

COMPUTER AND RELATED SERVICES. A CONTRIBUTION TO CURRENT
DISCUSSION ON PRODUCT CLASSIFICATION (CPC)

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1 INTRODUCTION

This paper presents an elaboration of the CPC for computer and related services and some proposals for discussion.

In the context of the Voorburg Group initiative, Sweden together with Japan volunteered to work out proposals for the CPC for computer and related services. Due to the dynamic change and development that characterise this sector, definitions and nomenclatures seem to be difficult to establish. We have put forward some common proposals for a draft explanatory text of the CPC in this area. However, we do not yet feel ready with the proposals so far.

In 1989, Statistics Sweden carried out a study on computer related services (businesses in ISIC 8323) by a mail questionnaire. Small enterprises in ISIC 38251, Manufacture of office, accounting and computing machinery, were also surveyed with the only purpose to check what their main activity really was. Thus, to some extent we have tested the CPC proposals. The results of these efforts will be presented below.

A short version in English the computer service study is attached in an Appendix.

2. THE PRESENT CLASSIFICATIONS (ACTIVITIES AND PRODUCTS) ACCORDING TO ISIC, REV.3 AND NACE, REV.1

The NACE/ISIC-activities related to computer services and CPC-COM (draft) are listed below. Activities related to computer services within the manufacturing industry are included.

ISIC	3000	Manufacture of office, accounting and computing machinery
NACE	30.01	Manufacture of office machinery
NACE	30.02	Manufacture of computers and other information processing equipment
NACE	51.64	Wholesale of office machinery and equipment
NACE/ISIC	7123	Renting of office machinery and equipment (including computers)
NACE/ISIC	7210	Hardware consultancy

CPC	8410	Consultancy services related to the installation of computer hardware
NACE/ISIC	7220	Software consultancy and supply
CPC	8421	Systems and software consulting services
	8422	Systems analysis services
	8423	Systems design services
	8424	Programming services
	8425	Systems maintenance services
NACE/ISIC	7230	Data processing
CPC	8431	Input preparation services
	8432	Data processing and tabulation services
	8433	Time sharing services
	8439	Other data processing services
NACE/ISIC	7240	Data base activities
CPC	8440	Data base services
NACE/ISIC	7250	Maintenance and repair of office, accounting and computing machinery
CPC	8450	Maintenance and repair services of office machinery and equipment including computers
NACE/ISIC	7260	Other computer related activities
CPC	8491	Data preparation services
	8499	Other computing services

3. COMMENTS ON THE CPC AND TENTATIVE PROPOSALS FOR EXPLANATORY TEXT

3.1 References

In some cases, we make references to a paper from the Statistical Office of the European Communities Statistics on Services, "Methodological Manual of Statistics on Service Enterprises, Chapter Information, Communication and Other Business Services", Document S0/90/12-6.en. Other comments are based on the survey to computer service businesses made in 1989.

3.2 Hardware and software services

Consultancy services related to the installation of computer hardware (CPC 8410)

Explanatory text: This class includes assistance to clients in the installation of computer hardware and computer networks. It also includes drawing of cables, installation of operative systems and application software, starting up the computer systems and general advising of computer room (hall) construction.

Comments: The definition seems to be wider than the EC-manual by including also installation of operative systems and application software. However, the EC-manual also includes advice on specialist electronic equipment like robots, automatic test equipment, point of sale devices as well as integrated circuits. We think this is a good idea. In that case, however, the name of the CPC 8410 should be altered so that become clear what kinds of hardware that are included.

Systems and software consulting services (CPC 8421)

Explanatory text: This class includes services of a general nature prior to the development of software applications and data processing systems.

Comments: This definitions were previously discussed with Japan. In the survey, however, we had to use a more precise definition. The definition used was "management services and project planning".

Systems analysis services (CPC 8422)
 System design services (CPC 8423)
 Programming services (CPC 8424)

Explanatory text: -

Comments: These divisions were not used in the survey. These services are the most important part of the sector. The breakdowns in CPC (and CPC-COM) in terms of systems analysis, system design and programming services were considered to be too detailed and too difficult to define separately as such. Nor were we able to provide good reasons for doing it. Instead, it was considered to be of more analytical interest to split the total of these services (systems development services) into development services for administrative uses and for technical uses. Thus, the breakdowns tested were:

Systems development services, technical systems
 Systems development services, administrative systems

It should be mentioned here that some respondents seemed to have problems with how to report systems integration services, i. e. services where hardware and software components are combined to a new system for a special

purpose of one client. In some of these cases, the revenue was put on a line marked "Other operating revenue". The respondents were asked to split hardware sale from software development. This operation, of course, has to be done if CPC should be followed.

