

Computer Services Survey (SERVCOM Feasibility Study) – Data for 2000

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Summary

- The Office for National Statistics (ONS) has conducted a successful pilot inquiry into the computer services sector, collecting sales by type of service 'product'
- The size of the computer services market in 2000 was £32.0bn, with IT consultancy, computer facilities management and systems integration being the largest three activities
- This is the first National Statistics official source of detailed service sector sales by product
- Following a development period of only six months, a detailed classification of computer services has been devised, according to which businesses have been able to provide data
- The survey has been conducted and published within six months, achieving 77% response from sampled businesses
- Useful lessons have been learnt in surveying service sector industries for this type of detailed information

Background

This inquiry is viewed as a study into the feasibility of a SERVCOM inquiry (albeit possibly limited to key sectors) - similar to the existing PRODCOM¹ (PRODUCTS of the European COMMunity) Inquiry which measures sales of manufactured products.

The computer services industries (Division 72 of NACE² (the EC classification of economic activity)), were piloted following the Performance Innovation Unit Report "e-commerce @ its.-best.uk"³, which supported DTI proposals for new five-digit codes for e-commerce enabling industries within the UK Standard Industrial Classification⁴(SIC(92)). The computer services industries are amongst the most important of these enabling industries. However, it was felt that industry based proposals would be both difficult to implement and of limited value in the fast-moving and converging IT services industry. It was decided that a product based approach ("SERVCOM") would have more chance of success.

Potential Benefits of Detailed Services Information

A range of initiatives has been put in place by the ONS over recent years to improve the quality and availability of service sector statistics, for example the newly developing Index of

Services (IoS), the Corporate Services Price Index (CSPI) and improvements to the Monthly Inquiry into the Distributive Services Sector (MIDSS). However a gap exists in the availability of detailed 'product' statistics for services. SERVCOM type information would have important uses for a range of Government and non-Government users, providing a detailed breakdown of service sector activity classification and sales. Detailed services sector sales by type of product is not available from any other National Statistics source.

In addition to the specific interest of the e-Envoy's Office and DTI in terms of the IT services industry, the potential benefits of SERVCOM type information to Government and industry users would be :

- the provision of a breakdown of product sales for the service industries, useful for detailed industry analyses of market shares etc
- allowing for expansion of Current Price Input-Output product groupings used in the National Accounts
- to improve the balancing of the components of Gross Domestic Product (GDP) through the Current Price Input-Output Supply and Use Tables
- the provision of an improved weighting structure for the CSPI to underpin service sector price indices
- improved deflation feeding into Constant Price Input-Output and product weighting structures for the IoS
- the provision of improved sample targeting for the International Trade in Services survey (ITIS)
- insight into possible improvements to service sector classification and input to the next revision of NACE in 2007

In addition the European Commission has an increasing interest in this area, particularly in the computer services and business services sectors, and Eurostat (the Statistical Office of the European Community) is currently running a pilot across European Community member states. The computer services data is also of interest to various Government Departments, the Bank of England and economists/commentators as part of the measurement of the "New Economy".

Computer Services Pilot Survey

Development of Detailed Classification of Computer Services

It is widely recognised that the NACE industry classification, and CPA⁵ (EC classification of products by activity) classification are less developed for the service sector than for manufacturing. The ONS worked in partnership with industry and DTI to develop a service 'product' classification for the computer services sector. International sources and developments were also considered, for example Stats Canada (the Canadian Annual Survey of Software Development & Computer Services), and the US Bureau of Labor Statistics (the North American Industry Classification System (NAICS)).

