



**INTERNATIONAL STATISTICAL COMPARISONS OF
OCCUPATIONAL AND SOCIAL STRUCTURES:
PROBLEMS, POSSIBILITIES AND THE ROLE OF ISCO-88¹**

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Introduction and background

1. The objective of this paper is to present ILO's work with the *International Standard Classification of Occupations (ISCO-88)* as well as general issues of importance for the creation of data sets using *occupation* as a central variable for comparative statistical studies of social and economic structures and their changes.
2. Founded in 1919 together with the League of Nations, the International Labour Organisation (ILO) is a specialised agency of the United Nations. One of ILO's tasks is to develop international standards and guidelines to help countries improve their labour administration as well as the quality, reliability and comparability of their labour statistics.² To these ends the need for an *international standard classification of occupations (ISCO)* was first discussed in 1923 at the *First International Conference of Labour Statisticians (ICLS)*. However, it was only in 1949 at the Sixth ICLS that work to develop ISCO was initiated. As a result the Seventh ICLS (1949) adopted a provisional classification of nine major groups. In 1952 the ILO published the *International Classification for Migration and Employment Placement*, with detailed descriptions of 1,727 occupations based on the national classifications of eight industrialised countries. At the Eight ICLS (1954) a provisional list of minor groups was approved and the Ninth ICLS (1957) completed the work by endorsing the major, minor and unit groups of the first ISCO. It was published in 1958 as ISCO-58 and included, in addition to the group definitions, descriptions of 1,345 occupational categories within each unit group. The Ninth ICLS recognized that ISCO-58 would need to be revised after a certain time, and a version of ISCO was published in 1968 (as ISCO-68) with a revised structure and an expanded number of described occupational categories (1,506). The third and most recent version, ISCO-88, was adopted by the *Fourteenth ICLS* in November 1987 and approved by the ILO's Governing Body in February '88.

¹ Based on a paper prepared for the *Symposium on Measuring Demographic Variables in International Perspective*, 30 September - 1 October 1999, Cologne, Germany. The views expressed are those of the author and do not necessarily reflect those of the ILO or its Bureau of Statistics. The author apologizes for all errors and omissions, and would welcome comments and suggestions for improvements and correction. Address: CH-1211 GENEVE 22, Switzerland; Fax: + 41 22 799 6957; e-mail: hoffmann@ilo.org

² ILO (1999) provides a general presentation of the work of ILO in the field of labour statistics.

3. ISCO-88 was immediately made available to users in English, French and Spanish, and has, since 1990-91, been available as printed volumes as well as on diskette, see *ILO (1990)*. Also available on diskette is a set of descriptions of more detailed occupational categories than those included in ISCO-88. These descriptions were adapted from those in ISCO-68 with only limited updating.

4. ILO material on work with occupational classifications can be found in *Embury et al (1997)* and *Hoffmann et al (1995)*, as well as in *Husmanns et al (1992)* chapter 10; in Chernyshev (1994), chapters 22, 23 and 24, and in *United Nations & ILO (forthcoming)* chapter 3. A list of ISCO-88 major, sub-major and minor groups is presented on the web-site <http://www.ilo.org/public/english/I20stat/class/isco.htm> from which a hyper-link is provided to the corresponding web-site of the *Institute of Employment Research (IER)* at the *University of Warwick* for information about ISCO-88(COM)³, the version of ISCO-88 developed by IER for Eurostat. In the future we also hope to establish such links also to corresponding national sites, as part of the plan to establish the ILO site as the main door of entry into the world of occupational classifications, as well as to the occupational classifications of the world.

5. As custodian of ISCO-88 ILO has provided advice for three efforts to develop common regional classifications based on ISCO-88: (i) ISCO-88(COM); (ii) ISCO-88(CIS) developed for the *Statistical Committee of the Commonwealth of Independent States (CIS STAT)* and (iii) ISCO-88(OCWM) developed for the ILO/UNDP Asian Regional Programme on International Labour Migration. Up to the end of 1998 there had been direct contacts with the relevant authorities in 53 countries and territories which have developed, or were in the process of developing, national occupational classifications using ISCO-88 as a model or the same principles⁴. There had also been contacts with the authorities in nine countries where it has been decided to use another model when revising the national classification, usually that of the previous one. Advisory visits had been made to 19 countries and officials from two countries had visited the ILO⁵. National and regional training seminars were organized for China, Costa Rica, Kyrgyzstan and Thailand as well as for CIS member states, South East Asian countries and South Pacific countries⁶. Countries where a national classification based on ISCO-88 has been developed with the assistance of an ILO sponsored or back-stopped resident expert include Trinidad & Tobago, Tanzania, Namibia, Mauritius and Fiji. We know

³ IER represents a second international centre of competence on occupational classifications. In addition to developing ISCO-88(COM) IER has provided advisory services and organized workshops for member countries of the European Economic Area (EEA) as well as for countries in central and eastern Europe receiving support from the PHARE and TACIS programmes. In fact, the five workshops organised by IER for statistical offices in PHARE countries represent the only sustained effort to ensure exchange of relevant experiences between custodians of national occupational classifications.

