

Unclassified

STD/CSTAT/WPNA(2008)11

Organisation de Coopération et de Développement Économiques
Organisation for Economic Co-operation and Development

12-Sep-2008

English - Or. English

**STATISTICS DIRECTORATE
COMMITTEE ON STATISTICS**

Working Party on National Accounts

REPORT OF 2008 OECD SOFTWARE SURVEY

**To be held on 14-16 October 2008
Tour Europe, Paris la Défense
Beginning at 9.00 a.m. on the first day**

This document has been prepared by Jiemin Guo, Statistics Directorate and will be presented under item 9 of the draft agenda

For further information please contact:
Jiemin Guo
E-mail: Jiemin.GUO@oecd.org

JT03250493

Document complet disponible sur OLIS dans son format d'origine
Complete document available on OLIS in its original format



**STD/CSTAT/WPNA(2008)11
Unclassified**

English - Or. English

REPORT OF 2008 OECD SOFTWARE SURVEY

Introduction

1. In October 2001, under the auspices of the OECD Working Party on National Accounts (WPNA), an OECD task force was set up to address concerns about the implementation of the 1993 SNA recommendation to record software as a fixed asset. One of its first actions was to conduct a survey of member countries, aiming to:

- a) identify what the conceptual treatments were in countries and the rationale for them;
- b) determine the different methods being used to quantify the various software flows (GFCF, trade in software, etc.) and what might constitute best practice;
- c) determine how countries compiled price indexes for deflating software and what might constitute best practice; and
- d) quantify the differences in estimates.

2. The task force presented its report to the meeting of the OECD WPNA in 2002. The report showed that in some cases the differences between country practices and estimates were quite dramatic. It made many recommendations on how estimates of GFCF should be estimated in both current prices and in volume terms. In mid-2004, a small follow-up survey was conducted to determine whether country practices had changed over the following few years and, if so, what had been the impact. The results of the survey were reported at the meeting of WPNA in October 2004. They showed that many countries had taken steps to implement the task force's recommendations, but there remained much still to be done.

3. In late 2007, the OECD Task Force on R&D and Other Intellectual Property Products (TFIPP) was formed with the principal aim of developing a handbook to provide guidance on the compilation of GFCF and other capital measures¹ of intellectual property products (IPPs). The major reason for taking this initiative was the recognition of R&D as a fixed asset in the updated 1993 SNA - now officially referred to as the 2008 SNA. However, the handbook will also provide guidance on the three other types of intellectual property products: software and databases; entertainment, literary and artistic originals; and mineral exploration and evaluation. In the case of software, the guidance will be based on the 2002 report of the OECD Software Task Force.

4. The OECD Secretariat conducted another software survey in early 2008. Its purpose was to obtain details of the methods used to estimate software GFCF, with the aim of updating the recommendations of the 2002 report for inclusion in the IPP handbook. Survey forms were sent to all OECD Member and accession countries. 20 countries returned completed questionnaires, and some also supplied additional material describing their methods. They are **Austria, Belgium, Canada, Czech**

¹ Capital stock, consumption of fixed capital (CFC) and the provision of capital services.

Republic, Finland, Denmark, Germany, Italy, Hungary, Israel, Japan, Netherlands, New Zealand, Norway, Poland, Spain, Slovak Republic, Sweden, Switzerland, and USA.

Survey results

1. *How do you currently measure software GFCF?*

5. A majority of countries (15) answered “Use a combination of partial demand-side and supply-side data on software.” Five countries (Japan, New Zealand, Switzerland, Sweden and USA) use the supply-side approach only.

2. *Demand-side approach*

2.1. *Do you use surveys to directly derive estimates of software GFCF (i.e. the demand-side approach)*

6. For those countries using the demand-side approach (15 countries), most use data from their annual structural business surveys to derive GFCF estimates for software purchases. A few countries extrapolate data from an infrequently conducted survey using partial indicators.