The existing NACE industry classification is :

Division 72 Computer and Related Activities	
72.10	Hardware consultancy
72.20	Software consultancy and supply
72.30	Data processing
72.40	Database activities
72.50	Maintenance and repair of office, accounting and computing machinery
72.60	Other computer related activities

This was used as a starting point - however it was not entirely suitable for defining services as principal products of a particular industry activity (the normal PRODCOM approach), being outdated. It was more appropriate to devise a product classification which reflected the existing industry structure and activity which could then be fed into the next NACE revision in 2007. The capability to map the computer services list back to NACE has been retained for comparability purposes; where a one-to-one or many-to-one relationship does not exist the mapping will be done using estimated splits provided by industry experts.

The main points that arose through developing the list with industry were that:

- i. Service product classifications may need to be less detailed than manufacturing, particularly in fast developing industries. The total number of computer services categories has been limited to 11, as too detailed categories could become out of date in a very short time, and many services cannot be specifically defined so a broader list of services is appropriate
- ii. The existing NACE/CPA classifications are outdated for the industry and no doubt this will apply to some other sectors. In particular, the split in classifications between sales of software and hardware cannot be achieved fully in practice as they are often provided within the same contract
- iii. It is not possible to identify Web/Internet related categories separately as technology is converging to such an extent that a large proportion of software development, consultancy and other services can be described as Internet

related. Consequently, much of it is indistinguishable, or irretrievably linked. In addition the revenue obtained from Internet related activity is often not directly attributable to the service given. For example, where computer services businesses provide links to the Internet, Web space, search engines etc. the revenue gained may come from advertising rather than from a fee for the ongoing service

Coverage

Presently, there are various non-ONS data sources for the computer services sector, but this is the first official source of detailed services data. Differing approaches in coverage have been taken by these sources which will be valid in different contexts. This survey has:

- Sampled from all sized GB firms within the sector, including businesses with less than 20 employment. This means that all sales including subcontracting within the computer services industries have been recorded. This is consistent with PRODCOM and with the national accounts requirement to measure all sales and purchases within the economy
- Measured total sales of services including exports
- Excluded supply of software from sales of services and recorded this activity as wholesaling (in line with NACE classification)
- Covered businesses classified to Division 72 i.e. there is no full estimate for computer services activity conducted by firms classified outside Division 72.

Related Services and Other Sales

The inquiry also collected data on sales of detailed services related to computer services, such as telecommunications services, and any other services provided, to enable the estimation of the non-computer services activity of the sector. This would be a requirement of any future SERVCOM inquiry for Current Price Input-Output GDP balancing purposes. Revenue from non-services activity, and total turnover were also collected to provide a complete picture of activity within the sector and for data validation purposes given the infancy of the inquiry.

Sampling Approach

The sample was drawn with due regard for minimising the burden of form filling, in particular for the smaller firms. A stratified sample of 2000 GB firms was taken from the Inter-Departmental Business Register⁶ (IDBR) (the ONS's register of UK firms), including coverage of the 0-9 employment sizeband given that a very significant proportion of firms classified within Division 72 are within this band (approximately 96%). Northern Ireland based firms were not included in the pilot given that the resource involved in

facilitating this operationally would not be justified by the small gain in turnover coverage. The sampling fractions used in the pilot survey are summarised in Table 1 :

Table 1 Sampling Fractions for the 2000 GB Computer Services Pilot Survey

Employment Sizeband	Sampling fraction	Sampling fraction (%)
0-9	1 in 133	0.75%
10-19	1 in 20	5%
20-49	1 in 7	15%
50+	1 in 1	100%
Total	1 in 65	1.5%

In addition a small number of large firms classified to sectors other than Division 72 (for example within NACE 64.20 Telecommunications, 51.64 Wholesale of Computer Equipment etc) thought to be significant in terms of computer services were added to the sample. This would provide a lower bound of computer services activity being carried out by firms classified outside Division 72.

Conduct of Survey

The inquiry was conducted on a statutory basis under the Statistics of Trade Act 1947 to ensure reasonable response to feed into the computer services estimates. Good response rates were achieved for the inquiry: 77% of forms were returned corresponding to 84% of the employment covered by the sample.