Maybe "systems integration" should be defined in an own CPC subclass? According to the EC-manual, services of this type should only be classified in this subsector (computer and related services), "if the main part of them consists in the service of integration of the different hardware and software components, otherwise it is a trade in hardware and or software."

Systems maintenance services (CPC 8425)

Explanatory text: Maintenance services include consulting and technical assistance of software products in use, rewriting or changing in existing programs or systems, and maintaining up-to-date software documentations and manuals. Also included are specialist work like conversions.

Comments: This seems us to be a well defined subclass and useful from analytical points of view.

3.3 Data processing and data base services

Since our present activity classification does not separate service bureaus from consultants, it was considered to be a too heavy response burden to specify data processing services too. We also do not feel confident with the present CPC.

Our previous attempts to provide explanatory text to services under the heading "data processing services" were as follows:

Input preparation services (CPC 8431)

Explanatory text: This class includes data recording services such as key punching, optical scanning or other methods for data entry.

Data processing and tabulation services (CPC 8432)

Explanatory text: This class includes services as data processing and tabulation services, computer calculating services, and rental of computer time.

Comments: We do not think that CPC 8431 and 8432 are always separable. Data capture might consist of transforming data

from one media to another in a way that makes them readable for computers. To a great extent is data processing. Registration of data, data tabulation and clearing of information also might be delivered as a package of services.

Time sharing services (CPC 8433)

Explanatory text: -

Comments: According to our views, these are the same type of services as "data processing and tabulation services" with the requirements that the services have to be time sharing processed. Why trying to separate a type of services based on the configuration of the hardware?

Other data processing services (CPC 8439)

Explanatory note: This class might include services which manage the full operations of a customer's facilities under contract, so called facilities management services. However, the contents may vary considerably from management of systems established by others to management of systems of own production.

Comments: Should facility management services constitute a separate CPC subclass?

Data base services (or data bank services) (CPC 8440)

Explanatory text: This class includes all services provided from primarily structured databases through a communication network.

Comments: Data bank services are provided by hosts directly or through information brokers. These suppliers offer data banks on-line via telecommunication networks to customers, which can use these data banks in dialogue. You may as well say that these services are communication services. We have noticed that in some analyses the data communication services are divided into two categories: basic communication services which only transmit data and value-added communication services which process, store, as well as transmit data.

Value-added communication services may be divided into:

-data bank services, which allow customers to retrieve information on-line through the user's own terminal

-other value-added network services like electronic mail services, videotex services and other forms necessary to establish "intelligent" computer based communication.

Thus, should CPC 8440 include both these services or only the first one?

Maintenance and repair of office, accounting and computing machinery (CPC 8450)

Explanatory text: Maintenance and repair encompass only those services related to hardware. Software maintenance is included in CPC 8425. It should be discussed if this group also should include industrial process control equipment and other electronic components (compare the definition of hardware consultancy).

Data preparation services (CPC 8491)

Explanatory text: -

Comments: We have no satisfactory definition of these services. Would it be advisable to include CPC 8491 in CPC 8431.

Other computing services (CPC 8499)

Explanatory text: Other computing services n.e.c.

4. OTHER COMMENTS

The questionnaire also included breakdowns of other services (secondary activities), namely:

- education and training services to clients
- maintenance and repair services of office machinery and equipment; *Gen.*
- resale^{of} computers and equipment
- resale of systems program and utilities
- resale^{of} application software packages
- own production of application software packages
- other operating revenue

In retrospect, the revenue breakdown seems to have functioned quite well. The response rate was high. By testing the activities of small companies in ISIC 38251, we observed that many of them were in the business of construction computerised control and/or steering systems for industrial processes or apparatus. It seems to us that such activities should be included in the subsector 7220. The appropriate CPC-code is systems development services (technical systems) or systems integration.

THE COMPUTER INDUSTRY IN SWEDEN

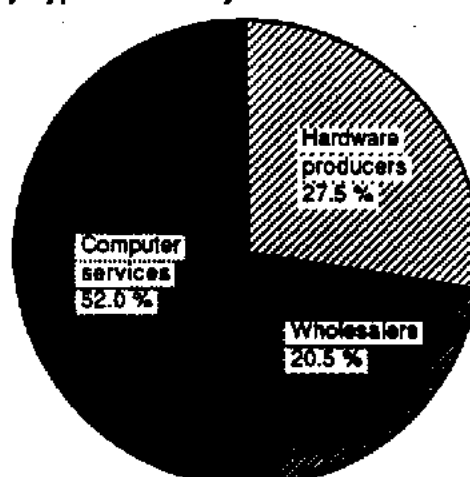
The computer industry, as it is defined here, consists of domestic producers, wholesalers of computers, equipment and software and other computer services producers. The number of employees and self-employed was 54 000 in 1988. This is 1.2 percent of the Swedish labour force. Total business income amounted to US\$ 9.2 billion.

