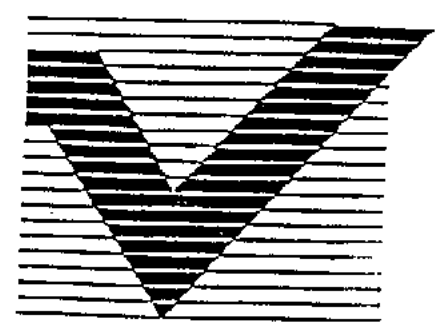
A MODEL SURVEY FOR COMPUTER SERVICES*

STATISTICS CANADA

*This is not the original paper but the paper approved by the Voorburg Group



A Model Survey of Computer Services

Introduction

1. The Voorburg Group has contributed to the development of the CPC by producing a classification of services as commodities for many of the service industries of ISIC. The work of the group has been incorporated into the version of the CPC which was presented to the 25th session of the UN Statistical Commission held in February 1989.

2. Subsequently, the Voorburg Group was asked to contribute a paper to the 26th session, with the understanding that such a paper was a natural outcome of the Group's deliberations and at the same time furthered the understanding and international comparability of statistics on the service sector.

3. At its fourth meeting held in Ottawa in 1989, the Voorburg Group decided that in reply to the UN request, it would prepare a proposal for a model survey to be taken by a group of countries.

4. This paper outlines a proposal for a model survey of computer services which has been approved by the Voorburg Group.

5. The paper presents a model in the form of eleven modules for the collection of data about computer services; it is designed to test the commodity classes of the CPC and ISIC and to measure the following:

- the value of gross and net output originating from the computer services industries;
- the exports of goods and services originating from the computer services industries;
- the output and exports of computer services produced by other industries;
- the imports of computer services;
- employment and fixed capital formation in the computer services industry.

It also gathers information on

- the distribution and country of origin of software;
- expenditure on software research and development.

6. **The modules are not meant to be used as a single collection vehicle since the target population is not the same for all modules and questions.** Each statistical office participating in the survey will need to elaborate questionnaires and a collection strategy in line with its own survey practices and taking into account the response burden imposed on its respondents. In doing so, they may choose not to use all of the modules, nor for that matter, all the detailed questions provided in the first two modules.

7. Modules 1 to 6 form the core of the survey. They are designed for businesses classified to ISIC 72 - Computer and related activities. Some of the questions in these modules would also be relevant for collecting information about output and exports from businesses operating in other sectors of the economy.

8. Module 7 is designed for the collection of data relating to the imports of computer services.

9. Module 8 is designed for the collection of additional information about software revenues.

10. Modules 9 and 10 are designed for the collection of information on the number and characteristics of persons working in computer services industries and on capital formation in those industries.

11. Module 11 is designed for investigating research and development expenditures on software development and business accounting practices related to these expenditures.

12. Those countries who choose the enterprise as the unit of observation might want to include a balance sheet in order to gather information on assets and liabilities and the source and application of funds. This information is typically available for enterprises, but not necessarily for more narrowly defined statistical units. Such an approach would provide a broader set of integrated data to analyse the performance of the computer services sector. Other data items which could be collected if the enterprise is used as the unit of observation are mentioned in the last part of the document.

13. The purpose of the modules, the universe to which they apply and possible measurement problems are discussed in the paper. The implications of the choice of the statistical unit or unit of observation is discussed in the last part of the document.

14. The classes of the CPC have been expanded and regrouped for inclusion in the questionnaire. Definitions are provided in Annex 1. An explanation of the relationship between the questions and the CPC is provided in Annex 2.

DATA COLLECTION MODULES

MODULE 1. REVENUES FROM THE SALE OF GOODS AND SERVICES

This section is concerned with the revenues generated by this organization from the sale of goods and services both to the domestic and the export market. For the purpose of this survey transactions with related parties (sales at market prices or transfers at internal prices) should be included. Please exclude from the amounts reported any taxes collected by this organization on behalf of the government.

SECTION 1. REVENUES FROM THE PROVISION OF COMPUTER SERVICES

	VALUE
A. PACKAGED SOFTWARE PRODUCTS (OF OWN DESIGN)	
a) Systems and user tools software	.....
b) Application software	.....
B. PROFESSIONAL COMPUTER SERVICES	
a) Consultancy services related to the installation of hardware	.....
b) Systems and technical consulting services	.....
c) Custom software development services	.....
d) Systems analysis and programming services	.....
e) Computer facilities management services	.....
f) Systems maintenance services	.....
g) Other professional computer services	.....
C. COMPUTER PROCESSING SERVICES	
a) Data processing and tabulation services	.....
b) Data entry services	.....
c) Other computer processing services	.....
D. DATA BASE SERVICES (Electronic information services)	.....
E. COMPUTER REPAIR AND MAINTENANCE SERVICES	.....
F. OTHER COMPUTER SERVICES (please specify _____)	.....
TOTAL - COMPUTER SERVICES (A to F)	.....

SECTION 2. REVENUES FROM THE SALE OF COMPUTER RELATED GOODS AND SERVICES

G. PACKAGED SOFTWARE (RESOLD)	.....
H. HARDWARE SALES (PURCHASED FOR RESALE)	.....
I. COMPUTER SERVICES (PURCHASED FOR RESALE)	.....
J. COMPUTER HARDWARE LEASING AND/OR RENTAL SERVICES	.....
K. NETWORK SERVICES	.....
L. COMPUTER RELATED TRAINING SERVICES	.....
TOTAL - COMPUTER RELATED GOODS AND SERVICES (G to L)	.....

CONTINUED ..

