IMPLEMENTATION OF THE MODEL SURVEY OF COMPUTER SERVICES: CANADA'S EXPERIENCE

VOORBURG GROUP CONFERENCE
SYDNEY, AUSTRALIA
OCTOBER 17-21, 1994

STATISTICS CANADA

September 1994

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INTRODUCTION

Canada has had four years of experience in implementing the model survey of computer services. This paper reports on this experience and shows that most of the modules have been implemented successfully.

The model survey contains 11 modules for the collection of data on computer services (see Appendix A for details). In Canada, these modules are implemented through several surveys (see Appendix B).

Ten of the eleven modules of the survey are, at this time, partly or fully implemented. This paper examines them in the light of the survey results and discusses problems encountered. The eleven modules are listed below:

Module 1: Revenue from the provision of goods and services
Module 2: Goods and services used in the operations
Module 3: Purchases of goods and services for resale
Module 4: Inventories
Module 5: Supplementary questions concerning the basis of accounting
Module 6: Exports
Module 7: Imports
Module 8: Supplementary questions regarding packaged software products
Module 9: Employment
Module 10: Fixed assets, additions and disposals
Module 11: Software research and development.

Module 4 dealing with inventories is not yet implemented. Other modules are discussed below.

MODULE 1: REVENUE FROM THE PROVISION OF GOODS AND SERVICES

No significant problems are encountered in implementing this module. Data are currently collected for 18 of the 25 categories. Most difficulties faced in the early stages of the survey were resolved through discussions with industry associations and individual respondents and through the development of definitions in collaboration with the industry.

Of the seven remaining categories, three commodities are thought to be small in size -- an assumption supported by the relatively small size of the residual categories -- and one is typically provided as an integral part of the other commodities. Two categories would require a redesign of the survey to comply with the model survey. Brief comments on these items follow.

Table 1
Revenue from the Sale of Computer Services

	Share (%)
1.1 Revenue from the provision of computer services	
A. Packaged software products of own design	13.2
a. Systems and user tools software	NC
b. Application software	NC
B. Professional computer services	
a. Consultancy services related to the installation of hardware	2.9
b. Systems and technical consulting services	5.1
c. Custom software development services	12.7
d. Systems analysis and software services	4.1
e. Computer facilities management services	7.4
f. Systems maintenance services	NC
g. Other professional computer services	4.0
C. Computer processing services	
a. Data processing and tabulation services	11.9
b. Data entry services	0.6
c. Other computer processing services	3.6
D. Data base services	2.9
E. Computer repair and maintenance services	3.6
F. Other computer services	NC
1.2 Revenue from the sale of computer related goods and services	
G. Packaged software resold	2.5
H. Computer hardware resold	9.2
I. Computer services resold	NC
J. Computer hardware leasing/rental services	3.3
K. Network services	3.4
L. Computer related training services	1.5
1.3 Revenue from other sources	
M. Royalties and patent fees received	NC
N. Services to related parties not included above	1.9
O. Other goods and services	4.3
P. Operating subsidies	NC
GRAND TOTAL - OPERATING REVENUES	**100.0**

NC means not collected.

Comments on Items Not Collected

- Systems and user tools software and Application software (of own design). This information is currently collected for total packaged software, combining questions in Modules 1 and 3. Separate data on systems software and application software are not currently collected.

- Systems maintenance services. In Canada, these services are typically offered as an integral part of software sales, facilities management contracts or computer repair and maintenance contracts.

- Other computer services. This commodity is thought to be small -- an assumption lent support by the relatively small size of the residual category.

- Computer services resold. This commodity is thought to be small; the relatively small size of the residual category tends to confirm this assumption.

- Royalties and patent fees received. Since this is treated as a method of payment for software products, it is covered in software related categories. Compliance to the model survey would require a redesign of the survey; further, it would be desirable to separate royalty from the non-royalty component (manuals, diskettes, consultation, etc.). However, experience suggests that this information is not readily available.

- Operating subsidies. It is not an important issue in Canada.

Experience with Items Collected

Packaged Software Products (of own design and resold)

There are no difficulties in collecting data on this category. However, there may be definitional or statistical unit issues arising from the treatment of IBM Canada's research laboratory. Although IBM develops software products in Canada, we classify this activity as a professional service since the immediate client is considered to be the parent company in the U.S. These revenues are, therefore, considered to be from custom software development. This decision results from the strict application of the definition of custom software as that which is developed to the specifications of a single client. However, an argument could be made to classify these revenues as software products. Since this is an intra-enterprise transaction, it could be argued that which is ultimately marketed is a software product.

