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Working Party on Indicators for the Information Society

REVIEWING THE ICT SECTOR DEFINITION: ISSUES FOR DISCUSSION

Stockholm, 25-26 April 2002

This paper serves as a basis for discussion for the review of the OECD ICT sector definition in the light of countries' experience in implementing such a definition. Delegates are invited to review the ICT sector definition, discuss whether it needs to be revised and suggest ways of improving the comparability of statistics collected according to this definition. General and specific issues for discussion are presented in section VII of the paper.

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REVIEWING THE ICT SECTOR DEFINITION:

ISSUES FOR DISCUSSION

Main points

1. In 1998, OECD Member countries agreed on a definition of the ICT producing sector, based on an international standard classification of activities (ISIC Rev.3). It was recognised at that time that it would be necessary to reconsider the definition and review it in the light of subsequent experience. This paper reviews the experience gained with the first two pilot collections of ICT supply data and the studies conducted by a number of Member countries on the feasibility of the OECD ICT activity-based definition (see Annex 1).

2. The paper shows that given the current use of detailed national classifications to provide data on wholesaling of ICT products, the only ICT service class for which there appear to be a low specialisation ratio is the R*enting of office machinery and equipment* (ISIC 7123). Most of the issues raised by Member countries concerning low specialisation ratios thus relate to ICT manufacturing classes, namely the class *Insulated wire and cables* (ISIC 313) and *Industrial process equipment* (ISIC 3313). The paper also provides an example of how the mapping of the activity-based definition to an ICT product-based classification such as that proposed in DSTI/ICCP/IIS(2002)5 can help to ameliorate the comparability of statistics for the ICT producing sector. Finally a sensitivity analysis of indicators of ICT manufacturing industries to the inclusion of activity classes for which the specialisation ratio appears to be very low is carried out. It shows that, for the purpose of comparisons across countries, the inclusion or the exclusion of those two classes from the definition does not make a large difference, at least in the case of those countries included in the example.

3. Delegates are invited to share their experience on the implementation of the OECD ICT activity-based definition. In particular Delegates are invited to report on:

- Difficulties in implementing the OECD ICT sector definition.
- Possibility of using national classifications to identify the wholesaling of ICT products.
- Degree of "ICT specialisation" of ICT industries in each country, possibly providing example using production data.
- Possibility of linking their activity-based classification to a product-based classification such as the HS classification at the 6-digits level.

4. Delegates are also invited to give their view on whether this definition needs to be revised both in terms of the underlying principles and the list of primary ICT activities, or whether its implementation only needs to be improved. In the discussion, the trade-offs between the statistical "purity" of the definition, its feasibility, and the primary user need for this type of statistics, namely the ability of carrying out international comparisons of core indicators, need all to be taken into account. General and industry specific issues for discussion have been identified in the paper and are contained in section VII.

I. Introduction

5. In 1998, OECD Member countries agreed on a definition of the ICT sector as a combination of manufacturing and services industries that capture, transmit and display data and information electronically. This definition, based on an international standard classification of activities (ISIC Rev.3), was considered to be a first step to obtain some initial measurement of ICT sector core indicators. It was recognised at that time that it would be necessary to reconsider the definition and review it in the light of subsequent experience.

6. One important feature of the OECD ICT sector definition is that it conceptually breaks the traditional ISIC dichotomy between manufacturing and services activities. Activities producing or distributing ICT products can be found everywhere in the economy. On the other hand, by identifying those key sectors whose main activity is that of producing or distributing ICT products, this definition constitutes a first order approximation of the "ICT producing sector". In 1998, it was also recognised that such an activity-based definition should be complemented by an ICT products classification. Mapping products to activities would allow a more precise quantification of ICT related production, value added and employment, both within the core ICT sectors and in other sectors of the economy. A discussion of ICT goods and services classifications can be found in DSTI/ICCP/IIS(2002)6 and 7.

7. The aim of this paper is twofold. First to review the ICT sector activity-based definition in the light of (a) experience in collecting core internationally comparable indicators of ICT supply at the OECD and (b) experience in its implementation by Member countries[1]. Secondly, Delegates are invited to give their view on whether this definition needs to be revised both in terms of the underlying principles and the list of primary ICT activities, or whether its implementation only needs to be improved. The paper offers some suggestions on how to refine the ICT sector definition and ameliorate the comparability of statistics for the ICT producing sector. Section VII identifies some questions that Delegates may wish to address. In the discussion, the trade-offs between the statistical "purity" of the definition, its feasibility, and the primary user need for this type of statistics, namely the ability of carrying out international comparisons of core indicators, need all to be taken into account.[2]

1 . A series of Annexes – A to D – report Member countries' comments and discussion over the last two years. Namely, the "Nordic countries' experience in measuring the ICT wholesale activity using the NACE classification" (2000, Annex A); an "Assessment of the ICT sector definition based on Australian data" (2001, Annex B); an "Assessment of ICT manufacturing classes based on Danish production data" (2001, Annex C); "The use of NAICS to provide data based on the OECD ICT sector definition: the U.S. experience" (2001, Annex D); "Switzerland experience with the ICT sector definition" (2001, Annex E).

2 . Definitions not only need to be statistically feasible but also responding to user needs. Multiple user needs would certainly lead to a multiplicity of definitions. For example, the need to measure the relative size of ICT production and that of measuring ICT-related employment might have different implications regarding the opportunity of including both the manufacturing and distribution activities of ICT goods and services in the ICT activity-based definition. Another example is given by the feasibility of the ICT sector definition when implemented in the System of National Accounts (SNA) for analytical purposes. Looking at the growth rate of the ICT sector in terms of value added raises the problem of evaluating output in volume terms. For this type of analysis only aggregate activity classes based on national accounts can be used, and the inclusion of activity classes at the 4-digits level in a definition might prove to be of no practical use.

II. Some background: the OECD ICT sector definition approved in 1998

8. In 1998, the OECD recognised that the ICT sector ought to be defined as an industrial sector. Thus it should be formed by bringing together business units (establishments, enterprises or enterprise groups) that had common ICT activities. It was felt that the industrial classification ISIC rev 3 was the best option available to collect indicators on an internationally comparable basis, even though it did not precisely identify all the activities that could be considered to be ICT activities[3]. The list of ICT activities was decided on the basis of a set of principles, as shown in Box 1.

9. The meeting also recognised that the preferred way of identifying an ICT sector would have been to firstly define ICT goods and services, and then to formulate the ISIC classes that had activities (manufacturing, wholesaling etc) involving those goods and services. In order to obtain a initial set of indicators for the ICT sector in a limited amount of time, though, the approach taken was to first define the activities, and subsequently work on a list of ICT goods and services that could complement and help to refine the activity-based definition.

10. At the 1998 meeting, it was also argued that the inclusion of whole ISIC classes in the definition was too restrictive and would have meant that the definition would not be as pure as users would like – in statistical terms, the specialisation ratios would not be as high as desired. Thus it was proposed that the ICT sector should be defined by forming sub-classes in those industries where the activities covered a mixture of ICT and non-ICT goods and services. The group decided not to accept this proposal, except in the case of the Wholesale sector, where the industrial class 5150 was seen to be too broad and covering much more than ICT activities.

11. Finally, because very few retailers exclusively sell ICT products, it was agreed to postpone the inclusion of 5233 (other retail trade of new goods in speciality stores) until a commodity definition was available. Although delegates agreed to this, it was noted that in the North American Industry Classification System (NAICS), the distinction between wholesale and retail trade was blurring, reducing the rationale for including wholesale while excluding retail.

3. None of the alternative industrial classifications was particularly suited to define ICT activities, although the North American Industrial Classification (NAICS) was moving in the preferred direction in that it did bring together both manufacturing and service sector industry classes into the one “Information sector”.

Box 1 - The OECD ICT sector definition approved in 1998

***The principles underlying the choice of the activities included in the ICT sector definition**:*

For manufacturing industries, the products of a candidate industry:

- must be intended to fulfil the function of information processing and communication including transmission and display, or
- must use electronic processing to detect, measure and/or record physical phenomena or to control a physical process.

For services industries, the products of a candidate industry:

- must be intended to enable the function of information processing and communication by electronic means.

***The ISIC industries included in the ICT Sector**:*

Manufacturing:

- 3000: Office, accounting and computing machinery
- 3130: Insulated wire cable
- 3210: Electronic valves and tubes and other electronic components
- 3220: Television and radio transmitters and apparatus for line telephony and line telegraphy
- 3230: Television and radio receivers, sound or video recording or reproducing apparatus and associated goods
- 3312: Instruments and appliances for measuring, checking, testing, navigating and other purposes except industrial process equipment
- 3313: Industrial process equipment

Services:

- 5150: Wholesale of machinery, equipment and supplies (part only, where possible)
- 6420: Telecommunications
- 7123: Renting of office machinery and equipment (including computers)
- 72: Computer related activities

The discussion about the inclusion of certain activity classes in the 1998 definition

At the 1998 meeting, the inclusion of some of the ISIC industries currently part of the OECD ICT sector definition was object of a lively discussion. These were:

- ISIC 3130 (manufacture of insulated wire and cable). This activity class raised some questions due to its inclusion of transmission cable for electric power. Because of the perceived growing importance of optic fibre cables as part of this broader industry, it was agreed to include this industry with the understanding that there would have to be a footnote on historical time series alerting users that, because of technological change and the advent of optic fibres, the nature of this industry changes significantly over time. It was also noted that confidentiality restrictions could plague the reporting of data for this industry in some countries.

- ICT wholesale, retail and rental activities. Some of the discussion focused on the possible inclusion of wholesale, retail and rental activities in the industry definition of ICT. In the case of wholesale (5150, Wholesale of machinery, equipment and supplies) the argument was that for many OECD Member countries, ICT manufacturers that do not produce are often classified as wholesalers. The problem was that ISIC revision 3 did not have sufficient subcategories to allow a distinction between ICT equipment wholesaling and the wholesaling of other equipment (e.g. industrial machinery). To avoid this problem, delegates agreed to include 5150 but to only report data for the relevant ICT wholesaling activity through use of their more detailed national classifications (e.g. NACE 5143, 5164 and 5165). Because very few retailers exclusively sell ICT products, it was agreed to postpone the inclusion of 5233 (other retail trade of new goods in speciality stores) until a commodity definition was available. Although delegates agreed to this, it was noted that in the North American Industry Classification System (NAICS), the distinction between wholesale and retail trade was blurring, reducing the rationale for including wholesale while excluding retail. Finally, with little discussion, delegates agreed to include class 7123, Renting of office machinery and equipment (including computers), in the definition.