M. ROYALTIES AND PATENT FEES RECEIVED	.....
N. SERVICES TO RELATED PARTIES NOT INCLUDED ABOVE (RESEARCH AND DEVELOPMENT CHARGES, MANAGEMENT FEES ETC.)	.....
O. OTHER GOODS AND SERVICES (please specify _____)	.....
TOTAL - REVENUES FROM OTHER SOURCES (M to O)	.....
P. OPERATING SUBSIDIES	.....
GRAND TOTAL - OPERATING REVENUES (A to P)	.....

MODULE 2. GOODS AND SERVICES USED IN THE OPERATIONS

This section is concerned with the expenses incurred by this organization for goods and services used in the regular conduct of its business. Purchases of goods and services for resale without major modifications (e.g. purchases of software and hardware by systems integrators and value added resellers) should be reported in section 3. For the purpose of this survey, transactions with related parties (purchases at market prices or transfers at internal prices) should be included. Please exclude capital expenditures and income taxes.

	VALUE
A. WAGES, SALARIES AND EMPLOYEE BENEFITS	.....
a) Wages and salaries	.....
b) Employee benefits	.....
B. BUSINESS SERVICES	.....
a) Computer services for own use (CPC 84)	.....
b) Professional services - legal, auditing, management consulting, etc. (CPC 86)	.....
c) Advertising and sales promotion (CPC 871)	.....
d) Insurance (CPC 812)	.....
C. RENTAL AND LEASING OF MACHINERY (CPC 83)	.....
D. TELECOMMUNICATION SERVICES (CPC 752)	.....
E. MATERIALS AND SUPPLIES FOR OWN USE	.....
a) Operating supplies	.....
b) Office and other supplies	.....
F. OCCUPANCY COSTS	.....
a) Rental and leasing of land and buildings (CPC 82)	.....
b) Utilities (CPC 17)	.....
G. PROPERTY AND OTHER NON-COMMODITY INDIRECT TAXES	.....
a) Property and school taxes	.....
b) Permits, licenses and other non-commodity indirect taxes	.....
H. ROYALTIES AND PATENT FEES PAID	.....
I. SERVICES FROM RELATED PARTIES (not included above)	.....
J. DEPRECIATION	.....
K. OTHER OPERATING, ADMINISTRATIVE AND GENERAL EXPENSES (please specify _____)	.....
TOTAL - CURRENT OPERATING, ADMINISTRATIVE AND GENERAL EXPENSES (A to K)	.....

MODULE 3. PURCHASES OF GOODS AND SERVICES FOR RESALE

This section is concerned with purchases of goods and services made by this organization and which have been resold to its clients without major modifications.

	VALUE
A. Computer hardware	.....
B. Packaged software products	.....
C. Computer services (e.g. subcontracting computer professional or processing services, computer repair and maintenance services, etc.)	.....
D. Other goods and services (please specify _____)	.....
TOTAL - GOODS AND SERVICES FOR RESALE (A to D)	.....

MODULE 4. INVENTORIES

This section is concerned with the change in the level of the various types of inventories held by your organization during the period covered by this report

	opening	closing
a) Goods purchased for resale	.....	.....
b) Goods purchased for use in the operation	.....	.....
c) Other inventories	.....	.....

MODULE 5. SUPPLEMENTARY QUESTION CONCERNING THE BASIS OF ACCOUNTING

A. Did you report revenues (module 1) on an accrual or cash basis ?

accrual basis ..... cash basis ..... please go to next question

B. If you were unable to report revenues (module 1) on an accrual basis, please provide an estimate of

	opening	closing
a) Value of work in progress	.....	.....
b) Value of accounts receivable	.....	.....

MODULE 6. EXPORTS

This section is concerned with exports of goods and services. If this organization has foreign clients, please provide an estimate of the proportion of total sales to non-residents for each of the following products. Sales or transfers to foreign related parties should be included.

COMPUTER SERVICES	% of revenues declared in module 1	or value
A. Packaged software products	.....	.....
B. Professional computer services	.....	.....
C. Computer processing services	.....	.....
D. Data base services (Electronic information services)	.....	.....
E. Other computer services	.....	.....
COMPUTER RELATED GOODS AND SERVICES		
F. Computer hardware	.....	.....
G. Computer hardware rental and/or leasing services	.....	.....
H. Services to related parties not included above (research and development charges, management fees etc.)	.....	.....
I. Other goods and services (please specify _____)	.....	.....
TOTAL EXPORTS (A to I)		.....

MODULE 7. IMPORTS

This section is concerned with imports of computer related goods and services. If this organization has foreign suppliers, please provide an estimate of the purchase value of the following imported goods and services.

COMPUTER SERVICES	value
A. Packaged software products	.....
B. Professional computer services	.....
C. Computer processing services	.....
D. Data base services (Electronic information services)	.....
E. Other computer services	.....
COMPUTER RELATED GOODS AND SERVICES	
F. Computer hardware rental and/or leasing services	.....
G. Services from related parties not included above (research and development charges, management fees, etc.)	.....
H. Other goods and services (please specify _____)	.....
TOTAL IMPORTS (A to H)	.....

MODULE 8. SUPPLEMENTARY QUESTIONS REGARDING PACKAGED SOFTWARE PRODUCTS REVENUES

If your organization has generated revenues from the sale of packaged software products (module 1, sum of responses to questions A and G), this module requests supplementary information on the origin and type of packaged software distributed.

A. Please provide an estimate of the proportion of revenues (module 1, sum of A & G) derived from the sale of packaged software developed by

	% of revenues declared in module 1	or value
a) the organization covered by this report	.....	.....
b) a domestic third party	.....	.....
c) a foreign third party	.....	.....
d) a domestic related party	.....	.....
e) a foreign related party	.....	.....
TOTAL	100%	.....