⁴ This degree of acceptance may be more a function of the limited resources which national authorities are willing to work on occupational classifications, than a function of the qualities of ISCO-88.

⁵ Visited: Argentina, Belarus, Bolivia, Brazil, Costa Rica, Croatia, Dominican Republic, Estonia, Indonesia, Kenya, Kyrgyzstan, Paraguay, Russian Federation, Slovenia, Sweden, Thailand, Tunisia, United Kingdom and the United States. Visitors came from Switzerland and Ukraine.

⁶ Preparations were made for a project to develop a regional classification for the island countries in the South Pacific, but the necessary funds could not be found.

that 65 countries with a population census in the 1989-94 period established links to ISCO-88 for presentation of their latest census results while 33 countries linked the results to ISCO-68. For the 2000 round of Population Censuses it has been recommended that countries should be able to link the statistics on 'occupation' to ISCO-88, see *United Nations (1998)* and *UN/ECE et al (1997)*. In the statistics submitted for the 1999 edition of the *ILO Yearbook of Labour Statistics* 51 countries and territories are represented with employment and/or unemployment statistics according to ISCO-88 major groups, mostly from Labour Force Surveys and registrations by employment services (up from 43 in 1998 and 37 in 1997).

What is an occupational classification?

6. An occupational classification is a tool for organising all **jobs** in an establishment, an industry or a country into a clearly defined set of groups according to the tasks and duties undertaken in the job. It will normally consists of two components:

- a **descriptive component**, which may be just a set of titles of occupations and occupational groups, but which usually consists of descriptions of the tasks and duties as well as other aspects of the jobs which belong to each of the defined groups. These descriptions can be said to constitute a *dictionary of occupations*,
- the **classification system** itself, which gives the guidelines on how jobs are to be classified into the most detailed groups of the classification and how these detailed groups are to be further aggregated to broader groups. This classification system represents a value set for the variable 'occupation', a variable which describes the different tasks and duties of jobs.

7. Occupational classifications can be compared to a system of maps for a country, say Germany: the top level of aggregation corresponds to a small scale road map for the main motorways and highways; the next level corresponds to a set of larger scale maps for say each of the main regions, also showing provincial and local roads; and so on. At the most detailed level will be the detailed technical maps used by municipal engineers to plan sidewalks, traffic lights, road extensions, etc. Such detailed technical maps can be compared to the job descriptions which are used by enterprises for personnel management and wage systems which in most countries will not be the concern of national authorities, except for the management of public sector employees.

What are occupational classifications used for?

8. National occupational classifications and dictionaries are usually designed to serve several purposes. Although the detailed occupational descriptions and the classification structure must be seen as two parts of an integrated whole, different user areas have different degrees of interest in the various elements. **Detailed occupational descriptions** are used by those who need to know about the tasks, duties and working conditions of jobs, i.e. mainly by client-oriented users broadly speaking, (i.e. those responsible for job placement, vocational training and guidance, migration control, etc.). The occupational descriptions should be designed primarily to meet the needs of such users, but must also include the descriptive elements necessary for applying relevant aggregation schemes. **The classification structure**, i.e. the grouping of the detailed occupations together in progressively more aggregate groups, should be designed mainly to facilitate the sorting of jobs and persons into groups, i.e. for the matching of job seekers and vacancies, or for statistical description and analysis of the labour market and the social and economic structure of society.