Source: OECD (1998), DSTI/ICCP/AH/M(98)1/REV1

III. Experiences in implementing the ICT activity-based definition and outstanding issues

12. The following section reviews the experience gained with three rounds of ICT data collection at the OECD and the feasibility studies conducted by some Member countries over these last two years. In doing so it highlights some outstanding issues for discussion.

Issue 1 Can the OECD ICT sector definition be implemented?

13. There have been already two rounds of collections of core ICT supply indicators at the OECD and one is currently ongoing.[4]. The quality and comparability of the data collected has improved over time with some Member countries using their national classifications to provide a more accurate measurement of the ICT producing sectors. Table 1 summarises the concordance between the ISIC rev.3 classes of the OECD ICT sector definition and the more detailed national classifications currently used by Member countries to provide data to the OECD. Only some of the national classifications concordances are shown, namely the European classification NACE, the Canadian NAICS, the U.S. NAICS, the Australian and New Zealand ANZIC and the Japan SIC.

14. The ability of providing data according to the OECD ICT sector definition is a function of the similarity between national classifications and ISIC rev.3. While the European classification NACE matches with ISIC at the required level of detail and provides an even finer breakdown, specific concordances and estimates had to be provided in the case of NAICS (both by Canada and the United States) and ANZIC (by Australia and New Zealand). The Secretariat has suggested a concordance between ISIC ICT classes and Japan SIC. Specific problems arise with the following classes:

a) *Disaggregated data at the 4-digit levels*. In the case of Canada, Australia and New Zealand the data for ISIC classes 3312 and 3313 (*Instruments and appliances and Industrial Process equipment*) have not been reported separately. Australia and New Zealand could provide only aggregated data for the two classes 3220 and 3230 (*Manufacture of electronic components and of consumer electronics*). However, this does not pose a problem for the aggregate definitions of ICT sector or ICT manufacturing.

b) *ISIC Rev.3 class 3313* (*Industrial Process equipment)* cannot be separately recorded in the industrial classification used in Australia – due mainly to the fact that there is very little of this manufacturing activity performed in Australia. Three other countries did not supply data for this class (Greece, Mexico, Turkey) and the Netherlands could not supply it as a separate activity.

c) *The treatment of ICT Wholesale*. As mentioned, this was the only case for which in 1998 it was recommended that Member countries identified and provided the part of the class attributable to the wholesaling of ICT products. National classifications are currently being used by a number

4. The first collection was carried out in 2000 and the results were published in “Measuring the ICT Sector” (October 2000). The second, took place in 2001 and the data were used to produce ICT supply indicators for the Science, Technology and Industry Scoreboard 2001 and the IT Outlook 2002. The third round is currently undergoing and results are to be used in "Measuring the Information Economy 2002". The aim this time is to publish the underlying time series as well as use the data to produce estimates of ICT supply statistics that are compatible with the OECD STAN (STructural ANalysis) statistics based on national accounts. For more details on the availability of ICT supply statistics at the OECD see DSTI/ICCP/IIS/RD(2002)21.

of countries - albeit to a different degree of precision - to isolate ICT wholesale. See *Issue 2* below.

d) *ISIC Rev.3 class 6420 (Telecommunications services)*. A couple of countries are not able to separate data for this class from data related to post and telecommunications due to confidentiality reasons. Other countries (Germany, Greece and Turkey) have a very limited coverage in terms of variables and time series.

e) *Renting of office machinery and equipment*. About one third of the countries were not able to provide ISIC class 7123.

Overall it seems that the ICT sector definition, as it stands, can be implemented across the majority of OECD countries and that the comparability of the data has been enhanced considerably by the use of detailed national classifications. However, there is still a great deal of variation in the variables and level of detail supplied by Member countries. This is especially the case with variables related to employment, wages, gross fixed capital formation and number of enterprises.

Issue 2 Can the Wholesale of ICT products be identified using national classifications?

15. Table 2 shows examples of national classifications used so far to provide data about the part of wholesale of machinery and equipment that can be related to ICT products. The United States and Canada differ slightly in their definition of wholesale of ICT products. Some countries, such as Australia, use a part class procedure in which data is compiled about ICT specialist businesses. Australia excluded from the wholesale of machinery and equipment (ANZIC 4611) only the wholesaling of farm and construction machinery.

16. Following the review of the Nordic countries of the ICT sector definition (See Annex A), European countries were asked to isolate the wholesale of ICT products by using the NACE classification – i.e. providing NACE 5143 – Wholesale of electrical household appliances and radio and television goods, 5164 – Wholesale of office machinery and equipment, and NACE 5165 – Wholesale of other machinery for use in industry, trade and navigation. To date data could be gathered based on these 3 NACE classes for all EU countries except Germany and the Netherlands. Even within these classes, both ICT and non-ICT products are included. In the case of the Nordic countries the data have been refined even further using national classifications (see Annex A and Table 3). In the case of NACE 5143, the Nordic countries reported that the share of non-ICT goods was about one third in Denmark and Finland and even higher in Norway. In relation to NACE 5164, it was recognised that this included office furniture that should be out of scope of the ICT sector. However this was a small part of the overall industry. Concerning NACE 5165, the conclusion was that the classification was too broad and included significantly more than "telecommunications equipment" which was considered to be the only ICT sector product included in this class.

17. Based on a OECD Secretariat proposal (October 2000), the United Nations Technical Sub-group (TSG) of the Expert Group on Economic and Social Classifications has agreed to create a split of ISIC 515 (wholesale of machinery and equipment) in the 2002 mini revision of ISIC. Three new wholesale classes have been created that will enable a refinement of the ICT definition. Two ISIC classes can now be used to define the wholesale of ICT products, i.e.:

- **ISIC 5151** (Wholesale of computers, computer peripheral equipment and software)
- **ISIC 5152** (Wholesale of electronic parts and telecommunication equipment)

18. The NACE classification has also been modified accordingly. The class 51.64 (Wholesale of office machinery and equipment) has been split into 51.84 (Wholesale of computers, computer peripheral equipment and software) and 51.85 (Wholesale of other office machinery and equipment). The class 51.65 (Wholesale of other machinery for use in industry, trade and navigation) has been split in 51.86 (Wholesale of other electronic parts and equipment) and 51.87 (Wholesale of other machinery for use in industry, trade and navigation).

This means that in the future data related to the wholesale of ICT activity will enable the exclusion of wholesale of office equipment and machinery used in industry, trade and navigation. It thus seems that more detailed national classifications can be used to identify the part of the activity related to the wholesale of ICT products.

Issue 3 What is the ICT "specialisation" of the classes included in the OECD ICT sector definition?

19. One of the questions to be discussed when reviewing the OECD ICT sector definition is whether the classes that have been identified actually have a high ICT specialisation ratio. Several countries have provided examples and information that should be used to review both the list of current inclusions within the definition and the importance of having split classes if the definition is to closely relate to the industry about which users require data. Summarising the examples provided, the classes for which there seem to be evidence of a low ICT specialisation ratio are:

- **Class 3130: Insulated wire cable**

  The bulk of this category seems not to be ICT related, although fiber optic cables do constitute a sizeable and increasing component of it. In the examples provided, the ICT specialisation ratio of this class ranges from 25% in Australia, to 18% (share of production value of Fiber optic cables) in Denmark, and an estimated 20% in Switzerland. The United States also finds that Fiber optic cable represented a low share (only 16% in 1999) of the value of product shipments of ISIC 3130. However, the United States provided an example of the products that would correspond to ISIC class 3130 and the value of their corresponding shipments. This limits the ICT related part that can be attributed to class 3130 to the manufacturing of Fiber optic cables and of other communication and energy wire.

- **Class 3313: Industrial process equipment**

ISIC class 3313 does not really exist in the Australian classification, therefore no inferences can be drawn from it. The Danish example is not conclusive regarding this class as the product detail only allows identification of the production of a very small category. The United States shows, instead, that based on its national classification this class should be excluded. When providing data for this class, the United States used "Instruments and Related Products Manufacturing for Measuring, Displaying, and Controlling Industrial Process Variables (334513)". This NAICS industry contains measuring and process control instruments and devices. It is argued that many of these devices are essentially production machines, not information or communication processors or networks (see Appendix C).

- **class 7123: Renting of office machinery and equipment (including computers)**

This class includes firms that rent all types of office machinery and equipment, including ICT equipment. None of the Member countries that provide data for this class (about two third) has tried to isolate the ICT component. Only Australia has provided evidence related to this class and reports a very low specialisation ratio (about 1%).

From the evidence compiled it appears that ICT services such as telecommunication and computer services have high specialisation rates. Given the current use of detailed national classifications to provide data on wholesaling of ICT products, the only ICT service class for which there appear to be a low specialisation ratio is the renting of office machinery and equipment. Most of the issues concerning low specialisation ratios thus relate to ICT manufacturing classes. This leads to the question on whether an ICT manufacturing product definition such as the one proposed in DSTI/ICCP/IIS(2002)5 can be used to get a more accurate measurement of ICT producing industries.

Issue 4 Can the ICT product definition be used to refine the ICT activity-based definition?

20. The following example makes use of the definition of ICT manufacturing products proposed in DSTI/ICCP/IIS(2002)5 and based on the Harmonised System of classification. The purpose is to conduct a thought experiment using trade data. The first exercise consisted in mapping the ICT manufacturing products to the activity-based ICT sector definition, using total OECD export shares. Table 4 shows the 4-digits concordance between the ICT manufacturing products definition and the ICT sector definition. According to this concordance:

- *The Office, accounting and computing machinery* (3000) industry is exporting computers, "ICT" related office machinery (such as type writers and word processing machines, calculating machines, photocopying machines) and other types of machinery.

- Both the *insulated wire and cable* industry (3130) and the *electronic valves and tubes and other electronic components* industry (3210) export exclusively electronic components.