B. Please provide an estimate of the proportion of revenues (module 1, sum of A & G) derived from the sale of

	% of revenues declared in module 1	or value
a) mini and mainframe software	.....	.....
b) microcomputer software	.....	.....
c) communication and other software not specific to a) or b)	.....	.....
TOTAL.	100%	.....

MODULE 9. EMPLOYMENT NUMBERS

		MALES		FEMALES	
		COMPUTING*	OTHER	COMPUTING*	OTHER
Working proprietors and partners	- Full Time	.....	.....	.....	.....
	- Part Time **	.....	.....	.....	.....
Paid Employees	- Full Time	.....	.....	.....	.....
	- Part Time **	.....	.....	.....	.....
Total		.....	.....	.....	.....

* Include computing professionals (RISCO 2130), computer services managers (RISCO 1227), computing and related equipment operators (RISCO 3121 & 3122) and data entry operators (RISCO 4113).

** No definition of part-time is provided as it differs between countries. Each country should define part-time according to its own conventions.

MODULE 10. FIXED ASSETS, ADDITIONS AND DISPOSALS

Include all fixed assets shown on your book of accounts and all assets operated by your business under finance lease arrangments. Exclude expenditures on maintenance and on intangible assets such as goodwill.

	ADDITION DURING THE YEAR	DISPOSAL DURING THE YEAR	BOOK VALUE AT THE END OF THE YEAR
Land	.....	.....	.....
Building - Residential	.....	.....	.....
- Non-residential	.....	.....	.....
Other construction	.....	.....	.....
Motor vehicles and other transport equipment	.....	.....	.....
Furniture and fittings	.....	.....	.....
Computer equipment	.....	.....	.....
Other plant, machinery and equipment	.....	.....	.....
All other fixed assets (specify main additions during the year)	.....	.....	.....

MODULE 11. SOFTWARE RESEARCH AND DEVELOPMENT

The information requested in this module should also have been reported in modules 2 and 10.

A. Has this organization been involved, in the period covered by this report, in software R&D?

YES ___ go to B NO ___ end of this module

B. Please estimate the following categories of expenditure for the performance of software research and development within this company in this country in 199...

Current expenditure on software R&D	VALUE
a) Salaries and wages (incl fringe benefits of persons engaged in R&D)	.....
b) Other current costs (incl. contracts for services required to carry R&D but excl. contracts for R&D work. Excl. capital depreciation)	.....
TOTAL	.....
Capital expenditure on software R&D	
a) Land	.....
b) Buildings	.....
c) Equipment	.....
TOTAL	.....
TOTAL EXPENDITURE ON SOFTWARE R&D	.....

C. In its financial accounts does this organisation normally capitalize or expense the software development expenditures reported as current expenditure above?

	CAPITALIZED	EXPENSED
Wages, salaries and benefits	....	....
R&D contracts (subcontracting of the R&D work)	....	....
Other purchases of goods and services	....	....

NATIONAL ACCOUNTS CONCEPTS AND THE MODULES

Gross output at producers' prices

Module 1, except L (operating subsidies)

\+ Module 4c (closing)

\- Module 4c (opening)

\+ Module 5B (closing))
) optional
\- Module 5B (opening))

less **Intermediate inputs at purchaser's prices**

Module 2, except A, B, K, L and N

\+ Module 3

\+ Module 4, questions a & b (closing)

\- Module 4, questions a & b (opening)

less **Non commodity indirect taxes**

Module 2, questions K & L

plus **Operating subsidies**

Module 1, question L

= **GDP at factor cost**

\- Module 2, questions A & B

= **Gross operating surplus**

\- Module 2, question N

= **Net operating surplus**

NOTE - This schema does not provide a guide to the precise reconciliation of the content of the modules to the National Accounts. There are items such as interest and dividends paid and received which are not included in the modules. In addition, some of the items collected with the proposed model survey will need to be revalued to conform to SNA concepts. In particular insurance and depreciation expenses are treated differently in business and economic accounts.

EXPLANATORY NOTES

MODULE 1 - REVENUES FROM THE SALE OF GOODS AND SERVICES

1. The purpose of **module 1** is to measure the outputs, in current value, of business units classified in any of the computer services industries (ISIC 7210 to 7290). It is organized in three sections: **section 1** covers the primary outputs and **sections 2 and 3** deal with the industries' most likely secondary products or sources of revenue thereby allowing the calculation of specialization ratios necessary to determine the existence of industries (4-digit). If the questions of section 1 are also addressed to important secondary producers, it becomes possible to estimate coverage ratios, the missing element. This information would allow statistical agencies to test the applicability of the relevant ISIC classes.

Section 1

2. The intent of the questions in **section 1** is to measure the outputs of computer services in current value, by the computer services industries (ISIC 7210 to 7290). The classes of the CPC have been regrouped into the following categories[1]:

- Packaged software products (of own design)
- Professional computer services
- Computer processing services
- Data base services (Electronic information services)
- Computer repair and maintenance services
- Other computer services

The groups and detail for which output data are requested in section 1 of this module of the questionnaire are defined in annex 1. An explanation of their relationship to the CPC is provided in Annex 2.

3. The main reasons for this regrouping of the CPC are:

a) To explicitly account for the production (development) and distribution of packaged software products, not currently isolated in the ISIC (part of 7220), the CPC (part of 84210) or the HS (part of 85.24).

b) To be more in line with the approach adopted by the industry. The distinction between packaged software products, professional computer services and computer processing services, in particular, has general acceptance.

