# Improving occupational classifications as tools for describing Labour markets:  A summary of recent national experiences

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# Improving occupational classifications as tools for describing labour markets: A summary of recent national experiences

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# Preface

This review of recent national experiences with occupational classifications has been prepared as a background document for the discussion at the *17<sup>th</sup> International Conference of Labour Statisticians (ICLS)* (Geneva 25 November – 3 December 2003) on future work with the *International Standard Classification of Occupations (ISCO-88)*.

The history of the development of ISCO has always been closely connected with the work of the ICLS. It was in 1921 that the need for an international standard classification of occupations was initially discussed, but the first positive step towards its establishment was the adoption of a provisional classification of nine major groups by the 7<sup>th</sup> ICLS in 1949. In 1952 the ILO published the *International Classification of Occupations for Migration and Employment Placement*, based on the national classifications of eight industrialized countries. The first edition of ISCO was published in 1958, and a revised edition followed in 1968. The current version, ISCO-88, was adopted as the *Resolution concerning the revision of the International Standard Classification of Occupations* by the 14<sup>th</sup> ICLS in November 1987.

The development of ISCO has since the 1958 version followed the same cycle as the United Nations' *International Standard Industrial Classification of All Economic Activities (ISIC)*. Work has started that is expected to lead to a proposal for a revised ISIC in 2007[1]. This, together with the fact that it is 15 years since the 14<sup>th</sup> ICLS adopted the resolution that created ISCO-88, motivated the ILO to seek the advice of the 17<sup>th</sup> ICLS on the future of ISCO; and it was decided that the discussions should be based on the recommendations of an independent consultant's review of national practices with occupational classifications and experiences with ISCO-88.[2]

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[1] See pp. 20-21 of United Nations: "Statistical Commission: Report of the thirtieth session (1-5 March 1999)". *Economic and Social Council. Official Records 1990. Supplement no. 4.* E/1999/24. E/CN.3/1999/29. United Nations, New York. 1999. At its 34<sup>th</sup> session (2003) the UNSC requested that a revised ISCO should be available in time to be taken into account for the 2010 round of population censuses.

[2] In this the Office followed the example of the preparations for the discussion at the 13<sup>th</sup> ICLS (1982) of the need to revise ISCO-68. See Thirteenth International Conference of Labour Statisticians: *Report of the Conference*. International Labour Office, Geneva. 1988; and Ehrenström, B.: "The case for a revision of the Intrenational Standard Classification of Occupations". *Bulletin of Labour Statistics*. Pp. ix-xxi. 1983-1. International Labour Office. Geneva.

To undertake this review ILO engaged Ms. Debbie Budlender of the *Community Agency for Social Enquiry (CASE)*, the Republic of South Africa. Ms. Budlender was well known to the ILO as a social researcher with experience from countries in a range of different situations with respect to economic and social development. It was considered an advantage that although she was consulted on the adaptation of ISCO-88 for use in South Africa, she had not been directly involved in the development of the *South African Standard Classification of Occupations (SASCO)*. It was expected that with this background she would apply the perspective of an 'informed outsider'. This report presents Ms. Budlender's summary of national experiences in countries that recently or currently have worked on their national occupational classifications, and serves as background for her observations and recommendations concerning ISCO-88, presented in Working Paper no. 9: *Whither the International Standard Classification of Occupations (ISCO-88)?*[3]

The ILO will welcome all comments and suggestions concerning its work with occupational classifications. They should be addressed to The Director, Bureau of Statistics, International Labour Office, CH-1211 Geneva 22, Switzerland. Fax. No. + 41 22 799 6957. e-mail: stat@ilo.org

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**Geneva, October 2003**

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[3] The work on this report was organized and supervised by Mr. Eivind Hoffmann, ILO Bureau of Statistics.

# 1. Introduction

This paper presents a summary review of national experiences with work on occupational classifications in Australia, Canada, Croatia, France, Germany, the Netherlands, South Africa, Sweden, Switzerland, the United Kingdom and the United States. It also presents a short summary of experiences in the transition countries in Central and Eastern Europe that have benefited from technical advice on the development of national occupational classifications, provided through the European Union's PHARE programme administered by Eurostat.

The main purpose of these summaries, was to serve as a form of *aide-mémoire* for a review of the directions that work to improve and possibly revise the *International Standard Classification of Occupations (ISCO-88)* might take. The results of that Review are presented in Working Paper No. 9: *Whither the International Standard Classification of Occupations (ISCO-88)?*, and it has been considered correct to give the readers of that paper an insight into the author's understanding of recent and current national work in this area that has contributed to the observations and recommendations about ISCO-88 made in Working Paper No. 9.

This paper would not have been possible without the assistance of many people. It is impossible to name all of them. The informants in the countries visited by the researcher are listed with the national descriptions, and thanks are obviously due to them. Obviously none of them can be blamed for any of the mistakes, misunderstandings or omissions that there may be in the presentation of their national practices and experiences.

## 2. Australia

### 2.1 Development of the national classification

1. The first edition of the Australian Standard Classification of Occupations (ASCO) was completed in time for the 1986 census. Before this time, the Australian Bureau of Statistics (ABS) used the Classification and Classified List of Occupations (CCLO) which was modelled on earlier ISCOs, while employment services, education and other users used different classification systems. The new classification was intended both to provide a common classification for all major government users, and to provide a classification which better suited the shape of the Australian economy.

2. The development of the classification spanned the period 1978 to 1986 and consumed significant resources. In the early years the then Department of Employment and Industrial Relations (DEIR) contributed the majority of the resources, while in later years ABS took the lead in this respect. (The employment and education portfolios in Australia have been restructured and renamed many times over the last twenty years. This report uses the generic term 'employment and education portfolio' to avoid referring to all the diverse names.) The developers were given a wide-open mandate, and were not required to concern themselves with international standards or compatibility with previous Australian classifications. The result was greater contestation over the shape of the final product, but also more in-depth thought and debate than there might otherwise have been.

3. The development team initially came up with four possible structures. Structure A was favoured by employment services, structure B was favoured by ABS and based on skill level and skill specialisation, structure C was strongly linked with pathways within the education system, and structure D had a more socio-economic flavour. In 1983, structures A and B were disseminated to all identified users together in what was termed the 'user requirements survey'. Respondents were given a structured questionnaire which asked them to rank the two structures, ISCO and CCLO against each other, to describe their use of the classification, and to say which criteria they felt were most important for an occupational classification. Analysis of the more than 100 questionnaires classified and weighted users according to their significance, for example government or non-government. The analysis revealed a clear preference for structure B.

4. Over the period of development, the concepts of skill level and skill specialisation were spelled out with ever increasing clarity. In terms of skill level, the classification provided for eight major groups each at a different level. Within skill levels, skill specialisations were intended to group together occupations across which individuals should be able to change without significant formal retraining.

5.  ABS attempted as far as possible to synchronise the date of introduction of ASCO into the major collections. ASCO was implemented in the survey of employee earnings and hours in May 1986, the LFS of August 1986, and the census of June 1986, with coding on the latter starting in November 1986. The employment services used the working draft of structure A until 1991, when they shifted to ASCO.

6.  In the early 1990s, Australia developed ASCO second edition. This revision involved less radical changes, but nevertheless significant ones. On the structural side, the number of skill levels was reduced from eight to five, in recognition of the considerable overlap between levels in the first edition. These levels were matched with the Australian Qualifications Framework (AQF). The increasing use of the AQF in the country also saw greater emphasis on competence in determining the appropriate level, rather than length of service or on-the-job training. Clerical, sales and service workers were split into major groups in three different levels – advanced, intermediate and elementary. ASCO second edition also introduced a sub-major group between the major and minor group levels. The structure thus had nine major groups, 35 sub-major, 81 minor groups, 340 unit groups and 986 occupations. As a rule, the developers tried to avoid splitting of unit groups of the first edition. This was, however, impossible to avoid in the case of clerical, sales and service workers because of the splitting at the major group level.

7.  At the time of the interview, Australia was in the early stages of the next major review. This time the exercise is being undertaken together with New Zealand, with the objective of developing a common Australian and New Zealand Standard Classification of Occupations (ANZSCO). The development team reports to a project board consisting of senior officials from both countries. A larger reference group will include federal government representatives from education, training and immigration as well as representatives of state government, academia and the private sector. The team itself draws on officials from the two statistics agencies and Australia's employment services.

8.  The revision involves three phases of user consultation. The consultations in the first six months of 2002 were designed to get all the issues on the table and identify which classifications were being used in the two countries. By mid-2003, the development team will circulate a paper which presents one or more conceptual models. After the model is chosen, the developers will build the classification in time to present a draft for consultation by mid-2004. The draft will be tested in the first major pilot for the Australian census in August 2004, as well as in the similar exercise in New Zealand. The developers will also at this time obtain input from particular interest groups, and test the classification in their own (and possibly user) systems.

9.    The first round of consultations established that virtually all users favoured the use of skill as the central organising concept in the classification. There is, however, also some demand for 'alternate views', i.e. other ways of aggregating the unit groups or occupations.

10.   The Department of Employment and Workplace Relations (DEWR), which is part of the development team, already has what could be considered an alternate view. DEWR currently organises the ASCO unit groups into 20 'pragmatically' defined pseudo-industry groups, 100 clusters, 400 'occupations' (similar to unit groups), and 2,500 job titles. The Department acknowledges that, with hindsight, some of the disaggregations which expanded the number of unit groups/occupations were unnecessary. It nevertheless feels that certain changes in the current ASCO unit groups are necessary. Ideally, both partners would like to have identical unit groups as this would allow employment services to draw more effectively on LFS data on a regular basis.

11.   A separate call for 'alternative views' comes from interest groups such as the IT industry, culture and leisure, and building and construction. These groups want to be able to measure changes in demand and supply for relevant occupations. An industry classification does not produce the desired statistics because, for example, the IT industry does not include IT specialists working in firms in other sectors.

12.   The developers of ANZSCO report that they will investigate whether they can accommodate alternate views. One option would be to develop alternative views which assigned each and every occupation or unit group exclusively to a single higher level of the alternative view. However, it is not at all clear how this would be done while retaining the delineation of the lowest level group/s according to skill level and skill specialisation. It also seems that, if this were feasible, it would need to happen at the six-digit level, for which data are currently only available on a five-yearly basis. An alternative option is to derive a limited number of alternative views for the key sectors demanding this. This approach would not require that all occupations are covered, nor that any occupation is allocated to only one alternate view.

13.   In previous revision processes, the ABS was meant to focus on structural issues while the employment portfolio was responsible for developing the detailed level of the classification. In particular, the employment portfolio was expected to come up with definitions. With both the first and second editions of ASCO, there were attempts to come up with 'job content factors' (JCFs) or 'key occupation descriptors' (KODs) similar to those incorporated in the US Dictionary of Occupations, as these were seen as important for job matching, careers advice, rehabilitation and workers compensation. The 1983 structure A working draft included the JCFs. However, with both revisions the JCF aspect was eventually abandoned when the developers could not produce a product of sufficient quality in time and with the available funds. One of the major problems was the enormous amount of work necessary to validate the descriptions for each occupation. For the current revision, the ABS plans only to produce short descriptions for each occupation. DEWR is, however, still interested in developing more detail about skills within each occupation.

14. Although DEWR and ABS work as partners, ABS and Statistics New Zealand will be the main custodians of the classification. Within the ABS, the unit responsible for ASCO also bears responsibility for a range of other social classifications. The unit is not responsible for the industry classification, but does provide support in its use where appropriate.

15. The ABS has developed a range of methods of examining its data and operations so as to inform the development of the classification. It uses census data to obtain information on statistical balance. It compares census and LFS data to see where shifts in pattern might indicate poor quality data. It monitors the 'not elsewhere classified' (nec) groups for new and emerging occupations. It sorts responses to the occupational title question to see whether additions to the coding index are required. It also draws on the experience of the employment portfolio.

16. Australia conducts population censi on a five-yearly basis and has, up until now, undertaken revisions of its occupational classification on a ten-yearly basis. The census immediately following a revision is dual coded, which means that each edition is used for three censi, and for ten years of labour force surveys (LFS). The ABS is currently reconsidering this timetable in light of perceived rapid changes in the economy. One option being considered is to have additional minor updates one year before and two years after each census. The minor updates would allow for the addition of new occupations and amendment of definitions, but would not incorporate major structural changes.

## 2.2    Compatibility and comparison with ISCO-88

17. ISCO-88 is very similar to ASCO first edition. Indeed, the developers of ISCO-88 drew heavily on the experience and expertise of the ASCO developers. ASCO second edition differs a little more from ISCO-88, but retains a very similar conceptual basis. In particular, the conception of skill level and skill specialisation is very similar. Further, ASCO second edition has adopted the five-level structure of ISCO-88 as opposed to the original four levels.

18. An Australian informant said that in advising developing countries, they generally recommended that they start off with ISCO-88 rather than ASCO, as the latter is more suited to a developed country. It was thought, however, that several countries – including Indonesia, Singapore, and Malaysia – had chosen to use ASCO rather than ISCO-88 as their starting point.

19. For reporting purposes to ILO, the ABS classification team has developed a crosswalk between ASCO and ISCO-88 at the four-digit level.

20. In designing the new ANZSCO, the developers are keen to retain international comparability. However, they report that the age of ISCO-88 means that it can no longer be regarded as a true 'model of excellence'. Among the particular concerns are insufficient disaggregation of the skill level, the overlap of skill level in the 'middle' major groups, the separate identification of agriculture and the military, and the fact that the classification is out of date.

## 2.3. Utilisation of the classification

21. Within ABS, the two main sources of occupational information are the census and the LFS.

22. The census is conducted five-yearly in Australia and covers all households. It includes two questions on occupation – one about occupational title, and one about tasks and duties. Civil servants are asked to provide both their designation and occupational title. Occupation is coded to six-digits, i.e. to the occupation level.

23. The LFS is a monthly survey covering 30,000 households. Each household remains in the survey for eight consecutive months. The first interview is conducted face-to-face, while subsequent interviews are conducted telephonically. The occupation questions are similar to those in the census. They are included only every three months, and the information coded to four digits i.e. to the unit group level.

24. For the census, the write-in occupational information goes through an optical character recognition (OCR) process, followed by word repair. An automatic coding system which incorporates a dictionary of synonyms achieves a coding success for 55-60% of records. The remaining records are processed with the ASCO Coder, a computer-assisted coding (CAC) system. The earliest version of the Coder was developed for the 1986 census. It aimed to provide for minimal key entry, efficient searches, and carefully specified and ordered matching rules using occupational title, tasks, industry and employer's name as and where appropriate. Development over subsequent years has resulted in a product with a very high success rate in accurate coding at a relatively fast rate.

25. With the LFS, at present, interviewers are simply writing in responses on the questionnaire. They are, however, trained to prompt when respondents provide inadequate information in response to the occupation questions. ABS is currently moving to computer entry of responses, which are subsequently coded by state-based coding teams.

26. The LFS data are treated somewhat differently from the census data, although use is made of the same Coder. A further difference is that records with insufficient information to assign a code at the lowest level are 'coded up' to a 'not further defined' code in the census, while in the LFS these records are distributed among the lower levels in proportion to the distribution of records with full information.

27. In addition to the census and LFS, the ABS has a range of other surveys which collect information on occupation. On the establishment side, the two-yearly survey of employee earnings and hours collects occupation information on a sample of employees within the establishments covered. The data are coded to four digits, but reported mainly at the two digit level. A user-funded expenditure and training survey collects information only at the major group level. A number of other industry surveys collect occupation information in a way that is not consistent with ASCO.

28. On the household survey side, in ten of the twelve months of every year, the LFS contains a supplement covering issues such as labour mobility and transition to work on a rotating basis. These allow for cross-tabulation of further information with occupation. Each year there are approximately two special social surveys on topics such as time use, income and housing costs, health, education and training. There is also a four-yearly general social survey and a multi-purpose household survey which is planned to run continuously on the outgoing rotation group of the LFS. Most of these surveys contain the standard questions on occupation and are coded to four-digit ASCO codes. Other ABS products which utilise ASCO include the labour cost index and a series on average earnings. The Bureau also constructs a socio-economic index for each geographical area which uses occupation as an input. The index is used for allocating government funds, for example for schools.