Professional Services (CPC 842)

We have experienced very little difficulty in obtaining accurate responses for CPC 842. Even most systems integrators are able to report revenue from the sale of computer hardware separately from services. However, it is more difficult to obtain accurate details for the sub-categories as items are not easily identifiable in the companies' accounts. The relatively large size of the residual category "other professional services" confirms this. Professional services category is likely to grow in importance if the trend towards out sourcing continues.

Computer Processing Services (CPC 843)

In our experience, CPC 843 and in particular CPC 8431 -- Data processing and tabulation services, is one of the most difficult categories to apply due to the ambiguity of the term "processing" and to the generalized use of computer equipment to offer a wide range of services. Here the problem is mainly that of profiling and making sure that companies providing such services as payroll administration services, market research services, and public opinion polling services which typically involve the processing of data by computer are not classified to the computer service industry[1] This requires analyzing the activities of the firm carefully in order to classify it to the proper industry and its services to the proper service categories.

Services to Related Parties Not included in Above

As firms expand abroad, development charges and management fees may become an increasing component of revenues. In the case of software development firms, however, there is a danger of including revenues here that more correctly belong under software products. In practice, this category is small in Canada. We have observed that some firms do not report it as a revenue item but show it as a debit entry to reduce expenses (Module 2).

MODULE 2: EXPENSES

Total estimated expenses incurred by the computer service industry in 1992 were $6.3 billion. The surveyed organizations accounted for 66 per cent of these expenses. The detail of expenses is shown in Table 2.

1 The following criteria are used to identify computer processing services: the essence of the service is to provide the use of computer equipment and software for different applications, and the client determines the application; the supplier only provides the means. The processing of data is a necessary activity to provide the service but it does not represent intrinsic nature of the service.

Table 2
Goods and Services Used in the Operations, 1992

	(%)
A. Wages, salaries and employee benefits	
a. Wages and salaries	47.6
b. Employee benefits	4.3
B. Business services	
a. Computer services for own use (CPC 84)	3.8
b. Professional services (CPC 46)	1.6
c. Advertising and sales promotion (CPC 871)*	4.2
d. Insurance (CPC 812)	0.3
C. Rental and leasing of machinery (CPC 83)**	3.3
D. Telecommunication services (CPC 752)	5.3
E. Materials and supplies for own use	3.2
a. Operating supplies	NC
b. Office and other supplies	NC
F. Occupancy costs	
a. Rental and leasing of land and buildings (CPC 82)	4.5
b. Utilities (CPC 17)	0.5
G. Property and other non-commodity indirect taxes	0.4
a. Property and school taxes	NC
b. Permits, licences and other non-commodity taxes	NC
H. Royalties and patent fees paid	NC
I. Services from related parties	2.3
J. Depreciation	9.8
K. Other operating, administrative and general expenses	9.0
GRAND TOTAL - OPERATING EXPENSES	100.0

* Includes travel and entertainment expenses
** Covers computer and related equipment only
NC Not collected

Module 2 has been redesigned beginning in 1992 survey year to improve compliance with the model survey and National Accounts concepts. Specifically, the respondents are requested to provide data on three additional items: utilities, depreciation on buildings and furniture and fixtures, and non-commodity indirect taxes (business property and school taxes, permits, licences, etc.)[2] . Previously, they were lumped together under "occupancy costs".

2 For the survey's conceptual framework in terms of macroeconomic concepts, see United Nations, A Model Survey of Computer Services, New York, 1991, p. 27.

Response rates to these three questions are summarized in Table 3 below. The response rate is the number of respondents providing data on these specific items divided by the total number of respondents providing information on most of the questions in the questionnaire. The relatively low response rate for utilities (39.1 per cent) suggests the difficulty some firms have in identifying some items in their accounts.

Table 3
Response Rate to New Questions on Expenses, 1992
(Module 2)

	Response Rate (%)
Utilities	39.1
Depreciation	68.5
Non-commodity indirect taxes	74.8

Our experience suggests that there may be some advantage in posing the detailed questions in Module 2 less frequently than those pertaining to revenue, based on the following considerations. Reporting of expenses is one of the more burdensome aspects of the survey because most companies have entries in almost every cell. The relatively large size of the residual category "other expenses", and the low response rate for utilities in 1992 -- partly due to the fact that the question was being asked for the first time -- could be indications of the burden. Secondly, respondents appear to be reluctant to disclose their profit margins. Thirdly, the structure of expenses shows relative stability over time. If it was decided to reduce the frequency of surveying the detail in Module 2, it could form part of an understanding with respondents to both increase their propensity to comply and to reduce their response burden.