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[1] These groups have been tested and refined through the survey process, now in its fourth year, in Canada.

c) It has the advantage of grouping products which are generally priced on a similar basis and therefore to facilitate future compilation of price statistics. For instance

- **packaged software products** have a unit price;

- **professional computer services** are often charged on a per diem basis and the level of expertise of the people involved is typically the main price determinant;

- **computer processing services** are often priced on the basis of equipment utilization;

- **data base services (electronic information services)** are usually priced on the basis of connect time, type of service accessed and period of the day it is accessed.

Section 2

4. The intent of **section 2** is to measure the most important secondary outputs of businesses classified in the computer services industries. The rationale for, and issues raised by some of the questions in this section, are discussed below.

5. The **hardware sale** category is included to measure sales or commissions on sales of hardware by so-called systems integrators[2]. These businesses offer total solutions to information processing needs. They typically perform a number of activities including - needs analysis, the development of system specifications, procurement assistance or sale of system components, custom software design and development, assistance during the implementation phase in the form of testing and tuning, preparation of systems documentation and training of users, etc. - or manage those who perform these activities.

6. A number of issues arise regarding systems integrators:

- How should their output be defined?
- To which ISIC category should they be classified?
- How should their output be measured?

7. The output of systems integrators can either be defined as a combination of distinct goods and services - computer hardware, computer software and professional computer services - or as a bundle of goods and services. The former approach is suggested here. If the latter approach is adopted, a "system integration

[2] This type of business is also called "value added reseller" and "turnkey system vendor". True value added resellers, however, act more like a wholesaler in that they sell the same product (computer system) to many clients.

service" category would have to be defined and introduced in the questionnaire.

8. The current CPC is not explicit about the classification of system integrators' output. Perhaps CPC 84100 - Consultancy services related to the installation of hardware - was intended for this purpose. However a different interpretation of this product category has been made here (see definition in annex 1).

9. The ISIC is also unclear about the classification of system integrators. There are two apparent possibilities.

a) They should be classified in ISIC 7210 - Hardware consultancy. This is the approach suggested here. If this approach is supported, a clarification of this ISIC definition should be sought. At a minimum, this definition should mention the three basic components of a typical system integration contract mentioned above.

b) They should be classified on the basis of their primary activity, either the wholesaling of computer hardware and software (ISIC 5150) or the provision of computer services (ISIC 7210).

10. The choice of questions to measure the output(s) of system integrators is a function of the definition of their output (combination versus bundle of goods and services). The decision concerning the approach to assign an industry code to these businesses can also influence this choice; if the classification is based on the primary activity it becomes necessary to obtain information on the component parts of system integration contracts.

11. The **network services** category is included to account for network based services such as Electronic Data Interchange (EDI), Electronic Mail (E-mail) and videotex services (computerized home shopping, home banking, etc.) which are sometimes offered by businesses primarily engaged in the provision of computer processing services and/or in data base (electronic information) services. In Canada these services are treated as communication services rather than as computer services[3].

12. The **purpose of the operating subsidies** category is to respect the principles of economic accounting used in the valuation of industries' gross output. However not all countries may wish to use the question for the following reasons:

- subsidies are not an important source of income for the industry;

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[3] See the Canadian submission to the Ottawa meeting of the Voorburg Group on telecommunications services - Value-added network services.

- the question may be pertinent in some countries and not in others;
- there are other and more efficient ways of obtaining this information.

13. The main purpose of the question concerning **services to related parties** (1L) is to capture revenues earned by domestic business units by charging their foreign affiliates fees for research and development services, management services, etc. The pertinence of this question may very well vary by country. It is especially interesting for those which are the home base for multinational enterprises operating in the computer services sector.

14. Module 1 contains the core information needed to measure the gross output of computer services industries. The missing information will be reviewed below in the discussions concerning modules 4 and 5.

Secondary production of computer services by other industries

15. In order to obtain information on the total production of computer services, some of the questions in module 1 should be addressed to business units classified in industries other than ISIC 72 - Computer and related activities. For example:

(a) Our research shows that accounting firms (ISIC 7412) and management consulting firms (ISIC 7414) are becoming important producers of computer consulting services.

(b) A significant portion of the packaged software products is distributed not by those primarily engaged in designing and developing such products, but rather by wholesalers, retailers and computer equipment manufacturers (ISIC 5150, 5239 and 3000 respectively).

It is difficult to suggest which specific industries should be targeted for the measurement of the secondary production of computer services. The choice of other industries requires a good knowledge of the country's organization of production, a matter best handled by national statisticians.

MODULE 2 - GOODS AND SERVICES USED IN PRODUCTION - and
MODULE 3 - PURCHASES OF GOODS AND SERVICES FOR RESALE

16. The purpose of **modules 2 and 3** is to obtain information on the cost structure of surveyed business units. This information along with that of modules 1, 4 and 5 allows the calculation of value added at factor cost[4] originating from the computer services industries and also provides for an estimate of its major components, namely,

- wages, salaries and supplementary labour income;
- gross and net operating surplus.

17. The questions in **module 2** cover costs of production. The choice of categories was influenced by the following criteria:

- The expenses had to be significant for the targeted population. Countries may wish to combine some categories and elaborate others. For example, some may wish to combine salaries and wages with employee benefits or to isolate from the residual category fuel oil, gasoline and automobile repair costs and any other categories they consider important.

- It had to meet the minimum requirements to calculate value added. [These were set out in the "Industrial Statistics Production Model" developed in Statistics Canada and distributed at the fourth meeting of the Voorburg Group];

18. Categories Ga) - Property and school taxes - and Gb) - Permits and licenses - of **module 2** are included as examples of non-commodity indirect taxes[5]. The data are necessary in order to calculate, by the residual method, value added at factor cost. Each country adopting this survey would have to take into account its own taxation practices to determine which are the relevant questions.