29. On the employment services side, the Australian Workplace site (www.workplace.gov.au) brings together a range of employment information and services. *JobSearch* is the largest and most visited vacancy site in the country. In May 2002, it recorded 45,000 vacancies and over 100,000 resumes of job applicants. Employers can post jobs individually, or through one of the more than 200 members of Job Network, the outsourced system which Australia has adopted for job placement. *Job Outlook* assists users in exploring jobs and careers. It includes an overview for each occupation as well as more detailed information such as job prospects, main industries, job turnover, vacancy levels, tasks, age and gender and hours of work. Occupation and industry projections utilise an input-output simulation model developed at Monash University, but add the employment services' own assessments of what is happening in different parts of the economy. The projections reach about six years into the future. *Job Explorer* includes, among others, data extracted from the US's O*NET system for occupations where it was possible to match and where O*NET contained the necessary data. *Australian Training* provides information on education and training courses by occupation, region or training provider.

30. Most of the above applications use as their basis the 400 'occupations' defined by DEWR, and Job Outlook uses ABS data as its main data source. The vacancy report is slightly different in two respects. Firstly, it focuses on 120 selected skilled occupations. Secondly, the main source of information is manual searches of advertisements in the main city of each state. The series goes back 20 years, and is disaggregated by state as well as the 120 occupations. A separate series has been developed for IT, based on on-line recruiting sites, as this was not adequately catered for in the original series.

31. Other users of ASCO include the tax office, which codes personal income tax returns, immigration authorities, which assign points for applicants in selected scarce skill occupations, and workers compensation. Death, birth and marriage registrations include information on occupation. All vocational and educational courses are assigned a code according to the expected outcome. The Department of Education, Science and Training (DEST) has a Job Guide which is targeted at school leavers. Many of these users utilise ABS's Coder. However, a few are using their own systems. Most users code to six or four digits. Deaths are coded only to two digits because of the poor quality of the data. DEST uses ASCO as a basis, but has created its own disaggregation of between 500 and 600 'occupations'.

**Informants**:

Brian Embury, formerly Australian Bureau of Statistics
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# 3. Canada

## 3.1 Development of the national classification

1. Prior to 1971, Canada had separate classification systems for statistical and employment services use. Employment services used an adaptation of the US Dictionary of Occupational Titles (DOT). Statistics Canada (StatsCan) used a classification which was similar to the then ISCO.

2. During the 1960s, there was a growing realisation of the advantages of having a single classification for statistical and employment services purposes. A research programme was thus initiated which came up with detailed analyses of different jobs. The ultimate outcome of the research was two very similar classifications – the Canadian Classification and Dictionary of Occupations (CCDO) for use by employment services, and the Occupational Coding Manual (OCM) for statistical use. The full code for the CCDO was seven digits, of which StatsCan used the first four for their data collection.

3. Subsequent use of these classifications for two censi and as an employment services tool revealed a range of problems. Firstly, the classifications did not reflect new developments in the economy in that they were very detailed in respect of blue-collar, industrial work but did not cater well for white collar and new technology jobs. Secondly, on the employment services side the 6,700 specified occupations were felt to be locking people unnecessarily into particular jobs rather than promoting mobility. Thirdly, because StatsCan collected information only to the first four digits, there was no information on which to base career and job advice at the more detailed level.

4. These problems sparked off a new round of in-depth research in the early 1980s. The initiative was a large one, with about 45 people working full-time on it at one stage. Unlike many similar initiatives in other countries, those responsible were not concerned about retaining compatibility with the existing classifications in developing a new one. Instead, they were keen to approach the problem without preconceptions and so come up with new classification principles. Unlike the Canadian research in the previous decades, which focused on describing jobs, the studies in the 1980s focused on determining knowledge and skill requirements, paths of progression and inter-occupational mobility.

5. The National Occupational Classification (NOC) which resulted from the investigations is based on four principles: skill level, skill type, inter-occupational mobility and industry. The concepts of skill level and type are similar to those used for ISCO-88. This was not coincidental, as the two classifications were developed around the same time and had similar influences. The first digit of the 4-digit code of the classification reveals the skill type and the second and third digits reveal the level. However, unlike with ISCO-88, level is not seen as prior to type. Instead, the NOC is conceived as a matrix with ten skill types on the horizontal access and the skill levels arranged vertically.

6. In the NOC, skill type reflects the type of work performed in an occupation and the field of training and experience necessary for entry. The four skill levels describe the four major trends of education and training in Canada. Level A covers formal tertiary education, B covers formal education at a community college, as an apprentice, or in a specialised programme, C covers work for which employers usually require some high school, and might also require attendance at short practically oriented courses, D covers occupations which require some high school plus on-the-job training. In addition to the four skill levels, the classification provides for a management category which spans all skill types and which is not skill-linked.

7. The mobility principle of the NOC states that mobility between occupations within a unit group should be greater than mobility to any other unit group. Further, the way the skill types are defined allows the matrix to illustrate paths of occupational mobility. Industry is not used throughout the classification, but is used as a principle in areas such as manufacturing production and primary industries where there is little occupational mobility outside the industry.

8. The first NOC was published in 1991 and used for the census of that year. A subsequent revision of NOC attempted to reflect ongoing changes in the world of work and correct some weaknesses in the 1991 version. For example, IT occupations were developed in more detail, while some clerical occupations were discarded or amalgamated. The revision was again informed by detailed research into every unit group of the classification. On the one hand, Human Resources Development Canada (HRDC) looked at what they had learnt from users in employment services. On the other hand, StatsCan examined their statistics to see if they revealed similar problems. Despite the detailed research, the difference between the current NOC is insignificant when compared to the major changes introduced in the 1991 NOC.

9. There are currently two versions of the NOC – NOC 2001 which is used by employment services, and NOC-S which is used for statistics. The two classifications are identical at the first digit level, and use the same 520 4-digit unit groups as building blocks. However, they aggregate the unit groups in different ways. In particular, while the standard matrix provides for 26 major (2-digit) groups, NOC-S aggregates the unit groups to 48 categories. Some of these categories include unit groups from different skill levels.

10. StatsCan developed the 48 categories for both practical and principled reasons. At the level of principle, StatsCan strives to provide 'objective' information and was unhappy with the labelling of some NOC categories, such as the 'elemental' groups. At the practical level, StatsCan needed the groups to be large enough that statistics provided by the labour force survey (LFS) could be reliably reported for each category. StatsCan also attempted to come up with groups that would be analytically meaningful, for example by disaggregating groups that contained components that analysts might be interested in considering separately, and by creating groups that were homogeneous in terms of male- or female-domination, or prevalence of part-time work. The two versions of the classification use different codes, but the StatsCan code has the relevant four-digit NOC 2001 embedded within it. Further, both institutions have reached agreement on the titles and descriptions which are included in both the statistics coding manual and the employment services version of the documentation.

11. The Skills Information Division of HRDC led the development of NOC and acts as overall custodian. In this role it is responsible for updating both the basic 4-digit classification, and the 5-digit classification which is used in some employment services applications (see below). HRDC fulfils its custodian role in close collaboration with the Standards Division of StatsCan. Both parties are keen to keep the collaboration going. In particular, HRDC sees the need for statistics to inform government decisions on where to guide citizens in terms of job requirements and availability, and where to guide government delivery in areas such as skills and knowledge development.

12. StatsCan and HRDC have an informal agreement whereby the latter will send new titles which emerge through employment services usage to the Standards Division at StatsCan on a half-yearly basis. Staff of the two agencies will then meet together to discuss whether the new titles can be collected and coded in the statistics operations. This will ensure ongoing agreement on job titles for

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all uses. Larger-scale revisions will be timed to coincide with the five-yearly censi, but will not necessarily involve structural changes.

## 3.2     Compatibility and comparison with ISCO-88

13.    As noted above, NOC is close to ISCO conceptually in its use of skill type and skill level as basic principles. It is, however, country-specific in its definition of skill level in that the definition closely reflects the particular streams of the country's education and training framework.

14.    The Standards Division of StatsCan has developed a crosswalk at the aggregated level between NOC-S and ISCO. This is used, among others, in meeting the standard requests from the ILO and Organisation of Economic Cooperation and Development for statistics at the one-digit ISCO level and on particular occupational groups. The greatest difficulties in matching reportedly occur with respect to ISCO's manager group.

15.    Because of the North American Free Trade Agreement (NAFTA), there is also a need to provide statistics compatible with those of the United States and Mexico. The Standards Division has thus recently taken the 30,000 occupation titles on the US Census Bureau website and allocated an appropriate NOC-S code to each.

16.    Staff at StatsCan and HRDC have provided technical assistance to several countries on the creation and use of statistical classifications. In general, they advise other countries to use ISCO-88 as a basis because of the specificity of the NOC. However, the Canadian experience is utilised to illustrate the use of a matrix, to describe how detailed research into the local situation is necessary and how it can be done, and to explain the virtues of a single classification shared by all users.

## 3.3     Utilisation of the classification

17.    On the statistical side, the census and LFS are the two most important sources of occupational information. Canada has a five-yearly census which covers the full population in respect of a small set of core questions, and a 20% sample (about 2 million households) with a longer questionnaire. The longer questionnaire includes two open-ended questions on occupation. The census questionnaires are dropped off at residences and respondents complete the questionnaire themselves. For coding purposes, StatsCan employs a large team of temporary coders who manually code each response. Where the first-level coders are unable to find an appropriate code, the query gets referred to more skilled staff. After coding, there are some standardised edits which deal with obvious inconsistencies, for example between occupation and education, or occupation and industry.

18. The LFS is a monthly survey of 52,000 households, with approximately two respondents per household. Again, the questions on occupation are open-ended. However, in this case the questionnaire is administered by an enumerator who has been trained to elicit further information when initial responses are inadequate. A simple computerised autocoding process succeeds in allocating occupation codes to a portion of the responses. The remainder are manually coded by permanent staff who have been trained for this purpose.

19. A third household survey, the longitudinal survey of labour and income dynamics (SLID) is a third source of statistics on occupation. The data from this survey are handled in a similar manner to those of the LFS.

20. In all applications, coding is done to the four-digit level, but reporting is done to the 48 standard groups. Users can, however, obtain the raw data at the 4-digit level. StatsCan codes vague responses which cannot be coded to the fourth digit to a higher level. It then distributes these partly-coded categories among the relevant four-digit codes in proportion to the detailed responses. In cases where information on occupation is missing, StatsCan uses imputation through hotdecking. At the time of the interview, StatsCan was using NOC-S for coding of the 2001 census, but had not yet moved to the latest version of the classification for coding of the LFS.

21. StatsCan has no regular establishment surveys which cover occupation. There have, however, been a number of cost recovery special establishment surveys for particular provinces and industries which have included questions on occupations.

22. From the employment services side, the Career Handbook provides occupational information reworked for a range of employment services providers and users inside and outside government. The product is available both in print form and through the internet (www.hrdc-drhc.gc.ca/noc). At the time of the interview, the publicly available Handbook was based on the previous version of NOC, but the NOC 2001 version was to be implemented in the near future.

23. In addition to the code and description, the Handbook provides standardised descriptor scales and explanatory text for each occupation on aptitudes, interests, data-people-things, physical activities, environmental conditions, education and training to assist counsellors and other intermediaries. The education and training requirements are described in terms of eight levels rather than NOC's four through disaggregation of the top level. The number of occupations is also expanded to 924 by addition of a fifth digit. There is no statistical data for this level, but HRDC has developed the other aspects.

24. A second product, Job Futures (www.jobfutures.ca), draws on data from the census, LFS and other sources to provide a description of the current situation for each occupation as well as expected developments over the next 5-7 years. This application uses a mix of three-digit and four-digit occupations because of the lack of statistical data on which to provide detail on some disaggregated groups. It thus covers 226 individual occupations. The Canadian Occupation Projection System (COPS) which provides the information for Job Futures

consists of a set of inter-related macroeconomic models. The model and text are informed by both quantitative and qualitative analysis. Because of the nature of the source data, Job Futures is able to provide socio-economic information on each occupation. It is, however, weaker on the demand side because of the absence of a comprehensive establishment survey. When last reviewed, the projections were found to produce estimates within an average 6-7% of the real outcome at the end of the projection period.

25. HRDC has developed two primary products for job matching. The Job Bank (www.jobbank.gc.ca) is the largest government website in terms of usage. In 2002, the site hosted 66 million user sessions, and advertised 350,000 vacancies, with between 25,000 and 35,000 current at any one time. For the past year, employers have been able to do their own postings, and 60% of the jobs are now self-posted. The application guides the employer to choose one of about 25,000 approved titles which are then linked to the relevant NOC. After choosing the title, the employer is guided through 8-12 checklist categories which differ according to the job and which are informed by skills checklists developed to reflect employer hiring demands and worker skills and experience. Users can also add beyond the given checklist.

26. The Job Bank is available to users through the 320 offices which the federal HRDC has around the country. HRDC estimates that there are also around 2,500 partner offices which offer the service. Each of the provinces also has its own Job Bank, developed by the provincial government.

27. Informants report that employers are generally satisfied with the Job Bank service and the checklists. There are, however, some complaints about job titles. Some relate to language, in that the French translation is said to deviate in some cases from 'street language' used in the economy. Other complaints relate to cases where employers want to glamourise titles of low-level jobs, for example by referring to incumbents of non-managerial occupations as 'managers'.

28. The second job matching application is the electronic labour exchange (http://www.ele-spe.org/). This system has received less attention from HRDC in recent times, and will probably be incorporated in time into the Job Bank. Whereas the Job Bank focuses on employer postings, the exchange allows for postings by jobseekers.

29. Both job matching applications use the four-digit code, and display it prominently in the application. This approach reflects HRDC's interest in promoting public awareness and the ability of users to help themselves. HRDC feels that a four-digit code is adequate and optimal as further breakdowns within occupations are provided through job titles and the additional information in the checklists.

30. Over recent years HRDC has engaged in research into 'essential skills' – the nine fundamental competencies which apply to all occupations and form the basis for specific skills acquisition. The agency has developed definitions and rating scales for the essential skills and has undertaken field analysis of occupations in levels C and D. (The Essential Skills data base can be found at

http://www.15.hrdc-drhc.gc.ca/). Occupations at levels A and B will be analysed over the next several years. The users of essential skills information include provincial education authorities, literacy development groups and industrial trainers.

31. Other uses of the NOC include immigration and equal opportunity. The HRDC branch responsible for the latter has created its own aggregation of unit groups into 14 categories rather than using the standard groupings of the NOC. The developers of the NOC matrix regard this ability to create different aggregations as one of the strengths of the classification.

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## 4.    Croatia

### 4.1    Development of the national classification

1. Croatia has a seven-digit national classification which is closely based on ISCO-88. Development of the national classification spanned several years and was completed in 1999. The exercise was undertaken as a joint initiative of the Croatian Employment Service and the government statistical agency. Unlike some other countries in the region, Croatia was not part of the PHARE initiative. Instead, it worked closely with the ILO.

2. Prior to 1999, the Croation Employment Service had its own internal classification which it used for job matching and reporting purposes. This classification had a strong link to the schooling and vocational training system. It did not consider experience. The statistical agency did not use this classification. Instead, it used the international standard classification of occupations.

3. The statistics agency and Croatian Employment Service are jointly responsible for updating of the new national classification. The central office of the Employment Service has a help desk to which counsellors refer all their queries. These queries are investigated and, if they are not catered for through existing codes, stored in a special file for later updating of the classification. In 2003, the statistics agency and Employment Service plan to start sectoral meeting, for example in the IT industry, to discuss possible sector-specific updating of the classification.

## 4.2    Utilisation of the classification

4.    As in many other countries, the main users of the classification are employment services and the statistical agency.