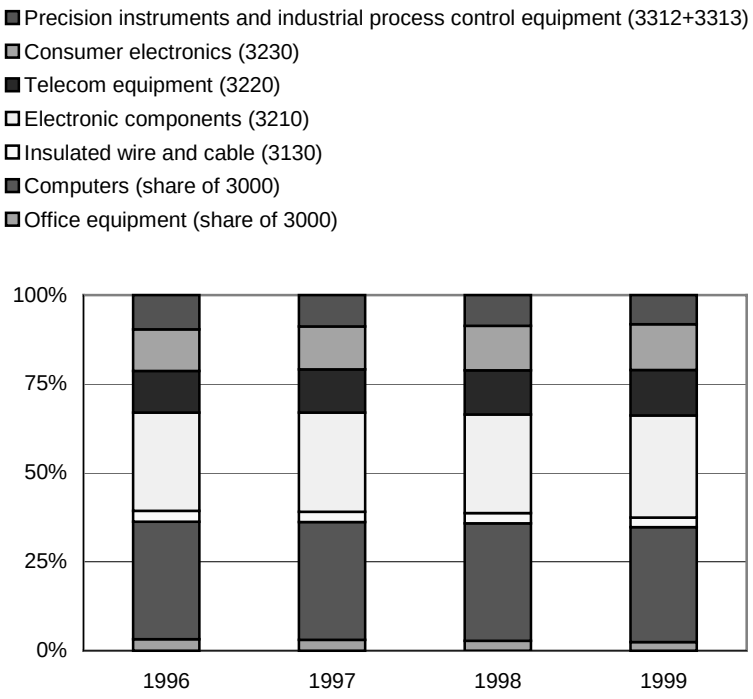
- *TV and radio transmitters and apparatus for line telephony and telegraphy* (3220) exports telecommunication equipment.

– *TV and radio receivers, sound or video recording or reproducing apparatus* etc. (3230), exports consumer electronics.

– *Instruments and appliances for measuring, checking, testing, navigating etc.* (3312) and *Industrial process control equipment* (3313) have been aggregated and together they export some telecommunication equipment (radar and radio apparatus) and measuring and checking instruments.[5]

21. The bulk of ICT products mapped to ICT industries in terms of exports is found in the computer and office equipment industry – computers make about 40 percent of ICT exports by the ICT sector - and electronic components - about 30 percent of ICT exports by the ICT sector - see Figure 1. The remaining ICT products are allocated equally to the other ICT industries (about 10 percent each) except for the insulated wire and cable (only 3%).

Figure 1 - Composition of ICT exports by the ICT sector, OECD, 1996-99



22. The second thought experiment consisted in calculating the shares of the ICT products belonging to the ICT industries to obtain a proxy of "specialisation ratios" in terms of export. Ratios obtained by using the ICT manufacturing definition proposed in DSTI/ICCP/IIS(2002)5 are presented in Figure 2. The exercise can also be carried out for individual countries to highlight countries' specific differences. The ICT exports contained in the computer and office equipment industry have been disaggregated further in computer (representing about 90 percent of ICT products classified to the computer and office equipment industry) and ICT related office equipment (photocopies, typewriters and word-processing machines that are currently included in the ICT manufacturing classification proposal). Based on that proposal also the class *Insulated wire and cable* (313) has a high specialisation in terms of ICT exports (about 80 percent). If

5 . Balances or instruments for checking chemical processes are excluded, see Table 4 for the detail of the products that would be included in this class.

more restrictive definitions of ICT manufacturing products were to be used, e.g. limit the ICT definition to only co-axial cables and/or fiber optic cables the export "specialisation ratio" would fall to 18% or 10%.

23. Mapping ICT products based on HS to the ICT industry *Industrial process control equipment* (3313) is particularly difficult. This is due to the concordance between ISIC Rev. 1 and product classifications that allocate "equipment to measure and control" to 3312 except for "equipment to control used in industrial process" that is allocated to 3313. It is hard to distinguish between the two in terms of products, that is why an export "specialisation ratio" has been calculated for the aggregate of the two. The ICT products corresponding to this aggregate would contain partly telecommunication equipment (radar apparatus, radio navigational aid apparatus and radio remote control apparatus and instruments used specifically for telecommunications[6]) and instruments to measure and control (for the detail of instruments included or excluded see Table 4). The export "specialisation ratio" for 3312 + 3313 amounts to about 39 percent.

Figure 2 - Exports of ICT products mapped to Exports of ICT ISIC Rev.1 industries in the OECD

	1996	1997	1998	1999
ICT share 3000	97.5	97.3	97.8	98.1
computers	88.8	89.0	90.1	91.2
office machinery (photocopies, typewriters and word-processing machines)	8.7	8.3	7.6	6.8
ICT share 313	81.3	81.1	82.7	83.9
co-axial cable and fiber optic cable	18.7	17.8	16.5	18.3
fiber optic cable	9.4	9.0	8.6	10.5
ICT share 321	92.3	91.5	92.9	93.1
ICT share 322	98.2	97.9	95.5	94.3
ICT share 323	95.2	96.3	96.8	96.8
ICT share 3312 +3313	38.5	38.9	39.9	38.5

24. The third thought experiment consists in showing the sensitivity of indicators of ICT manufacturing industries to the inclusion of those classes for which the export specialisation appears to be very low. This is the case of class 313 - if a product definition that only limits ICT electronic components to fiber optic cables and alike is adopted – and class 3313 – for which it is hard to find corresponding ICT products based on the HS classification. Since the final objective of the data collection is to compare the relative size of the ICT sector across countries, the sensitivity of the indicators to exclusion or inclusion of certain "border cases" matters. An example for a few countries and three core indicators, production, value added and employment are presented in Figure 3. The indicators are estimated both using the business survey data (the data submitted by countries to the OECD) and national account estimates (data used at the OECD to carry out comparisons and economic analysis). The difference in the indicators when using the OECD ICT manufacturing definition and a narrower definition that excludes classes 313 and 3313 is relatively small and rather stable over time. In the case of the three variables and the countries considered, the difference ranges between 0.5 percentage points and 1.4 percentage points. In terms of comparisons across those countries in the sample, the inclusion or the exclusion of those two classes from the ICT sector

6. This would correspond to HS class 903040: Instruments and apparatus for measuring or checking electrical quantities, specifically for Telecommunications, e.g. cross-talk meters, gain measuring instruments, distortion factor meters, psophometers.

definition - whether measured with survey data or national account estimates - does not seem to make a large difference.

These examples illustrate that, based on a rationale of "specialisation ratios", some of the ICT activity classes might be "border cases" in terms of their inclusion or exclusion from the definition. Nevertheless, also the trade-off between statistical "purity" of the definition, its feasibility, and the primary user need for this type of statistics, namely the ability of carrying out international comparisons of core indicators, needs be taken into account when arguing for the inclusion or exclusion of certain activity classes.

VII. Concluding remarks and issues for discussion

25. This paper reviews the experience gained with the first two pilot collections of ICT supply data and the studies conducted by a number of Member countries on the feasibility of the OECD ICT activity-based definition (see Annex 1). The OECD definition developed in 1998 constitutes a first order approximation of "ICT producing sector". While it included whole ISIC classes, except for the wholesaling of ICT products, the group had recognised that such an activity-based definition should be complemented by an ICT product classification to better identify the ICT component of each economic activity.

26. The paper shows that given the current use of detailed national classifications to provide data on wholesaling of ICT products, the only ICT service class for which there appear to be a low specialisation ratio is the renting of office machinery and equipment. Most of the issues raised by Member countries concerning low specialisation ratios thus relate to ICT manufacturing classes, namely the class *Insulated wire and cables* (313) and *Industrial process equipment* (3313).

27. An example is provided which links the ICT manufacturing product definition proposed in DSTI/ICCP/IIS(2002)5 - based on the HS classification - to the ICT producing industries based on ISIC Rev. 3. For this purpose export data available at the OECD have been used to calculate "export specialisation ratios". Using such a product-based definition would lead to low specialisation ratios only for the class 3313 (industrial process equipment). A product definition such as one based on a 6-digits HS classification would be detailed enough to identify ICT part classes of interest in the manufacturing sector. The trade classification can be thus linked to a local production classification such as the Central Product Classification (CPC). Finally a sensitivity analysis of indicators of ICT manufacturing industries to the inclusion of those classes for which the export specialisation appears to be very low is carried out. It shows that, for the purpose of comparisons across countries, the inclusion or the exclusion of those two classes does not make any difference, at least in the case of those countries included in the sample.

28. Delegates are invited to share their experience on the implementation of the OECD ICT activity-based definition. In particular Delegates are invited to report on: (1) difficulties in implementing the OECD ICT sector definition; (2) possibility of using national classifications to identify the wholesaling of ICT products; (3) the degree of "ICT specialisation" of ICT industries in their own country, possibly providing example using production data; (4) the possibility of linking their activity-based classification to a product-based classification such as the HS classification at the 6-digits level.

29. On the basis of the above discussions, it is now possible to identify a range of issues that merit consideration and discussion:

a) In the light of the above experience do some of the industries currently included in the ICT sector definition need to be excluded? If yes, does this require a modification of the principles agreed to in 1998?

b) Should the agreement to only include the whole of ISIC classes in the ICT sector be reviewed? If there is agreement at the meeting to a definition of ICT goods, does this impact the specific activity classes to be included? If so, in what way?

c) If there is agreement to include part classes, for which classes this should be considered, for all or only some (e.g. only for border line cases of classes whose specialisation rates are lower but close to fifty percent)?

30. In terms of the specific classes that are included in the current definition, delegates are invited to discuss the following:

d) both the Nordic countries and Australian case studies indicate that class 3130 (Insulated wire and cable) has a low ICT specialisation ratio if one tries to isolate the *fiber optic* component. The U.S. presents a product-based classification corresponding to ISIC 3130 and argues for the inclusion of this class. Should this activity class be excluded and data about optical cables be compiled only as part of a commodity definition? Or should this class continue to be included but only as a part class? In both cases, the implications for the ICT manufacturing proposal [DSTI/ICCP/IIS(2002)5] should be discussed. Currently the ICT products linked to ISIC class 3130 include cables other than fiber optic cables, thus leading to an "export specialisation ratio" of ISIC 3130 of about 80% for the OECD total.

e) ISIC class 3313 (Industrial process control equipment) seems to be only partially related to ICT activities. On the other hand, with the current ISIC classification, it is hard to distinguish manufacturing activity of industrial process control equipment from other types of control equipment. Also, the ICT manufacturing goods definition will be discussed at the meeting. Canada has tabled a proposal DSTI/ICCP/IIS/RD(2002)17 in which it is argued that some HS categories that cover different types of medical equipment classes should be added to the ICT manufacturing definition under discussion. These additional categories belong to class 3311. If this proposal is accepted this would raise the ICT specialisation ratio of class 331. One alternative that could be worthwhile exploring is that of defining the ICT specialisation ratio with respect to the entire class 331.

f) Based on an OECD Secretariat proposal, ISIC Rev 3.1 (2002) now contains a split of ISIC 515 (Wholesale of machinery and equipment) that allows to separate "Wholesale of computers, computer peripheral equipment and software" (5151) and "Wholesale of electronic parts and telecommunication equipment" (5152) from "Wholesale of other machinery, equipment and supplies" (5159). What are the implications in terms of the feasibility of collecting data for the wholesale of ICT products? What are the implications for the current ICT manufacturing goods definition proposal [see DSTI/ICCP/IIS(2002)5], since for example copy machines, currently included in the goods proposal, are explicitly excluded from classes 5151 and 5152 and are included in 5159 ISIC Rev 3.1 (2002) class?

g) The Australian experience shows that the industry class 7123 (*Renting of office machinery and equipment - including computers)* has a very low specialisation ratio. Do other countries have a similar experience? Should this class be excluded from the definition or should further data be obtained before considering its exclusion?