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[4] The information necessary to measure own account capital formation, in its traditional SNA sense, is not asked here because it is assumed to be a marginal activity for the targeted population. If software is considered capital there would be a definite need to address this issue in the questionnaire. Perhaps the questions of module 11 (software R&D) could serve the purpose of measuring this type of own account capital formation.

[5] **Indirect taxes** are defined as compulsory payments made by producers to government in respect of the production, sales, purchase or use of goods and services, which they charge as expenses of production. **Non-commodity indirect taxes** are defined as indirect taxes which cannot be identified with any particular commodity produced or sold.

19. **Module 3** primarily targets systems integrators. As stated earlier, this type of business is often engaged in trading computer hardware and packaged software products. The information on the purchase value of these products (module 3) along with the information on their sale (module 1) allows the calculation of trade margins.

MODULE 4 - INVENTORIES

20. The purpose of **module 4** is to collect information which permits the calculation of and intermediate inputs for services producing industries in a manner consistent with that used for goods producing industries. It presupposes that information relating to costs has been collected as materials and services purchased rather than goods and services used.

21. The first question in **module 4** (inventories of goods purchased for resale) is addressed to business units engaged in the trading of computer hardware and packaged software in order to adjust purchases of goods for resale for changes in the level of inventories. The actual business practices of the targeted population may, however, make this question rather marginal. The units targeted by this question are, again, systems integrators. Since these businesses essentially "tailor" computer systems to meet the particular needs of each client, it is probably more efficient for them to acquire the necessary products on a need basis than to maintain inventories. A study of systems integrators' practices with regard to inventories could shed light on this issue.

MODULE 5 - SUPPLEMENTARY QUESTIONS CONCERNING THE BASIS OF ACCOUNTING

22. The purpose of **module 5** is to collect the information necessary to correctly value the production of service outputs when transactions/revenues are reported on a **cash basis.** This is especially important for some consulting services, including professional computer services, since their production can require an extended period of time. In those cases, the period in which transactions (payments) are recorded may not reflect the period in which the services were produced.

23. **Module 5** is organized in a manner similar to that of a typical module on inventories. It asks for particular values at the opening and closing of the accounting period. The questions address the issues of:

(a) **Progress payments** - Some service contracts include provisions for payments after completion of particular phases of the project. These payments can be used as a proxy for the value of production, during a period, of a project which is not yet completed.

(b) **Accounts receivable** - This item allows the measurement of the value of services which have been delivered during the accounting period, but for which no payment has been received.

24. The above questions are not needed if respondents report revenues on an accrual basis of accounting.

MODULE 6 - EXPORTS & MODULE 7 - IMPORTS

25. The purpose of these modules is to measure international trade in computer services.

26. The classifications used in the export and import modules are consistent with, although not as detailed as, the classifications used in module 1. The choice of aggregate, rather than detailed categories, follows the usual practice where trade classifications are not as elaborate as those used for production statistics. This does not preclude the use of a more detailed or aggregated classification. This choice should be based on the relative importance of trade in the various services and on the capacity of respondents to supply the requested information. However, since the object of this survey is to produce internationally comparable data, it would be preferable to use either standard classes (most detailed level) or aggregates consistent with the classes or aggregates used to measure production.

27. Many of the issues that arise in measuring the import and export of computer services are a consequence of the different modes of delivery of these services. These can be:

(a) Delivery by the employees of a domestic enterprise by travelling to a foreign country (e.g. professional computer services, computer repair and maintenance services and computer related training services).

(b) Shipped across the border embodied in a physical medium, e.g., diskettes, tapes, books. The most obvious examples are packaged and custom software[6].

(c) Delivery through public or private telecommunication networks. Computer processing services and data base services are the best examples of services delivered this way.

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[6] Custom software can be delivered like other professional computer services, by telecommunication means or simply in hardcopy by mail.

28. The main issues with regard to packaged or custom software shipped across the border are:

(a) The Harmonized System, the customs classification, does not isolate software as a traded product but rather categorizes the medium. There would therefore be a need to amend the HS if customs documents are to be used to gather information on trade in software.

(b) The valuation at the border, especially in the case of custom software, is very often that of the medium rather than the product. Because this problem will continue to exist even after changes to the HS, it may be preferable to obtain this information by addressing questions directly to importers and exporters.

29. The import or export value of computer services delivered through public telecommunication networks can be difficult to measure due to the fact that the provision of such services can involve more than one enterprise, that is, the computer service firm and one or many telecommunication carriers. The measurement difficulty can best be explained with the following example: an individual or a business subscribes to a telecommunication carrier's "gateway" service[7] to gain access to a number of data bases, some of which are foreign. The client extracts data from a foreign source; therefore an import of services should be recorded. The individual - the importer - transacts with a domestic enterprise, the telecommunication carrier, which acts as a broker. The bill received includes both the telecommunication charge (which itself can include an imported element) and a charge for the use of the data base service. This part of the bill is remitted, less a collection charge, to the foreign data base vendor by the telecommunication carrier. Although the individual is the importer, the telecommunication carrier is likely the best source to obtain information on imports of data base services in these instances. In the absence of "integrated billing", the importer (in this case the business or individual accessing the foreign data base) would be the best source to obtain the information.

30. **The target population for each of the two modules is different. The target population for the export module includes businesses classified to ISIC 72 - Computer and related activities - and important secondary producers.** [N.B. In addressing these questions to domestic based multinational enterprises they need to be instructed not to include sales by foreign subsidiaries in exports.]

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[7] See the Canadian submission to the Ottawa meeting of the Working Group on telecommunication services - Value added Services.

31. **The target population for the import module includes all businesses and institutions and, in the case of some services (in particular software products and data base services), it also includes individuals.** The size and diversity of the target population makes the elaboration of a collection strategy for import data a difficult task.