9. Legislators and public sector administrators use occupational statistics in support of the formulation and implementation of economic and social policies and to monitor progress with respect to their application, including those of manpower planning and the planning of educational and vocational training. Managers need occupational statistics for planning and deciding on personnel policies and monitoring working conditions, at the enterprise and in the context the industry and relevant labour markets. Psychologists study the relationship between occupations and the personality and interests of workers. Epidemiologists use occupation in their study of work-related differences in morbidity and mortality. Sociologists use occupation as an important variable in the study of differences in life styles, behaviour and social positions. Economists use occupation in the analysis of differences in the distribution of earnings and incomes over time and between groups, as well as in the analysis of imbalances of supply and demand in different labour markets. Depending on the purpose of the study, "occupation" may be regarded as the main variable in the empirical analysis, or it may serve as a background variable. Used as a background variable, it may serve as a proxy for other variables such as 'socio-economic groups' or 'working conditions', or it may be used as one element in the construction of other variables, such as 'social class' or 'socio-economic status'. The resolution needed for the value set to satisfy these different areas of use, i.e. the degree of detail in the classification, will differ dramatically: from the distinction between just two groups popular with some journalists, sociologists and the managers of the former Soviet Union ("manual" v. "non-manual" or "white-collar" v. "blue-collar") to the more than 10,000 described in the *U.S. Dictionary of Occupational Titles*.

10. ISCO is intended to facilitate international communication on the subject of occupations and occupational groups, narrowly or broadly defined, both for client-oriented and for statistical users. ISCO should therefore lend itself to the different uses at the national level, while taking into account the special considerations which must follow from its international nature.

11. Internationally comparable statistics on occupational groups are used mainly to:

- (a) compare the distribution of the employed population or some other variable (e.g. wages, hours of work, work accidents, income, consumption, reading habits) over occupational groups in two or more countries;
- (b) compare data on broadly or narrowly defined individual sets of occupations in two or more countries, e.g. to compare the average wages of 'computer programmers' in country A with those in country B, or to compare the number of 'industrial designers' in the two countries;
- (c) merge data from different countries referring to comparable groups, e.g. to obtain enough observations to study the incidence of particular work-related accidents or diseases among workers in broadly or narrowly defined occupational groups, believed to have similar exposure to particular working conditions or harmful substances.

Experience shows that at the international level, many users of occupational statistics need data at the highest level of aggregation - usually for descriptions of type (a). Important exceptions are international studies of wage rates, earnings, work hazards and injuries and other conditions of work: such studies often require that detailed occupational groups can be defined consistently, sometimes in cross-classification with other variables such as 'industry' and/or 'status in employment'.

12. It is important to note that while the statistical use of type (a) above requires that the occupational classification cover all types of jobs, the focus in other types of use (statistical or client-oriented) is on specific occupations or groups of occupations. In total the sum of all such users' areas of interest could conceivably also cover all occupations, but in practice they will only cover a sub-set.

13. The main client-oriented application of an international standard classification of occupations is in the international recruitment of workers and in the administration of short- or long-term migration of workers between countries. An internationally developed and agreed set of descriptions for detailed occupational categories which can serve as a common "language" for the countries and parties involved in such programmes may greatly increase the effectiveness of the communication necessary for their execution.

14. When the responsible agency in a country needs a model to serve as basis for developing or revising the national classification, or when a substitute for a national classification is needed in countries that have not developed their own, then an international standard classification may be a good alternative. These applications have been kept in mind both in the original development of ISCO and in its subsequent revisions.

Key characteristics of ISCO-88

15. The last revision of ISCO aimed to produce an international classification which would:

- have a stronger and more clearly stated conceptual basis - to strengthen its usefulness as a descriptive and analytical tool and to make it easier to update;
- reflect the labour markets of developing as well as of industrialised countries, covering the 'informal' as well as the "formal' parts of the world of work;
- reflect better than before women's positions in the labour market;
- reflect occupational consequences of different technologies;
- incorporate new occupations and reflect shifts in the relative importance of occupational groups.

16. In the context of ISCO-88 a job is defined as "a set of tasks and duties which are (or can assigned to be) carried out by one person". Most occupational classifications classify, i.e. group **jobs** together in occupations and more aggregate groups, by the similarity of (some aspect of) the type of work done in these jobs. **Persons** are classified by 'occupation' through their relationship to a past, a present or a future job. In ISCO-88 occupations are grouped together and further aggregated mainly on the basis of the similarity of skills required to fulfill the tasks and duties of the jobs. Two dimensions of the skill concept are used in the definition of ISCO-88 groups: Skill level, which is a function of the range and complexity of the tasks involved, where the complexity of tasks has priority over the range; and skill-specialisation, which reflects type of knowledge applied, tools and equipment used, materials worked on, or with, and the nature of the goods and services produced. It should be emphasised that the focus in ISCO-88 is on the skills required to carry out the tasks and duties of an occupation - and not on whether a worker in a particular occupation is more or less skilled than another worker in the same or other occupations.