In order to minimise the burden of form filling on businesses the questionnaire was tested on a small number of firms during the development of the list of detailed computer services. This provided feedback on the service product classification and the design of the questionnaire itself. A voluntary question on the form requesting completion time lead to the original estimate of the time taken to complete the form (based on PRODCOM experience) to be reduced by half to around 45 minutes. In general the feedback from businesses was positive about the questionnaire design and the service categories used.

Division 72 Computer and Related Activities Pilot Survey Results 2000

The 2000 GB estimate of computer services activity by firms classified to Division 72 is £32.0bn, with overall total turnover of £44.2bn. This does not include any estimate for computer services activity by firms classified to other sectors, given that a non-exhaustive sample of large firms outside the

sector was drawn which cannot be grossed up. The survey total for computer services activity by firms classified outside Division 72 (based on this non-exhaustive sample) is £632m. Total sales of related services are £5.4bn.

An overall summary of the sales activity by GB firms classified to Division 72 is given below in Table 2. All results shown (with the exception of the non-Division 72 total above) have been grossed up to represent estimates of total population activity and relate to GB in 2000.

Table 2 Summary of Overall Activity by Businesses Classified to Division 72

	GB, 2000 £m
Total turnover	44,231
Total computer services (for breakdown see Table 3)	31,951
Total related services (for breakdown see Table 6)	5,413
Other services and non-services income	3,011
Balancing item*	3,855

*For explanation of balancing item see Estimation Methods.

The total computer services sales are shown broken down by individual computer service in Chart 1 and Table 3 below. The detailed computer services breakdown is the key aspect of the pilot results and shows that of the total of computer services sales of businesses classified to division 72, 24% of sales are IT consultancy service, followed by Computer facilities management (20%) and Systems integration (13%).

NB. Estimation for individual component variables of this nature is inherently difficult and challenging. The experimental nature of the results should be borne in mind as the methodology underlying the estimates is part of an ongoing programme of development.

Chart 1 Computer Services by Size of Sales Activity (£bn)

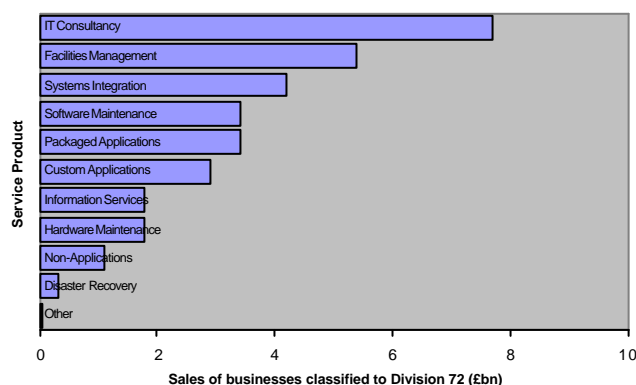


Table 3 Computer Services Pilot Survey Results by Service Type – by Businesses Classified to Division 72

		GB, 2000
Service Product Code	Service Description	£m
72001150	Computer Systems Integration Service - integration of different computer software products, with or without the associated hardware, to form a complete system	4,190
72002350	Development of Custom Built Application Software products for customers	2,875
72002550	Development of Packaged Application software products for customers i.e. programs developed and sold as a product. (Software licences included)	3,402
72003550	Development of Non-Application Software for customers (System Software, Tools, Utilities) whether custom built or packaged. (Software licences included)	1,071
72004550	IT Consultancy Service	7,687
72005150	Software Systems or Applications Maintenance and Support	3,403
72005350	IT Disaster Recovery / Business Continuity Services	317
72005550	Computer Facilities Management (outsourcing) / Data Processing Services (Includes: Operating the day to day running of clients' computer/network systems; Data entry, Data capture and imaging, Transaction processing; Application Service Provision (ASP) etc.	5,407
72005750	Hardware Maintenance – Repair and/or Maintenance of office machinery, including computing equipment	1,758
72009550	Electronic Information Services - Database Related Activities (without design of specific software) (Including: Database development, i.e. assembly of data from one or more sources ; Data storage; On-line provision of information; Data mining; Directory and mailing list publishing. Excluding "Fulfilment Housing" activity	1,789
72009750	Other computer services nowhere else specified	53
Total computer services sales		31,951

Table 4 analyses the total computer services sales and total turnover of businesses classified to Division 72 in terms of how the businesses are currently classified on the IDBR.