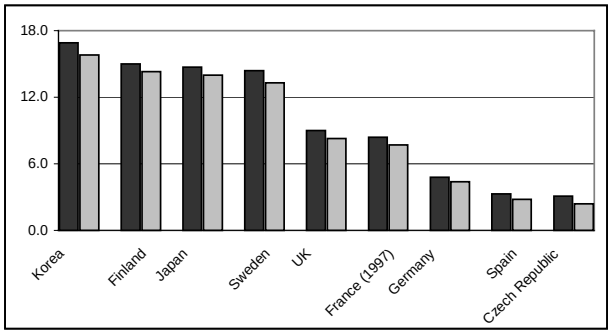
h) Should further investigatory work be undertaken with a view to better defining a set of retail activities and classes that might be included within the ICT sector definition?

Figure 3 - Difference between the ICT manufacturing definition and a "narrower" ICT manufacturing definition, share of ICT manufacturing over total manufacturing, selected countries, 1998[1]

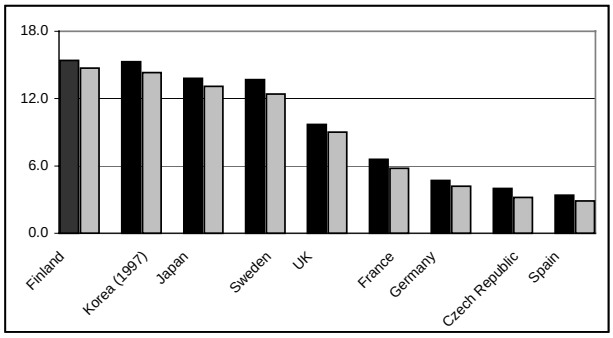
(Grey bars refer to the "narrower" definition)

PRODUCTION

business survey data

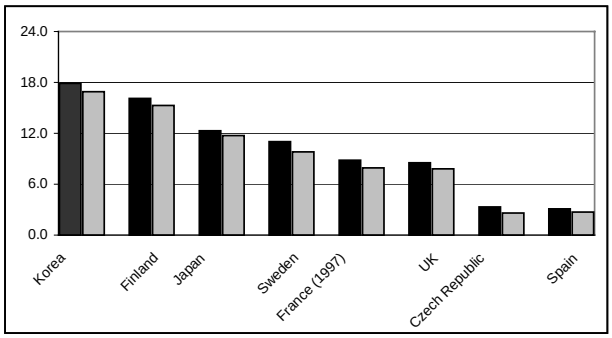


national accounts estimates



VALUE ADDED

business survey data



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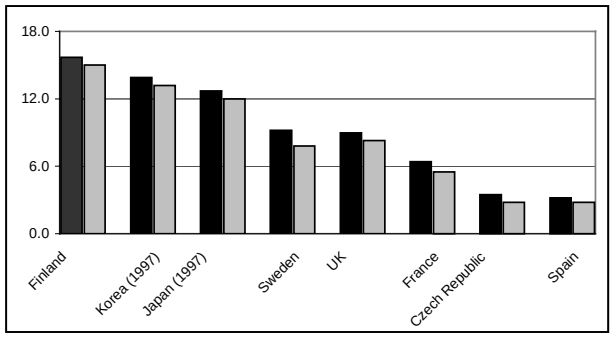
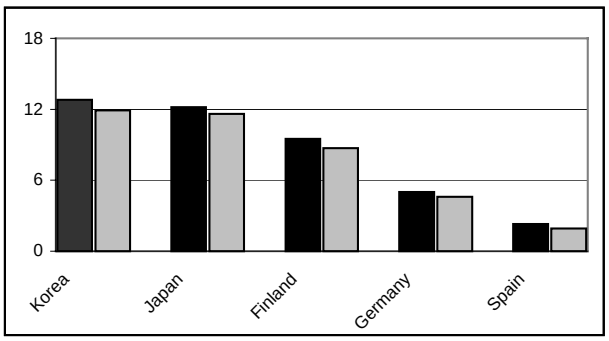
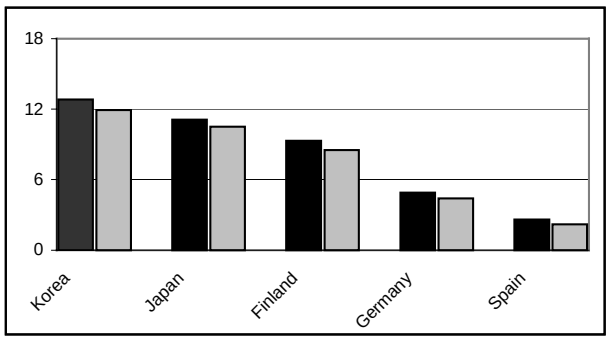


EMPLOYMENT

business survey data



national accounts estimates



(1) The narrow definition excludes ISIC classes 313 and 3313.

Table 1 - Example of countries' concordances used to provide data based on the OECD ICT sector definition

Classifications / ISIC rev. 3	NACE Rev.1	Canada NAICS	United States SIC	United States NAICS	Australia ANZSIC	New Zealand ANZSIC	Japan JSIC Rev.10 (1993) (2)
30	30	33331 33411	3571,2,5,7pt,8, 9pt	333313 334111, 334112, 334113, 334119	2841	2841	2981 3051
3130	31.3	33592	3357	335921 335929	2852	2852	2741 2742
3210	32.1	33441	3671 3672 3674 3675, 6, 7, 8, 9pt, 3661pt	334411 334412 334413 334414, 334415, 334418, 334419	2849	2849	3081 3082 3083 3088
3220	32.2	33421 33422	3651, 3679pt	334310	2842	2842	3041 3042
3230	32.3	33431	3661pt, 3577pt, 3679pt 3663, 3679pt, 3699	334210, 334418pt 334220, 334290			3043+3044+3062+3084+ 3086+3087+3085+3089+ 3093
3312	33.20	33451	3825pt 3826	334514pt, 334515 334516	2839	2839	3069+3071+3211+3212+ 3213+3214+3215+3216+ 3217+3218+3219+3221+ 3241 2998+3072
3313	33.30		3823	334513			
5150 (1)	51.43 51.64 51.65	41731 41732 41791	5045pt 5045pt	421430	4612 4613 4614 4615	4613	**(2)** 5214 5232
6420	64.20	51322 51331 51332 51333 51334 51339	481,22, 99 4841	513310, 21, 22, 30, 513210, 20	7120	7120	4711 + 4712 + 4713 + 4719 + 4721+ 4731 + 4749 + 8131 + 8132
7123	71.33	53242	7377	532420	7743(pt)		7931
7200	72	51121			72 =	72 =	
7210	72.1	51419	7371	541511	7831+	7831+	8211
7220	72.2	51421	7372	334611, 511210	7832+	7832+	8211+8212
7230	72.3	54151	7373	541512	7833+	7833+	8221
7240	72.4	81121	7374	514210	7834	7834	8222
7250	72.5		7375	514191, 514199			7811+7812
7290	72.6		7376 7378 7379	541513 811212 541519			na

Table 2 - Wholesale of machinery, equipment and supplies (ISIC 5150): Isolating the part related to the wholesale of ICT products

AUSTRALIA: ANZIC 4612, 4613, 4614/4615	
4612	Professional equipment wholesale
4613	Computers
4614/4615	Business machines and electrical and electronic equipment nec
NACE: 5143, 5164, 5165 To date availability at OECD: all EU and other countries in Europe, except Germany, the Netherlands, Czech Republic, Slovak Republic, Poland, Turkey. For the Nordic countries (Denmark, Finland, Norway and Sweden a finer breakdown is provided).	
5143	Wholesale of electrical household appliances and radio and television goods
5164	Wholesale of office machinery and equipment
5165	Wholesale of other machinery for use in industry, trade and navigation
CANADA: NAICS 41731, 41732, 41791	
41731	Computer, Computer Peripheral and Pre-Packaged Software Wholesaler-Distributors
41732	Electronic Components, Navigational and Communications Equipment and Supplies Wholesaler-Distributors
41791	Office and Store Machinery and Equipment Wholesaler-Distributors
USA: NAICS 421430, 421430, 421610 pt, 421690 pt	
421420	Office Equipment Wholesalers
421430	Computer and computer peripheral equipment and software wholesalers
421610 pt	Electrical Apparatus and Equipment, Wiring Supplies and Construction Material Wholesalers (Except electric lighting fixtures and light bulbs)
421690 pt	Other Electronic Part and Equipment Wholesalers (Except blank video or audio tapes and citizen's band two-way radios)

Table 3 - The Nordic countries and their refinement of the ICT wholesale definition

Definition used in the publication "The ICT Sector in the Nordic Countries 1995-2000". Percentages refer to the share of the part class included (in terms of employment and turnover respectively) provided in the example in Annex A