17. Only a few broad "skill level" categories can usefully be identified for international comparisons. The 1976 version of the *International Standard Classification of Education (ISCED)* was used to define the ISCO-88 skill levels, but these definitions can easily be reformulated with reference to the revised ISCED-1997. This formulation of the definitions does not mean, however, that skills can only be obtained by formal education or training. Most skills may be, and often are, acquired through experience and through informal training, although formal training plays a larger role in some countries than in others and a larger role at the higher skill levels than at the lower - see also paragraph 24 below. For the purpose of the ISCO classification system, determining how a job should be classified is based on the nature of the skills that are required to carry out the tasks and duties of the job - not the way these skills are acquired. Nor is it relevant that the job incumbent may have skills not demanded by the job.

18. "Skill specialisation" can be indicated both broadly and more narrowly and is related to subject matter areas, production processes, equipment used, materials worked with, products and services produced, etc. The words used to describe subject matter, production processes, etc. therefore have to be used as labels for the core sets of skills with which occupations are concerned. The same type of words may be used to describe the type of activity, i.e. the *industry*, of the production unit. For some workers it will therefore be possible to "predict" the occupation in which they are working with a fairly high degree of success, knowing how they are classified by industry. This does not mean that ISCO is using industry as a classification criterion (except in a few cases where it is directly relevant), only that skills in fact are linked to products, materials, etc. which are the determinants of the industry of the establishment in which the work is carried out. The conceptual difference between the two types of classifications should not be forgotten, even though it may be partly obscured by the correlation between them and by the terminology used.

Table 1: ISCO-88 major groups, the number of sub-groups and skill level

Major groups	Sub-major groups	Minor groups	Unit groups	Skill level
1. Legislators, senior officials and managers	3	8	33	-
2. Professionals	4	18	55	4th
3. Technicians and associate professionals	4	21	73	3rd.
4. Clerks	2	7	23	2nd
5. Service workers and shop and market sales workers	2	9	23	2nd
6. Skilled agricultural and fishery workers	2	6	17	2nd
7. Craft and related workers	4	16	70	2nd
8- Plant and machine operators and assemblers	3	20	70	2nd
9. Elementary occupations	3	10	25	1st
0. Armed forces	1	1	1	-
Total	28	116	390	

19. As shown in table 1 ISCO-88 defines four levels of aggregation, consisting of:

10 major groups

28 sub-major groups (subdivisions of major groups)

116 minor groups (subdivisions of sub-major groups)

390 unit groups (subdivisions of minor groups)

Unit groups will consist of a number of detailed occupations. For example, as a separate occupation nuclear physicist belongs to ISCO-88 unit group 2111 Physicists and astronomers, which belongs to minor group 211 Physicists, chemists and related professionals, which is part of sub-major group 21 Physical, mathematical and engineering science professionals of the major group 2 Professionals.

20. Eight of the ten ISCO-88 major groups are delineated with reference to the four broad skill levels, see table 1. Five of the eight major groups, i.e. 4, 5, 6, 7 and 8, are considered to be at the same broad skill level and are distinguished by reference to broad skill specialisation groups.

21. Skill level references are not made in the definitions of the two major groups entitled Legislators, senior officials and managers and Armed forces respectively, because other aspects of the type of work were considered more important as similarity criteria, i.e. policy making and management functions, and military duties, respectively. As a result there are significant skill level differences of the jobs classified to each of these two major groups. However, the sub-major and minor groups of the first major group have been designed to include occupations at similar skill levels.

22. A distinction is made at the major group level between (a) occupations that are essentially craft-oriented (i.e. major group 6 "Skilled agricultural and fishery workers" and 7 "Craft and related trades workers"), and (b) occupations that are essentially oriented towards the operation of tools, machinery and industrial plants (i.e. major group 8 "Plant and machine operators and assemblers") - to cope with the issue of different skill requirements for jobs with similar purposes, due to differences in technologies used.

23. Occupations which are craft oriented consist of skilled jobs directly involved in the production of goods or services, where the tasks and duties require an understanding of and experience with the natural resources and raw materials used and how to achieve the desired result. The workers in these jobs may also use more technologically advanced tools and machines, provided that this does not change the basic skills and understanding required for the jobs. Modern machines and tools may be used to reduce the amount of physical effort and/or time required for specific tasks, or to increase the quality of the products. On the other hand the tasks and duties of jobs in occupations which are oriented towards the operation of tools, machinery and industrial plants primarily require an understanding of the machines: how to operate them properly, how to identify malfunctioning and what to do when something goes wrong. The skills required are oriented towards the machines and what they are doing rather than to the transformation process as such or its results. Occupations where the tasks and duties consist of assembling products from component parts according to strict rules and procedures are considered to belong to the same major group as the machine-oriented occupations. Jobs which only require low or elementary skills and little or no judgement are classified to occupations in major group 9.