5.    The Croatian Employment Service was founded in 1907, and continued to operate throughout the socialist period. Throughout this period it offered job matching and vocational guidance services analogous to those offered in Western Europe. The Service was severely disrupted by the war of the 1990s and the subsequent transition period. It is currently being reorganised. One of the most far-reaching changes was introduced by a law of April 2002 which ended the Service's monopoly by allowing for competition from private employment services. The law also ended the obligation on enterprises to declare vacancies to the Employment Service even if they did not utilise its services.

6.    The Employment Service consists of a three-tier network. At the apex is the central office in Zagreb, complemented by regional offices in the 21 counties, and local offices in the smaller towns, giving a total of 114 loci. At present, the bulk of the job matching services focus on middle level skills such as administration, and lower level skills such as construction, shipbuilding, metal, and services. The Service provides some assistance to people with higher level skills, but expects this area of work to diminish as private employment services develop. On the other hand, the agency expects to provide job matching services for an increasing range of atypical work situations as these have now been regularised in law.

7.    In addition to job matching within and between regions of Croatia, the Employment Service also provides job matching between employers from outside the country and local jobseekers. In particular, it works through the German government to provide workers for agriculture and catering, and to place students. The cross-border placements do not usually require complicated occupational coding as they cover a very restricted number of industries and occupations, and often involve the same people who return to Germany each year for the agricultural or holiday season. For student placements, the agency looks for people who have studied German.

8.    Like other countries, the Croatian Employment Service has a computer-based job matching system. The system allows for multiple methods of searching, including by occupation, sector, location, or level of qualification. Users seldom search on occupation and, when they do, are often confused by the level of detail which it produces. In future, the Employment Service plans to hide the occupational aspect from users. Instead, it hopes to develop search engines similar to those used in the private sector which utilise a more intuitive mix of concepts.

9. The agency is also reorganising the way its counsellors are organised. Previously, counsellors were responsible for particular occupations. Under the new system, the agency is increasingly oriented to providing services for employers, and counsellors are therefore responsible for particular sectors and the occupations which are dominant in that sector. Counsellors work in teams, with one person primarily responsible for selecting potential jobseekers, while the other liaises with – and even visits – employers.

10. The Employment Service nevertheless recognises the importance of an occupational classification. In particular, unlike the private services, the Employment Service is responsible for producing statistics and other information on employment and unemployment for the country as a whole. It has statistics from 1952 onwards.

11. The statistical agency is already publishing statistics from investigations such as the labour force survey, census and household budget survey according to the national classification. The employment services will start to do so from January 2003. The Employment Service delay in publishing statistics according to the national classification occurred because of the need to educate staff and to adapt the forms used to register jobseekers. In particular, the forms had to be changed to record experience alongside education and training.

12. The statistics produced by the Employment Service will not be totally accurate in the first years as jobseekers who registered previously will be recorded on the basis only of education and qualifications. The Employment Service will therefore continue to use both classifications throughout 2003. Over time, it plans to re-interview all registered jobseekers so as to capture experience as well as education and qualifications. In doing so, it will first focus on key sectors such as construction and shipbuilding. These are sectors where there is a lot of shadow economy activity, and where formal sector employers struggle to find suitable workers.

13. As noted above, employers are no longer required to report all vacancies to the Croatian Employment Service. Instead, they need only report vacancies in respect of which they would like the Service to assist with job matching.

14. In the past, most Croatian enterprises knew the old national classification well and were able to code the vacancies themselves. The introduction of a new classification and the proliferation of smaller enterprises within the economy have created a situation where employers are far less able to do the coding themselves. Further, the Employment Service finds that employers are now looking for employers with particular skills, including a range of personal skills, rather than simply occupation and/or experience. The agency has attempted to accommodate this by creating internal classifications for 'special skills' (such as computer skills) and 'personal skills' (such as language, or ability to communicate).

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# 5. France

## 5.1 Development of national classifications

1. France has three official occupation-related classifications. The *nomenclature des professions et catégories socioprofessionelles* (PCS) is used by the statistical agency, the National Institute for Statistics and Economic Studies (INSEE). Employment services, in the form of the *Agence Nationale pour l'Emploi (ANPE)*, use the *Répertoire Opérationnel des Métiers (ROME)*. The Ministry of Labour has developed a third classification of occupational families which brings together the PCS and ROME.

## 5.2 Nomenclature des professions et catégories socioprofessionnelles (PCS)

2. Scott (1985) describes the PCS as a 'socio-occupational' classification. Thus while ISCO is seen as classifying occupations, PCS is seen as describing and classifying both occupations and the people who hold them.

3. The choice of criteria used in the PCS was based on empirical observation of French society. The objective was to arrive at a classification which corresponded with the conception of occupations and associated social attributes in the French social consciousness. While ISCO is based on two criteria – skill level and skill specialisation – the developers of PCS recognised that social groups are defined by a range of attributes, and that the relevant attributes differ between different groups. In more than half of the categories, the classification was influenced by grading systems used in the civil service or contained in collective and other agreements. But the developers recognised that very often these systems were themselves influenced as much by the social position of the holder of the occupation as by the job content.

4. Each of the following items of information is needed to classify occupations under PCS, although not every item of information is needed for any one category:
   - Actual occupation, trade and job;
   - Status in employment;
   - Economic activity of the firm or enterprise;
   - Number of employees in the enterprise (for 'independants', which are inclusive of, but not the same as, the self-employed);
   - Whether the employer is government (including local government) or a private firm;
   - Classification according to collective agreement (for wage and salary earners);
   - Grade (for civil service);
   - Function (for some cadres);
   - Size and type of production (for farmers).

5. Using these characteristics in different combinations, the PCS provides for a total of 455 occupational groups. INSEE's alphabetic index has between 7,000 and 8,000 job titles. The tabulation of these titles in the index lists the job titles vertically, and provides a range of possible classifications for each title. The choice of correct code depends, firstly, on whether the person receives a wage or salary or not. Wage and salary earners are then further subdivided into unskilled workers, skilled workers, blue collar workers, etc, while those who do not receive a wage or salary are classified according to the number of employees.

6. The PCS full code consists of four digits. The first digit divides the classification into eight categories, six of which cover the economically active. The categories for the economically active at this topmost level are as follows:
   - Farmers;
   - Craftspersons, tradespersons and general managers;
   - Senior civil servants, senior managerial staff and higher intellectual professions;
   - Middle-level professions;
   - Clerical and service staff; and
   - Manual workers.

7. The second digit allows the classification to be split into economically active). The third and fourth digits divide the classification further into between 450 and 500 unit groups. The following extracts for major categories 3 and 6 illustrate how the system works at the two-digit level. The table shows, for example, how category 32 is sub-divided into sub-categories 34 and 35, and category 61 into sub-categories 62, 63, 64 and 65. This approach to numbering obviously prevents simple tabulations up to a particular digit.

| Major level | Next level | Detailed level |
|---|---|---|
| 3 Senior civil servants, senior managerial staff and higher intellectual professions | 31 Liberal professions | 31 Liberal professions |
| | 32 Senior civil servants, higher intellectuals and artistic professions | 33 Senior civil servants |
| | | 34 Professors and scientific occupations |
| | | 35 Information workers and artistic and performing artists |
| | 36 Senior administrative, managerial and technical staff in industry and commerce | 37 Senior administrative and managerial staff in industry and commerce |
| | | 38 Engineers and senior technical staff in industry and commerce |
| 6 Manual workers | 61 Skilled workers | 62 Skilled industrial workers |
| | | 63 Skilled craft workers |
| | | 64 Drivers |
| | | 65 Skilled transport and warehouse equipment workers |
| | 66 Unskilled workers | 67 Unskilled industrial workers |
| | | 68 Unskilled craft workers |
| | 69 Agricultural workers | 69 Agricultural workers |

8. The extracts also illustrate how the PCS combines a range of different dimensions. For example, the division within category 32 is based partly on whether the occupation is within the public sector or outside. The separation of 69 (agricultural workers) from other workers within category 6 is based on industry.

9. INSEE is currently revising the PCS, which was last revised in 1982. The new revision will be used from 2003. The main motivation for revision was that there had been significant changes in occupations since the early 1980s. When revision was first discussed, those responsible also felt that they might need to align the classification more closely with ISCO given the requirement to produce standardised statistics for Eurostat. When it became clear that a revised ISCO would not be available before 2008, INSEE proceeded with a less radical revision of its own classification.

10. The PCS revision will not involve any changes within the first two digits. Those responsible recognise that this is a weakness, as some occupations have changed their social classification within the hierarchy. The example was given that some manual workers now earn more than clerical workers. Further, as in some other countries, higher qualifications are now required of primary school teachers and this is seen as changing their social status. However, INSEE decided that continuity was more important than reflecting such changes. Further, an audit approximately five years ago established that most users were satisfied with the overall shape of the classification.

11. At the detailed level, the revision is facing the common challenge as to how to deal with the constantly changing world of computer-related jobs. In terms of statistical balance, the developers have attempted to disaggregate large groupings such as secretaries, but have found it difficult to come up with a workable disaggregation. The developers are also trying to accommodate changes in relative status between different occupations since the time PCS was first developed

12. To assist with particularly difficult areas, INSEE established working groups which included people with expertise from outside the Institute. One difficulty with this approach was that the outsiders sometimes asked for a degree of differentiation which INSEE felt was not possible to implement because of insufficient information obtained in responses to questionnaires. Another difficulty was that some groups were opposed to their area of work being disaggregated between different levels of the classification.

## 5.3   *Répertoire opérationnel des métiers et emplois (ROME)*

13. ROME was developed by ANPE in 1993, with a revision in 1996. The system classifies jobs according to skills and knowledge in addition to job titles. Like ISCO, ROME is trans-sectoral in that occupational codes are not linked to particular industrial sectors. The system is hierarchical. The five-digit code divides the classification into three levels, with a fourth level providing further for further specialisation. The levels are as follows:
   - 22 occupational categories (CP), denoted by the first two digits. This level refers to status and job milieu. Of the 22 categories, 11 are defined as tertiary and 11 as technical/industrial;
   - 61 occupational domains (DOM), denoted by the third digit. This level refers to the field of knowledge and know-how, for example function, type of work organisation or technology, sector of activity;
   - 466 jobs or careers (E/M), denoted by the fourth and fifth digits. This is intended to represent an aggregation which facilitates mobility rather than restricting people to a narrow path. Similarity is determined on the basis of content of the activity, technical competencies, and similarity of required profile;
   - Specialities attached to each E/M, denoted by complementary codes. These are intended to differentiate between the diversity of work situation, for example by type of organisation of the enterprise, experience, and other attributes.

14. In addition to the associated job titles, the listing of each E/M includes a definition, the general conditions in which the occupation is exercised, training and experience, required and associated competencies, capacities, the location where the activity is usually exercised, and conditions of work. ROME refers to competencies rather than qualifications in acknowledgement of the fact that formal qualifications are not always necessary in order to be able to perform a task. Associated competencies are described as those which are not indispensable for the work, but which are acquired in the process of working. Capacities are the required cognitive, social and physical skills and attributes. These are seen as assuming increasing importance in the workplace.

### 5.4 Occupational families

15. The Ministry of Labour's classification of occupational families attempts to match ROME and PCS on the basis of knowledge obtained through education and training and used in work. The documentation acknowledges the difficulty of doing so, given the very different logic and objectives of the two systems. In particular, it notes that ROME places less emphasis on qualifications and status, so that a single ROME code must be mapped to several different PCS codes. In other respects, ROME is more detailed than PCS, so that a single PCS code must be mapped to several ROME codes. The difficulties encountered are illustrated by the fact that some of the families in the occupational family classification do not contain any codes for one of the constituent classifications.

16. The occupational family classification has two levels of aggregation – 224 and 84. A letter represents the occupational domain, for example A denotes agriculture, and B is building and public works. Domain is distinct from industry, because it is related to the individual rather than the place where they work. The domain letter is followed by a digit which determines order. Finally, there is a digit denoting qualification, with the following categories:
0 = independent;
2 = non-qualified worker;
4 = qualified worker;
6 = qualified or non-qualified employee;
7 = foreman/forewoman;
8 = technical or professional;
9 = engineer or cadre.

The document provides the number of people found in each family in the census of 1990.

### 5.5 Compatibility with ISCO-88

17. INSEE produces statistics according to ISCO-88(COM) for Eurostat. The statistics are derived using a table of correspondences between the PCS and ISCO-88(COM) at the three-digit level. There is widespread acknowledgement that the table has weaknesses, but no-one currently at INSEE is reportedly aware of the exact nature of the problems beyond the fact that the two classifications are based on significantly different principles. In 2003, INSEE plans to begin work on a new table of correspondence with ISCO.

## 5.6 Utilisation of the national classifications

18. INSEE has developed two slightly different versions of the PCS. The first is used for household surveys. The second, named PCS-ESE, is used for enterprise surveys. The second version is more detailed than the first in respect of some occupations because INSEE feels that enterprises can discriminate more precisely between jobs than household respondents can. However, PCS-ESE does not include jobs of self-employed people as they are not covered by the enterprise surveys.

19. The first version of the PCS is used for coding of the census and the labour force survey (LFS). France had its last traditional census in 1999. It will in future each year be conducting rotating 'censi' in different parts of the country which, in a period of five years, will cover the full population. The main motivation for this approach, rather than less frequent full censi, is that it involves less fluctuation in employment of census staff.

20. The approach to the LFS is also changing. 2002 was the last year of an annual LFS. From 2003, France will shift to a quarterly survey which will cover the same total number of households, but with fewer in each tranche.

21. The LFS is coded to four digits. Interviewers are responsible for coding, with the assistance of a computer-assisted system. For the census, coding occurs at INSEE headquarters, with an automatic coding system which reportedly is able to code 90% of occupations.

22. Overall, INSEE uses two digits more often than four digits. Beyond INSEE, other users such as private companies and researchers also tend to restrict their analysis to two digits, or even one.

23. PCS-ESE is used for coding of administrative information that employers are required to provide to government for social security and tax purposes. The information in the 'declaration administrative des donnees sociales' (DAD) is submitted to social security, which passes it on to INSEE to analysis. Employers with more than 20 employees are required to code the occupations themselves at the four-digit level. INSEE provides them with a booklet to assist with this task. Alternatively, they can consult a table on the internet. For smaller establishments, the coding is done by INSEE. For smaller establishments, coding is only to the two-digit level.

24. Up until 1998, employers with more than 20 employees were also required to complete the questionnaire '*structure des emplois*'. The objective of the enquiry was to establish the nature of the jobs in a workplace so as to ensure that enterprises were employing sufficient numbers of people with disabilities. Since 1999, this questionnaire has been replaced by the obligation to indicate PCS codes in the DADS submission.

25. PCE-ESE is also used for the '*déclaration des mouvements de main d'oeuvre*' (DMMO). This administrative questionnaire is required to be completed on a monthly basis by enterprises with more than 50 employees, and is used to calculate monthly levels of employment in the country.

26. None of the occupational classifications are currently used for immigration purposes, or for birth and death registration.

27. As noted, ROME was specifically designed for employment services, and is used by the many ANPE offices around the country for job placement purposes. As elsewhere, the service is provided through a computer-based system. The system reportedly works relatively well for lower skilled job, but is less used by those who have higher skills and qualifications.

28. While ANPE's main task involves working directly with (potential) workers and enterprises, the employment services incorporate observatories which produce statistics. Concern over the lack of comparability between the statistics produced by these observatories and INSEE's statistics was one of the primary motivations for the development of the classification of occupational families.

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# 6.    Germany

## 6.1    Development of the national classification

1.    The official German classification of occupations, the *Klassifizierung der Berufe* (KdB), is significantly different from ISCO-88. The most recent version of the KdB is dated 1992. It was developed and is used by the German Federal Statistics Office. However, the division responsible for the revision was subsequently relocated geographically and the people responsible are no longer employed there. There are currently no procedures for updating of the KdB beyond the addition of new job titles.

2.    The previous version of the KdB is still widely used for labour market analysis, including by the *Institut fur Arbeitsmarkt und Berufsforschung* (IAB), which is part of the Federal Employment Services (*Bundesanstalt fur Arbeit*). The IAB argues that the resources involved in switching to the revised classification would not be well spent as it does not differ significantly from the previous one. The previous version, although dated 1988, is in fact a reprint of the 1970 classification with the addition of some new job titles. The 1992 version is also based on the 1970 classification, with further new job titles and detailed structure at the three- and four-digit levels.

