

# Measuring Intangible Investment

## **The Treatment of the Components of Intangible Investment in the UN Model Survey of Computer Services**

*by*

**OECD Secretariat**

© OECD 1998

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

## TABLE OF CONTENTS

1. Introduction.....	3
2. Treatment of software, etc. ....	3
3. Borderline with other intangibles .....	6
4. Borderline between intangible and tangible investment products .....	8
5. Factors affecting the coverage of the final results .....	8
6. Application of the survey.....	10
.....	10
ANNEX 1. MODULE 1. REVENUES FROM THE SALE OF GOODS AND SERVICES.....	11
.....	12
ANNEX 2. DEFINITIONS OF CLASSES USED IN MODULE 1.....	13
ANNEX 3. OUTLINE OF THE MODEL SURVEY .....	16
List of the modules .....	17

## **1. Introduction**

"The increasing use of microcomputers and packaged software has given rise to a whole range of computer-based services for which international norms and standards for the compilation of statistics are an urgent need in view of the importances of the computer services industry for domestic economic growth and the world economy. The purpose of the model survey of computer services<sup>1</sup> is to present a framework of information needs, survey design and methods of measurement and classification that would make data collection comparable across countries and eventually improve the compilation and availability of statistics of computer services.

The computer services industry provides packaged software products, professional computer services, computer processing services, database services, computer repair and maintenance services. These groups of products represent a wide range of computer services that are classified in division 84 of the Central Product Classification (CPC). In terms of activity coverage, the model survey is designed for businesses engaged in computer and related activities that are classified in division 72 of the International Standard Industrial Classification of all Economic Activities (ISIC).

The conceptual framework of the model survey is in the form of 11 modules for the collection of data on production, trade and accumulation; it is designed to test the product classes of the CPC and the industry classes of ISIC and to provide performance measures of the computer services industry. In addition, compilation procedures, including the methods of measurement, choice of statistical units and the derivation of aggregates, are explained. A module system allows countries to choose from a catalogue of data items those which suit their requirements and individual circumstances.

Because the computer services industry is continually evolving, there is interest in testing the model's product and activity classifications as well as its compilation procedures. In the model survey, the relevant parts of the CPC have been modified by either elaborating or merging some classes to derive product groups that were considered more appropriate for data collection. As regards ISIC, the experience from pilot studies suggests that there may be a need for clarifying the boundaries of the computer services industry. The compilation procedures are flexible as to what the statistical unit should be and what kinds of data to gather."

Module 1 contains the core information needed to measure the gross output of the computer service industries and thus to provide data on computer-related intangible investment from the producer side. It is reproduced as Annex 1 to this paper. As the revised version of the CPC for computer services (CPC 84) contains extensive references to software and databases it is reproduced as Annex 2. The full list of modules is given in Annex 3.

## **2. Treatment of software, etc.**

### **2.1 Definitions**

The model survey provides the following definitions of software:

- a) "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.

- b) 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 organisation, handling, maintenance, matching and retrieval, file organisation, handling, maintenance, matching and retrieval, etc.), development aid software (file conversion, programme optimisers, program testing, translators, CASE tools, etc.) system software (emulators, simulators, job accounting, systems security, etc.) and utility software (library, sort, merge, etc.).
- c) 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.”

In the tables a systematic difference is made between packaged software services and the rest.

## **2.2 *Packaged software***

The packaged software services industry is separately identified in the new version of the CPC, (see Annex 2).

The following information is collected for total packaged software:

- a) Standard information
  - Revenues from sales (distinguishing systems, etc., from customised)
  - Revenues from resale
  - Exports
  - Imports
- b) Special information

**“Module 8. Supplementary questions regarding packaged software products revenues**

If your organisation 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	or value
a) the organisation 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	or value
a) mini and mainframe software	.....	.....
b) microcomputer software	.....	.....
c) communication and other software not specific to a) or b)	.....	.....
TOTAL	100%	.....”

“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 (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 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.

The question 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 specialised stores (part of);
- ISIC 3000 -- Manufacture of office, accounting and computing machinery.”

### 2.3 *Other software*

Two categories can be considered for inclusion in intangible investment, "8423 Custom software development services" and "8424 Systems analysis and programming services", (see Annex 2).

Since they are subcategories of 842 Professional computer services, the only data declared for them would be revenue from the provision of services (see Annex 1).

### 2.4 *Databases*

The revised SNA definition of software as an intangible asset also covers major databases. The model survey identifies database services (CPC 844) (see Annex 2). It covers supply of the information itself plus the associated hardware and software. The provision of the information is described as "database development". It is not specified whether subsequent purchases of updates by a customer is included.

Data should be collected on:

- revenues from the sale of database services;
- the percentage of the above derived from exports;
- the value of imports.

## 3. **Borderline with other intangibles**

### 3.1 *Software research and development*

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

“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 19\_\_ on software development.”

“**Software research and development (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



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

The treatment of R&D sub-contracting is not clear. This is equivalent to extramural R&D spending in standard R&D surveys and is excluded from current expenditure in section B in order to prevent double counting when responses are aggregated. Despite this exclusion it appears in part C, an extremely interesting question on the treatment of software R&D in company accounts.

Subcontracted R&D to related parties by all computer services units is included in section N of module. "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".

Information is also requested on earnings from patents and licences (see Annex 1).