24. The 14th ICLS decided that for international comparisons it should be possible to reflect in ISCO the important differences which exist between countries, and sometimes within a country, in the required skill levels of jobs which traditionally have been seen as belonging to the same occupational group. Such differences are linked to the actual tasks which are carried out as these, although similar in nature, may vary significantly in the degree of judgement, responsibility and planning required. These differences in tasks will have resulted in national differences in skill levels and qualifications required for entering the occupations. The 14th ICLS therefore decided that ISCO-88 should make it possible for countries to classify some occupational groups either to major group 2 "Professionals" or to major group 3 "Technicians and associate professionals", depending on national circumstances. This possibility was created for primary, pre-primary and special teaching occupations, nursing and midwifery occupations, social work occupations and some artistic occupations.⁷

25. The 14th ICLS also decided that, as in ISCO-68, jobs in the armed forces should be classified in a separate major group 0 "Armed forces", even if the jobs involve tasks and duties similar to those of civilian counterparts. However, many national classifications, otherwise based on ISCO-88, follow the original secretariat proposal to classify such jobs with their civilian counterparts.

26. All occupations which consist of jobs in which the workers have mainly legislative, administrative or managerial tasks and duties should be classified to major group 1 "Legislators, senior officials and managers". In ISCO-68 they were partly classified to major group 2 ("Administrative and Managerial Workers") and partly to other major groups.

27. "Working proprietors"⁸ are to be classified according to whether their tasks and duties are mainly similar to those of managers and supervisors or to those of other workers in the same area of work. This is because the status of "working proprietor" is seen as related not to type of work performed but to "status in employment" - corresponding to the "self-employed" and "employer" categories of the *International Classification of Status in Employment (ICSE)*. One self-employed "plumber" may have mainly managerial tasks and another may carry out the tasks of "plumber" with very few managerial responsibilities, depending for example on the size of the firm. In ISCO-88 the former job should be classified with managers and the latter with "7136 Plumbers and pipe fitters".

28. In ISCO-88 both "apprentices" and "trainees" should be classified according to their actual tasks and duties as, if needed, these two groups may be separately identified through the "status in employment" classification. ISCO-68 recommended that apprentices should be classified to the occupation for which they are being trained, but that trainees be classified according to their actual tasks and duties.

⁷ To achieve this result both the ILO and national participants at the 14th ICLS experienced a certain amount of lobbying by international federations and national organisations representing workers in these occupations.

⁸ In ISCO-68 there are separate minor groups for "working proprietors in 'wholesale and retail trade' and 'catering and lodging services', as well as for 'farmers'. These were defined as "workers (who) conduct business ... on their own behalf or in partnership".

29. The problem of classifying jobs which have a broad range of tasks and duties should be handled by the application of priority rules, i.e. some tasks and duties are given priority in determining the occupational category to which a job should be classified:

- (a) in cases where the tasks and duties are associated with different stages of the process of producing and distributing goods and services, the tasks and duties related to the production stages should take priority over associated tasks and duties, such as those related to the sale and marketing of the same goods, their transportation or the management of the production process (unless either of these associated tasks and duties dominates). For example, the worker who bakes bread and pastries and then sells them should be classified as "baker", not as "sales assistant"; the worker who operates a particular type of machinery and also instructs new workers in how to operate the machine should be classified with the machine operators; the taxi driver who drives his/her own car and also keeps the accounts should be classified with motor-vehicle drivers; and
- (b) in cases where the tasks and duties performed require skills usually obtained through different levels of training and experience, jobs should be classified in accordance with those tasks and duties which require the highest level of skill. For example: there are a number of jobs whose tasks and duties most of the time require a set of relatively easily obtained skills, but where the workers are also expected to have skills which require more training or experience, to make it possible to cope with unexpected and infrequent situations, e.g. to avoid accidents or injuries.

It is recognised that a certain amount of judgement and adjustment to national circumstances will be necessary in the choice and application of these priority rules.

30. Many users of ISCO-68 had found that its top aggregation level of nine groups meant that the differences within each group were too large for the groups to be useful for description and analysis. However, the next level of aggregation, with 83 groups, represented too much detail for many types of analysis, as well as for international reporting of occupational distributions, especially if the data are obtained through sample surveys. ISCO-88 therefore includes 28 "sub-major" groups as a new level in the aggregation system - between the former major and minor groups, see table 1.