The Swedish Computer Industry 1988

Main activity	Number of enterprises	Persons engaged	Revenue Billions of US\$
Hardware production	210	14 860	2.6
Wholesale	828	11 040	3.1
Services	5 422	26 800	3.4
Total	6 460	52 700	9.2

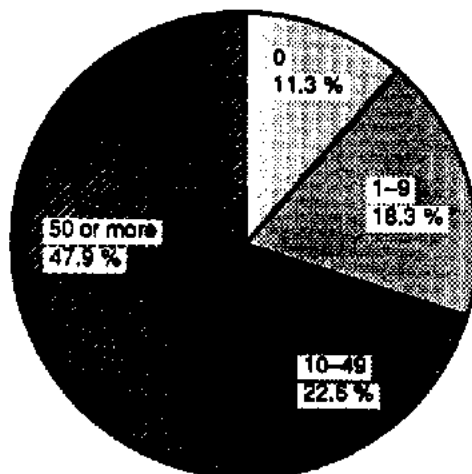
Retail trade in computers and software is excluded as well as enterprises mainly engaged in leasing and renting of computers and enterprises mainly engaged in education and training of personnel. When leasing services are provided in connection with sales, they are included in the wholesale industry. Revenues from leasing services of office equipment inclusive of computers provided by specialised leasing and renting firms were estimated to US\$ 105 million in 1988.

Figure 1
Employment in the computer industry
by type of activity.



The universe of services production is not estimated in this study, since in-house activities by industrial enterprises or other bodies are not taken into account. There is reason to believe that the greater part of total expenditure on software and software related services remain within industrial firms and public authorities. Statistics on the German software market show that more than 60 percent of total expenditure for software and support was spent within the user's own firms.

Figure 2
Employment in the computer services industry by size of firms. No. of employees.



THE HARDWARE AND EQUIPMENT INDUSTRY

The production of computers and equipment is a rather small industry in Sweden. Business income in 1988 was US\$ 2.6 billion. Of this figure, around US\$ 1.1 billion was production of computers and equipment. The remaining part concerns other hardware production, software sale, distribution of hardware and computer related services. Included are production and construction of control systems for automation processes. The division of income by these types of products and services is not known.

The number of businesses was 210 in 1988. The 5 largest firms accounted for 90 percent of total business income. Business total employment was 14 860 persons in 1988. The smaller firms are mostly engaged in construction of systems for automatic steering of industry processes and instruments.

THE DISTRIBUTION INDUSTRY

The main portion of computers, equipment and software products for the domestic market is imported. The Swedish wholesale trade industry in this area is thus large. There were about 800 trade businesses with about 11 000 employed in 1988. The industry's income in 1988 is estimated to US\$ 3.1 billion. As was mentioned, the Swedish hardware producers are to a great extent involved in sale of computers, equipment and software produced and developed by a foreign parent or third party.

The figure of the trade industry's income does not represent the total

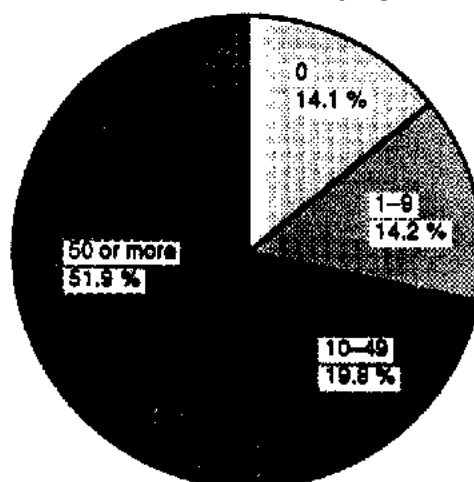
domestic market for these kinds of products due to the fact that sale does not go directly from the "first" seller to the final consumer but usually passes through other sellers.

