on businesses. Large businesses will probably provide all information. We will use bespoke questionnaires and negotiate with them on how they can best provide the information. We will pay special attention to the respondent burden for middle size businesses which will provide information for the modules which best represent their contribution to the economy. We will use tax data for smaller businesses (subject to legal authority) for key variables and model other data.

Future directions

Initial experience with the statistical modernisation programme is that it will be ambitious to deliver within available resources. It has been reshaped to provide a more incremental development. At the same time our overall strategy is moving forward, to take greater advantage of administrative sources, develop capture of real time information, and develop longitudinal sources.

Given that it will be some time before BSIP delivers new statistical systems, work in the shorter term is focusing on bringing together working practices and procedures, using existing systems: in particular using the organisation framework we have developed in Sources to deliver benefits from new ways of working.

The directions for UK economic surveys are based on themes that have developed during 100 years of operation.

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Annex
Glossary

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| ABS | Annual Business Survey |
| ACOP | Annual Census of Production |
| ABI | Annual Business Inquiry |
| ABI1 | Annual Business Inquiry covering employment |
| ABI2 | Annual Business Inquiry covering economic variables |
| AES | Annual Employment Survey |
| ASHE | Annual Survey of Hours and Earnings |
| BOS | Business Omnibus Survey |
| BRES | Business Register and Employment Survey |
| BSIP | Business Surveys Integration Project |
| BSO | Business Statistics Office |
| CORD | Central ONS Repository for Data |
| CSO | Central Statistical Office |
| DSIs | Distributive and Service trade Inquiries |
| DTI | Department of Trade and Industry |
| GSS | Government Statistical Service |
| IDBR | Inter-Departmental Business Register |
| ITIS | International Trade in Services |
| MBS | Monthly Business Survey |
| ONS | Office for National Statistics |
| SIP | Statistical Infrastructure Project |