31. In all areas of statistics it is important to achieve a balance between continuity of time series and needed adjustments and improvements in definitions, in methods of data collection and in classification systems. In developing ISCO-88, continuity was aimed for at the unit group level. The revision did, nevertheless, result in the splitting of a significant number of ISCO-68 unit groups. The numerical importance of many of these splits at the country level need not be important.

32. The unit group level is the most detailed level specified in the ISCO-88 structure. The previous versions of ISCO also specified a detailed set of occupational categories, although they were not discussed or approved by the respective ICLS. Upon request, adapted versions of those of the detailed ISCO-68 descriptions which are still relevant are made available to the users of ISCO-88 on diskette.

33. The emphasis on skill level and skill specialisation as the main similarity criteria for the delineation of occupational groups in ISCO-88 is not such a dramatic change from ISCO-68 and related national classifications as it may seem. That skill was implicitly used in ISCO-68 can be seen through a closer analysis of its classification system. For example, the group 0/1 ('Professional, Technical and Related Workers') contains occupations with tasks and duties which require, for the most part, highly trained or skilled workers. Occupations of comparable skill requirements are otherwise only found in its major group 2 "Administrative and managerial workers". Each of the other major groups in ISCO-68 covers different broad areas of skill specialisation. For example, most of the occupations in major group 3 "Clerical and related workers" mainly require skills needed to deal with data and information, while most of the occupations in major groups 4 and 5 "Sales workers" and "Service workers" can be said to mainly require skills needed in dealing with people. Similarly the distinctions between different minor and unit groups within a major group can be seen as distinctions between different skill specialisations. Skill level is explicitly discussed in the introduction to ISCO-68 in relation to minor group 9-9 ('Labourers not elsewhere classified'). The conclusion that skill implicitly plays an important role in both ISCO-58 and ISCO-68 is also supported by the following quotation from the Introduction to ISCO-58:

... combinations (of occupations) may be based on materials worked on, workplace, environment, the specialised equipment used (if any) and similar relationships. The particular skills, knowledge and abilities of the workers concerned have an intimate connection with such factors.

34. When coding ISCO-68 groups to ISCO-88 we found that 55 per cent of the ISCO-68 unit groups (157 out of 286) had been left unchanged or have had their scopes only slightly expanded or reduced. Fourteen of the new unit groups had been created by combining two or three ISCO-68 unit groups - using a total of 31 such groups. The coding also showed that 96 ISCO-68 unit groups were split - and that the parts were coded to 174 different ISCO-88 unit groups. Twenty-four of the split groups were "not elsewhere classified" groups. A total of 32 ISCO-88 unit groups contain no reference to any ISCO-68 unit groups or occupational categories.

Creating comparative occupational statistics

35. Above it was mentioned that in the 1998 *Yearbook of Labour Statistics* for 43 countries one can find statistics on employment and/or unemployment according to the major groups of ISCO-88. This, however, only means that these statistics are being presented according to a standard format, consistent with ISCO-88. It does not necessarily mean that they are comparable to a degree which will satisfy most of serious users of such statistics. To understand the reason for this one must recognize that statistical series only will be "completely comparable" between different geographic regions (or over time) if the survey operations upon which they are based satisfy the following conditions:

- a. The populations covered have been defined and delineated in the same way.
- b. The concepts (variables) to be measured have been defined in the same way.
- c. The same type of data collection instrument has been used.
- d. The reference periods are the same.

- e. The questions used in the survey questionnaires are understood in the same way by the respondents, and the training, instructions, other support and supervision of the data collectors are equivalent, as are the editing and processing procedures.
- f. The distribution variables at the most dis-aggregated level and the response categories are the same.
- g. The sampling frame and units, the sampling procedures and the estimation procedures - including procedures for dealing with non-response - are the same.

36. In other words, the "norm" is an integrated survey operation covering all the regions to be compared. Even where examples of approximations to such survey operations exist, e.g. as cooperative efforts among researchers in different countries, the data processing procedures are normally not standardized and documented as well as the value sets for the variables and the procedures used to collect the information will be, i.e. question formulations and sampling procedures. However, processing procedures, and in particular coding, are important for the quality of occupational data, and therefore also for the comparability of the resulting statistics. This has been documented in e.g. *Campanelli et al (1997)*. A simple, but flawed, indicator of the quality of coding is the *reliability rate* (i.e. the rate of consistency between different coders of the same material), which typically will tend to be around 0.8 for 'occupation'. As all coders involved in a quality test may have made a mistake relative to a "true" value, this will be a low estimate of an "error rate". Thus it is important to use procedures for coding which may reduce significantly the number of errors made.