THE COMPUTER SERVICE INDUSTRY

The computer service industry includes firms whose revenues are generated mainly from software development, professional computer related services, and data processing services. Lease and rental of computer hardware and hardware repair and maintenance are not included. It is the fastest growing service industries in Sweden at present. Total business revenue rose from US\$ 1.7 billion in 1985 to 3.3 billion in 1988. The number of businesses expanded from 2 100 in 1985 to 5 400 in 1988 and continues to increase thereafter. In 1988, about 3 400 were firms without employees. Employment rose from 17 300 in 1985 to 26 800 in 1988. The reason behind this remarkable growth is partly to be sought in an increased amount of contracting out. Some large data departments of goods producing enterprises have become companies of their own and have been classified to the computer service industry. This has strengthened the growth of this subsector.

In 1988, firms with 50 employees or more accounted for 48 percent of the total number of employment and 52 percent of the total revenues earned in the industry (Figure 2 and 3).

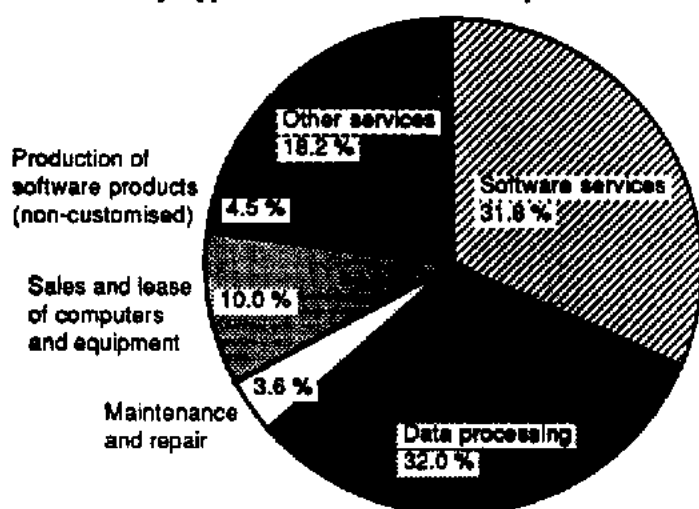
Figure 3
Revenue of the computer services industry
by size of firms. No. of employees.



The industry is in a process of dynamic change and development. Permanently new services are created and brought to market in various kinds of supply. Common concepts, definitions and nomenclatures are to some extent still missing or inadequate. With the present rudimentary way of classifying the output of this service sector, we end up with the distribution of output given by the percentage shares in figure 4.

Hardware consultancy encompasses all advices given to customers of computer equipment covering mainframes, minis and office micros. Software (systems) development and consultancy is defined as mainly customized services, that is development of and advice to clients on system software products and on application software. Services in this

Figure 4
Revenue by type of services for computer services firms.

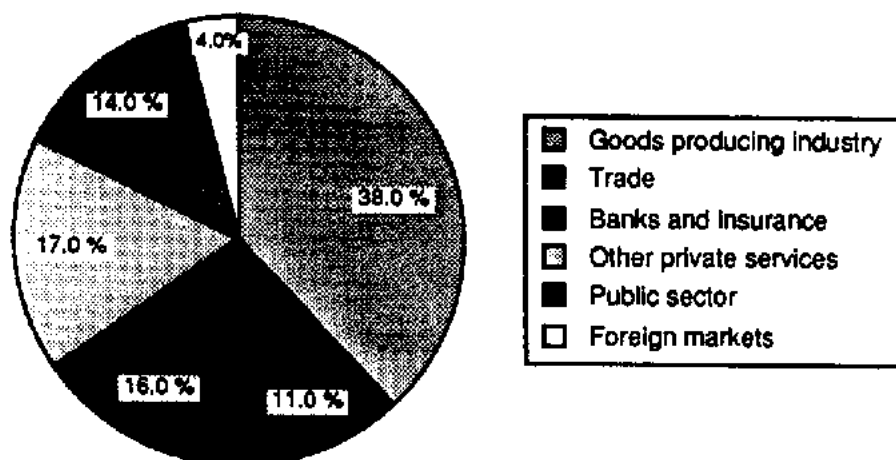


area are divided in (a) professional advices, management support and investigations, (b) systems development for technical uses, (c) systems development for administrative uses and (d) systems maintenance.

Data processing services encompass input preparation services, data processing and tabulation services, data bank services and facility management services, i. e. management of complex computer and communication systems for clients.

The goods producing industry was the largest customer group with 43 percent of the computer service industry's total sale (Figure 5). Other big customers were those engaged in financial services with 18 percent and in trade services with 12 percent of total sales. Foreign customers' share amounted to 4 percent which is around US\$ 120 million.

Figure 5
Revenue by class of customers for the computer service industry.



The industry's net investment was US\$ 370 million. Investment in on-the-job training amounted to US\$ 1300 per employee.