### **3.2 *Borderline with training***

The provision of training in the use of software and services is included in the services concerned in the revised CPC categories (see Annex 2). However, respondents are requested to report their revenue from the sales of training services in module 1 (see Annex 1).

## **4. *Borderline between intangible and tangible investment products***

The survey only treats expenditure on land, buildings and equipment as capital expenditures by computer service firms. However, it includes a number of questions designed to clarify which types of expenditure are capitalised by the responding units.

Special steps are taken in the survey to identify revenues from the (re)sale of computer hardware sold alongside computer services and the cost of their acquisition from the hardware industry. (Modules 1 and 3).

## **5. *Factors affecting the coverage of the final results***

The results of such a survey can be analysed in two ways. In the first, the response to module 1 serves to identify (or to confirm) the main economic activity of the business unit concerned and thus to which computer services industry it belongs. In the second the aim is to obtain a complete picture of the provision of a given computer service regardless of the main economic activities of the business units concerned.

Module 1 is designed to provide the core information needed to measure the gross output of computer service industries using the second approach.

## **5.1 Recommendation are included concerning secondary production of computer services by other industries**

"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) 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 organisation of production, a matter best handled by national statisticians.

## **5.2 Units of observation**

The degree to which all computer services activities will be covered also depends on the unit chosen.

"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.

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

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
  - establishment 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 specialisation of enterprises operating in the computer services sector.

- a) 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 specialisation 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.

- b) 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.

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.”

## **6. Application of the survey**

The modules in the survey have been tested in a number of Voorburg countries. The results of a first review, co-ordinated by the Australian Bureau of Statistics will be found in the 1992 report of the Voorburg Group. Five countries took part: Australia, Canada, New Zealand, Sweden and the United Kingdom.

## ANNEX 1. MODULE 1. REVENUES FROM THE SALE OF GOODS AND SERVICES

This section is concerned with the revenues generated by this organisation **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 organisation on behalf of the government.

### SECTION 1. REVENUES FROM THE PROVISION OF COMPUTERS SERVICES

A.	PACKAGED SOFTWARE PRODUCTS (OF OWN DESIGN)	VALUE
	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	.....
D.	DATABASE 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**

VALUE	
G. PACKAGED SOFTWARE (RESOLD)	.....
H. HARDWARE SALES (PURCHASED FOR RESALE)	.....
I. COMPUTER HARDWARE LEASING AND/OR RENTAL SERVICES	.....
L. COMPUTER RELATED TRAINING SERVICES	.....
TOTAL -- COMPUTER RELATED GOODS AND SERVICES (G to L)	.....
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 (N to O)	.....
P. OPERATING SUBSIDIES	.....
GRAND TOTAL -- OPERATING REVENUES (A to P)	.....

## ANNEX 2. DEFINITIONS OF CLASSES USED IN MODULE 1

### **841 - Packaged software products**

**8411 - Systems and user tools software** - The development and marketing (sale, rental, leasing and/or licensing) 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-customised 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**.

**8412 - Application software** - 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-customised 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**.

### **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 organisation, of planning the organisation's acquisitions, of counselling the client on the procurement of hardware and software, of performing an audit on the computer related operations of the organisation, 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 database 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 database, 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**.

**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 programmes 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**.

**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 programmes, 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 computerised 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 **84255 - 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 - Database services** - The provision of on-line information retrieval services. This class includes the provision of the information (database development) and of the computer resources (hardware and software database 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 databases is classified to **CPC 752 - Telecommunications 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**

### ANNEX 3. OUTLINE OF THE MODEL SURVEY

"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.

**The models 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.

Modules 1 to 6 form the core of the survey. They are designed for business 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.

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

Modules 8 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 these industries.

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

## **List of the modules**

Module 1 Revenue from the sale of goods and services

1.1 Revenue from the provision of computer services

1.2 Revenue from the sale of computer related goods and services

1.3 Other revenues

Module 2 Goods and services used in the operation

Module 3 Purchases of goods and services for resale

Module 4 Stocks/inventories

Module 5 Supplementary questions concerning the basis of accounting

Module 6 Exports

6.1 Computer services

6.2 Computer-related goods and services

Module 7 Imports

7.1 Computer services

7.2 Computer-related goods and services

Module 8 Supplementary questions regarding packaged software revenues

Module 9 Employment numbers

Module 10 Fixed assets, additions and disposals

Module 11 Software research and development

## NOTES

1. The model survey of computer services is a contribution from the Voorburg Group on Services Statistics to the work of the United Nations Statistical Commission. The Voorburg Group is a co-operative effort among national and international statistical agencies to address problems associated with data gaps and conceptual issues in service statistics. Its main purpose is to provide an informal forum for the exchange of views on service statistics in order that national and international statistical agencies may be assisted in or directed towards the solution of particular problems or the development of international guidelines and handbooks in the field of service statistics. The Statistical Commission, at its twenty-fifth session in February 1989, had asked the Voorburg Group to contribute a report on a substantive topic in view of the increasing interest in the compilation and methodological aspects of service statistics.

Statistics Canada, with the co-operation and assistance of the Voorburg Group participants, worked out an initial proposal for a model survey to be taken by a group of countries. A final report that outlined a model survey of computer services with supporting methodology was approved by the Voorburg Group. The model survey was presented to the Statistical Commission in 1991 which recommended its publication.