32. There are, however, some alternatives to surveying the entire potential universe of importers for certain types of services, provided some assumptions are made. For example:

a) The value of imports of **packaged software** can be obtained through a survey of software distributors (wholesalers, retailers, developers, hardware manufacturers and distributors etc.). The necessary assumption here is that most imported software bought in the country is distributed through those channels.

b) The value of imported **data base services** could perhaps be estimated from information provided by telecommunication carriers. This information could consist of total billings, traffic for gateway services and an estimate of the traffic generated by data base services that does not pass through gateways. The assumption here is that telecommunications carriers are able and willing to discriminate between this type of traffic and other movements of information through their networks. This approach will not however account for data base services transacted between parent and subsidiary corporations when private networks are used. In this case questions would have to be addressed directly to the businesses making payments or transfers to their parent companies abroad for data base services and other computer services.

c) The target population for the question concerning **payments made to related parties** can be established by isolating foreign owned enterprises operating in the computer services sector and related fields.

MODULE 8 - SUPPLEMENTARY QUESTIONS REGARDING SOFTWARE REVENUES

33. **This module** serves the following objectives:

a) To identify the national origin (domestic or foreign) of packaged software products marketed by domestic distributors in the domestic market[8] (question A).

b) To provide an insight into the structure of the software product market (question A), that is, what proportion of the market is

[8] One also needs to look at the information gathered in modules 1 and 6 to get the "complete picture".

served by domestic software developers, foreign software developers or independent distributors;

c) To compare the size of the mini and main frame software market with that of the microcomputer software market and of the market of software adapted to both technologies.

34. The questions in this module can be addressed to any business unit engaged in the marketing of packaged software products. Most of these units are likely classified in one of the following ISIC categories:

- **ISIC 72** - Computer and related activities (in particular ISIC 7220 - Software consultancy and supply),

- **ISIC 5150** - Wholesale of machinery, equipment and supply (part of),

- **ISIC 5239** - Other retail sale in specialized stores (part of),

- **ISIC 3000** - Manufacture of office, accounting and computing machinery.

MODULE 9 - EMPLOYMENT NUMBERS

35. This module is designed for the collection of information both about working proprietors and partners and paid employees within the businesses. No definition of part-time is provided as this differs between countries. Each country should define this according to its own conventions.

36. Computer related occupations are defined in terms of the Revised International Standard Classification of Occupations of the International Labour Office. This module is principally designed for businesses primarily engaged in the supply of computer services.

MODULE 10 - FIXED ASSETS, ADDITIONS AND DISPOSALS

37. This module is designed for the collection of information relating to capital formation. The objective is to collect information about investment in all types of construction and machinery and equipment by businesses primarily engaged in the supply of computer services.

MODULE 11 - SOFTWARE RESEARCH AND DEVELOPMENT[9]

38. The purpose of **module 11** is to gather information on amounts spent by software developers on R&D and on their accounting practices related to these expenses. The information requested in this module ought <u>also</u> to have been provided in modules 1 and 10.

39. **Software research and development**[10] (R&D) is defined as the systematic investigation carried out in the field of software by means of experiment or analysis to achieve a scientific or commercial advance. **Research** is original investigation undertaken on a systematic basis to gain new knowledge. **Development** is the application of research findings or other scientific knowledge for the creation of a new or significantly improved product. If successful, development will usually result in a product which represents an improvement in the "state of the art" and is likely to be patentable.

40. It is recommended that for section B all outlays on this activity by the surveyed organization should be included, whether these outlays are expensed or capitalized. A further question in C then asks the respondent whether the expenses are capitalized or not.

UNIT OF OBSERVATION

41. The choice of unit of observation for this survey is best left to participating countries since they are in a position to take account of factors such as the industry profile, the structure and content of their business register, the agency's usual collection strategy, etc.

42. This being said, it is probable that participants will either choose the establishment or the enterprise, the two most widely used statistical units.

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[9] Those countries who currently conduct an R&D survey based on the OECD (Frascati) standards can meet the basic objectives of this module by adding the following question: Please estimate the percentage of the total R&D expenditures reported for 199.. on software development.

[10] There are some important unresolved definitional, valuation, classification and measurement issues relating to the treatment of R&D and similar expenses in economic accounts. These issues are dealt with in "Intangible investment - An Essay at International Comparison" by M.C. Caplan for the OECD's Directorate for Science, Technology and Industry and "Service Output as Capital: What are the Implications?" by Anne Harrison and Carol S. Carson of the U.S. Bureau of Economic Analysis.

43. The choice of statistical unit for the questions of modules 1 to 6, especially when addressed to the computer services industries, can affect the comparability of results.

The main consequences are:

a) A difference in coverage. Contrary to an enterprise based survey, an establishment based survey would include

- "commercial" establishments classified in ISIC 72 which belong to enterprises for whom the provision of computer services is a secondary activity;

- establishments classified in ISIC 72 whose products are transacted within the enterprise;

and would not include

- establishments classified outside ISIC 72 which belong to enterprises primarily engaged in providing computer services.

The impact on the comparability of results will depend on the degree of specialization of enterprises operating in the computer services sector.

b) Choosing the enterprise rather than the establishment would also have an impact on the industrial structure shown by statistics. Choosing the enterprise could result in significantly different specialization and coverage ratios if enterprises are generally more diversified than establishments and if the production of computer services is a significant secondary activity of enterprises classified outside the computer services sector.

c) Choosing the enterprise can also create difficulties in tabulating information on a regional basis. This problem, however, can be solved by asking enterprises to report information on a regional basis or to provide information which allows the statistical agency to make estimates.