3.    The top level of the system was originally, and remains, based on a production concept. The five divisions are agriculture, mining, production, technical occupations, service and other. While these divisions are similar to broad industry classifications, occupation is coded according to the nature of a particular job rather than where it is performed. So, for example, a nurse in the mining industry would be classified under services. The KdB does not reflect skill. It also does not distinguish between civil servants and other workers in terms of occupation.

4.    The 1992 version does not differ from the previous version at the top level. The differences are concentrated at the level of job titles where, for example, there is more detail in terms of computer professionals, and where architects and civil engineers have been placed in different groups. The publication on the new version also lists, for each occupation, similar occupations which should be grouped elsewhere. This information was not included in the documentation for the previous version.

5.    The KdB is based on job title. Already in 1966, Germany had a publication which provided descriptions of different jobs and described their links to the qualification system. The 1970 classification and later ones do not include descriptions. Nevertheless, the strong link with qualifications remains.

6.  The IAB acknowledges that the system in Germany is different in this respect to that in many other countries and that the German system might thus not be appropriate for other countries. The Institute explains that at the time of unification, almost all workers in Eastern Germany had formal qualifications for the work they did, while in Western Germany about 10% had no formal qualifications, but had learnt on the job. Nevertheless, most workers knew what their occupation was in terms of an industry-based collective agreement system which had been in operation for a century. More than half of all employees were covered either directly or indirectly by these agreements. Many who were not formally covered nevertheless used the system. As a result, job titles are relatively standardised, and appear on the certificates that people receive when qualifying through the well-developed dual system of training.

## 6.2      Compatibility and comparison with ISCO-88

7,  The documentation for the 1998 version of the KdB includes a cross-classification for the 1975 (and thus 1998) and 1961 KdBs and ISCO-68, but does so only up to three digits. There is no official cross-classification between KdB 88 and ISCO-88. IAB has, however, developed a cross-classification which allows it to include ISCO codes in its central file on occupations. This cross-classification works in only one direction, coding the 1,920 KdB occupational categories to the 361 of ISCO-88(COM). The Federal Statistics Office has its own separate cross-classification from the 4-digit KdB code to ISCO-88(COM) which it uses to code the micro-census data for Eurostat as Germany's input to the European Employment Survey.

8.  The IAB does not itself use ISCO, although it is aware that some non-government researchers use ISCO in preference to the KdB. The Institute feels that ISCO mixes different dimensions. It would prefer that there be separate, independent classifications for different dimensions such as qualification level and field, tasks, hierarchy, and private/public, each with a maximum of about 20 different elements. The IAB acknowledges that, while this approach might be conceptually clear, its does have difficulties. One problem is providing continuity with previous statistics. A second concern is how to obtain the necessary data on all the dimensions. A third consideration is the political pressure to move closer to ISCO.

9.  The IAB also acknowledges that the KdB does not solve the issue of dimension. However, because it focuses on task rather than level, they feel that the KdB is less confusing than ISCO even though a person can still change from one class to another if they proceed beyond a certain 'level'.

10. Another weakness of the KdB is that it is better suited to an industrial-based economy than one that is dominated by either services or agriculture. This is of concern both to the more developed countries, which are becoming increasingly dominated by services, and for developing countries, where agriculture is still dominant.

## 6.3    Utilisation of the classification

11.    The IAB analyses occupational information from two main sources – social security records and the micro-census. In both cases, the IAB is responsible for analysis, but is not responsible for the collection of the data. The Institute also conducts a number of separate surveys of its own. Its regular establishment survey does not generally include information on occupations. However, it can, and does, combine its establishment panel data with the social security information. It has also conducted a 10% sample of employers in which it obtained more detailed occupational information.

12.    The social security records are sourced from the social security submissions of employers. Employers are required to provide this information once a year and when there are any changes in employment. The system excludes those earning below 325 euros per month, the self-employed, and civil servants. The latter exclusion is not as serious as first appears in that a significant proportion of public sector workers are not classified as civil servants and are thus covered by social security. The system covers about four-fifths of all employees.

13.    Employers are required to code occupations for the social security submissions themselves. Coding is done in three-digit format and the submissions form the basis for the employment statistics of the Federal Employment Services. The booklet which is given to employers to assist with their social security submissions lists the occupations only in alphabetical order together with their three-digit codes. It includes a blank page on which employers can list their most frequently used occupations. The IAB notes that while this might save time for employers, it probably encourages employers to restrict the number of codes they use. Comparison of coding by employers with data from the micro-census suggests that employers tend to code employees to a higher level than that described by the employees themselves. This experience matches that of some Eastern European countries in using ISCO-88(COM).

14.    The micro-census replaced the full population census, which was last held in 1987. The micro-census has been conducted annually since 1993, and covers 1% of all households. It includes a range of labour-related questions and thus obviates the need for a separate labour force survey. Information is obtained through interviewers employed by the Federal Office of Statistics. Interviewers write down the job title and it is coded in headquarters.

15.    The IAB finds that 70% of job titles in its own surveys can be coded automatically by the computer, a further 25% are coded automatically after small corrections of the spelling of the job title, and only 5% need serious human intervention. The Federal Statistics Office uses a different coding system and the IAB is not aware what percentage they manage to code automatically.

16. The IAB uses three-digit codes when analysing employment statistics, while the full 4-digit KdB code is available for unemployment statistics. The experience of the IAB is that coding beyond three digits is difficult because the necessary information is often not available to the people responsible for coding. The Institute has the sense that the difficulty is increasing, whether because of changing work processes which result in less defined jobs, or because people are less willing to provide the necessary detail.

17. For job placement, the labour offices have a computer-based matching system which has the KdB as its core, but supplemented by other information. The system was developed by the Federal Employment Services and is accessible on the internet as the *Berufenet* system (http://berufenet.arbeitsamt.de). The system does not have a clear conceptual basis. Instead, it was described as 'experience-based' in that it was constructed on the basis of advertisements and experiences in the labour offices.

18. In using the system, the person who is doing placement in the labour office does a two-sided translation – from jobseeker and employer – on the basis of their own knowledge and experience. Unfortunately, because each of the officers is responsible for 700-900 unemployed people as well as other administrative work, they are unable to maintain close contact with firms and sectors. As a result, they do not always have a good knowledge on which to base their 'translations'. A proposal to restructure the work so that each officer is responsible for a particular sector rather than jobseekers in a particular range of the alphabet has been delayed by more major reforms of the employment services system.

19. The databank which underlies the *Berufenet* contains 100,000 job titles. The system works relatively well in terms of established occupations, but works less well for dynamic and new parts of the labour market. Labour market specialists add new titles on an ongoing basis by locating the code that matches the activity most closely. This approach does not work very well where there is significant change in job content.

20. The *Berufenet* provides the 4-digit KdB code and a full description of the occupation, as well as the necessary qualifications and the courses and education and training institutions through which they can be obtained. It also provides labour market statistics for the specified occupation. These statistics are derived from the social security data. The system allows searches by theme as well as job title. The specified themes are:
    ▪ Economy and administration (includes office-related; foreign languages; selling, counselling and waiting; and public service);
    ▪ Production (includes electrical; construction; wood; metal; textile, leather garments; chemical, glass, ceramics, plastics and paint);
    ▪ Transport and traffic (includes car-related; flying-related; shipping; tourism; and leisure);
    ▪ People and environment) (includes fashion and beauty; health; helping others; food and drink; plants and animals; biology, chemistry, physics; and care of the environment);

- Media and design (includes creative occupations; music; print, publishing, advertising; computer-related; film, broadcast, TV, theatre).
  Most of the information is maintained by the labour market information section of the administration, by a section called labour market information section of the Federal Employment Services.

21. The IAB is not aware of any use of the occupational classification for immigration purposes.

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# 7.    The Netherlands

## 7.1    Development of the national classification

1. The Netherlands has a single official classification which is used for both general statistical purposes and for job matching. The classification, the Netherlands Standard Classification of Occupations (NSCO) was completed in 1992. The previous classification, of 1984, was based on ISCO-68. The development of NSCO-92 more or less coincided with that of ISCO-88, and, like ISCO-88, it is based on skill level and skill specialisation. There are, however, enough differences between the two to render them different classifications rather than different versions of the same classification.

2. The *Centraal Bureau voor de Statistiek* (CBS) is the custodian of the national classification. Within the CBS, the division which acts as custodian does so in respect of both the occupational and educational classifications. The occupational classification itself has a strong link with the Netherlands Standard Classification of Education (NSCE) in that both the 'level' and 'specialisation' criteria are operationalised largely on the basis of the most adequate training programme together with the duration of job experience required. The categories of the NSCE were, however, aggregated differently from the usual grouping so as to be useful for labour market research.

3. Further, in several cases the developers decided that the most adequate training programme was not sufficient to indicate required skills, and the nature of the job was thus used to divide occupations into major and minor specialisation categories. For example, managers and public administration employees are divided according to the field of knowledge, while occupations requiring primary education and more than six month on the job training are divided according to the field of experience that is needed to do the job properly. This approach was seen as providing a clearer indication of the substitutability of labour.

4. Beyond the skill specialisation level, the CBS developed a list of 128 task clusters which can be used to distinguish within unit groups. These clusters are based on skills not usually learned in school, at least some of which are based on personal characteristics. The clusters are seen as covering the 'task' aspect contained in the standard ISCO definition of the distinction between a job and an occupation.

5. The CBS consulted with all known users in developing the system. Development proceeded through four fairly distinct stages: (a) conceptual development and operationalisation of the level and specialisation criteria; (b) population of the categories with occupations based on data from 3,400 job descriptions drawn from the Netherlands Central Employment Board, evaluation of government jobs, sector-oriented publications, and collective agreements; (c) addition of 2,200 job descriptions for occupations not covered by existing descriptions; and (d) clustering of resulting occupations to avoid categories with less than 5,000 incumbents in the population. The final system provided occupational equivalents for approximately 30,000 job titles in 1992 and 33,000 in 2001.

6. The occupational code contains five digits. The first two digits determine the level, the third digit indicates the minor specialisation, and the last two digits are a sequence number differentiating the main tasks. This is different from ISCO-88 where level does not have a separate digit to distinguish it. Further, NSCO distinguishes five occupational levels rather than ISCO's four in that it divides ISCO's second level into two. This was done for two reasons. Firstly, the division distinguishes between what, in the Netherlands, are skilled and more or less unskilled workers. Secondly, more than half of all people employed in the Netherlands are in occupations in these two levels.

7. Overall, the NSCO has 13 major specialisations, 43 occupational classes, 121 occupation groups, and 1,211 occupations. The table below shows the code of the occupational class of occupations within each combination of major skill specialiation and skill level. As can be seen, some cells – for example high and academic general occupations – are empty as there are no occupations with this particular combination.

**Codes of the occupational classes in the NSCO'92: skill level and major skill specialisation**

| | | *Skill level* | | | | |
|---|---|---|---|---|---|---|
| | | Elementary | Low | Middle | High | Academic |
| | *Major skill specialisation* | | | | | |
| 01 | General | 11 | 21 | • | | |
| 02 | Teachers and staff in education | | 22 | 42 | 62 | 82 |
| 04 | Agricultural | | 24 | 44 | 64 | 84 |
| 05 | Mathematics and natural sciences | | 25 | 45 | 65 | 85 |
| 06 | Technical | | 26 | 46 | 66 | 86 |
| 08 | Transport, traffic and communications | | 28 | 48 | 68 | • |
| 09 | Medical and paramedical | | 29 | 49 | 69 | 89 |
| 11 | Economics, clerical and commercial | | 31 | 51 | 71 | 91 |
| 13 | Juridical, public administration, law enforcement and security | | 33 | 53 | 73 | 91 |
| 15 | Language and culture | | | 55 | 75 | • |
| 16 | Social behaviour and society | | | 56 | 76 | 96 |
| 17 | Home economics and service trades | | 37 | 57 | 77 | • |
| 18 | Management | | | • | 78 | 98 |

• = Combinations of skill level and major skill specialisation combined with others, as a consequence of insufficient cell numbers.

8.     The table reveals that, unlike in ISCO-88, military occupations are not separated out. However, management and agriculture are separate, similar to ISCO=88. The management specialisation is used only for those who are not also involved in professional tasks. Within the managerial group, occupations are divided into academic and higher level. Any management occupations below the higher level are assumed also to include non-managerial tasks and are classified according to the other tasks. The agricultural specialisation covers all except labourers (general) and management.

9.     Dutch employment services, in the form of the *Centrale Organisatie Werk en Inkomen* (CWI – Central Organisation for Work and Income) also use NSCO as the basis for job matching. However, CWI disaggregates the occupations beyond the four-digit level for matching as the NSCO would not distinguish, for example, between hairdressers and beauticians. The CWI thus uses 2,606 main occupations rather than the 1,211 in the standard NSCO.

10.    The system for updating NSCO is not well developed. CWI updates its system when it discovers new occupations and titles and sends these through to CBS, but the new information is not automatically and immediately added to the NSCO. The CBS also obtains job descriptions from the National Institute of Social Security, and from the fieldworkers it uses in its own surveys. The CBS plans to use all this information when it revises the classification. To date, however, there has not been time to revise beyond adding some 3,000 new job titles to existing numbers.

## 7.2 Compatibility with ISCO-88

11.  Informants felt that while ISCO-88 is based on similar criteria to NSCO-92, these criteria are not operationalised and applied as systematically in ISCO-88 as in the Dutch classification. For example, ISCO-88 does not distinguish secondary school teachers according to the field of knowledge. The informants acknowledge, however, that some of the weaknesses in terms of systematic application might be due to the significant differences between countries in terms of skills required for different occupations. They also acknowledge that the Netherlands system will not work for job matching across the border.

12.  Like other EU countries, the CBS is required to report to Eurostat in terms of ISCO-88(COM) categories. When NSCO 92 was developed, the CBS also wished to consider coding to the previous national classification so as to be able to maintain time series. To avoid a time- and labour-consuming triple-coding system, the CBS developed a computer-based system which automates much of the process.

13.  The system works by first standardising the job titles, main and managerial/executive tasks and description of the economic activity provided by respondents as far as possible, and then assigning each job title a provisional code unrelated to any of the occupational coding systems. The computer subsequently uses these provisional codes, often in combination with coded responses to questions about (level of) education, number of people supervised, position on the labour market and economic activity code, to arrive at the appropriate occupational code for different classifications.

## 7.3 Utilisation of the classification

14.  Within CBS, NSCO is used to code the monthly labour force survey (LFS) as well as the permanent survey on life circumstances. Both these surveys are conducted by interviewers armed with computers. The interviewers record job title and other details as reported by informants and coding is done in head office. At present, about 12% of occupations can be coded automatically by computer, but the remaining 88% require human input through computer-assisted coding. The CBS hopes to automate the system further by forcing more standardised answers in the field through presentation of a list of options to interviewers.

15. The CBS also annually collects information on vacancies from employers. Coding is done by the CBS. Because the process of automatic coding is still being developed, the agency cannot at this stage say how much they will be able to code automatically. One concern is that employers provide information only on the job title and education required. There is thus less information on which to base the occupation code than with the LFS.

16. More generally, the fact that fewer people in the Netherlands than in some other European countries know their unambiguous occupational title presents a problem for all usages of NSCO. People in the Netherlands know their job title, but not always the NSCO occupation to which it belongs. The CWI attributes the lower level of usage of unambiguous occupational titles to the fact that the Netherlands has a less hierarchical and more flexible occupational system and society than in some other countries. The disadvantage is that further information is needed for correct coding and to find good job matches.

17. Netherlands has not had a census since the 1970s as a result of protests around privacy. The country has a fairly extensive set of registers, including registers of unemployed and disabled person. However, these do not include occupation.