7. Nearly all of the 15 countries with survey data for purchases of software also derive supply-side estimates. They then go through a confrontation and balancing process. Some countries appear to rely more on the supply-side data and effectively just use the proportions from the survey estimates to allocate the supply-side aggregate to using industries and sectors, but others, such as the Netherlands, place more reliance on the demand-side data.

8. Six countries (Austria, Czech Republic, Hungary, Norway, Slovak Republic, and Spain) indicated that they also use surveys to obtain estimates of own account software GFCF. Austria conducted a detailed survey in 1997 and extrapolates the results by assuming a fixed a ratio between purchased and own account software GFCF. The other five countries collect the data annually.

2.2. *If so, could you please provide details of the surveys (scope, coverage, frequency, etc.) used and copies of the form(s).*

9. Details of survey coverage were provided by most countries that use surveys to derive purchased software estimates. Some provided survey forms (Austria, Hungary, and Norway, for example).

10. The frequency of the surveys varies. Most conduct annual surveys for all, or most, industries. But some surveys are conducted intermittently, at least for some industries. The Slovak Republic has both quarterly and annual surveys.

2.3. *What is your assessment of the quality of the estimates produced?*

11. *Purchased software:* 11 countries provided answers to this question. The results show that the assessment of quality of the estimates is mixed. On the one hand, some countries believe the reported values are understated (Czech Republic and Germany, which does not use them). Others expressed concern that the estimates were reliant on reporting units adequately differentiating between fixed capital formation and intermediate consumption. One reason given is that business accounts are unsuitable for supporting such estimates. There is also a concern of possible underestimation of government own account investment because spending on software can be part of a routine expenditure that is not reported as investment but only as intermediate consumption. On the other hand, some countries (such as the Netherlands) think the estimates are satisfactory.

12. There is uncertainty as to what extent software produced on own account should be capitalized. Another issue was whether royalty payments for the use of software should be capitalised irrespective of whether there is a long-term contract or not.

2.4. What do you consider to be the most important contributors to the success of your surveys?

13. Countries that responded to this question identified different contributors to success, examples are:

- Questions should be simple to answer.
- Asking for approximate percentage distributions on the different types of equipment, software and services should be sufficient.
- Others suggested that surveys needed to be compulsory and have good coverage of the population.
- General reconciliation between demand and supply was mentioned by Norway and the Netherlands.

2.5. Do you use any other sources of data for the demand-side approach?

14. Some countries have sources other than surveys. For example, Spain uses company association data for the software and hardware industries.

3. Supply-side approach

3.1. Purchased software

15. The draft *Handbook on Deriving Capital Measures of Intellectual Property Products* provides a step-by-step guide for estimating purchased software that is based on the guide provided in the 2002 report of the OECD task force. The survey asked countries to provide answers to questions on each of the steps in an attempt to identify common or different practices.

Step 1: starting with domestic industry data, CPA, CPC, ISIC (or NAICS, ANZSIC, etc.)

16. For countries using the supply-side approach, information about the industry classification codes used was provided in the survey responses. The codes are consistent for those countries using the same classifications (for example, CPA and NACE for European countries, NAICS for USA and Canada), but the details vary from country to country. For example, Austria uses CPA 72 on a 2- digit level, while the Czech Republic uses 4-digit NACE and 3-digit CPA level.

Step 2: inclusion of imports to obtain total resources

17. Countries use foreign trade statistics (customs data) and/or BOP data in estimating software imports. The use of these data is complicated by a number of factors:

- a) BPM5 is generally interpreted to mean that licences to use packaged software supplied on disks should be included in goods, while all other software should be included in services: either in the current account (royalties or licence fees) or capital account (outright purchases).

- b) While licences to use packaged software supplied electronically are recorded in services, it is uncertain whether back-up copies supplied on disk are recorded in goods in the BOP data.
- c) Customised software can also be supplied on disk and needs to be removed from the trade data to get BOP estimates.
- d) Software may not be separately identified in the available BOP data (both goods and services components), and the software proportions are likely to change over time.