MODULE 3: PURCHASES FOR RESALE

There are no particular problems associated with this module. Data collected for this module help classify firms, by distinguishing between wholesalers and computer service companies.

MODULE 5: SUPPLEMENTARY QUESTIONS REGARDING THE BASIS OF ACCOUNTING

Respondents are asked to report data on the accrual basis of accounting.

MODULE 6: EXPORTS

The total exports of the computer service industry are estimated at $755 million in 1992. The surveyed organizations which provided full details of the breakdown of exports account for more than half of these exports; the detail shown below is based on the exports of these organizations. This information was collected for the first time in 1989.

The categories for which data have been collected are those most significant in the Canadian context.

Table 4
Exports By Commodity, 1992

	Share (%)
COMPUTER SERVICES	
A. Packaged software products (of own design)*	53.2
B. Professional computer services	17.9
C. Computer processing services	1.3
D. Data base services (electronic info services)	NC
E. Computer repair and maintenance services	NC
F. Other computer services	NC
Total computer services	72.4
COMPUTER RELATED GOODS AND SERVICES	
G. Packaged software (resold)*	NC
H. Computer hardware (resold)	12.0
I. Computer hardware rental and/or leasing services	NC
J. Services to related parties not included above	14.2
K. Other goods and services	1.3
Total computer related goods and services	27.5

Note: * Category A includes category G.

This module poses some difficulties due to the tendency of firms with foreign subsidiaries to report consolidated export earnings. A question asking respondents to report separately the foreign sales of the company and those of its affiliates, added in the 1990 survey year, helps detect these errors. In addition, data on sales originating from the foreign subsidiaries of Canadian firms responds to industry's request and policy makers' need to know the extent of the expansion of Canadian firms into foreign markets, a phenomenon not adequately measured by exports alone.

MODULE 7: IMPORTS

Statistics Canada collects data on imports of computer services by all importers. Imports by the computer service industry are not separately identified.

MODULE 8: SUPPLEMENTARY QUESTIONS REGARDING PACKAGED SOFTWARE PRODUCTS REVENUE

Data for the variables of Module 8 are available for the surveyed companies only (Table 5). The data for Part A of the module are expressed as a percentage of the total revenue earned from the sale of packaged software, whether of own design or resold.

Table 5
Source of packaged Software Products, 1992
(Module 8, Part A)

	Share (%)
PACKAGED SOFTWARE DEVELOPED BY:	
a) the organization covered by this report	87.7
b) a domestic third party	2.1
c) a foreign third party	2.0
d) a domestic related party	2.8
e) a foreign related party	5.5
Total	100.0

The data for Part B of the module -- software by type of architecture -- are expressed as a percentage of the total revenue earned from the sale of any type of software that is packaged (of own design or resold) and summarized in Table 6. The respondents had no difficulty supplying the information. Every firm that provided data on sales of software products also provided the breakdown by type of hardware. The shift from mini computers and mainframe to the client/server and network environment is obvious.

Table 6
Distribution of Software Products Sales (Module 8, Part B)
By Type of Hardware
(%)

	1989	1990	1991	1992
Mini and main frame software	61.7	55.1	46.0	39.6
Microcomputer software	21.9	37.3	43.6	46.0
Communication and other software	5.4	7.6	10.4	14.4

After consultation with the industry, a question was added to obtain data on software by function (not required in the model survey). Respondents are asked to provide revenue earned from the sale of software products of own design or resold for six specific types of software. The results for 1992 are summarized in Table 7.

Table 7
Sales of Software By Function, 1992

	Firms (No.)	Revenue (%)
System software (operating systems, compilers, utilities, communications)	132	26.7
Financial software (non-industry specific, payroll, accounting, etc.)	120	9.4
Application tools (database, word processing, spreadsheet, graphics, etc.)	97	28.4
Manufacturing software (CAD/CAM, MRP, MMS, etc)	33	4.7
Scientific and engineering (mathmatical, simulation, seismic analysis, GIS)	40	4.5
Industry-specific (application solutions such as hotels, retail, banking)	153	26.3
TOTAL	NA	100.0

This information is useful for two purposes. It provides an indication of the extent to which software may be produced in other industries: while the low figures for scientific and engineering (4.5 per cent) and manufacturing (4.7 per cent) software may suggest a relatively small market, it could also indicate that because of the technical nature of these types of software a good portion is being developed in other industries[3] Secondly, with the software segment of the industry growing rapidly, this information could prove useful in classification.