Wholesale of electrical household appliances and radio and television goods (NACE 5143)		
	Including wholesale of:	**Excluding wholesale of:**
Denmark	Radio and television goods 41%, 51%	Electrical household appliances; grammophone records, recorded and unrecorded videos; white goods
Finland	Radio and television goods 64%, 71%	Electrical household appliances
Norway	Radio and television goods 26%, 24%	Electrical household appliances; grammophone records, recorded and unrecorded videos; lightning equipment
Sweden	Radio and television goods 14%, 22%	electrical household appliances; grammophone records, tapes, CDs and video tapes
Wholesale of office machinery and equipment (5164)		
Denmark	Office machinery, computers and equipment 90%, 94%	office furniture and office supplies
Finland	Computer hardware; office machinery 94%, 97%	office furniture
Wholesale of other machinery for use in industry, trade and navigation (5165)		
Denmark	Electrical material; electronic components 44%, 49%	other machinery, equipment and accessories
Finland	Electrical equipment and supplies; telecommunication equipment and electronic components 40%, 38%	Machinery for industry, trade and navigation
Norway	Machinery/equipment for trade, transport and services 37%, 33%	Machinery/equipment for power production; equipment for ships and fishing gear; machinery/equipment for oil, gas, quarrying
Sweden	computerized materials handling equipment; telecommunication equipment and electronic components, 32%, 43%	Measuring and precision instruments; machinery for industry, trade and navigation

Table 4 - Mapping the ICT goods classification proposed in DSTI/ICCP/IIS(2002)5 (HS) into ICT industries (ISIC Rev.3)

ICT industries: ISIC Rev. 3	ICT products: HS Rev. 1		DESCRIPTION
3000			**Office, accounting and computing machinery**
	8471	computers	Automatic data processing machines and units thereof; magnetic or optical readers, machines for transcribing data onto data media in coded form and machines for processing such data, not elsewhere specified or included.
	847330/50		Parts and accessories (other than covers, carrying cases and the like) suitable for use solely or principally with machines of headings Nos. 84.69 to 84.72.
	847310/21/40	office machinery	
	846911/12		Automatic typewriters and word-processing machines.
	847010/21/29/40/50		Calculating machines; accounting machines, cash registers, postage-franking machines, ticket-issuing machines and similar machines, incorporating a calculating device.
	9009		Photo-copying apparatus incorporating an optical system or of the contact type and thermo-copying apparatus.
products excluded:	*844312*		*Offset printing machinery : Sheet fed, office type (sheet size not exceeding 22 x 36 cm)*
	8472		*Other office machines (for example, hectograph or stencil duplicating machines, addressing machines, automatic banknote dispensers, coin-sorting machines, coin-counting or wrapping machines, pencil-sharpening machines, perforating or stapling machines).*
3130			**Insulated wire and cable**
	854420	electronic components	Co-Axial Cable And Other Co-Axial Electric Conductors, Insulated
	854441/49/51/59		Electric Conductors
	854470		Optical Fibre Cables Made Up Of Individually Sheathed Fibres, Whether Or Not Containing Electric Conductors Or Fitted With Connectors
products excluded:	*854430*		*Ignition wiring sets and other wiring sets of a kind used in vehicles, aircraft or ships*
3210			**Electronic valves and tubes and other electronic components**
	8532	electronic components	Electrical capacitors, fixed, variable or adjustable (pre-set).
	8533		Electrical resistors (including rheostats and potentiometers), other than heating resistors.
	8534		Printed circuits.
	8540		Thermionic, cold cathode or photo-cathode valves and tubes (for example, vacuum or vapour or gas filled valves and tubes, mercury arc rectifying valves and tubes, cathode-ray tubes, television camera tubes).
	8541		Diodes, transistors and similar semiconductor devices; photosensitive semiconductor devices, including photovoltaic cells whether or not assembled in modules or made up into panels; light emitting diodes; mounted piezo-electric crystals.
	8542		Electronic integrated circuits and microassemblies.
3220			**TV and radio transmitters and aparratus for line telephony and telegraphy**
	8517	telecommunication equipment	Electrical apparatus for line telephony or line telegraphy, including such apparatus for carrier-current line systems.
	852510/20/30		Transmission apparatus for radio-telephony, radio-telegraphy, radio-broadcasting or television, whether or not incorporating reception apparatus or sound recording or reproducing apparatus; television cameras.

Table 4 continued - Mapping the ICT goods classification proposed in DSTI/ICCP/IIS(2002)5 (HS) into ICT industries (ISIC Rev.3)

ICT industries: ISIC Rev. 3	ICT products: HS Rev. 1		DESCRIPTION
3230			**TV and radio receivers, sound or video recording or reproducing apparatus etc.**
	8518	consumer electronics	Microphones and stands therefor; loud-speakers, whether or not mounted in their enclosures; headphones, earphones and combined microphone/speaker sets; audio-frequency electric amplifiers; electric sound amplifier sets.
	8519		Turntables (record-decks) record-players, cassette-players and other sound reproducing apparatus, not incorporating a sound recording device.
	8520		Magnetic tape recorders and other sound recording apparatus, whether or not incorporating a sound reproducing device.
	8521		Video recording or reproducing apparatus.
	8522		Parts and accessories of apparatus of headings Nos. 85.19 to 85.21.
	8527		Reception apparatus for radio-telephony, radio-telegraphy or radio-broadcasting, whether or not combined, in the same housing, with sound recording or reproducing apparatus or a clock.
	8528		Television receivers (including video monitors and video projectors), whether or not combined, in the same housing, with radio-broadcast receivers or sound or video recording or reproducing apparatus.
	852910	telecommunication equipment (1)	Parts suitable for use solely or principally with the apparatus of headings Nos. 85.25 to 85.28.
3312 + 3313			**Instruments and appliances for measuring, checking, testing, navigating etc. Industrial process control equipment**
	8526	telecommunication equipment	Radar apparatus, radio navigational aid apparatus and radio remote control apparatus.
	9012	Instruments	Microscopes other than optical microscopes; diffraction apparatus.
	9014		Direction finding compasses; other navigational instruments and appliances.
	9015		Surveying (including photogrammetrical surveying), hydrographic, oceanographic, hydrological, meteorological or geophysical instruments and appliances, excluding compasses; rangefinders.
	9024		Machines and appliances for testing the hardness, strength, compressibility, elasticity or other mechanical properties of materials (for example, metals, wood, textiles, paper, plastics).
	9028		Gas, liquid or electricity supply or production meters, including calibrating meters therefor.
	9029		Revolution counters, production counters, taximeters, mileometers, pedometers and the like; speed indicators and tachometers, other than those of heading No. 90.15; stroboscopes.
	903010/20/31/39/82/83		Oscilloscopes, spectrum analysers and other instruments and apparatus for measuring or checking electrical quantities, excluding meters of heading No. 90.28; instruments and apparatus for measuring or detecting alpha, beta, gamma, X-ray, cosmic or other i
	9031		Measuring or checking instruments, appliances and machines, not specified or included elsewhere in this Chapter; profile projectors.
	9032		Automatic regulating or controlling instruments and apparatus.
products excluded:	*9016*		*Balances of a sensitivity of 5 cg or better, with or without weights.*
	9017		*Drawing, marking-out or mathematical calculating instruments (for example, drafting machines, pantographs, protractors, drawing sets, slide rules, disc calculators); instruments for measuring length, for use in the hand (for example, measuring rods and ta*
	9025		*Hydrometers and similar floating instruments, thermometers, pyrometers, barometers, hygrometers and psychrometers, recording or not, and any combination of these instruments.*
	9026		*Instruments and apparatus for measuring or checking the flow, level, pressure or other variables of liquids or gases (for example, flow meters, level gauges, manometers, heat meters), excluding instruments and apparatus of heading No. 90.14, 90.15, 90.28*
	9027		*Instruments and apparatus for physical or chemical analysis (for example, polarimeters, refractometers, spectrometers, gas or smoke analysis apparatus); instruments and apparatus for measuring or checking viscosity, porosity, expansion, surface tension or*
	9033		*Parts and accessories (not specified or included elsewhere in this Chapter) for machines, appliances, instruments or apparatus of Chapter 90.*

ANNEX A - THE NORDIC COUNTRIES' EXPERIENCE IN MEASURING THE ICT WHOLESALE ACTIVITY USING THE NACE CLASSIFICATION[7]

31. In *NACE 5143 Wholesale of electrical household appliances and radio and television goods*, all Nordic countries except Iceland have different more detailed national classifications. These four countries (Denmark, Finland, Norway, Sweden) have special classifications for *Wholesale of radio and television goods*, as well as *Wholesale of electrical household appliances*. Three countries (Denmark, Norway and Sweden) have a classification for *Wholesale of gramophone records, tapes, CDs and video tapes*. This indicates that there are good possibilities for a common Nordic application where activities in Wholesale of electrical household appliances could be excluded from the ICT sector activities. Almost one third of the total turnover of NACE 5143 is out of products for ICT sector in Denmark and Finland, the proportion being even higher in Norway.

5143 Wholesale of electrical household appliances and radio and television goods			
DK 1997 Employment (f.t.e) 3.624 Turnover DKK mill.: 23.120	FI 1997 Employment 1.650 Turnover FIM mill.: 7.295	NO 1997 Employment 3.136 Turnover NOK mill.: 16.492	SE 1997 Employment 9.852 Turnover SEK mill.: 38.713
Wholesale of radio and television goods Employment 41% Turnover 51%	Wholesale of radio and television goods Employment 64% Turnover 71%	Wholesale of radio and television goods Employment 26% Turnover 24%	Wholesale of radio and television goods Employment 14% Turnover 22%
Wholesale of electrical household appliances Employment 15% Turnover 9%	Wholesale of electrical household appliances Employment 36% Turnover 29%	Wholesale of electrical household appliances Employment 35% Turnover 44%	Wholesale of household appliances Employment 9% Turnover 12%
Wholesale of gramophone records, recorded and unrecorded videos Employment 17% Turnover 14%		Wholesale of gramophone records, recorded and unrecorded videos Employment 14% Turnover 12%	Wholesale of gramophone records, tapes, CDs and video tapes Employment 10% Turnover 10%
Wholesale of white goods Employment 27% Turnover 26%		Wholesale, lightning equipment Employment 25% Turnover 20%	Wholesale of electrical and lightning equipment Employment 68% Turnover 56%

32. In *NACE 5164 Wholesale of office machinery and equipment* three countries (Denmark, Finland and Iceland) have national breakdowns of NACE. Depending on further analysis of the contents of the national classifications, it might be possible to make a Nordic definition leaving out office furniture, thus restricting ICT-related activities to Wholesale of office machinery, computers and equipment. Though the economic importance of office furniture is minor, in principle, it shouldn't be included in the definition.