72.60 Other computer related activities is the third largest industry (SIC) in terms of computer services sales and turnover. However some of the economic classifications of businesses classified to this industry are less reliable given its 'Not elsewhere classified' status. The service products of these firms fall into the individual categories shown in Table 3; Table 3 shows that very few computer services sales (£53m) could not be allocated to a specific service.

Table 4 Computer Services and Total Turnover by Industry – by Businesses Classified to Division 72

		GB, 2000	
SIC	Title	Computer Services Activity £m	Total Turnover £m
72.10	Hardware consultancy	598	989
72.20	Software consultancy and supply	18,744	25,216
72.30	Data processing	6,553	8,259
72.40	Database activities	400	605
72.50	Maintenance and repair of office, accounting and computing machinery	591	945
72.60	Other computer related activities	5,066	8,218
Total		31,951	44,231

Table 5 shows the Division 72 GB computer services activity by size of business. The businesses with employment between 0 and 9, and 50 or more contribute most of the sales of the sector. This is illustrated in Chart 2 and Table 5 below:

Chart 2 Computer Services Sales by Size of Business

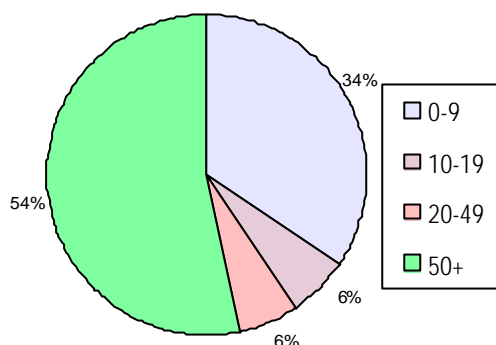


Table 5 Computer Services Sales by Size of Business – by Businesses Classified to Division 72

GB, 2000		
Size of business (employment)	Number of businesses on IDBR	Computer Services Activity £m
0-9	124,235	10,998
10-19	2,545	1,983
20-49	1,005	1,915
50+	785	17,055
Total	128,570	31,951

The estimate of related but non-computer services GB activity by firms classified to Division 72 is £5.4bn. These sales are broken down by individual service in Table 6 below:

Table 6 Related Non-Computer Services Sales by Service Type – by Businesses Classified to Division 72

GB, 2000		£m
Service Product Code	Service Description	
64200001	Telecommunications Services (Including: Telephone service, Network design, Installation, Internet connectivity and access provision, Intranet services, email services, etc.)	1,228
71330001	Leasing or Rental Services of Computing Machinery or Office Machinery or Equipment	119
74500001	Recruitment and/or Provision of IT Specialised Personnel (Excluding: if as part of IT consultancy / support service)	309
80421001	"End-user" IT training, e.g. for training in use of packages such as Word, Excel etc. (Excluding: if as part of IT consultancy / support service)	297
80421002	Technical / programming IT training (Excluding: if as part of IT consultancy / support service)	144
93050001	Intellectual Property Rights (Including: Revenue from Patents, Trade marks, Copyrights, Royalties etc.) (Excluding: Software licences)	176
50000001	Wholesaling or Retailing – sales of goods (whether computers or software or not), purchased for resale without further processing (Excluding: goods included in the provision of an associated service such as consultancy or systems integration service)	3,140
Total related but non-Computer Services		5,413

Estimation Methods

The estimation method used is a modified form of that used for production of the PRODCOM estimates (for further information see Chambers & Cruddas⁷ (1996)). The methodology is based on an assumption about the relationship between the size of the firm (employment) and its sales ie, a form of ratio estimation is used. PRODCOM makes estimates for each manufactured product separately. Here some of the services have been aggregated for estimation to alleviate the problems associated with small sample sizes (at individual service level).