18. As noted, the CWI uses an expanded version of NSCO for job matching. For each of the 2,500 occupations in the expanded system, the CWI has gone further to establish the 10-20 related occupations which might be suitable for the job-seeker concerned. Ultimately, the CWI would like to have an automatic 'knowledge system' which uses standard variables and competencies to establish these relationships. At this stage, the knowledge system work is done manually by occupational analysts who compare occupations and allocate percentage matches of 90%, 75%, 50% for pairs of titles.

19. The CWI's computer search and match programme is used by its 130 offices which are spread around the country. It can also be accessed on-line by the public at www.werk.nl. Users of the CWI system do not see the NSCO as such. The agency is thinking of adding, in addition to the occupational title, additional information such as occupational class, formal training needed and job descriptions in a 'user-friendly' way.

20. The on-line system allows jobseekers to look for work, submit their curriculum vitae (cv), and find out about available jobs. It allows employers to search for a suitable applicant and place an advert. It allows training providers to add courses. The submission of cv's follows a standardised format, which requires that the user complete seven steps entitled personal, training, previous work, driving licence, personal wishes, what occupation, last questions. Subscribed employers and jobseekers automatically receive regular postings of potential applicants or job offers through email.

21. The system also contains an extensive system for vocational guidance. Additional elements include pages providing advice on workseeking, rights and duties, atypical work (for example, temporary work agencies, freelancers, entrepreneurs without employees) and opportunities for people with disabilities.

22. The CWI's job matching system was introduced in August 2002. The Organisation estimates that in a period of a single week each on-line vacancy is 'visited' an average of five times by potential applicants, while 7% of the potential applicants are scanned by employers. Subscribers receive an average of two vacancies or potential applicants a week through the electronic email service. All of these emailed vacancies and applicants meet a minimum matching score level.

23. One area in which job matching does not work well is in the ICT sector, where the system has occupations which are more broadly defined than those used in the industry. On the other hand, as in other countries, the CWI encounters the problem of inadequately specified occupations. It refers to occupations such as 'production labourer' and 'consultant' as 'container' occupations. It feels that one reason these are used is that the industry does not always recognise the need to specify the occupations in great detail.

24. The CWI on-line system contains approximately 15,000 job titles, as opposed to the 30,000 recorded by the CBS. One reason is that the CWI's supplier did not have the full list when developing the system. A further reason is that the CWI system omits many of the out-of-date job titles.

25. Outside of the CBS and CWI, current users include the *Uitvoeringsinstelling WerknemersVerzekeringen* (UWV – Social Insurance Benefits Agency), the *Expertisecentrum voor loopbaanvraagstukken (*LDC – Dutch Centre for Career Issues), temporary employment agencies, market researchers, and university researchers. In 2001 the CBS produced in 2001 a cd-rom containing a revised version of the NSCO-92. The cd-rom contains both a systematic and alphabetic listing, and a lookup system based on job title and all the classification criteria. It includes a printable text on the development of the classification. The index includes popular English titles such as copywriter, account manager, project manager, and consultant. The popularity of the classification can be seen in the fact that CBS sold 200 copies of the cd-rom in one year. The CBS has not produced a printed version of the updated NSCO-92, apart from a thin booklet with titles of provisional codes for coders.

26. There is no use of occupational code for death and birth registration, nor immigration and work permit. The Netherlands does not have an official national socio-economic classification.

**Reference**:

Statistics Netherlands: *The Development of the Standard Classification of Occupations 1992 and its Application in 2000*. Service Centre for the Classifications of Education and Occupation.

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# 8. South Africa

## 8.1 Development of the national classification

1. During the last years of the apartheid era, Central Statistical Service (CSS, now Statistics South Africa (Stats SA)) was using the developed South African Standard Classification of Occupations of 1986 (SASCO-86) for coding of occupation in the population census. This classification was developed by the Institute of Manpower Research of the parastatal Human Sciences Research Council, in consultation with the National Manpower Commission, the National Training Board, the Department of Labour and CSS.

2. One of the primary considerations in developing SASCO-86 was to retain maximum comparability with the range of occupational classifications then in use in the country. The developers also attempted to provide for international comparability by drawing on ISCO-86. This objective was, however, sometimes abandoned on account of the 'unique circumstances' (CSS, 1986: preface) in the country as well as to achieve comparability with several existing local classifications.

3. In 1995/6, soon after the first democratic elections of 1994, Stats SA began work on developing a revised SASCO. One of the objectives of the revision was to bring the classification in line with international practice.

4. By late 2002, SASCO had not yet been officially published, although the substantive work was completed in 2001. The classification was in use even before completion. ISCO-88 or the nascent SASCO was used for coding the population census of 1996, and for household surveys from as early as 1994. This was possible because coding for the October household survey of 1994 was done to the three-digit level, while coding for later household surveys and the census was done to the four-digit level, where there were virtually no deviations from ISCO-88.

5.   At a later stage, Stats SA added a number of codes within major group 0 to cater for respondents whose occupation is unspecified or not classifiable elsewhere, and for those who are not economically active. These codes, in effect, record data problems or employment status rather than occupation. They do not therefore cause differences in the coding of occupation.

6.   When originally developed, the revised SASCO provided for a five-digit code. Further revision provided for a seven-digit code, where the sixth and seventh digits allow for more detailed disaggregation of the sub-unit groups. Regular household surveys such as the half-yearly labour force survey (LFS) are coded only to four digits. The census of 2001 is being coded to five digits, as is the establishment-based survey of employment by occupation, gender and race (SEOGR).

7.   The decision to develop the extra precision beyond five digits was a response to demands from the sector education and training authorities (SETAs). These bodies form part of the country's new and ambitious skills development programme. All employers are expected to belong to one of the 25 SETAs, and must report to them on a regular basis in respect of the skill composition of their workforce and their plans for skills development. Some of the standard reporting by both employers and SETAs is done to the major group level. However, many of the stakeholders find reports at this level to be relatively meaningless for the purposes of determining skills gaps and the necessary direction for training. They therefore asked for a classification which would allow greater specification. Stats SA undertook the task on the basis of data submitted by the Department of Labour. The detail of the disaggregation can be judged from the fact that in some cases, a particular five-digit grouping was found to need more than the 99 variations provided by the extra two digits.

8.   One of the reasons for the delay in publication of SASCO was that Stats SA was waiting for the Department of Labour to complete the development of an electronic database which would allow automatic coding of the job titles used in each SETA. This task proved more difficult than originally envisaged. One of the difficulties was that job titles are far less standardised in South Africa than in most countries of Western Europe, even within a single sector. It is thus not possible to find a single code for some titles. The Department of Labour is currently considering abandoning the detailed system originally envisaged. Their decision is influenced by the difficulties to date, as well as by the realisation that maintenance of a detailed system would necessitate ongoing close interaction with enterprises.

9.   The second reason for the delay concerns coding of occupations within the public service. At the time the revised SASCO was being developed, the public service was transferring to a new grading system. Stats SA successfully matched all the new grades with SASCO codes. However, the Department of Public Service and Administration subsequently embarked on an elaboration of the grading system, and Stats SA was waiting for this to be completed.

10. From Stats SA side, the main challenge in developing SASCO on the basis of ISCO-88 was deciding how to deal with skill-occupation combinations that do not fit easily into the system. Teachers provide an example of the problem, in that after several years of intensive upgrading programmes, the country still has 50,000 teachers who have no formal education or training. Many have not even completed secondary school.

11. Stats SA is concerned that users of seemingly comparable information from different countries will assume that similar occupations imply similar skill levels when this is, in fact, not the case. The SASCO publication contains an explicit adaptation of ISCO to the South African situation, where significant numbers of adults have no formal schooling, by noting that skill level 1 includes people without any formal primary education. However, most people reading comparative statistics will not know about this difference.

12. The draft SASCO publication's approach to skill is unnuanced, in that it states bluntly that 'skill is measured by means of formal education and experience.' However, the country's skills development programme is in line with the ISCO-88 approach in openly acknowledging that skills can be gained through experience rather than formal qualifications.

13. Stats SA is comfortable with how SASCO performs in respect of the informal sector. The sector is, in fact, a relatively new area for the agency as during apartheid minimal attention was paid to it, and a range of laws prevented black people from starting their own businesses – big or small - freely. The agency's surveys suggest that the informal sector has grown significantly over recent years. Part of this increase reflects methodological improvements which result in better capture of these activities. Part of the increase reflects real changes in the economy as a result of stagnating, or even falling, numbers of formal sector job opportunities.

14. While Stats SA is comfortable with how SASCO caters for the informal sector, some of the resulting patterns might be surprising for observers. One example is the significant proportion of people in the informal sector classified as managers. What this pattern reflects is the coding of large numbers of self-employed people as managers, in that they manage their own small businesses. Another example is the coding of subsistence farmers as skilled agricultural workers. This latter example contradicts Stats SA's own perception that occupation should be tightly linked to formal skills, in that most South African subsistence farmers will have little, if any, formal education. Further, many people are engaged in subsistence work because of the absence of any alternative. If they did find a formal sector job, it would probably be at the elementary level.

15. Stats SA has recently created a new code within major group 9 to cater for gardeners employed by private households. This was done to avoid the anomalous situation whereby (largely female) domestic workers were in major group 9 whereas the (largely male) gardeners were in major group 6.

16. SASCO is updated on an ongoing basis with input from the LFS and other household surveys. Until a recent move to a new building disrupted routines, a sub-committee of about eight people met on a monthly basis to decide where new occupations should be situated within the classification. The census of 2001 will provide a further source of information. Stats SA also sees the census serving as a monitor of the coverage of the classification.

17. The draft SASCO publication lists job titles in order of SASCO code. For each title it provides the new SASCO code to five digits, the processing code used in the discontinued Manpower surveys which monitored vacancies in establishments, the SASCO-68 code, and the ISCO-68 code. The titles are provided in English and Afrikaans. This is a hangover from the apartheid years, when these were the official languages of the country. South Africa currently has eleven official languages. The task team which oversaw the revision suggested that Afrikaans be dropped from the publication. However, Stats SA finds that many employers insist on responding in Afrikaans, even when questionnaires are supplied in English.

18. Stats SA also produces English and Afrikaans alphabetical indices. There is no publication with detailed descriptions of the different occupations.

19. Stats SA has not documented the changes it has made in adapting ISCO-88. It does, however, have a list of just under 40 occupations it has added, presumably to the occupations which existed in the previous South African classifications. Surprisingly, none of these occupations appear to be ones which are likely to be found in the informal sector.

## 8.2     Utilisation of the classification

20. Information on occupation is collected in many of Stats SA's surveys, as well as in the census. In household surveys, interviews are conducted face-to-face by trained fieldworkers. The questionnaire requires that respondents describe the 'kind of work' that they do by providing an occupation or job title. They are also asked to describe the main tasks or duties in the job. Interviews are conducted in the home language of the respondent, but responses are translated and recorded on the questionnaire in English by the fieldworker. Coders in Stats SA's head office are responsible for coding of occupation. They reportedly rely heavily on the description of main tasks and duties in the coding. Where they are unsure of the code, they refer to the educational level, income and industry variables.

21. Stats SA's own publications generally report on occupation only to the one-digit level. However, Stats SA makes unit record data from all household surveys available to interested users, who can then do their own analysis up to the four-digit level.

22. For the census, household respondents can choose whether they are interviewed face-to-face or whether they complete the questionnaire themselves. They can also choose which language they respond in. Respondents are asked to provide only the occupation, which is explained as the 'kind of work'.

23. The census of 2001 is the first in South Africa to have occupation coded through computer-assisted coding. The system works on an incremental basis. Operators will key in text describing the occupation from the scanned image. The first time any particular text occurs, the operator will be required to find and type in the appropriate code. All further occurrences of identical text will be coded automatically by the system. In this way, a database of all terms used (including mis-spellings, if these are typed in) will be built up.

24. Occupations are entered into the system in the language in which they appear on the questionnaires. To date, the majority have been found to have been written in either English or Afrikaans.

25. The quality of the system is not known at present as coding of occupations was halted after problems unrelated to coding were discovered in the scanning process. However, the brief period during which coding occurred revealed problems in instances where people gave insufficient detail. In these cases, Stats SA's coding experts advised that variables such as industry, income and educational level be used.

26. The computer-assisted coding system was developed by a contractor. It is not clear if the contract allows for Stats SA to use the database subsequently for coding of other surveys. Stats SA's coding experts do plan to use the database to investigate how the classification system can be improved.

27. Stats SA conducts a range of establishment surveys. Only one of these surveys, the SEOGR, asks for coding of occupation beyond the single-digit level. Stats SA hopes to publish the results of this survey for the first time in the near future, after several years of pilots. For the SEOGR, employers are required to provide detailed occupational information in respect of a sample of their employees. Coding is done by Stats SA, to the five-digit level. As with household surveys, coders sometimes need to use other variables to come up with the correct code.

28. The Department of Labour also has several questionnaires which require information on occupation. These include submissions by employers related to the skills development strategy, and annual submissions under the Employment Equity Act. In respect of the latter, employers are required to provide breakdowns of their workforce by occupation in terms of race, sex and disability. Two different forms of occupational classification are used. The first, termed 'occupational category', uses the SASCO major groups. The second, termed 'occupational level', provides for equivalence to the main job evaluation and grading systems used in the country. It provides for six levels – top management, senior management, professional and middle management, skilled technical and junior management, semi-skilled, and unskilled.

29. Slightly fewer employers are able to provide the required statistics in terms of occupational level than can provide statistics in terms of occupational category. Nevertheless, the Commission responsible for monitoring the implementation of the Employment Equity Act appears to be more interested in the level breakdown than in the breakdown by category. This bias reflects the Commission's current interest in promoting the representation of black and female employees at management levels. The focus of interest could change over time, as the Act itself stresses the need for equitable representation at all levels of the workforce.

30. The one-digit classification submitted by employers in the Stats SA and Department of Labour surveys yields fairly consistent patterns over the years. This suggests consistent coding, but does not necessarily imply that the coding is accurate. Erratic and unusual patterns in respect of the small skilled agriculture occupational grouping suggest that this category is not well understood by respondents.

31. Employment services are not currently using SASCO or any formal occupational classification system. The method of working of employment services in South Africa is, however, currently being reviewed. Within the Department of Labour there is some support for the use of SASCO within a new system.

32. The Unemployment Insurance Act was amended in 2001. Under the amended Act, employers are required to submit monthly returns which include details of individual employees. This is different from the past, where they were required to provide information only on the total number of employees covered, and the total wage bill. Employers are not required to submit information about occupation. Unemployed workers applying for benefits are required to provide information on occupation. The Unemployment Insurance Fund uses ISCO-88 to code the information supplied by applicants to the four-digit level.

33. Occupation used to be recorded on death certificates, but this information was not coded. Since the late 1990s, occupation is no longer recorded on death certificates.

**Reference**:

Central Statistical Service: The Standard Classification of Occupations Report No 09-90-01, (Pretoria) 1986.

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# 9. Sweden

## 9.1 Development of the national classification

1. In 1992, the National Labour Market Board (*Arbetsmarknadsstyrelsen*, or AMS) and Statistics Sweden (SCB) embarked on a review of the Nordic standard classification of occupations (NYK 83) in use at that time by both Statistics Sweden and employment agencies. The AMS and SCB were concerned that the NYK was out-of-date in terms of jobs reflected. Further, they wanted to investigate whether a shift to a skill-based concept, as used for ISCO-88, would be more appropriated than the sector-oriented approach of the NYK, which was based on ISCO-58
.
2. After preliminary investigations, the AMS-SCB team advised that ISCO-88(COM) be adopted as a model for the new classification. In arriving at this recommendation, the investigating team did not restrict itself to ISCO. In particular, they looked at the ROME system used in France and the Canadian occupational system. However, for reasons such as limited resources as well as the desire for international comparability, they decided to use ISCO-88 as the base for the Swedish national classification.

3. The first step, completed in November 1993, was to translate ISCO-88 into Swedish. The second step, completed in May 1995, was to classify the NYK job titles into the new system. The third step involved consultation and discussions of the new draft classification as well as internal review. The resulting SSYK classification, adjusted to fit the Swedish situation in response to comments and consultation, was published in May 1996. The final step, between August 1996 and May 1998, involved detailed work with the AMS to develop descriptions of the SSYK groups and the index of job/occupational titles.