7. This results were presented by Lea Parjo (Statistics Finland) at the WPIIS April 2000 meeting [DSTI/ICCP/IIS(2000)4]

5164 Wholesale of office machinery and equipment		
DK 1997 Employment (f.t.e.) 17.438 Turnover DKK mill. 48.840	FI 1997 Employment 9.394 Turnover FIM mill.: 21.004	ICE 1998 Employment N.A. Turnover ISK mill. 3.582
Wholesale of office machinery, computers and equipment Employment 90% Turnover 94%	Wholesale of computer hardware Employment 78% Turnover 84%	Wholesale of computers, typewriters etc. Employment N.A. Turnover 97%
Wholesale of office furniture and office supplies Employment 10% Turnover 6%	Wholesale of office machinery Employment 16% Turnover 13%	Wholesale of office equipment Employment N.A. Turnover 3%
	Wholesale of office furniture Employment 5% Turnover 3%	

33. In *NACE 5165 Wholesale of other machinery for use in industry, trade and navigation* all Nordic countries have national extensions. Several classifications are strongly related to the structure of the national industry (the fishing industry in Iceland and Norway, the telecommunications industry in Finland and Sweden). Suggestions for breakdown of NACE as well as a possible Nordic definition relating to the ICT sector will depend on further clarifications and analyses. An example of the need for further clarification could be that in Denmark, wholesale of telephones and telefax machines are placed in 5164. It's evident, however, that something must be done. Only telecommunications is relevant to the ICT-sector, meaning 15% of turnover in NACE 5165 in Finland and 42% in Sweden.

5165 Wholesale of other machinery for use in industry, trade and navigation				
DK 1997 Employment : 17.807 Turnover: DKK mill. 38.630	FI 1997 Employment: 14.474 Turnover: FIM mill. 27.895	ICE 1998 Employment: NA Turnover: ISK mill. 31.146	NO 1997 Employment : 14.369 Turnover: NOK mill. 40.703	SE 1997 Employment : 24.639 Turnover: SEK mill. 71.132
Wholesale of electrical materials Employment 15% Turnover 15%	Wholesale of electrical equipment and supplies Employment 21% Turnover 23%	Wholesale of fishing gear and fish-processing industry Employment NA Turnover 22%	Wholesale of machinery/equipment for power production Employment 24% Turnover 27%	Wholesale of measuring and precision instruments Employment 9% Turnover 7%
Wholesale of electronic components Employment 29% Turnover 34%	Wholesale of telecommunication equipment and electronic components Employment 19% Turnover 15%	Wholesale of other machinery for use in industry, trade and navigation Employment NA Turnover 78%	Wholesale of equipment for ships and fishing gear Employment 13% Turnover 16%	Wholesale of computerised materials handling equipment Employment 3% Turnover 1%
Wholesale of other machinery, equipment and accessories Employment 56% Turnover 51%	Wholesale of machinery for industry, trade and navigation Employment 60% Turnover 62%		Wholesale of machinery/equipment for oil, gas, quarrying Employment 6% Turnover 24%	Wholesale of telecommunication equipment and electronic components Employment 29% Turnover 42%
			Wholesale of machinery/equipment for trade, transport and services Employment 7% Turnover 33%	Wholesale of machinery/equipment for trade, transport and services Employment 59% Turnover 50%

ANNEX B - AN ASSESSMENT OF THE ICT SECTOR DEFINITION BASED ON AUSTRALIAN DATA

34. One way of assessing the suitability of the ICT sector definition is to consider the commodity composition of the outputs of the industries included in the definition. While it is not possible to do this perfectly without a precise commodity based definition of ICT goods and services, it is possible to draw some fairly broad conclusions based on our general understanding of which commodities ought to be considered to be ICT goods and services. In fact, it was on this basis that the current industrial definition was made.

35. Australia is one country that has in place a collection methodology that allows the compilation of both industry and commodity data for specific industries. It should be noted that the Australian data is based on its own standard industrial classification (ANZSIC) and its own standard commodity classification (ASCC). Nevertheless these are based on international standards and so can be used relatively easily for the purpose of reviewing the ICT sector definition.

36. The methodology adopted for this review is to look at the specialisation ratio of the industries included in the definition. This is one of the standard ways in which countries decide on the specific classes to be included within a standard industrial classification.

ISIC 3000 – Office, accounting and computing machinery

37. The major commodity outputs from businesses coded to this industrial class are

- Data processing machines (other than main frame).
- Data processing machines parts and accessories.
- Other electronic office and accounting machinery.
- Calculators and electronic machines incorporating a calculator.
- Data processing machines – mainframe.
- Electrical capacitors, electronic integrated circuits, electrical appliances.

38. It could be expected that each of these commodities would be considered to be ICT goods although the third on the list (other electronic office and accounting machinery) could contain both ICT and non-ICT goods. This category contributes something in the order of 20% of the total commodity output. Thus the industrial class would have a specialisation ratio of at least 80% (and probably higher) and so should definitely be included within the ICT sector definition.

ISIC 3130 – Insulated wire and cable.

39. The major commodity outputs from businesses coded to this industrial class are:

- Insulated cable, wire and strip – other than optical fibre cable or winding wire.
- Optical fibre cable.

- Uninsulated copper and aluminium stranded wire, rope, cables etc.
- Coaxial cable and other coaxial electric conductors.
- Winding wire.
- Automotive insulated cable wire or strip.
- Other electronic equipment and parts.
- Electric generating sets and rotary converters.
- Outdoor lighting other than fluorescent.

40. The largest commodity component of this group in Australia is the first, accounting for about 60% of the output. This commodity is unlikely to be considered an ICT good as it standard cable that is used for all sorts of purposes. The second commodity, optical fibre cable is likely to be an ICT good and this accounts for about 20% of the output. The third largest commodity is uninsulated wire and cables, which is unlikely to be considered to be an ICT good. This accounts for nearly 10% of the output.

41. Thus the industry in Australia could be considered to produce about 25% of ICT goods and 75% of non-ICT goods. On this basis it ought to be excluded from the industrial sector definition of the ICT sector.

ISIC 3210 and 3230 – Manufacture of electronic valves and tubes and other electronic components; manufacture of television and radio receivers, sound or video recording or reproducing apparatus and associated goods

42. These ISIC classes are combined into one in Australia and so cannot be studied separately using the Australian data. However, the classes clearly contain both ICT and non-ICT goods. On the basis of the Australian data, non-ICT goods appear to make up the majority of the output and so the combined classes should be subject to review. However, no definitive answer can be given on the basis of the Australian data.

ISIC 3220 – Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy

43. The major commodity outputs from businesses coded to this industrial class are:

- Radio broadcast studio equipment, tv studio equipment, tv or radio transmitters, radio transceivers.
- Telecommunications equipment parts.
- Carrier telephone/telegraph equipment.
- Complete telephones (other than mobile, cellular and car phones).
- Mobile, cellular and car phones.
- Satellite receivers.
- Data modem equipment.
- Electronic switchboards.
- Other electronic equipment and parts.

44. The largest commodity components of this group in Australia are the first three categories. Each of the listed commodities could be considered to fall within the scope of ICT goods and so the specialisation ratio is likely to be in the order of 100%. This industry therefore ought to be included in the ICT sector definition.

3312 – Manufacture of instruments and appliances for measuring, checking, testing navigating and other purposes, except industrial process control equipment

45. The major commodity outputs from businesses coded to this class are:

- Surveying instruments, physical or chemical analysis instruments, electricity meters and other measuring, checking and testing instruments, appliances and parts.
- Radar equipment, radio navigational aid equipment, radio remote control equipment, direction finding compasses and other navigational instruments.
- Mechano-therapy, massage and psychological aptitude testing apparatus, ozone, oxygen or aerosol therapy apparatus, artificial respiration or other therapeutic respiration apparatus and other breathing appliances and gas masks.
- Other electronic equipment and parts.

46. The largest of these commodities in Australia is the first and it clearly meets the criteria agreed for an ICT good. The second also appears to meet the principles behind the ICT sector definitions - but there is no data available for it for confidentiality reasons. The latter two commodities probably contain a mixture of ICT and non-ICT goods. It could be expected that greater than 50% of the sales for this industry class would be ICT goods based on the current principles of definition and so the class should continue to be included within the ICT sector.

3313 – Manufacture of industrial process control equipment

47. This class is not separately recorded in the industrial classification used in Australia – due mainly to the fact that there is very little of this manufacturing activity performed in Australia. Thus there is no information available to enable any conclusions to be drawn about its inclusion within the ICT sector definition.

5150 – Wholesaling of machinery, equipment and supplies

48. As discussed elsewhere, this ISIC class is very broad, covering a whole range of office machinery, equipment and supplies in addition to computer and telecommunications equipment. If the proposal before the UN Classifications Group is accepted, this class will be dissected into two parts – one relating to the wholesaling of computer and telecommunications goods and one to the wholesaling of other goods. In that case it would make eminent sense to modify the definition of the ICT sector.

49. Should the proposal not be accepted, it would be appropriate to look at the specialisation ratio for ICT goods within this category. Based on the Australian data for 1998-99, the share of total income attributed to ICT goods is nearly 40% of the total income of this ISIC class. Based on that proportion, it would be sensible to consider excluding ISIC class 5150 from the definition if it stays in its current form.

6420 – Telecommunications services

50. According to the 1998-99 Australian data, the share of ICT income to total income of businesses classified to this industry is almost 100%. Thus the class should be retained within the definition.

7123 – Renting of office machinery and equipment (including computers)

51. This class includes firms that rent all types of office machinery and equipment, including ICT equipment. According to a recent Australian survey, the share of income generated from the renting of computers was only in the order of 1%. On this basis, the class should be excluded from the ICT sector definition.

72 – Computer services

52. According to the 1998-99 Australian data, the share of ICT income is almost 100% of the total income of businesses classified to these classes. Hence all the classes within ISIC Division 72 should be retained within the definition.

ANNEX C - AN ASSESSMENT OF ICT MANUFACTURING CLASSES BASED ON DANISH PRODUCTION DATA

53. Statistics Denmark has carried out an analysis of the production of ICT manufacturing industries based on the OECD definition, using data from production statistics in 2000 (based on the Harmonised System classification – HS at the 6-digits levels).

– *Manufacture of office machinery (3001)*

The major commodity outputs from businesses coded to this class are machines for photocomposition/photocopying. Three types of products account for two thirds (67 per cent) of the production:

- Machinery for photocomposition (HS 844210): 33 per cent.
- Parts for machinery for photocomposition (HS 844240): 15 per cent.
- Machines for photocopying (HS 900911): 19 per cent.

More detailed product information is needed to conclude whether or not to maintain this activity as an ICT activity, depending on the type of machinery.