44. If the establishment is chosen as the unit of observation, it would be necessary to develop a questionnaire (or a collection strategy) to cover the activities of ancillary units classified in the target industries. This is necessary in order to have full coverage and, by implication, to enable the measurement of value added originating from the industry. The ancillary units of particular interest in the computer services industries are head offices and R&D units concerned with the development of software. The basis for such an inquiry could be the questions of module 2 - goods and services used in the operations - and module 11 - software R&D.

45. Those countries who choose the enterprise as the unit of observation might want to include a balance sheet in order to gather information on assets and liabilities and the source and application of funds. This information is typically available for enterprises, but not necessarily for more narrowly defined statistical units. Such an approach would provide a broader set of integrated data to analyse the performance of the computer services sector. Other questions which would be relevant at the enterprise level are interest and dividends paid and received, insurance claims, bad debts recovered and donations.

ANNEX 1

Definitions of classes used in Module 1

ANNEX 1 - COMPUTER AND RELATED SERVICES

Definitions of classes used for model survey

841 - Packaged software products[1]

8411 - Systems and user tools software[2] - The development and marketing (sale, rental, leasing and/or licensing) of systems and user tools packaged software. Documentation, maintenance and other support services such as assistance in installation and training can be an integral component of this service. The retail of packaged software is classified to **CPC 63252 - Retail sales of computers and non-customized software.** The custom design of software or the modification of packaged software to meet specific user needs is classified to **8423 - Custom software development services.** **ISIC 7220**

8412 - Application software[3] - The development and marketing (sale, rental, leasing and/or licensing) of application packaged software. Documentation, maintenance and other support services such as assistance in installation and training can be an integral component of this service. The retail of packaged software is classified to **CPC 63252 - Retail sales of computers and non-customized software.** The custom design of software or the modification of packaged software to meet specific user needs is classified to **8423 - Custom software development services.** **ISIC 7220**

842 - Professional services

8421 - Consultancy services related to the installation of hardware - The provision of advice and assistance on matters related to the management of businesses' and institutions' computer resources. This service may consist of assessing the computer needs of the organization, of planning the organization's acquisitions, of counselling the client on the procurement of hardware and software, of performing an audit on the computer related operations of the organization, etc. The provision of advice on technical matters related to computer systems is classified to **8422 - Systems and technical consulting services.** **ISIC 7210**

8422 - Systems and technical consulting services - The provision of advice and assistance on technical matters related to computer systems. This service may consist of conducting feasibility studies on the implementation of a system, of providing specifications for a data base design, of providing technical expertise for the integration of hardware and software, of providing guidance and assistance during the start-up phase of a new system, of providing specifications to secure a data base, etc. The custom design of software is classified to **8423 - Custom software**

development services and the provision of systems analysis and programming services is classified to **8424 - Systems analysis and programming services**. The training of personnel on the use of a computer system is classified to **CPC 92 - Education services.** **ISIC 7220**

8423 - Custom software development services - The development (analysis,design and programming) of software for, and to meet the requirements of, a specific client. The modification of packaged software is also included here. The provision of assistance during the installation phase and of training services can be an integral component of this service. The provision of systems analysis and programming services is classified to **8424 - Systems analysis and programming services.** **ISIC 7220**

8424 - Systems analysis and programming services - The provision of systems analysts and/or programmers services on a per diem basis to participate in one of the phases of the development of a system. The client supervises and retains the right to their work. The delivery of software commissioned by the client where the developer supervises and is involved in all phases (analysis, design and programming) of the development project is classified to **8423 - Custom software development services.** **ISIC 7220**

8425 - Computer facilities management services - The provision of personnel to manage and operate client owned (leased) computer facilities on an on-going basis whether these facilities are located on the client's or supplier's site. The incidental development of software can be an integral component of this service. The provision of computing resources is classified to **8431 - Data processing and tabulation services.** **ISIC 7230**

8426 - System maintenance services - The provision of assistance to keep computer systems (software) in a good working condition. The maintenance can be corrective or preventive and includes services such as testing to detect, locate and remove faults, improving existing programs, providing up to date user manuals and providing advice on the proper use of a system. If this service is provided as an integral component of a custom software development contract, a packaged software purchase contract or a computer facilities management contract, it is classified to the appropriate service category. **ISIC 7220**

8429 - Other professional services - The provision of computer related professional services not elsewhere classified. **ISIC 7220**

843 - Computer processing services

8431 - Data processing and tabulation services - The provision of computing resources for the purpose of processing information owned and supplied by the client. The execution of the application may be performed by the client (remote access) or the supplier. The provision of accounting (e.g. payroll accounting), statistical (e.g. tabulating and analysing results of a market research survey), administrative (e.g. billing services from a computerized list supplied by the client), etc. services where the supplier uses computers to deliver the service are not classified here, but rather according to the nature of the service rendered. The provision of computer facilities management services is classified to **8425 - Computer facilities management services.**
ISIC 7230

8432 - Data entry services - The capture of data (supplied by the customer) on tape, diskette or other medium or directly into a data processing system.
ISIC 7230

8439 - Other computer processing services - The provision of computer processing services not elsewhere classified. This category includes, among other services, the provision of tape and diskette conversion and rectification services, input preparation services and optical character recognition services.
ISIC 7230

844 - Data base services - The provision of on-line information retrieval services. This class includes the provision of the information (data base development) and of the computer resources (hardware and software - data base vending) necessary to store, retrieve and manipulate the information. The provision of the telecommunication network services (leased networks, public data networks or gateways) necessary to access data bases is classified to **CPC 752 - Telecommunication services.**
ISIC 7240

845 - Computer maintenance and repair services - The repair and maintenance of computer hardware. Systems (software or application) maintenance services are classified to **8426 - Systems maintenance services.**
ISIC 7250

849 - Other computer services - The provision of computer services not elsewhere classified.
ISIC 7290

ENDNOTES TO ANNEX 1

1. A software package is a program (or set of programs) and associated documentation useful to many users and which can be used without modification on defined computer systems (i.e. with specific hardware and embedded software). The buyer is licensed to use the software, but cannot copy it or modify it without the permission and usually the involvement of the developer. In contrast, custom software is developed for and to meet the needs of a particular user. The buyer may or may not retain exclusive rights to the software.