4. The new classification was implemented for the Swedish labour force survey and salary statistics in January 1997 and in other SCB surveys in January 1998. It was published as a report on Statistical Coordination for the Official Statistics of Sweden in August 1998.

5. SSYK is a four-digit classification, like ISCO-88. AMSYK, the AMS version, extends SSYK by a further two digits, giving a total of 994 occupations at the 6-digit level. In adapting ISCO-88, Sweden tried to minimise changes at the three highest levels of the classification. Adjustments were thus concentrated at the fourth-digit level. One current concern is that Eurostat is now asking that the European labour force surveys report to the four-digit level.

6. SCB has developed a series of documents which show the differences in classification of particular occupations across the different systems. The table below, compiled from these documents, shows the number of the changes between ISCO-88 and ISCO-88(COM), and between ISCO-88(COM) and SSYK. The table shows that ISCO-88(COM) brought in a significant number of changes involving both different contents and code. It also excluded 31 groups. SSYK involves far fewer changes involving both different contents and code, but significantly more changes of other kinds.

| Nature of change | ISCO-88/ISCO-88(COM) | ISCO-88(COM)/SSYK |
|---|---|---|
| Different contents and code | 41 | 8 |
| Different contents/same code | 13 | 61 |
| New group | 7 | 71 |
| Same contents/different code | 1 | 52 |
| Excluded groups | 31 | 96 |

7. One set of adaptations in the development of SSYK involved aggregations where groups were too small. Another set involved addition of new groups where these were not adequately catered for. For example, Sweden has a large public sector and felt that ISCO-88(COM) catered primarily for the private sector, especially as regards managers. Further, Stats Sweden was concerned about apparent gender bias in ISCO. They tried, for example, to split up aggregated female-dominated occupations such as sales workers, clerical and secretarial, and to aggregate male-dominated ones which were unnecessarily disaggregated. They also felt there was insufficient specification of media jobs.

8. AMS was an important partner in the development of SSYK both because they are a key user of the classification and because they have a team of specialist analysts with detailed vocational information on the job, what it involves, the training, salary, tasks, trends and future. Stats Sweden also drew on its own experience of collecting and analysing data. In particular, it looked at classes that had grown over time, and instances where 'not elsewhere classified' categories were significant.

9. The main person responsible for the classification plays a key role in the updating process. The person concerned has a good knowledge of the classification because he was involved in the revision of SSYK and the development of AMSYK and since then has received and responded to most queries. The person maintains a database into which he inserts all new job titles he comes across in advertisements, through queries, or through other means. In particular, SCB regularly monitors the performance of the coding system for the LFS and responses by employers to various surveys. This monitoring reveals ways in which the job title dictionary can be improved, for example by allowing for common misspellings or adding titles which regularly go forward to the manual processing stage. Within AMS there is a group of four people who collect information on new jobs coming through employment services. However, their main focus is on the vocational and training system, rather than the more theoretical aspects of classification.

10. Sweden has a separate socio-economic classification which dates back to 1982 and is based on job title and status in employment. SCB is keen to revise it, but is waiting for work to be done within the European Union. Informants acknowledged the conceptual and ideological difficulties that would be encountered in reaching agreement on social class across countries, and across paradigms.

## 9.2    Utilisation of the classification

11. Sweden's labour force survey (LFS) is conducted on a monthly basis, and covers 20 000 persons. The questionnaires are entered and occupation is coded to the 4-digit level. Approximately 40% of occupations are coded automatically by a system based on exact matching to a dictionary containing approximately 7,400 entries. Computer-assisted coding is used to complete the remainder, with a specialised working group allocated to the task. SCB is hoping todevelop the automatic coding system further, but because only 3,000 to 4,000 records require manual intervention each month, there is not great pressure to do so.

12. SCB is also utilising SSYK in its relatively new occupational register. This register is part of the new register-based census system being developed as a result of the abandonment of the traditional housing and population census, which was last conducted in Sweden in 1990. Sweden already has a population register, an education register and an employment register based on tax information. However, none of these include occupation. The occupational register requires that each employer submit the personal ID number and occupation of each employee. SCB can then use the ID number to link the information with that from other registers. To date, information has been requested at the 3-digit level, but from 2004 it will be required to four digits.

13. One of the main sources for the new register is the official annual statistics on wages and salaries. Information is collected through different surveys for which employers are the respondents. SCB cooperates with employer associations from both the public and the private sector in this respect. Where employers are members of associations, the information is collected through the association so as to minimise employer burden. One disadvantage of this approach is that many associations are using their own classifications which are not always compatible with SSYK. A 1998 study 1998 found that some of the conversion keys appeared to be of inadequate quality, in that approximately 30% of the resulting codes were incorrect. SCB itself, for example, uses a classification for the state sector which, as a result of a poor conversion key, classifies statisticians as administrators. SCB is trying to convince the associations to move to SSYK or to change their classification in order to improve the mapping. One of the largest associations, SAF/SN, has now agreed to do so.

14. The method of working through associations provides full coverage of the public sector through the three employer associations which, respectively, cover the state sector, country councils, and local government. It does not, however, provide full coverage of the private sector. The wage/salary survey of the private sector covers only 11,000 of the more than 200,000 employers in the country. Because the sample is dominated by big enterprises, it covers a more than half of the private workforce. Enterprises which are not covered in the wage statistics are surveyed by means of a questionnaire. These employers are surveyed on a rolling schedule.

15. Employer respondents are asked to do the coding themselves but, where they do not, it is done by SCB. Employers are provided with a coding book arranged both alphabetically and by structure. To keep it manageable, SCB was forced to make a selection of job titles. There have been some criticisms of the selections, particularly from computer people. SCB feels that these criticism are overstated in that some of the apparently 'new' jobs are simply renaming of existing occupations. The coding system is also on the website, where it can be searched.

16. The occupation register project began in 1999. By 2002, all employers should have been covered as the design involves a three- to four-year cycle in which all employers should be covered. SCB hopes to publish the first results in the (northern hemisphere) Spring of 2003 and will then evaluate the method and quality. Because most employers do their own coding, SCB can only do a limited number of checks, for example against industry and qualification, when the occupational information is gathered. The evaluation will be carried out by comparing the coding of the LFS and the occupational register.

17. The strongest support for the occupational register comes from researchers, particularly on occupational health, where Sweden is known for its long tradition of good data. The occupational register is also seen as a source for socio-economic classifications, in which there is a keen interest. It is, however, doubtful if any socio-economic information can be derived from the register.

18. The AMS utilisation of AMSYK occurs through its 21 regional labour market boards and 200 employment offices. In 1996 AMS developed a centralised system for job matching, which is used in the decentralised offices for job matching. The Board also offers a self-service system, so that its offices could concentrate on the more complicated placements while the public helped itself wherever possible. The occupational code is not visible on the public system as it would have not meaning for most users.

19. As noted, AMSYK provides for 994 occupations. Each of these occupations covers, on average, about six alternative job titles, giving a total of 6,500 titles. The job matching system includes job profiles for the 994 occupations, including the skills and qualifications commonly needed for the job. It allows searches on the code, occupation name, and job titles. It also provides searches on words.

20. At present the AMS computer system is structured according to SSYK. SSYK will remain the basis of the search system, but the user interface could change to make it more intuitive for users. At present AMS is trying to map SSYK into 19 categories based on 'the way people think'. The categories are as follows:
   ▪ Administration, economy, law;
   ▪ Construction;
   ▪ Computing/IT;
   ▪ Sales, purchases, marketing;
   ▪ Handicrafts;
   ▪ Hotel, restaurants, canteen;
   ▪ Health care;
   ▪ Installation, maintenance;
   ▪ Culture, media, design;
   ▪ Environment, health and safety;
   ▪ Natural scientific work;
   ▪ Social work;
   ▪ Security work;
   ▪ Technical work; and
   ▪ Transport.

21. As discussed below, AMS's experience in developing their system resulted in their being commissioned to develop the EURES cv-search system. Their experience in developing EURES cv-search convinced those involved that classification to six digits is unnecessary, and possibly even counter-productive in restricting searches to options that are too narrow. They report that employees in the local employment offices also favour four-digit coding but tend to code six digits nevertheless, because this is what they are accustomed to do. In the future, Sweden will probably change to a 4-digit system for employment services.

22. SCB and AMS were not aware of the use of SSYK for immigration purposes, but said that they had received queries from staff working on immigration issues.

**Reference**:

Haldorson, L: 'Quality Assurance and Quality Declarations in Occupational Statistics'. Statistics Sweden. Presentation prepared for 7th TACO workshop, Orebro, Sweden. 10-11 June 2002 (2002).

Statistics Sweden. N.d. Timetable of the new Swedish Standard Classification of Occupations (SSYK).

## 10.    Switzerland

### 10.1    Development of the national classification

1.    Switzerland's national occupational classification is significantly different from ISCO-88 and ISCO-88(COM). There were serious discussions in Switzerland in 1990 as to whether the country should adopt a classification better aligned with ISCO-88 or retain as basis the national classification first developed in 1900 and subsequently updated every ten years. The final decision was that the country needed a classification which retained at its core a focus on work area, rather than skill or educational level. Proponents argued that this approach was entrenched in thinking about occupations as a result of the country's history of strong professional guilds which today still underlie the framework for apprenticeship training. The decision to retain this approach was affirmed in 2000 when the classification was updated.

2.    The 1990 classification had codes made up of five digits, reflecting four levels. The top level had three divisions – agriculture, industry, services – and a miscellaneous 'other'. While these resemble industries, each occupation was coded according to the work done by the person concerned, rather than the industry in which they worked. The second level consisted of 27 classes. Finally, there are 388 five-digit groups.

3.    For the 2000 revision, the Swiss Federal Statistical Office drew on the 1980 Swiss classification and the Austrian classification of 1970. The revision was overseen by a reference group with representation from the Ministry of Labour, vocational advisers, social partners, and staff from other sections of the Swiss Federal Statistical Office.

4.    The revision aggregates the 27 divisions of the second level in a different way so as to have ten divisions at the top level. This change was effected so as to be able to report in a more meaningful way as the three top divisions of the previous version were felt to be too few for those wanting to present summary statistics, while 27 was too many especially for surveys. The decision as to which groups to aggregate was informed by calculations based on data from the 1990 census.

5.    At lower levels the revised classification generally retains occupations in the same five-digit group as previously, so as to keep them in the same class. The only exceptions are in respect of some old occupations, which have been aggregated, and the addition of a new informatics group. Only seven new five-digit codes were added in the revision, including one related to computers (webmaster/mistress).

6.    To facilitate coding to both the previous and current versions of the national classification as well as to ISCO-88(COM), the Swiss Federal Statistical Office has developed a system whereby job titles are coded with an eight-digit running number rather than directly with an occupation code. The 8-digit coding is effected through a database of approximately 18,000 job titles, each of which contains the relevant title in three languages and the sex variants for each language. In addition to the running code and variants of the title, each entry also contains a number of technical codes about the title, and its equivalent codes in the 1990 and 2000 Swiss classifications and ISCO-88(COM). This database with running numbers was introduced 1996/7 and makes the use of different coding systems feasible and affordable.

7.    The job titles in the database are sourced from the censuses of 1970, 1980 and 1990, responses to the labour force survey (LFS), and entries in the register of foreigners. Some titles are also sourced from the employment services.

8.    The Swiss Federal Statistical Office acts as custodian of the classification and database. In this role, it receives all requests for additions and queries from users. Where an appropriate entry cannot be found, it adds the new titles to the database. The rate and nature of additions differs over time. In 2002, the Office has added about 1,000 titles, many emanating from the coding of the 2000 census. In other years, fewer additions are made, but there may be changes to technical notes or other aspects of existing titles.

9.    The Office has published a list of definitional descriptions for all occupations used in the 1990 census. The list has not been updated for the classification of 2000. Instead, users must rely on the job titles classified within a particular occupation to understand what it covers. Alois Macht's *Klassifizierung der Berufe - Systematisches und alphabetisches Verzeichnis der Berufsbenennungen-, Statistisches Bundesamt Wiesbaden* (Stuttgart, Metzler-Poeschel, 1992) in respect of occupations in Germany is a further important source of information. In employment services, advisers must rely on their knowledge of the labour market when utilising the classification for job matching.

## 10.2    Compatibility with ISCO-88

10.    The 8-digit coding system makes it relatively easy to generate tables according to ISCO-88(COM), whether this is done by the Swiss Federal Statistical Office for Eurostat, or by the Office or other users for other purposes.

11.    The main problem encountered with ISCO-88(COM) relates to inadequate information on job title received from informants. The problem is particularly acute in respect of the census as there is no direct contact between the respondent and the Office. With the LFS, the interviewer has the job titles available online, and each title includes a technical field which says whether more information is required for accurate coding.

12.    Some respondents provide titles such as 'employee', which are virtually impossible to code under any classification. Examples of common unspecific titles which provide particular problems with ISCO-88(COM) include 'foreman' and 'team leader'. It is difficult to determine where to code them when the person concerned does not appear to be at a high enough level to be in major group 1. A similar problem arises where the job title does not indicate whether the person is working with machines or not, and it is thus difficult to determine whether it is major group 7 or 8. For major group 1, the database provides more than one code for particular job titles and the technical fields provide guidance as to which code to choose. However, the Swiss Federal Statistical Office would like more guidance from the ILO on choices and defaults.

13.    Another problem identified with ISCO-88(COM) is that the classification does not provide adequately for vocational guidance purposes because far more attention was paid during development to the organisation of occupations in a hierarchical framework than to vocation training issues.

14.    A third problem with ISCO-88(COM) relates to changes in the necessary qualifications for a given profession. A specific example of this relates to primary school teachers. This occupation is currently coded as 3310 as in the past it required attendance at a special course which was not at the tertiary level. However, in the future primary school teachers will be required to have a tertiary degree.

## 10.3    Utilisation of the classification

15.    The Swiss Federal Statistical Office uses both ISCO-88(COM) and the national classification for presentation of statistics and analysis. In analysis of the LFS, it tends to use ISCO-88(COM) as it considers it superior in depicting the social structure. For other purposes, Swiss audiences often insist on the national classification because this is what they are used to. For many uses, the classification is used only to the first or second level.

16. The Swiss Federal Statistical Office's most important usage of occupational classifications occurs in respect of the decennial census and the annual LFS. The latter is conducted for one quarter each year, and focuses on only one respondent in each of the surveyed households. The questionnaire does, however, include basic information about all household members, including their occupation. The Swiss Federal Statistical Office insists that the target person answers the questions relating to their work so as to avoid inaccurate proxy responses. This is not required in respect of other household members, for whom the information on occupation will therefore be less reliable.

17. The LFS is administered telephonically, and the interviewer enters the information directly into the computer with computer-assisted coding. For the census, about a third of all occupations are coded automatically after optical reading. The remainder require some human intervention. About 10% present serious problems because of inadequate information.

18. The Swiss Federal Statistical Office also uses its occupations database for coding of its household budget survey, Swiss health survey, causes of mortality statistics, Swiss statistics on social assistance, and educational statistics. All these surveys are coded to the national classification. In addition, ISCO-88(COM) is used in analyzing all except the survey of educational statistics. ISCO-88(COM) cannot be used for this last survey because it focuses only on professional training.

19. Switzerland maintains a register of foreigners which includes information on occupation. Because foreigners are only required to update their information every five years, the register is of limited use. From 2003, the LFS will be expanded by an additional 15,000 foreigner households to address this weakness.

20. The Swiss Federal Statistical Office is not aware of any use of occupational codes for controlling immigration. However, the recent agreement with the European Union on free labour movement provides escape clauses if movement in or out of the country exceeds certain percentages. Enforcement of these clauses will require an improvement in labour market information, including on occupation.