37. In official statistics the national labour force surveys (LFS) in many ways can be said to represent an approximation to the same survey format because of their use of a common set of basic concepts and variables as well as similar survey procedures, see e.g. *Lawrence, 1999*. This applies in particular to the LFSs which follow the specifications given by Eurostat for the *European Union Labour Force Survey (ELFS)*. However, there is little evidence that those responsible for these surveys have in fact taken all the steps possible and necessary to ensure a reasonable degree of comparability with respect to the occupational statistics to be derived from the results, even when these results are presented according to ISCO-88 or some other common value set, see e.g. *Birch & Elias (1997)*. Even when pains have been taken to satisfy condition f. indicated above, little attention seems to have been given to condition e. with respect to the "occupation" variable.

38. Comparable statistics with data of low reliability is a self-contradiction. Therefore the first objective if one wants to compare occupational statistics must be to ensure that the data being compared have been measured reliably. The studies quoted above do not really provide the components of a *total quality model* for occupational statistics, but based on them and more general methodological considerations the following elements would seem to be important, see e.g. *Hoffmann et al (1995)* for a more detailed discussion:

- (a) the surveys should use one or more questions which will ensure that the respondent provides the type of information which can be used to identify and code the "occupation" of the selected job. Such question(s) should usually ask about the job

title and the main tasks and duties of the job, not about “occupation” which is a term often interpreted by respondents to mean the type of work they were trained for.

- (b) The information provided by the respondents should be coded by using coding indexes which reflect the type of responses which are given to the question(s) used. The indexes should be organised to support the rules for coding, see (c) below, and the index items should have references to the codes of all relevant classifications⁹.
- (c) Coding should be to the most detailed level of the classification supported by the responses given, to preserve the as much as possible of the information provided. That some codes may not appear frequently enough to warrant separate presentation when publishing the results should be dealt with during the preparation of tables, not as part of the coding process. Coding to a pre-defined “level” in the coding structure is inappropriate as the size of the groups defined at that level will vary significantly in most national occupational classifications as well as in ISCO-88. Therefore the best coding strategy will normally be to register the coding index entry identified as best representing the response. This will ensure “coding to the most detailed level”, and will make it possible to leave the choice of the most relevant classification to when one is making the tables.
- (d) If coding to a common classification cannot be done during the initial coding process, then the mapping from the original codes to e.g. ISCO-88 should be done from the most detailed level of the classifications used, even if the data are not available at that level. Reliable mapping cannot be made on the basis of group titles alone, especially if some of them are translated from the original language, but must be based on an examination of the specified tasks and duties in the respective groups. The mapping at this level should be the basis from which one should construct the links for the data available, see *Hoffmann (1994)* for an elaboration.

39. While not sufficient to ensure good quality and comparable occupational statistics, the use of a common value set of occupational groups and carefully constructed coding indexes and rules are certainly necessary tools. The HISCO project, see *van Leeuwen, Maas et al (1999)*, represents an interesting effort to ensure that these tools are being developed for the study of historical materials, through joint discussions between participating researchers on the best way to construct coding indexes and procedures to be used for historical records providing occupational information for different periods and in different countries. The best available discussion on the problems one faces, both possibilities and limitations, when such tools have not been applied when producing the available statistics, can be found in Anker (1998): in particular in chapter 4 but also in chapter 11 and elsewhere in the book.¹⁰

⁹ Chapter 3 in *OFS (1998)* presents how this will be done for coding to the Swiss *Répertoire des professions* as well as to ISCO-88(COM) and the Swiss vocational training system.

¹⁰ The analysis in *Anker (1998)* is based on the data found in SEGREGAT. This data base has statistics from about 40 countries on the employment of men and women in fairly detailed occupational groups (national classifications), mostly from Labour Force Surveys or Population Censuses for 1970, 1980 and 1990, or years close to these. SEGREGAT is available upon request from the ILO Bureau of Statistics.