Please describe how you derive estimates of software imports. Which codes and level of detail are used, and is an estimate for software royalties and license fees derived separately?

18. What national accountants do is determined largely by what is available from the sources in their country.

19. A number of countries reported the difficulties they have and the steps they have taken to overcome them. For example, Canada described how customised software (25% of the total) is removed from the trade data by the BOP statisticians to avoid double counting. Israel described how it is extending its trade in services survey to capture software. Denmark described how it imputes estimates for software in the various service categories. The US described how it identifies the various components and differentiates between software service flows between affiliated units and unaffiliated units.

Step 3: inclusion of trade margins and taxes

20. In general, there are no direct data available for software trade margins/taxes. Many countries (such as Canada, Denmark, Finland, Israel, Italy, Spain, Sweden, and USA) use margin/tax rates from input-output tables or supply-use tables. In addition, periodic survey data are used in estimating trade margins.

Step 4: avoiding double counting and exclusion of intermediate consumption

Please describe how you go about avoiding double counting.

21. Countries reported different treatments, but most countries reported that they follow the recommendations of the OECD TF in identifying and excluding subcontracting and pre-packaged software purchased by hardware and software bundlers. Several countries reported difficulties avoiding double counting, and proportions based on past benchmark surveys are often used for allocating the domestic supply between household consumption, investment and intermediate consumption.

Step 5: maintenance

22. Responses indicate that most countries exclude maintenance from total software estimates and they generally follow the recommendation of treating maintenance as intermediate consumption. There are some exceptions, however: Hungary, Japan, Norway, and Slovak Republic do not exclude maintenance from software supply. Those countries that do exclude maintenance use different ways of estimating it and the estimates vary considerably. For Italy, it composes about 2.5-2.6% of total resources, while it is 10% of the estimates of customised software for New Zealand.

Step 6: exclusion of household purchases

23. Countries estimate household purchases of software either directly through household surveys (Canada, Denmark, New Zealand, Norway, and Slovak Republic, Spain) or combine survey data with commodity flow methods. The USA uses the benchmark IO table, which is based on Census Bureau retail

sales and service receipts. In other years, household purchases are estimated using industry sales from annual retail trade surveys. However, the proportion of household purchases of total resources varies significantly among countries, ranging from about one per cent (Spain) to fifteen per cent (Japan). The following proportions of total resources were reported:

Spain: 1.1%

Sweden: 2%

Finland: 3%

New Zealand: 5.4%

Denmark: 4.6% (basic price), 8.6% (purchasers' price)

Japan: 15%

Switzerland: 3.5%

Step 7: exclusion of exports

24. As for imports, most countries report that they source their exports data from foreign trade statistics. The proportion of total resources varies. There are exceptions, such as Israel, that use exports data from surveys to exclude them from supply.

25. The following proportions of total resources were reported:

Japan: 14%

Finland: 18%

New Zealand: 10 %

Spain: 17 % (2004).

Sweden: 18% (2005).

3.2. Own-account software (includes software for own use and software originals from which copies are to be made for sale or licence)

26. Some countries rely exclusively on survey data for their estimates (Norway, Czech Republic, Slovak Republic). Japan reported that it does not estimate own-account software.

3.2.1. Labour costs

How do you determine the number of software personnel: direct survey or employment data by occupation? Please give the ISCO codes of the types of software personnel included and the proportions of their time it is assumed is dedicated to software GFCF.

27. Most countries use population census data, labour force survey data or a combination of the two to get the numbers of people working on software GFCF. It is not easy comparing the scope of occupational categories used by countries because different coding systems are used. However, it seems that there is some variation. For example, Canada includes only 'computer system analysts' and 'computer programmers', but the US also includes 'software engineers'. Germany includes a wider range of occupational categories, including 'data entry clerks', 'consultants and marketing specialists in the field of IT'.