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# 11. United Kingdom

## 11.1 Development of the national classification

1. The United Kingdom's occupational classification tends to be revised every ten years, for use in the decennial population census. Prior to 1990, the Office of Population Census and Surveys (OPCS) had an occupational classification which was used both for the census and surveys. However, because the statistical function within government was decentralised, some other departments of government had their own, different occupational classifications.

2. For job placement, the Employment Department Group was using its own directory of occupational titles (CODOT) for employment services. The classification provided for 3,500 categories organised in terms of administration, marketing and sales, and production. Because CODOT did not work well for statistical purposes, the Employment Department Group attempted to derive a key list of occupations (KOS) from CODOT which could be used for statistics. The team responsible for this task came up with a list of 400 such occupations.

3. The revision of the census classification for the 1991 census represented a significant break in that the government wanted to align the different classifications. Working with both the previous OPCS classification and KOS, the developers came up with a framework containing 371 occupational codes. The classification became known as SOC 90. The development occurred at around the same time that ISCO-88 was being developed, and the developers were involved in some of the discussions around the revision of ISCO. The thinking behind the two classifications was similar on many aspects, although SOC 90 was published earlier than ISCO-88.

4. The change to SOC 90 was reportedly 'traumatic' for many stakeholders. In particular, employment services felt that the new classification did not have sufficient detail to serve their needs. Some of the officials accepted the argument that coding at a less detailed level would encourage wider thinking about possible jobs for an individual jobseeker. However, many grassroots officials complained about the large number of vacancies they had to sort through with the broader classification. The problem was aggravated by the fact that the computer system at the Jobcentres did not allow searches on job title.

5. The next major revision of the national occupational classification took place in the latter years of the 1990s and results in SOC 2000. Those responsible see SOC2000 as being somewhere between a revision and an update of SOC 90. The developers were initially asked to update the classification without changing the conceptual basis. They were therefore asked to retain the major group structure, and introduce changes only in the content at lower levels. However, once they had started on the task, the developers came to the conclusion that the conceptual basis had not previously been applied rigorously enough. In particular, the classification was not close enough to ISCO-88. The resulting changes thus constituted more than a simple update. For example, double-coding of three different sources of information to both SOC 90 and SOC 2000 revealed that a full 30% of occupations were off the diagonal.

6.  The SOC 2000 major groups are similar, but not identical, to ISCO-88. In particular, in SOC 2000 major groups 5, 6 and 7 cover skilled trades occupations, personal service occupations, and sales and customer service occupations. The table overleaf records the distribution of SOC 2000 unit groups according to both SOC 2000 and ISCO-88(COM) major groups. There are relatively few occupations off the diagonal in major groups 1-4 and 8-0. However, most of SOC 2000 major group 5 fall in ISCO major group 7, most of SOC 2000 major group 6 fall in ISCO major group 5, and SOC 2000 major group 7 is more or less equally distributed across several ISCO major groups.

7.  As a result of these differences in major groups, SOC 2000 does not have the same ordered linking between the major groups and skill levels that ISCO-88 does. The loss of order happens in respect of skill levels 2 and 3, in that major groups 3 and 5 cover level 3, while major groups 4, 6, 7 and 8 cover level 2. Major group 1, as with ISCO-88, is not neatly linked to a single skill level. In SOC 2000 it includes occupations classified in both levels 3 and 4.

8.  The ONS's mapping of ISCO-88(COM) to SOC2000 at the four-digit level reveals that there are 14 minor groups in ISCO-88(COM) which are not used at all in SOC 2000. These include professional nursing and midwifery, in that SOC 2000 classifies these as associate professionals. They also include fashion models, two skilled agriculture groups, three operator groups, and shoe cleaning and other street services in the elementary group. The 'unnecessary' unit groups thus constitute a mix of occupations which are classified elsewhere in SOC 2000, some which have been consolidated with other groups because there are too few incumbents, and some which are not relevant in the British economy.

9.  On the other hand, SOC 2000 disaggregates some ISCO-88(COM) categories. For example, the general grouping for secretaries (4115) is sub-divided into five sub-categories – medical, legal, school, company, and personal assistant and other. This change was made in response to the critique that female-dominated occupations tended to be less disaggregated than male-dominated, with the result than a very high proportion of women were classified in only eleven occupations. Another response to this critique was an attempt to aggregate some of the male-dominated jobs which were too finely disaggregated.

10. In addition to refining concepts, SOC2000 attempted to provide for a range of new job titles. There was also a change at the technical level, from three digits to four digits. This was necessary because the decision to add a submajor level in SOC 90 had been taken very late in its development, and submajor groups were thus indicated by a small letter following the first digit rather than a separate digit. SOC 2000 changed the system by denoting submajor groups by the second digit, as is done in ISCO-88.

## 11.2    Utilisation of the national classification

11. SOC 2000 is now used for virtually all official purposes. The New Earnings Survey plans to move to SOC 2000 next year. Official uses include the international passenger survey conducted at Heathrow, and births and death registration. Occupation statements are recorded at the registration of marriage and divorce, but are not routinely coded. Occupation is not recorded in the ONS establishment surveys, but is included in the large annual Employer Skills Survey, which the Institute of Employment Research (IER) at Warwick University conducts with government funding. SOC 2000 is also used quite widely by researchers and others outside the official system.

12. The IER worked together with government officials on the development of both SOC 90 and SOC 2000. The Institute continues to play a key role in Britain's occupational classification.

13. At the time of the interview, IER was near to completing the development of a computer-automated coding system for SOC 2000 based on job titles known as CASOC. The IER system is based on the comprehensive list of job titles maintained by the ONS Occupational Information Unit. For any given job title entered into the system, CASOC generates a list of possible matches for each of which it allocates a percentage rating in terms of nearness of match, and which it lists in order of these percentages. The system handles differences in word order, misspelling, single or concatenated words. Nearness of match is calculated both by how closely the submitted job title matches a given title in the system, and how many other near matches there are. CASOC can be used for automatic coding, with the user deciding on a percentage score above which codes are allocated automatically, and below which human intervention is required to decide on the most appropriate title. It can also be operated manually.

14. At present ONS interviewers utilise a computer-assisted BLAISE system for coding of occupation in the labour force survey (LFS). For the 2001 census, the ONS outsourced all processing to a US company, Lockheed Martin. The company was contracted to deliver output, rather than the system which produced the output. The ONS is now investigating developing the tools to produce the output in-house. At this stage it is not clear whether the ONS will use CASOC or some other system.

15. IER has also developed systems which allow employment services to use the occupational classification for job matching, vocational training and occupational information more broadly. Worktrain is available on the internet at http://www.worktrain.gov.uk. It is thus available for individual jobseekers, but is also used by staff in the Jobcentres of the Department of Work and Pensions. The system has information on job vacancies classified according to between 800 and 900 occupations. For each of the occupations, the system provides a fairly detailed description. It has the ability to search on about 5,000 job titles. The system does not

include all job titles which the ONS has in its system, as it would then not be possible to browse. The system also includes a database of 1.5 million learning opportunities which is maintained by the Department of Education and Skills. The latter are classified according to subjects, rather than occupations, but the system provides a fairly seamless transition for the user between the vacancy and training components.

16. As with other similar systems, individual users and staff search on job title. The system is based on SOC 2000, but users do not see the link. Instead, the system uses a set of categories which psychologists advised represented how people think about jobs. The list below reveals that these have more of an industry than occupation 'flavour':
    - Administrative, legal & financial
    - Art, design, media
    - Catering, leisure, tourism
    - Health & care
    - Managerial & professional
    - Transport & manufacturing
    - Armed forces, emergency services
    - Building & construction
    - Farming, forestry & mining
    - Information & communication technology
    - Retail, sales & customer services
    - Other work

## 11.3 Custodianship and maintenance of the classification

17. The revision which resulted in SOC 90 was initially funded by the Department of Employment, but the OPCS (and subsequently the ONS) became the custodian. An Occupational Information Unit was established in December 1989, and is currently staffed by six people.

18. The Unit's objective is to record all known job titles, and at present there are 27,000 titles in its index. The Unit has a fairly established system of receiving new information and queries to inform updates, although it hopes to improve the system further. The census is obviously an important source of information about occupations. From the 1991 census alone, the Office of National Statistics (ONS) recorded a total of 175,000 queries, many of which represented new titles which need to be catered for. In respect of the 2001 census, the Unit has asked that Census Division provide it with the text and code for 120,000 records, including an indication each record whether the code was derived automatically or through interactive coding. The ONS will examine these records to check whether SOC 2000 and the index are working, and how they can be improved. The agency will perform similar tests on the LFS to see what it can learn from the operation of the BLAISE system.

19. Employment services usage also provides input for updating in that every two months all job titles not identified by Worktrain are downloaded and handed over to the IER. The Institute, in turn, will be passing new titles to the ONS Unit for a decision as to whether and where they should be added to its comprehensive index.

20. There are also a range of less systematic sources of information used for updating. There are, for example, sometimes queries from people who find that the unit groups do not isolate a job in which they are particularly interested. This could happen, for example, in relation to a compensation claim where there is a need for information on average earnings. There are also requests related to wage disputes. At the time of the interview, the ONS Unit had received four separate enquiries associated with the firefighters' pay claim. The queries came from:
   - the ONS Press Office, which was answering a call from a television company;
   - the firefighters union;
   - the Office of the Deputy Prime Minister; and
   - the body set up to review the pay of firefighters.
   All four callers wanted to know how firefighters were classified, and whether their classification had changed.

21. Similarly, soon after SOC90 was published, the trade association for the florists expressed its discontent with where florists appeared in the classification. They were concerned as funding for training was calculated according to a scale based on SOC 90.

22. Government's employment services no longer has any staff with explicit responsibility for classifications. Instead, IER act as their consultants and are mandated to represent the interests of employment services in the development of the classification. The possibility has been mooted of developing an employment services variant with an extra digit during the next revision to address this concern of practitioners that SOC does not currently provide sufficient detail for job matching purposes.

## 11.4 Other classifications

23. The United Kingdom also has an official classification of socio-economic class. The classification is very recent, and replaces the two social classifications – one from 1911 and the other from the 1950s– which were previously in widespread use. The development of the new classification was spearheaded by the University of Essex, assisted by the University of Warwick, and took four years to complete. It uses occupation as one of its bases, in addition to terms and conditions, status, supervisory status, and establishment size.

**Reference**:

Beerten, R (2002): 'Occupational Coding Quality in Official Statistics: The UK Experience'. Office for National Statistics. Presentation prepared for 7th TACO workshop, Orebro, Sweden, 10-11 June 2002.

**Informants**:
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# 12.    United States of America

## 12.1    Development of the national classification

1.  The United States is perhaps best-known in the field of occupational classifications for its Dictionary of Occupational Titles (DOT). The DOT was first released in 1939, when it provided definitions for 17,500 occupations. The 1991 version of this massive work contained close to 13,000 titles. However, one informant estimates that it would require about 50,000 titles to cover the full US economy. Further, some of the definitions had not been updated for decades.

2.  The DOT was used for a wide range of uses, and was incorporated in many different pieces of legislation. However, it was not the only occupational classification used by government agencies in the country. A significant characteristic of the US situation is the decentralisation of functions relating to occupational classification to a range of federal, state and other agencies. This decentralisation encouraged the proliferation of different classifications.

3.  In the 1970s, the federal government attempted to establish a single occupational classification to be used for statistical purposes by all relevant federal agencies. The result was the Standard Occupational Classification (SOC) of 1997. The release of the SOC elicited comments which suggested that it already required adjustments. A review process resulted in the publication of the first SOC manual in 1980.

4.  The federal government recommended, but did not mandate, use of the 1980 SOC. As a result, it was not widely used. By 1990 there was recognition both of non-use of the SOC, and that there had also been further changes in the labour force of the country since its development. The Office of Management and Budget (OMB), which is responsible for overseeing the federal use of occupational and industry classifications, therefore initiated action to develop a new classification. After a large conference in 1992 which included some international speakers, the OMB established a SOC Revision Policy Committee to develop the new classification. The Census Bureau of the Department of Commerce and the Bureau of Labor Statistics of the Department of Labour drove the subsequent activity, but with representation on the committee from the Office of Personnel Management, the Employment and Training Administration (ETA) of the Department of Labour, the Defense Manpower Data Center, the National Occupational Information Coordination Committee (now defunct) and the National Science Foundation (NSF).

5.  The committee worked in seven working groups. These groups were delineated largely on the basis of the classification then used for the occupational employment statistics (OES) of the Bureau of Labor Statistics (BLS) as this was considered the most up-to-date. Occupations were allocated to each work group, which investigated, defined and reallocated among themselves where necessary.

6.  The process included opportunity for public participation. In particular, the OMB issued five federal regulation notices on its website between February 1995 and September 1999 asking for comments on particular topics. The specified topics included uses of occupational data, principles, purpose, scope, concepts and purpose, hierarchical structure, and update procedures. The notices generated a lot of responses, especially once drafts had bee published. The responses to each notice were duly summarised in the following notice, with explanations as to how and why the committee had responded to the points raised.

7.     The classification developed by the committee is organised in terms of 23 major groups (denoted by the first two digits), 98 minor groups (third digit), 452 broad occupations (fourth and fifth digits) and 822 detailed occupations (sixth digit). The 23 major groups can also be further aggregated into a standard set of six or eleven larger groups.

8.     In practice, there are differences at the detailed level between the classifications used by the Census Bureau and BLS and the standard SOC. The standard SOC has 822 detailed occupations, the Census Bureau uses 509, and the BLS uses 750. Each of the Census Bureau occupations is created from one or more SOC unit groups. To avoid confusion, the Census units have serial numbers rather than using the SOC codes. The smaller number of groupings was necessitated by the relatively small size of the current population survey (CPS) when compared with the BLS's OES, as well as limitations of specificity in information supplied by census respondents. In particular, while the OES provides definitions of occupations on its questionnaires, these explanations are not available to CPS or census respondents. The use of 750 rather than 822 groupings in the OES is largely explained by the fact that the SOC has the same occupation at the detailed and broad occupation level in cases where there is little confusion about the content of a detailed occupation. The 750 does away with this duplication.

9.     In the early discussions, there was great interest in using skill as the conceptual basis for the SOC. As the process proceeded, those responsible recognised that there was not enough information available about the skills required for particular occupations to use skill level as a basis. The SOC thus uses skill in the sense of skill type, or area of work, but does not incorporate skill level. The apparent hierarchy in the classification thus is more about 'rolling up' into occupation families which make descriptive sense. In the words of several of the developers, the SOC committee 'opted for practical approaches to the classification rather than for (perhaps more appealing) theoretical approaches' (BLS, 1999: 2). Within groups, the lower levels are numbered in alphabetical order, apart from supervisors (who are first) and residual groups (which comes last). To allow for addition of new occupations, the system has gaps in the numbering for later insertions.

10.    The BLS is the custodian of the SOC to the extent that it has several staffmembers with explicit responsibility for SOC. These staff members advise others – and particularly the state agencies – on use of the classification. The custodianship is, however, decentralised to the extent that the Census Bureau maintains and publishes its own index of approximately 36,000 job titles.

11.    For updating, there is a SOC Policy Committee which communicates every six months to discuss request for changes. On investigation, many of the requests are revealed to be the result of misunderstanding of the classification. Where this is not the case, the committee still tends to hesitate about changes because this would affect such a wide range of agencies and uses. More thorough discussion of possible revisions or updates will occur on a ten-yearly basis in preparation for the census.

## 12.2     Compatibility and comparison with ISCO-88

12.    The US did not draw on ISCO-88 in developing the SOC. The first few federal regulation notices suggest that comparability with ISCO-88 'should be considered in the structure, but should not be an overriding factor'. The final publication does not mention ISCO at all in describing the guidelines used in SOC's development.

13. Several reasons were offered for not using ISCO-88. The most common was the feeling that ISCO was not 'flexible' and detailed enough to meet the needs of the diversified and developed US economy. Aversion was also expressed to the inclusion of some informal occupations, and some 'female' occupations (BLS, 1999: 7).

14. The BLS has recently developed a crosswalk from SOC 2000 to ISCO-88 in response to a request from the ILO. However, the BLS reports that very few of the many requests receive from users relate to the international classification. Up until now, the US has been submitting statistics required by ILO for various collections according to ISCO-68 rather than ISCO-88.