3 The Surveys of Consulting Engineering Industry and of the Scientific and Technical Services Industry collect data on software sales and custom systems development. In 1991, the two industries derived 0.8 per cent and 1.2 per cent of total revenue from this source. See Statistics Canada, Architectural, Engineering and Scientific Services in Canada, 1991 (63-234).

MODULE 9: EMPLOYMENT

Estimates of the variables of this module are available in different sources. The Annual Survey of Software Development and Computer Service Industry collects data on full-time and part-time employees, and working owners and proprietors. In 1992, the industry employed 66,400 persons, of which 92 per cent were full-time and 8 per cent part-time. The survey does not collect information on the occupational distribution of the workforce. However, estimates from the 1991 census of population show that almost half (48.9 per cent) of those employed in the industry are in computing related occupations.

Employment data on distribution by sex are available from the 1991 census of population. Male employees accounted for 66.1 per cent of the workforce in 1991, and the female employees 33.9 per cent.

MODULE 10: FIXED ASSETS, ADDITIONS AND DISPOSALS

The objective of this module is to collect data on capital formation in the computer service industry. The Survey on Capital and Repair Expenditures started collecting annual data on capital formation beginning in the 1992 reference year. The industry invested $1,247 million in new capital in 1992.

MODULE 11: RESEARCH AND DEVELOPMENT

Since the Research and Development in Canadian Industry survey covers all industries, software R&D is available for the entire economy. Respondents are requested to indicate the proportion of total R&D that is devoted to software. Since this proportion is high for firms classified to the computer services industry, the survey of Research and Development in Canadian industry questions dealing with the composition of total R&D expenses are adequate to determine the elements of this module.

IMPLICATIONS FOR CPC

The Central Product Classification (CPC) is a complete product classification covering good and services. For goods the CPC is based on the Harmonized Commodity Description and Coding System (HS) which is a classification based on the physical properties of products.

One of the main problems of the CPC is that it provides less detail than other specific classification systems. Rapid growth of the computer service industry and the convergence of computer technologies with telecommunication and entertainment industries require revision to and the expansion of the CPC.

The computer service industry with revenues of $6.4 billion in 1992 is the largest business service industry for which Statistics Canada estimates data. Three components of the industry, software, professional services and processing services, have revenues exceeding $1 billion each. All three are growing rapidly, employing higher technologies, innovating and producing new products[4] . Statistics Canada is currently examining expansion of the SIC as it relates to the computer service industry and looking at commodity classification.

The current approach to limiting surveys to large revenue producers has implications for the analysis of commodity production; it means that small firms introducing new products are not visible to the survey. New products are reported only when they are produced by large firms. However, data reveal some trends.

Software products is one of the fastest growing products in Canada, increasing its share from 10.0 per cent in 1987 to 15.3 per cent in 1992. Supplementary questions introduced by us on software by function in Module 8 (Supplementary questions regarding packaged software) would help to elaborate the CPC. Further, developments in the industry suggest that the distinction between system software and applications is likely to become blurred. For example, the earlier versions of DOS did little more than control the storage and retrieval of data and start applications programs. Over time, the operating systems have become more versatile, and in a year or so, some of them would include electronic mail and remote access.

The other development of note is the growth of out sourcing. The Canadian computer service industry's revenue from facilities management has grown from 5.0 per cent in 1989 to 7.1 per cent in 1992. Since out sourcing generally includes a bundle of services, an analysis of the services included would be required to break down this category.

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4 A proposal is being developed to measure innovation in the model surveys of service industries. See F.D. Gault and W. Pattinson, Model Surveys of Service Industries: The Need to Measure innovation, Voorburg Group meeting, October 17-21. Sydney, Australia..

CONCLUSION

Most of the modules have been implemented successfully. There have been some difficulties in the early stages to identify properly the target population and to obtain consistent responses from all respondents. For the most part, however, these "start-up" difficulties have been resolved. Still, much remains to be done in the area of profiling to further our understanding of the nature of certain organizations and of the services they provide.

The rapid evolution of the computer technology, its wide use across the economy and its convergence with telecommunication and entertainment sectors lead to the rapid development of new products and the entry into the "computer services" market of many new businesses and of businesses traditionally involved in other types of activities. In this type of environment, classification and definitional issues are particularly important.

For a rapidly changing industry, standard classifications and model surveys are important in order to obtain internationally comparable data.