28. There is also considerable variation in the proportions of time allocated to software GFCF. Finland, Belgium, Canada, and the USA counted 50% of software professionals' time spent on software GFCF. Spain allocates only 12.5%. Germany, with its wider scope of classifications, apportions a smaller

proportion of their time to software GFCF, ranging from 2.8% for ‘practising data-processing specialists in other occupations’ to 18.4% for ‘application software developers’. Denmark also allocates different proportions of time for different occupational categories: varying between 20%, 50% and 100%. Israel varies the rate across industries: 10% for manufacturing, 20% for computer and related industry, and 50% for other industries.

3.2.2. Non-labour costs

29. In general, labour costs are marked up to take account of non-labour costs, including capital services, but the mark-up varies among countries. For example, Canada reported that non-labour costs are about 50% of the labour cost, the USA 100% and Germany about 120%. Israel takes no account of non-labour costs. New Zealand estimates non-labour costs as 50% of labour cost, but this excludes the cost of capital services. Some countries, such as Sweden, use data from units in the computer services industry.

3.2.3. Cost of capital services

30. Most of the reports indicate that this cost is included in the non-labour costs. Two exceptions are New Zealand and Sweden.

3.2.4. Sales adjustment

How do you estimate the costs of producing custom software to be sold?

31. Only a few countries (Belgium, Canada, New Zealand, Norway, and USA) reported that a sales adjustment was made.

32. Canada, New Zealand and Denmark use survey data for the sales adjustment; the USA uses occupational employment in industry "Computer systems design and related services" is judgementally adjusted to exclude production for sale.

4. *Licence to use with a long-term contract*

4.1. The revised SNA will recommend that annual payments for a licence to use a copy with a long-term contract should be treated as GFCF, while annual payments for a licence to use a copy without a long-term contract should be treated as a service under an operating lease. Which sources of data will you use to separate the two kinds of payments?

33. Most countries reported that no data had been collected or study had been done on this subject. A number of questions were raised by countries on this issue that will need to be addressed by the TFIPP.

34. Denmark provided comments on the proposal for making such estimates (see below). Germany also expressed serious doubts about them and said that it was still not convinced that payments for a licence to use something can be investment.

35. Spain expressed concern about the new SNA requirements “will make us face additional statistical problems in the future. Solution proposed above (asking either producers or users) is acceptable in theory, but we see problems to search this information in our country (due to problems of statistical overburden).”

36. **Remark by Denmark:** We do generally not believe in various special conventions with respect to different kinds of assets, and we agree on the decision to treat the payment for software for which the use is paid by annual (or other periodic) royalties as intermediate consumption, whenever the lease can be terminated on short notice. The exact method used for distinction between short-term and long-term leases can be discussed. The proposal may be feasible. It might, however, be easier to obtain such information

from the domestic users of the software. Furthermore, it may be possible to find information in the notes in the annual reports of some big enterprises. Finally, there seems to be some evidence that accounting practises with respect to capitalisation of software in Danish enterprises tend to move in the national accounts definitions. If this is the tendency it may be possible to follow the distinction made in business accounts.

4.2. *Do you consider that a feasible solution would be to get a periodic breakdown of sales by length of licence agreement from major software suppliers – both at home and abroad? Would it be possible to get such a breakdown for sales to government and businesses by software suppliers in your country?*

37. Few countries expressed a willingness to do so, and some expressed doubts about it. The Netherlands indicated that “The availability of such data would of course be very helpful, we doubt however the feasibility of this solution. At Statistics Netherlands we currently do not have the data to make such a breakdown.” Also, see the comments by Denmark to the above question.

5. R&D and software

5.1. *In the R&D statistics for your country, do you have estimates for R&D in software?*

38. More than half the countries (12 out of 20) reported No or did not answer.

5.2. *If so, please, describe the source of the data for these estimates.*

39. R&D Survey: Canada, Israel, Netherlands, Norway, Slovak Republic, USA

5.3. *If possible, please indicate whether the R&D thus estimated is included in the estimates of software GFCF.*

40. Four countries (Canada, Israel, Netherlands, and USA) reported that R&D is included in estimates of software GFCF.

6. Prices of software

Please describe how you derive price indices for deflating software GFCF? Please, indicate, if different price indices are used for different components of software, and describe the level of detail used for deflation.