## 12.3    Utilisation of the classification

15. From the Census Bureau side, the two main uses of the occupational classification are for the decennial census and the current population survey (CPS).

16. The census has two main instruments – a shorter questionnaire which goes to all households, and a longer questionnaire which goes to one-sixth of all households. It is the longer questionnaire which contains the questions about occupation. The questionnaires are sent to households by mail and completed by household members. There is no procedure for follow-up and coders must thus work with the information as is.

17. The CPS is often referred to as the US's 'household survey', and is similar to the LFS of other countries. The survey is a joint venture of the Census Bureau and the BLS. The former is responsible for sampling, administration, coding and cleaning of data, while the latter is responsible for analysis and dissemination.

18. Each month the survey goes out to 60,000 households, with an average of two individuals aged 16 years or above per household. Each household stays in the survey for four months, is rotated out for eight months, and then is rotated in again for a further four months. The first round of interviews for any household are conducted face-to-face. Later rounds may be conducted telephonically.

19. Since 1994, all interviewers have entered information directly into computer as they conduct the interview. This innovation has allowed for more complicated skip patterns. It has also allowed for 'dependent' interviewing, where the questions asked are influenced by responses in the previous round. For occupation, the interviewers type in verbatim responses to the questions rather than coding on the spot. The free-form responses are later coded by Census Bureau responsible. Where the coders experience problems, the 'dependent' system allows them to specify the clarification to be sought from the household concerned in the next round of interviewing.

20. Coding of occupation for both the census and CPS is achieved through a combination of autocoding and individual intervention by professional Census Bureau staff. There is some imputation according to other characteristics where necessary.

21. The latest census was coded to SOC 2000. The CPS will move to SOC 2000 in February 2003. The first CPS results for each month are produced by the 7$^{th}$ of the next month. The first release focuses on overall unemployment rates, with unemployment by broad occupational categories available within the next month. More detailed information is produced on an annual basis, each January, with averages for the previous year by detailed occupation, ethnic group, age and sex. In addition to numbers in each occupation, the standard publications cover issues such as wages, hours of work, and union affiliation, with level of detail in terms of occupation limited primarily by cell size. Users can also request the raw data or specific tabulations through the FERRET tool available on the BLS website.

22. To facilitate production of time series, the BLS plans to develop a crosswalk from the old to the new SOC. Census Bureau staff have recoded data from the CPS for 1999 through 2002 to SOC 2000 as the basis for the crosswalk. In cases where there is not a one-to-one match between codes, BLS plans to provide ratios or coefficients in the crosswalk, perhaps based on the annual averages.

23. Unlike the CPS, the OES is completely managed by the BLS. It is an establishment survey, with the sample based on the unemployment insurance database. It thus covers most employees in the economy. The most important weakness is in agriculture, where not all states require coverage by unemployment insurance. The survey was previously conducted on an annual basis, but has recently changed to semi-annual. The occupational information – including both numbers employed and wages – is published by industry and by state and metro area.

24. The OES covers 400,000 establishments per year and calculates rolling averages on the basis of responses from the most recent three years. Certainty sampling is used for the largest establishments, which means that they are all covered in a three-year cycle. Probability sampling is used for smaller establishment.

25. Each selected firm receives a questionnaire tailored for the relevant industry. There are over 90 industry-specific forms for establishments with 10 or more employers. Each of these has a list of all the likely occupations together with a description of each. It also provides space for the employer to add further occupations which are not listed. The latter are used by the BLS to identify new and emerging occupations. For smaller firms there is a shorter, open-ended questionnaire where the employer fills in free-form occupational titles to cover all employees. The industry-specific forms provide for pre-coded answers and thus require intervention from BLS staff only when the editing checks reveal suspicious patterns or when additional occupations are added. The forms for the smaller forms are all coded by BLS staff. The BLS started using SOC in the OES survey in 1999. Due to uneven implementation across states, the BLS was only able to publish the data according to detailed OES codes in 2001.

26. The BLS also develops the Occupational Outlook Handbook. This product – available in both print and electronic form (www.bls.gov/oco/) – is widely used in career guidance. The internet site alone has about five million hits in a month. The Handbook is published every two years in hard copy and updated at that time on the internet. The 2002-03 edition came out at the end of 2001, and was the first edition to utilise SOC 2000.

27. For each identified occupation the Handbook describes the job outlook and prospects over the next ten years. The descriptions are based on qualitative research by the 20-25 economists employed on the project, as well as on econometric projections based largely on OES and CPS data. The Outlook uses the OES as the basis for numbers of incumbents and earnings. However, it supplements with information for the self-employed through the CPS as the OES does not cover this group. A 1997 evaluation of the projections found that they performed well in capturing the overall trends in the economy. However, the projections for detailed occupations tended to be conservative, and error rates were largest for smaller occupations (Veneri, 1997).

28. Resource and information constraints mean that the Handbook cannot cover each detailed occupation separately. However, an index links each O*NET code to the relevant page of the handbook, and each occupational 'statement' lists the applicable O*NET codes. The 270 'statements' in the handbook are estimated to cover 88% of jobs in the economy, with those requiring higher education receiving most attention. A further 7% of jobs are covered in brief occupational discussions. The remaining 5% of jobs are covered by the SOC's residual categories.

29. The Occupational Information Network (O*NET) (http://www.onetcenter.org/) is the major employment services application based on the SOC. In time it should completely replace the DOT, thus completing a shift from a 'dictionary' to a 'database' of occupations. The O*NET initiative began before the development of the SOC and still relies on analysis of aggregated data from older classifications. However, a massive ongoing research effort should see the ratings in the system completely based on new data from incumbent workers within the next five years.

30. O*NET has tried to stay as close to SOC as possible, but has broken out some of the unit groups, and ignored the residual groups, so as to arrive at just over 1,000 detailed occupations. The codes for these unit groups are formed through a two-digit extension to the relevant six-digit SOC code. The research effort involves a phased investigation into the different families of the classification to develop the accuracy of the skills content of the application. The current skills information reflects the results of ranking by expert analysts of the different occupational units. The research effort uses four different questionnaires for job incumbents in each industry, in addition to expert ranking. The questionnaires cover skills, work activities, knowledge, work context, work styles, education and training, and tasks. For each occupation, there are 500 data points, with two ratings on each of 250 characteristics. The results of the first round of investigation are due out in early 2003.

31. O*NET is available on the web and can be downloaded as an electronic database. Because of its size, there will not be a printed version. At the time of the interview, more than 500 organisations had downloaded the database. The website includes an O*NET database errata sheet which records changes since the last update. The main database is updated from the errata sheet every six months.

32. The O*NET project is managed by a Federal/State consortium. The staff responsible for the research and data collection effort are based in North Carolina. They contract out some of the work to universities and the private sector.

33. The SOC is explicitly intended and mandated for use by federal agencies in statistical applications. The federal regulatory notice of 1999 reads as follows: 'Although it is likely that the 1998 SOC, like the 1980 SOC, will also be used for various nonstatistical purpose (e.g., for administrative, regulatory, or taxation functions), the requirements of government agencies that choose to use the 1998 SOC for nonstatistical purposes have played no role in its development, nor will OMB modify the classification to meet the requirements of any nonstatistical program.'

34. Changeover to the use of SOC among non-statistical users has been uneven. Users who rely on OES – for example lawyers arguing in terms of 'prevailing wage' clauses – will probably now be using SOC, as will some government users in the education, health and other fields. The BLS is also encouraging private companies and their advisers to adopt the classification as it will simplify their reporting for the OES. Many other users, including government users in immigration and disability, still use the DOT as many pieces of legislation explicitly refer to the older classification and have decision-making processes that rely on specific data variables from the DOT that describe categories of physical strength or training time.

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## 13. Central and Eastern Europe

1. The Institute of Employment Research, University of Warwick, United Kingdom (IER) was the main player in developing ISCO-88(COM) for the Statistical Office of the European Communities (Eurostat). Subsequently, it effectively became the technical wing for Eurostat on occupational classifications. In this role, it has coordinated the Technical Assistance for the Classification of Occupations (TACO) programme. TACO is part of the broader PHARE programme, which initially provided assistance with economic reconstruction to Poland and Hungary, but subsequently expanded its efforts to other Central and Eastern European countries.

2.      Eurostat's directives form the basis of the European Statistical System (ESS), which covers all EU member states as well as Iceland, Norway and Liechtenstein. Eurostat has adopted a less rigid approach in respect of occupational classifications than industrial classifications. In respect of the latter, it requires that all member countries adopt the International Standard Industrial Classification (ISIC (Rev.2)) as their common standard. In respect of occupation, it says that countries can retain their own classifications for coding of national statistics, but must be able to provide statistics to Eurostat according to the categories of ISCO-88(COM).

3.      The development of classifications which conformed to Eurostat's directives was of particular importance to many of the countries involved in TACO as it was a precondition of their admission into the European Union (EU). However, TACO has clearly had benefits beyond this narrower objective. At this point, the programme convenes what is probably the only ongoing multi-country event focusing specifically on occupational classifications. Since 1994, TACO has convened seven workshops which have brought together candidate EU and other countries to discuss progress and challenges in developing and using occupational classifications. The proceedings of these workshops provide useful evidence to inform policy making around classifications.

4.      Further, IER has done work in all countries in the region except Serbia and Croatia, as well as in several countries outside the region. It is thus in an excellent position to provide an overview of the challenges faced in standardising the way countries report occupations. IER staff note, among others, the influence of the way the society, economy and work processes are organised in determining how occupations are conceptualised. In some of the more centrally planned economies, for example, occupational classification was controlled by the state and determined the person's status and benefits to a far greater extent than in many other countries. This approach often resulted in a system which recorded enormous details about particular jobs, but which did not cope well with changes in work processes and organisation.

5.      The seventh TACO workshop, held in June 2002, had participants from Bulgaria, Cyprus, the Czech Republic, Estonia, the Former Yugoslav Republic of Macedonia, Hungary, Latvia, Lithuania, Poland, Romania, the Slovak Republic, Slovenia, Sweden and the United Kingdom. Presentations from all these countries reported close alignment with ISCO-88(COM). Observers report that some countries were so keen to adopt this standard that they wanted to do so without any modifications for the national situation besides translation into the local language. However, the presentations suggest that many have expanded considerable time and energy in making the necessary modifications.

6.      At the technical level, some countries have developed the classification beyond the four-digit level. For example, Poland and Slovenia have seven digits, Slovakia, FYR Macedonia and Romania have six digits, and the Czech Republic has five digits. The report from Slovakia notes that users do not report, or even code, beyond the fourth digit at most. Nevertheless, they feel that having an alphabetical listing of occupations coded to the 6-digit level assists users in finding the correct higher-level code.

7.      Hungary adopted a different approach in catering for national peculiarities. Instead of expanding the code lengthwise, they provided greater disaggregation beyond the second digit so as to have 631 unit groups at the 4-digit level rather than the 390 found in the standard ISCO. Disaggregation is concentrated in major groups 7 and 8 where the previous national classification had been very detailed. The third and fourth digits are seen as serving the needs of local users, while the first and second digits are used for international comparisons. This approach meets current Eurostat requirements, in that the regulations ask that countries report only at the one- or two-digit level. Informants suggested, however, that this requirement could be changed. If this happens, several countries besides Hungary will experience difficulties in providing standardised statistics.

8.      The presentations by countries who have participated in the TACO programme provide useful evidence of some of the challenges in developing and using occupational classifications, and ISCO in particular.

9.      Several countries present comparisons of the distribution of occupations obtained from different sources, for example they compare data from enterprise surveys with data from labour force surveys or censi. In general, reports note a tendency for employer coding in the establishment surveys to be at a higher level than employees' coding of their own positions. This happens, in particular, for people with management duties who employers classify in major group 1, but who report themselves to be professionals. The Czech Republic reports that the under-reporting of senior status by employees is particularly marked for women.

10.     Hungary, like Sweden and the UK, has observed marked gender clustering by occupations. In the Hungarian case, two-thirds of women are found to be concentrated in only one-third of identified occupations.

11.     Several countries report the usual difficulties with supervisors and foremen. An IER representative reiterated during the workshop that the rationale for the way these categories are treated in ISCO-88 is that the classification is skill-based, whereas the status of these groups reflects the relationship with the employer rather than the type of work performed.

12.     Nevertheless, Cyprus retained several elements of ISCO-68 when it first adopted ISCO-88 so as to be able to distinguish these categories. For example, they retained codes for sales and shop supervisors and clerical supervisors, retained a special code 70 at the two-digit level for production supervisors and general foremen, and introduced a distinguishing final digit for apprentices. Their report notes that, because Cyprus is a small country, supervisors and foremen usually supervise more than one category of workers and the general category is therefore necessary. However, in the latest revision of its national classification, Cyprus has abandoned all these variations except the addition of a code for head of villages and chiefs of communities.

13.     Many countries report on difficulties in classifying managers. Estonia reports that, as in the UK, their major group 1 is large relative to other countries. They suggest that the reason could be that the word 'manager' appears in job titles more frequently than in other languages and countries. Several countries report the addition or disaggregation of codes for managers within the civil service. Latvia has added a new group for self-government senior officials.

14. Slovenia reports in some detail on frequent miscodes and possible reasons for their occurrence. In addition to the manager problem described above, they report frequent incorrect coding of occupations in major groups 3 and 4 to major group 2, and miscoding of occupations in major groups 7 and 8 to major group 9. The Slovenia country report suggests that the errors in respect of major groups 2, 3 and 4 occur because the titles of major group 2 are more understandable to coders than those in groups 3 and 4. The report suggests that miscoding between major groups 7, 8 and 9 occurs because coders do not consider the educational requirements of a job.

15. The education and qualification question is a fraught one. The UK report notes that the ONS only uses control edits based on education at a very late stage in the processing, as they would otherwise be making assumptions which would prevent exploration of complex relationships. Nevertheless, several reports suggest that countries are using information about education and qualifications characteristics in determining and correcting codes at a much earlier stage. Thus Slovenia reports that even where the code matches the job title, if there is a mismatch with educational requirements, the agency considers the chosen code as a miscode. Similarly, the report from Macedonia expresses the agency's discomfort with allocating a major group 1 code to directors of small enterprises who have only secondary, or even primary, education. They express similar discomfort in coding as clerks people who have a university degree. In Cyprus – and perhaps other countries – information on earnings is used to inform decisions about coding of occupations.

16. There are several overt, and some implicit, suggestions that language presents a problem. The Slovakian report notes that the linguistic features of their language makes it difficult to distinguish clearly between job title and description of main tasks and duties within questionnaires. The Lithuanian report notes that many more words are used in their language to describe an occupation than in English or Swedish, and that this hampers automatic coding. An implicit suggestion of the language challenges occurs in the Czech report, which refers to major group 2 as covering 'experts'.

17. An observer noted that language had proved a stumbling block in the original translation of the ISCO-88 classification into other languages. In the French case, INSEE was asked to redo the translation after complaints about the first version. Even greater problems are reported to arise in respect of the ISCO-88 index prepared by the ILO. Especially where resources are limited, countries are sorely tempted to simply translate this index and use it as is. Unfortunately, simple linguistic translation is not adequate as there are too many differences between national economies in the way jobs and occupations are organised and described. Informants suggested that it would be more useful for the ILO to provide guidance on how to construct a valid index, rather than providing a tempting prototype.

18. Most of the above observations are drawn from the report and presentations from a single workshop. Further valuable information would be found in the reports on previous workshops. Those who have participated in the workshops value them highly. But there are also important shortcomings in at least two respects. Firstly, the workshop focuses on Eastern and Central Europe. Two or three Western European countries may be asked to participate at any given workshop as experts, but they do not have an ongoing opportunity to participate and benefit. Countries beyond Europe do not participate at all and would have very different experiences to bring to the table.

19. Further, TACO has focused on the more strictly statistical usage of the occupational classifications. Those who are more interested in the employment services side have not enjoyed similar opportunities of sharing experience.

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