Appendix A

MODULES OF THE MODEL SURVEY OF COMPUTER SERVICES[5]

Modules	Topics
1	Revenue from the sale of goods and services
1.1	Revenue from the sale of computer services
1.2	Revenue from the sale of computer-related goods and services
1.3	Revenue
2	Goods and services used in the operation
3	Purchases of goods and services for resale
4	Inventories
5	Supplementary questions concerning the basis of accounting
6	Exports
6.1	Computer services
6.2	Computer-related goods and services
7	Imports
7.1	Computer services
7.2	Computer-related goods and services
8	Supplementary questions regarding packaged software products revenue
9	Employment
10	Fixed assets, additions and disposals
11	Software research and development

5 For details, see United Nations, A Model Survey of Computer Services, New York, 1991.

Appendix B

DESCRIPTION OF THE SURVEYS

This section describes the surveys used to collect data for the model survey of the computer service industry.

ANNUAL SURVEY OF SOFTWARE DEVELOPMENT AND COMPUTER SERVICES

Context:

An annual production survey which collects income and expenditure items. Provides information on exports to balance of payments, and sample for the development of price index for computer services. Production and sales are provided for input-output tables.

Frame:

Corporate tax filers coded to SIC 772[6] Some large unincorporated entities are also included in the survey. Small firms, incorporated and unincorporated, are included in industry estimates.

Implementation Issues:

Rapid evolution of the industry and the convergence of computer technologies, telecommunication and entertainment sectors gives rise to definitional problems both in terms of reporting units and services provided.

BALANCE OF PAYMENTS

Context:

Annual survey of large exporters and importers reporting receipts and payments for services by country and relation of client. Provide trade in services information for commodities for national accounts.

Frame:

All large corporations known to be active in the international trade in services.

6 The Canadian SIC 772 corresponds to ISIC 721, 722, 723, 729 and part of 725 and 7213..

Implementation Issues:

The service commodity classification used for this survey is not readily comparable to the CPC. The multiple aspect of certain services are difficult to reconcile with uni-dimensional classification[7] . The overlap with trade in merchandise is problematic in the case of software.

INTERNATIONAL MERCHANDISE TRADE

Context:

Provides estimates of imports of packaged software.

Frame:

All customs documents with a transaction exceeding $100cdn (or $1200cdn for an entire shipment).

Implementation Issues:

Since the Harmonized System (HS) is a classification of goods, no explicit categories were available for packaged software imports until 1990. Theoretically, only the value of the recording medium (diskettes, tapes,, etc.) was captured. In January, 1990, Statistics Canada implemented a classification refinement in order to permit the capture of software imports.

RESEARCH AND DEVELOPMENT IN CANADIAN INDUSTRY

Context:

Provides information on the resources committed to R&D in Canada by industry. The survey requests information on the proportion of R&D devoted to software. The survey covers all industrial sectors including the computer service industry.

Frame:

All R&D performers in Canada.

7 For example, software could be represented as royalties, computer services or research and development..

Implementation Issues:

The survey suffers from the same classification difficulties as the Annual Survey of Software development and Computer Services with respect to computer services companies (see below).

ANNUAL SURVEY OF WHOLESALE TRADE

Context:

Provides information on sales and commissions. This survey does not provide commodity detail and consequently information of software sales is not available. However, a supplement to the survey for 1988 obtained sales of software by country of origin for wholesalers of computer equipment and packaged software.

Frame:

Firms active in wholesaling goods for which revenues exceed $7 million. More specifically, Canadian SIC 5744 (ISIC 5150) represents firms distributing computer hardware and packaged software.

Implementation Issues:

Many classification problems arise due to the difficulty in determining whether a company properly belongs in computer services or wholesaling. It is important to view the two surveys together.

SURVEY ON CAPITAL AND REPAIR EXPENDITURES

Context:

Provides information on new capital and repair expenditures, with considerable commodity detail.

Frame:

Stratified sample of establishments in the software development and computer service industry.

Implementation Issues:

None.

Appendix C

RELATIONSHIP BETWEEN THE CPC AND THE MODEL SURVEY VERSION

Central Product Classification	Model Survey Version
84100 - Consultancy services related to the installation of computer hardware	8421 - 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 - Applications
	8423 - Custom software development services
84220 - Systems analysis services	8424 - Systems analysis and programming services
84230 - Systems design services	
84240 - Programming services	
84250 - Systems maintenance services	8426 - Systems maintenance services
84310 - Input preparation services	- eliminated as a separate category. Part of "Other data processing services"
84320 - Data processing and tabulation services	8431 - Data processing and tabulation services
84330 - Time sharing services	

84390 - Other data processing services	8425 - Computer facilities management services 8439 - Other computer processing services
84400 - Database 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

Appendix D

DEFINITIONS OF CLASSES USED FOR MODEL SURVEY

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 7229**

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 analyzing 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 APPENDIX C

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 optimises, 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 word processing, 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.