For the computer services pilot, for each SIC within Division 72, the total computer services activity (covering all 11 individual services) is first estimated, together with the total related services activity (covering all 7 individual services). Similarly all other services activity is grouped for estimation. Non-services revenue is estimated separately. Since the bias of a ratio estimator is of the order $1/\sqrt{n}$ (where n is the number of businesses providing the service) the bias has been reduced by aggregating similar services.

However even at this level of aggregation, bias still exists in the ratio estimator as is evident from the balancing item in Table 2. This is the difference between the grossed total turnover of firms classified to Division 72 and the sum of the grossed components. Further analysis has shown that the majority of the balancing item occurs in the 0-9 employment sizeband. This is not surprising given that the smaller firms tend to provide a smaller range of services, and is exacerbated by the small sampling fraction in this sizeband.

By aggregating like services together for estimation, the bias is effectively minimised in the total computer services and total related services estimates, since all (or nearly all in the case of the related services) respondents are included in the sample at this aggregate level (ie. within each industry of Division 72 all businesses provide at least one computer service, and most provide one or more related services). This means that the remaining bias is occurring in the estimation of the 'Other services and Non-services income' variable, where there is a particular sparsity of responses from firms as not all will provide other services or receive income from non-services activity. The implication is that the vast majority of the balancing item is attributable to the 'Other services and Non-services income' variable.

Given the level of confidence in the estimates of computer services and related services activity, to produce the breakdown of individual services the simple unbiased expansion estimator was used. This grosses up the survey responses by the inverse of the sampling fraction. The individual services were grossed separately using the expansion estimator, and then the proportion that each contributed to the aggregate of computer services was applied to the grossed total at aggregate level obtained using the PRODCOM ratio estimator. A similar approach was used for related services.

Sampling and Non-Sampling Errors

Any sample survey will lead to error in the estimates as a result of sampling. The standard deviation or standard error associated with the computer services and related services aggregates, together with total turnover, has been estimated. We can say that we are 95% confident that the true value lies within approximately 2 standard deviations of the estimate ie the true value of computer services activity for Division 72 is £32.0bn +/- £1.3bn.

Table 7 Standard Errors for 2000 GB Division 72 Aggregates

	95% Confidence interval (£bn)	Standard error (% of estimate)
Total Computer Services	32.0 ± 1.3	2.1%
Total Related Non-Computer Services	5.4 ± 0.6	5.4%
Total turnover	44.2 ± 1.6	1.8%

The standard error associated with each individual service cannot be estimated at present. This is because the estimator consists of two parts (the ratio estimation at 'service group' level and breakdown to individual service by using the simple expansion estimator) which means that it is a non-linear estimator. The derivation of the associated standard error is therefore non-trivial and will require further work.

In addition to sampling error it is important to emphasise that there will be errors in the estimates that are not associated with sampling ie. non-sampling error. This can arise through misinterpretation of the questionnaire by businesses given that this was the first inquiry, non-response to the questionnaire, incorrect coding of services on the questionnaire given the infancy of the detailed classification of services etc. At present mechanisms do not exist to measure the non-sampling error although any follow-on surveys would consider these issues.

Future Work

Following the publication of these data, industry and Government users will be consulted on the success of the Study, and the usefulness and quality of the computer services classification and results. Depending upon its success and only if further funding is available to continue the work, the computer services survey may be repeated and consideration will be given to developing classifications for further services industries, for example related sectors such as the telecommunications industry (NACE 64.20). In addition a review of the statistical methods underpinning the estimates would be carried out. A more limited computer services survey may be published in future as part of the European pilot study.

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Further Information

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