– *Manufacture of computers and other information processing equipment (3002)*

Eighty per cent of the total production value of this industry clearly is ICT-related, there is no doubt that this industry should be maintained as an ICT activity:

- Digital, automatic computers (HS 847141): 14 per cent.
- Other units for computers (HS 847180): 46 per cent.
- Parts and accessories for computers (HS 847330): 25 per cent.

– *Manufacture of insulated wire and cable (3130)*

About two thirds of the value of the production derives from two product categories (isolated wires/cables and other electrical conductors) that are not specifically ICT-related. However, the third largest production value is represented by optical fibres, which is indeed an ICT product. As the largest part of the production value derives from non-ICT products, one might argue that the activity should be excluded from the ICT-sector definition.

- Isolated wires/cables (HS 854459): 46 per cent.
- Other electrical conductors: 19 per cent.
- Optical fibres: 18 per cent.

– *Manufacture of electronic valves and tubes and other electronic components (3210)*

The Danish activity classification allows for a split of ISIC 3210 into two groups, Printed and integrated circuits (321010), and Semi-conductors, condensers etc. (321090). The first group represents 70 per cent of the production value of ISIC 3210, and the second group 30 per cent.

Printed and integrated circuits constitute 81 per cent of the production value of the first group. In the second group, semi-conductors, condensers etc., electrical and other resistors represent 46 per cent, whereas light-sensitive semi-conductor components, photo-cells etc. represent 33 per cent of the production value.

ISIC 3210 should therefore be part of the ICT sector definition.

– *Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy (3220)*

In the Danish activity classification ISIC 3220 is split into two groups: Manufacturing of apparatus for radiotelegraphy and radiotelephony, representing 72 per cent, and Manufacturing of telephone apparatus and – systems and telefax apparatus representing 28 per cent respectively, of the total production value of ISIC 3220.

The production value of the first group, Manufacturing of apparatus for radiotelegraphy and radiotelephony, is dominated by transmitters and receivers for telephony (HS 852520), which constitutes 88 per cent of the production value of the group and 64 per cent of ISIC 3220. Thus it is to be considered an ICT activity.

The production of the other group, Manufacturing of telephone apparatus and – systems and telefax apparatus is not as specialised. Apparatus for telephony and telegraphy coupling constitutes 34 per cent, and electronic components 25 per cent of the production, respectively.

On this basis ISIC 3220 should be considered ICT, as the largest part of the production value relates to ICT products.

– *Manufacture of television and radio receivers, sound or video recording or reproducing apparatus and associated goods (3230)*

This class is to a very large extent specialised in the production of television transmitters, receivers, loudspeaker-systems, antennas and parts/components for these products, which account for 67 per cent of the production value. This should be considered an ICT activity.

– *Manufacture of instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process control equipment (3320)*

ISIC 3320 is split into five groups in the Danish activity classification:

- navigation equipment: 8 per cent.
- apparatus for measuring of consumption, pressure etc. in fluids/ gasses: 12 per cent.
- apparatus for measuring or control of electricals: 10 per cent.
- instruments and apparatus for physical or chemical analyses: 24 per cent.
- other measuring and control equipment: 46 per cent.

In the first group, Manufacturing of navigation equipment, 31 per cent of the production derives from instruments for navigation, and 15 per cent from radar apparatus. Thus this group might be considered ICT.

The second group, Manufacturing of apparatus for measuring of consumption, pressure etc. in fluids/ gasses, is dominated by measuring equipment for fluids (46 per cent of prod. value), and is not ICT-related.

In the third group, Manufacturing of apparatus for measuring or control of electricals, the production is specialised within equipment for telecommunication technology (73 per cent), which makes it an ICT-related activity. Within the fourth group, Manufacturing of instruments and apparatus for physical or chemical analyses, 50 per cent of the production value is related to microtomes. In the fifth and last group, Manufacturing of other measuring and control equipment, which is the largest measured by its share of the production, nearly half (43 per cent) of the production is related to measuring instruments. The production is otherwise split between many different types of product, none of these constituting more than 6 per cent of the production value. More information is needed to decide whether or not to consider the activity ICT-related.

This preliminary exercise is not detailed enough to conclude whether to keep including or to exclude ISIC 3320 from the ICT definition. It does indicate though, that only a minor part of the production is ICT-related.

– *Manufacture of industrial process control equipment (3313)*

More detailed data on the production is needed for analysis. For this exercise, based on data on HS 6-digit level, only one type of product is produced: parts for electrical apparatus (HS 853810).

ANNEX D - THE USE OF NAICS TO PROVIDE DATA BASED ON THE OECD ICT SECTOR DEFINITION: THE U.S. EXPERIENCE[8]

54. Since the U.S. NAICS classification is more detailed and allows more precision than ISIC Rev.3, following the ISIC-based OECD definition would result in an overstatement of the size of U.S. ICT sector. The data provided by the U.S. Census Bureau to the OECD for its 2000 ICT sector publication included those NAICS categories corresponding to the ICT ISIC classes that were considered to be significant, and contained primarily ICT content (see Table D.1). Only exception was the ISIC Rev.3 class 7123, that was included in its entirety. U.S. comments on the inclusion/exclusion of the classes listed in the OECD ICT sector definition can be summarised as follows[9]:

a) Along with the Nordic countries and Australia, the U.S. finds that Fiber optic cable represented a low share (only 16% for the U.S. in 1999) of the value of product shipments of ISIC 3130. However, the U.S. provided an example of the products that would correspond to ISIC class 3130 and the value of their corresponding shipments. According to this product-based definition, about 60% of the wire and cable in the U.S. can be linked to ICT. Class 3130 should therefore be retained.

b) Class 3210 should be included. While it is impossible to determine the final application (ICT or non-ICT) for transistors, diodes, capacitors, resistors, integrated circuits, etc., because of the high tech manufacturing processes used in the production of semiconductors and related devices, these fit in an ICT grouping. The US excluded capacitors, resistors, and similar devices used in power transmission from the ICT data numbers provided (see the excluded 335999 link in the table D.1).

c) Class 3230 should be included. The US only included data for Audio and Video Equipment Manufacturing. The other various components shown in the mapping in Annex C either were not ICT products or were not separately available in the data and represented only a small portion of the industries linked.

d) Class 3313 should be excluded. When providing data for this class, the U.S. used "Instruments and Related Products Manufacturing for Measuring, Displaying, and Controlling Industrial Process Variables (334513)". This NAICS industry contains measuring and process control instruments and devices. While many of these are technologically advanced or intricate devices, they may not belong in an information and communications technology grouping. These are providing information about what is going on in an industrial process (temperature, humidity, viscosity, etc.) but are essentially production machines, not information or communication processors or networks.

8. Based on the comments received by the U.S. delegation to the OECD Working Group on Indicators for the Information Society (WPIIS) on August 2, 2001.

9. Based on the comments sent by the U.S. delegation on August 2, 2001.

55. The U.S. delegation recommended that, since the OECD definition contains whole ISIC classes, countries with more detailed breakouts available should provide data based on their finer national classifications. By including the mapping used to provide ICT sector statistics, data users will have the information they need to correctly use the data. Over time, as more countries are able to produce more detailed data, the OECD will be able to revise the specificity of the definition.

Table D.1 - Mapping of NAICS into the OECD ICT sector definition.
Shaded rows indicate NAICS codes for which the U.S. reported ICT data to OECD in 2000.

ISIC	NAICS		
		Title	Description
3000	333311	Automatic Vending Machine Manufacturing	Change making machines
	333313	Office Machinery Manufacturing	Except dictation machines
	333315	Photographic and Photocopying Equipment Manufacturing	Blueprinting, whiteprinting and photocopying equipment
	334111	Electronic Computer Manufacturing	
	334112	Computer Storage Device Manufacturing	
	334113	Computer Terminal Manufacturing	
	334119	Other Computer Peripheral Equipment Manufacturing	
	334418	Printed Circuit/Electronics Assembly Manufacturing	Modems, external consumer type
	339942	Lead Pencil and Art Good Manufacturing	Hole punchers, label making equipment, rolodex address files, paper cutters, pencil sharpeners, staplers, staple removers, and tape dispensers
3130	331319	Other Aluminum Rolling and Drawing	Insulated wire made in drawing plants
	331422	Copper Wire (except Mechanical) Drawing	Insulated wire made in drawing plants
	331491	Nonferrous Metal (except Copper and Aluminum) Rolling, Drawing and Extruding	Insulated wire made in drawing plants
	334419	Other Electronic Component Manufacturing	Wiring harness assemblies
	335921	Fiber Optic Cable Manufacturing	
	335929	Other Communication and Energy Wire Manufacturing	
	335999	All Other Miscellaneous Electrical Equipment and Component Manufacturing	Wiring harnesses, wiring cords, and sets including appliance and extension cords
3210	334411	Electron Tube Manufacturing	
	334412	Printed Circuit Board Manufacturing	
	334413	Semiconductor and Related Device Manufacturing	
	334414	Electronic Capacitor Manufacturing	
	334415	Electronic Resistor Manufacturing	
	334418	Printed Circuit/Electronics Assembly Manufacturing	Except modems, external consumer type
	334419	Other Electronic Component Manufacturing	Other including attenuators and rectifiers
	335999	All Other Miscellaneous Electrical Equipment and Component Manufacturing	Capacitors and condensors
3220	334210	Telephone Apparatus Manufacturing	Except telephone answering machines
	334220	Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing	Except pagers, antennas, satellites, satellite dishes, and headphones
	334290	Other Communications Equipment Manufacturing	Intercommunication systems
	811213	Communication Equipment Repair and Maintenance	Repairing products of ISIC 3220 other than personal and household but including telephones