41. There is a great deal of variation in the way countries derive their volume estimates of software GFCF. The

42. Some countries deflate different components (packaged, customised and own account) separately, while others deflate the aggregate. The types of price indices used vary. A number of countries follow the US approach and use the US Bureau of Labor Statistics’s PPI for packaged software with the bias adjustment calculated by the BEA for packaged software and combinations of this index with cost indexes for the other components. Other countries use their own PPIs and CPIs. Germany reports that its deflator is based on software-related hardware (and not on observable prices for standard or gaming software) as they believe that the trends in the hardware prices reflect the developments in closely related software values better than the mentioned software prices.

7. Service lives of software

What sources of data do you use for the estimation of service lives of software?

Please indicate whether you use different service lives for different components of software, and describe the level of detail used for estimating capital stocks of software.

43. The following table lists the reported results for the service lives of software. Most countries do not estimate service lives for own account and pre-packaged software separately.

44. Some countries reported that their service lives are based on expert opinions (Finland) or those of other countries (Austria and Italy base their estimates on those of the USA). For Japan, the estimates of software service lives are derived from the taxation system.

	own account & customized	purchased	total
Austria			30% depreciation rate
Belgium			3
Canada	5	3	
Czech Republic			
Denmark	6	4	
Finland			
Germany			
Hungary			5
Israel	5	3	
Italy			
Japan			5
Netherlands			3
New Zealand			4
Norway			
Poland			8
Slovak Republic			5
Spain			4
Sweden			
Switzerland			
USA	5	3	

Summary

The survey responses show that:

1. Basic approach

- a. The majority of countries (15 out of 20) use a combination of supply-side and demand-side methods in measuring software GFCF. Nearly all of the 15 countries with survey data for purchases of software also derive supply-side estimates. They then go through a confrontation and balancing process. Some countries appear to rely more on the supply-side data and effectively just use the proportions from the survey estimates to allocate the supply-side aggregate to using industries and sectors, but others, such as the Netherlands, place more reliance on the demand-side data.

- b. Consistent with the varying reliance on the survey estimates of software purchases, countries had different views on their quality with some countries thinking they were of satisfactory quality and others having concerns.
- c. Six countries indicated that they also use surveys to obtain estimates of own account software GFCF. Three of them also use a macro method to derive estimates, but the others rely solely on the survey estimates.
- d. The remaining 5 of the 20 countries use the supply-side approach only for purchased software and the macro approach only for own account software.

The results are quite different to the ones found in the 2001 OECD software survey, in which few countries reported successfully using the demand-side approach for purchased software.

2. *Supply-side approach for purchased software*

- a. It is clear that accurately identifying imports of software is a major problem for many countries.

3. *In each of the subsequent steps, there is considerable variation in country practices and the relative magnitude of the adjustments.*

4. *Macro approach to the estimation of own account software*

- a. Most countries appear to use employment of software professionals in category 213 of ISCO 88, but it is not always easy to tell because of the use of different coding systems. There are exceptions, with some countries using a narrower scope and others using a wider one.
- b. There is considerable variation in the assumed proportions of the time spent by these people.
- c. The mark-up for non-labour costs varies a great deal, too.

5. *SNA 2008 recommendation on software licences*

- a. It appears that it will be difficult to implement in practice, and it is something the TFIPP needs to address.

6. *R&D and software*

- a. Only a few countries report having estimates of software R&D.

7. *Software price indices*

- a. A number of countries use the same approach as the BEA and use the adjusted BEA price index for packaged software. Most of the others use various PPIs, CPIs or wage rates.

8. *Most countries do not use different service lives for packaged and own account/customised software. Overall, the service lives used vary between 3 and 8 years.*