2. System and user tool software are used to control the operations of computer systems and to support the development of systems or application software. This category includes, among others, communication and distributed data processing software (monitors, remote job entry, terminal support, etc.), compilers (assemblers), data management software (data entry and validation, file organization, handling, maintenance, matching and retrieval, etc.), development aid software (file conversion, program optimisers, program testing, translators, CASE tools etc.), system software (emulators, simulators, job accounting, systems security, etc.) and utility software (library, sort, merge, etc.).

3. Application software is used to carry out specific tasks. This category includes general purpose software such as wordprocessing, spreadsheet, accounting and statistical analysis packages as well as software designed for use in specific fields such as credit card and instalment loan accounting software used in the banking field, actuarial accounting software used in the insurance field, computer aided design software used in the engineering and architectural fields, reservation management software used in the hotel management field and tutorial software used in the education field.

ANNEX 2

Relationship of classes used for the model survey and the CPC

ANNEX 2

MODEL SURVEY - COMPUTER SERVICES

INTRODUCTION

1. The purpose of this annex is to explain, in more detail, the relationship between the product classification proposed for testing and the current CPC as well as the rationale behind the adaptation of the CPC. The relationship is as follows:

Current CPC	Version for testing
84100 - Consultancy services related to the installation of computer hardware	- no change
84210 - Systems and software consulting services	8422 - Systems and technical consulting services
	841 - Packaged software products
	8411 - Systems and user tools software 8412 - Application software
	8423 - Custom software development services
84220 - Systems aralysis services 84230 - Systems design services 84240 - Programming services	8424 - Systems analysis and programming services
84250 - Systems maintenance services	8426 - Systems maintenance services
84310 - Input preparation services	- eliminated as a separate category. Part of "Other data processing service"
84320 - Data processing and tabulation services 84330 - Time sharing services	8431 - Data processing and tabulation services

84390 - Other data processing services	8425 - Computer facilities management services
	8439 - Other computer processing services
84400 - Data base services	844 - no change
84500 - Maintenance and repair services of office machinery and equipment including computers	845 - no change
84910 - Data preparation services	- eliminated as a separate category
no apparent equivalent category	8432 - Data entry services

RATIONALE

2. CPC 84210 - Systems and software consulting services - has been further elaborated into the following categories:

- Systems and technical consulting services
- Packaged software products
    - Systems and user tools software
    - Application software
- Custom software development services

This elaboration has been done for the following reasons:

(a) It provides the proper framework to monitor the growth of the software market and the relative importance of packaged and custom software in this market. There is a widespread interest in this information.

(b) These products are important outputs of the computer service industry.

(c) As mentioned in the core document, it would facilitate the eventual gathering of price statistics. In particular, the manner in which packaged and custom software are priced is different.

3. The following CPC categories be have been merged into one product class titled Systems analysis and programming services

CPC 84220 - Systems analysis services
CPC 84230 - Systems design services
CPC 84240 - Programming services

for the following reasons:

(a) While the distinctions made in the CPC provide a good description of the systems development process, the important distinction to be made in a product classification is that between the delivery of a ready to use custom software where the supplier is involved in all phases of the development and the provision of experts (analysts or programmers) on a per diem basis to perform one of the phases of the development. The detail suggested in the CPC is better obtained as an occupational breakdown.

(b) There are indications that provision of systems analysis services as a distinct service is relatively unimportant. As for systems design services, it is unlikely that it is supplied as a separate service i.e. separate from analysis and/or programming.

4. The following CPC categories have been merged into one class titled Data processing and tabulation services:

CPC 84320 - Data processing and tabulation services
CPC 84330 - Time sharing services

The collapsing of these classes has been done for the following reasons:

(a) "Time sharing services" is essentially a term used to refer to services supplied by mainframe service bureaux. The relative importance of this type of business has been declining in recent years with the increased use of micro computers and remote access to computers via telecommunication networks.

(b) As well, the distinction between "time sharing services" and "data processing and tabulation services" is not obvious and could therefore lead to some implementation difficulties. In both cases, the service provided is essentially to supply access to computing resources and expertise.

5. CPC 84310 - Input preparation services - and CPC 84910 - Data preparation services - have been eliminated for the following reasons:

(a) They appear to refer to the same service.

(b) There is no evidence that input preparation services are a statistically significant product. It was probably important some years ago when data entry was typically done using key-punched cards.

For these reasons it is recommended that this item should only be listed as an example under the "Other data processing services" category.

6. A category titled "Data entry services" has been created[11].

7. The "management and operation of data processing facilities on a continuing basis" has been separated from CPC 84390 - Other data processing services. This service is a professional rather than a processing service. Available literature also suggests it is a relatively new and growing service, likely to grow at a fast pace in the coming years as a result of increased "outsourcing" of this function by large organizations.

8. These classes have been aggregated into the classes shown below.

841 - Packaged software products
842 - Professional computer services
843 - Computer processing services
844 - Data base services
845 - Computer repair and maintenance services
849 - Other computer services

These categories, in particular the first three, are generally recognized in the industry as the main types of computer services. They also have the advantage of grouping products which are generally priced on the same basis.

[11] The production of this type of service accounts for an important share (10%) of the total production of data processing services (including data base services) by the Canadian computer services industry.