ISIC	NAICS		
		Title	Description
3230	333313	Office Machinery Manufacturing	Dictation machines (MARGINAL)
	333315	Photographic and Photocopying Equipment Manufacturing	Sound recording and reproducing equipment for motion pictures
	334210	Telephone Apparatus Manufacturing	Telephone answering machines
	334220	Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing	Pagers, antennas, satellite dishes, and headphones
	334290	Other Communications Equipment Manufacturing	Garage door, TV and other remote control units
	334310	Audio and Video Equipment Manufacturing	
	334419	Other Electronic Component Manufacturing	Phonographic needles and styluses
	811211	Consumer Electronics Repair and Maintenance	Repairing commercial sound and video reproducing equipment such as VCRs and other products of ISIC 3230 other than personal and household
	811213	Communication Equipment Repair and Maintenance	Repairing communications equipment such as public address and other products of ISIC 3230 other than personal and household
3312	332212	Hand and Edge Tool Manufacturing	Precision measuring devices including inspection, quality control, tool room, and machinists'
	333314	Optical Instrument and Lens Manufacturing	Test, inspection, and measuring instruments
	333315	Photographic and Photocopying Equipment Manufacturing	Densitometers, sensitometers, exposure meters and range finders
	333319	Other Commercial and Service Industry Machinery Manufacturing	Automotive wheel mounting and balancing equipment
	333999	All Other General Purpose Machinery Manufacturing	Balancing equipment other than wheel
	334511	Search, Detection, Navigation, Guidance, Aeronautical, and Nautical System & Instrument Manufacturing	
	334512	Automatic Environmental Control Manufacturing for Residential, Commercial and Appliance Use	
	334514	Totalizing Fluid Meter and Counting Device Manufacturing	Except parking meters
	334515	Instrument Manufacturing for Measuring and Testing Electricity and Electrical Signals	Except signal generators and averages
	334516	Analytical Laboratory Instrument Manufacturing	
	334518	Watch, Clock, and Part Manufacturing	Chronometers
	334519	Other Measuring and Controlling Device Manufacturing	Except metal detectors
	339111	Laboratory Apparatus and Furniture Manufacturing	Other laboratory apparatus including balances, calimeters, incubators, shakers and stirrers, and microtomes
	339112	Surgical and Medical Instrument Manufacturing	Medical thermometers
	339942	Lead Pencil and Art Good Manufacturing	Pantographs
	811219	Other Electronic and Precision Equipment Repair and Maintenance	Repairing electrical aircraft instruments and other products of ISIC 3312 other than personal and household
3313	334513	Instruments and Related Products Manufacturing for Measuring, Displaying, and Controlling Industrial Process Variables	
	811219	Other Electronic and Precision Equipment Repair and Maintenance	Repairing industrial process control instruments and other products of ISIC 3313 other than personal and household
5150	*421120	Motor Vehicle Supplies and New Part Wholesalers	Engine testing equipment and service station equipment
	*421210	Furniture Wholesalers	Nonhousehold
	*421410	Photographic Equipment and Supplies Wholesalers	Motion picture studio and theatre equipment
	421420	Office Equipment Wholesalers	
	421430	Computer and Computer Peripheral Equipment and Software Wholesalers	
	421440	Other Commercial Equipment Wholesalers	
	*421450	Medical, Dental and Hospital Equipment and Supplies Wholesalers	Except surgical and orthopedic instruments, equipment and supplies
	*421490	Other Professional Equipment and Supplies Wholesalers	Except school classroom equipment
	*421610	Electrical Apparatus and Equipment, Wiring Supplies and Construction Material Wholesalers	Except electric lighting fixtures and light bulbs
	*421690	Other Electronic Part and Equipment Wholesalers	Except blank video or audio tapes and citizen's band two-way radios
	*421720	Plumbing and Heating Equipment and Supplies (Hydronics) Wholesalers	Industrial power boilers
	421740	Refrigeration Equipment and Supplies Wholesalers	
	421810	Construction and Mining (except Petroleum) Machinery and Equipment Wholesalers	
	421820	Farm and Garden Machinery and Equipment Wholesalers	
	*421830	Industrial Machinery and Equipment Wholesalers	Except ladders
	*421840	Industrial Supplies Wholesalers	Except box shooks, cooperage, and printers' supplies
	*421850	Service Establishment Equipment and Supplies Wholesalers	Except sprinkler systems
	421860	Transportation Equipment and Supplies (except Motor Vehicle) Wholesalers	
	*421910	Sporting and Recreational Goods and Supplies Wholesalers	Outboard motors and boats including motor and sail, and canoes
	*421990	Other Miscellaneous Durable Goods Wholesalers	Coin-operated game machines, fire extinguishers, firearms and ammunition
	*422120	Stationary and Office Supplies Wholesalers	Inked ribbons and photocopying supplies
	*422690	Other Chemical and Allied Products Wholesalers	Epoxy repair products
	*422990	Other Miscellaneous Nondurable Goods Wholesalers	Foam rubber; taxidermy supplies; and broom, mop, and paint handles

ISIC	NAICS		
		Title	Description
6420	513111	Radio Networks	Radio relay systems
	513120	Television Broadcasting	T V relay systems
	513220	Cable and Other Program Distribution	
	513310	Wired Telecommunications Carriers	
	513321	Paging	
	513322	Cellular and Other Wireless Telecommunications	
	513330	Telecommunications Resellers	
	513340	Satellite Telecommunications	
	513390	Other Telecommunications	
	514191	On-Line Information Services	
	812990	All Other Personal Services	Operating coin-operated (pay) telephone equipment
7123	532420	Office Machinery and Equipment Rental and Leasing	Computer equipment rental
72	511140	Database and Directory Publishers	Data base publishing
	511210	Software Publishers	
	514199	All Other Information Services	Other including information search services and telephone-based recorded information services
	514210	Data Processing Services	Except microfilming services
	541511	Custom Computer Programming Services	
	541512	Computer Systems Design Services	
	541513	Computer Facilities Management Services	
	541519	Other Computer Related Services	Except computer disaster recovery, software installation, and other computer related services
	541519	Other Computer Related Services	Disaster recovery services, software installation, and other computer related services
	561410	Document Preparation Services	Computer word processing
	811212	Computer and Office Machine Repair and Maintenance	Repairing accounting, computing, photocopying, typewriting, and other office machines

Source: U.S. Census Bureau, 2001

ANNEX E - SWITZERLAND EXPERIENCE WITH THE ICT SECTOR DEFINITION[10]

56. Switzerland carried out an exercise similar to the one carried out by the Nordic countries and used a more detailed national classification to better identify the size of the ICT sector. The results are summarised in Table D.1. Column A corresponds to the straight application of the OECD ICT sector definition. Column B provides an aggregation that is in line with the principles of the OECD definition but that is *adapted* by using the Swiss more detailed national classifications to exclude non ICT activities. In the third column C, an even narrower ICT sector definition is used that only concentrates on computer and telecommunication related activities, putting less emphasis on the electronic processing activities. Using the OECD ICT sector definition ICT employment in 1998 represented about 6% of total business sector employment. With the second and *adapted* definition the share of ICT sector employment in total business sector employment in 1998 would amount to about 5%, while, with the third narrower definition, the share would decrease to about 4%.

57. Notwithstanding the importance of having an international definition of those core classes that belong to the ICT sector, the Swiss delegation provided the following comments and suggestions:

- Countries differ in economic structure and specificity of national nomenclatures. For this reason, countries that use more detailed national activity classifications in national statistical production should have some flexibility to use their national classifications to provide a more precise picture of the ICT sector. In Switzerland, for instance, the size of the ICT sector as measured with the OECD ICT sector definition would be overestimated. This is because of the inclusion of several industries that are traditionally important in Switzerland, but which have nothing to do with ICT like, for instance, the NACE class 5165 (wholesale of other machinery...) which includes the production of building machinery.

- The decision taken in 1998 of including only whole of ISIC classes can lead to serious statistical distortions. In the case of countries where detailed product statistics are not available, or no other means can be used to determine the part classes attributable to ICT, there should be at least some thumbnail rules on the percentage of an industrial class that should be included. For instance, for ISIC 3130 (insulated wire cable) a share of 20 percent could be used, if one think that this reasonably approximates the production of optical cables (in Switzerland cables are mostly produced for electricity). In cases, where the share of ICT production cannot be estimated, a share of 50% should be taken in order to minimize the statistical distortion. These rules would only have to be implemented in countries like Switzerland where it is not possible to determine the share of ICT production by a products breakdown.

- The possibility of modifying the "principles" embedded in the OECD ICT sector definition should be discussed. A particular problem arises in Switzerland with the second principle concerning **electronic processing**. This principle should be guiding the inclusion in the definition of classes such as ISIC 3312 (Instruments and appliances for measuring...) or ISIC 3210 (electronic components). In Switzerland there are problems in attributing ICT related activities to these classes. For instance, in ISIC 3312 one typically finds enterprises that are constructing scales (not related to ICT). In ISIC 3210 one typically finds electronic components for cars, planes, engines or arms (should this belong to ICT?). Furthermore,

10. Based on the comments submitted by the Swiss delegation to WPIIS on August 21, 2001.

Switzerland has always had a comparative advantage in the production of miniaturized precision instruments. What has changed over time is the production technology: from mechanical, to electrical and now electronic. The ICT sector definition from 1998 considers as an important element of ICT the use of electronic components in the production process and products with an electronic display. Consequently, should Switzerland include, for instance, the watch industries in the ICT sector, because nowadays a lot of watches with digital display are produced?

- The production of a manual, or at least guidelines for the collection of national data, are necessary. But before, the ICT sector definition has to be improved. Especially, the boundary between ICT and the use of electronic components in the production process is not clear enough.

Table E.1 - The OECD sector in Switzerland (1998): three definitions compared

	A. OECD sector definition (no adaptations)		B. OECD sector definition (leaving out non ICT activities)		C. Narrow ICT sector definition (activities related to computers and telecommunication)	
NOGA (*)	Number of enterprises	Number of employees	Number of enterprises	Number of employees	Number of enterprises	Number of employees
3001A	18	1526				
3002A	108	1804	108	1804	108	1804
3130A	60	5588	60	5588		
3210A	397	12307	397	12307		
3220A	51	7140	51	7140	51	7140
3230A	107	833	107	833	107	833
3320A	505	14717	505	14717		
3330A	233	6063	233	6063		
5143A	356	4173				
5143B	354	3512	354	3512	354	3512
5164A	145	3917				
5164B	584	11558	584	11558	584	11558
5164C	201	1439	201	1439	201	1439
5164D	172	1468				
5165A	3320	25167				
6420A	361	29438	361	29438	361	29438
7133A	16	48				
7210A	640	3495	640	3495	640	3495
7220A	6408	33465	6408	33465	6408	33465
7230A	65	1129	65	1129	65	1129
7240A	80	1919	80	1919	80	1919
7250A	167	885	167	885	167	885
7260A	29	435	29	435	29	435
Total ICT sector	**14377**	**172026**	**10350**	**135727**	**9155**	**97052**

(*) NOGA=Swiss classification of economic activities; the first four digits are identical with NACE, rev.1, the last digit described by a letter is swiss specific.

Source: Swiss Federal Statistical Office (SFSO).