40. The validity of the above arguments is independent of the particular common classification chosen, and e.g. both *Anker (1998)* and the HISCO project use ISCO-68 as the common classification. For Anker the reason is simple: most of the national data sets he used were based on (national variants of) ISCO-68, both because most sets pre-dated ISCO-88 and because it always takes considerable time for a new international standard to be implemented. For the HISCO project the advantage of using ISCO-68 instead of ISCO-58 or ISCO-88 is not evident, and the choice may have been more a result of the familiarity of the initiators of the project with this classification than the result of a careful evaluation of possible alternatives¹¹. The choice of ISCO-88 as the ‘common denominator’ for comparative studies where ‘occupation’ is an important variable has to be based on an evaluation of whether the distinctions it makes are relevant for the issues to be explored and of the extent to which it corresponds to the classifications used in the sources upon which the studies will be based. Even when the former consideration does not point clearly to ISCO-88 the latter may do so, as indicated in the information about the penetration of ISCO-88 in national statistical practice given in paragraph 4 above. There is reason to expect that the use of or mapping to ISCO-88 will be more widespread in the 2000 round of population censuses than in the 1990 round, as a consequence of the longer period of adaptation of national practices. It may also have an effect that the ILO and the United Nations Statistics Division together have prepared a guide on how to implement the recommended economic activity variables in population censuses, see *United Nations & ILO (forthcoming)*

‘Occupation’ (and ISCO-88) is necessary but not sufficient

41. It is generally recognized that for adequate descriptions and analysis of the world of work and its social and economic context and consequences it is necessary, but not sufficient, to be able to describe the type of work being carried out (i.e. the *occupation*). Among the background variables which are needed in addition are (i) the type of activity within which the work is being carried out (i.e. the *industry*¹²); and (ii) the contractual conditions of the work (i.e. the *status in employment*¹³). Thus the UN recommendations for population censuses have always included that these variables should be measured for the economically active population, see e.g. *United Nations (1998)*.

42. ‘Social stratification’ and ‘social mobility’ are important areas for social research which also correspond to important social and political concerns about inequalities of

¹¹ Relevant considerations: (i) Both ISCO-58 and ISCO-88 distinguish between “craft workers” and “machine operatives” producing the same type of goods. This distinction, which is absent from ISCO-68, is particularly important in an historical context. (ii) ISCO-58 has and ISCO-88 could easily be given a level of detail of defined ‘occupations’ corresponding to that of ISCO-68. (iii) The treatment of “managers” in ISCO-88 would seem more satisfactory than in either of the other two classifications, while the treatment of “supervisors” has weaknesses in all three. (iv) It is also an argument for using, or making a connection to, ISCO-88 that statistics produced now will be a source of historical studies in the future. These may include possible extensions of the HISCO project.

¹² See *United Nations (1989)*.

¹³ See *ILO, 1993* and chapter 3 in *ILO, 1998*.

opportunities and results, as well as about their reproduction over life cycles and generations, see e.g. *Erikson & Goldthorpe (1993)* Central tools in such areas of analysis are typologies of “social class” or “socio-economic groups”. Whereas the distinctions between various groups in these typologies have been given a variety of theoretical justifications their operationalisations have normally relied upon the variables “occupation”, “industry” and “status-in-employment”, usually with the former as the most important element and with all variables represented with very limited value sets. Sometimes these variables are supplemented with variables such as “educational attainment” and “type of authority at work-place”. Some of these typologies have separate classification rules for persons who are not economically active, such as “main source of livelihood”.¹⁴

43. Some researchers have criticised ISCO-88 for not incorporating “status-in-employment” aspects, i.e. for not being more of a socio-economic classification. The above presentation of ISCO-88 has hopefully explained why this is so. *Ganzeboom & Treiman (1996)* says that “this ... may diminish the applicability of ISCO-88 for practical reasons. Securing additional information on employment status usually will require additional survey questions.” This argument ignores the fact that information about the “status-in-employment” situation about a job does not come spontaneously when asking for its main tasks and duties, the information needed to code “occupation”. Thus when the “status-in-employment” distinctions are incorporated into the ‘occupation’ classification used, one or more separate questions may have to be asked to obtain the information needed for correct coding. This is clearly demonstrated e.g. by the questionnaire used for the last French census.

44. In this context it is also relevant to observe that it is surprising that little or no attention is paid to the problems of determining the borderline between “paid employment” and “self-employment”, i.e. in the intermediary contractual situations which many workers find themselves. To do so would be particularly pertinent in developing and transition economies where such situations are more prevalent than in the traditional market-oriented, industrialized economies. However, anecdotal information suggests that new contractual forms and borderline situations are becoming more common also in the latter. Some of these forms and situations are well known: e.g. “owner-managers” of incorporated businesses and taxi-drivers whose contract with the owner of a taxi-licence or car in effect means that they rent their means of production and effectively carry (most of) the economic risks of self-employment, even though they may consider themselves to be “employees”. Other borderline situations are represented by “day labourers” who (may) have to sell their services to a (new) “employer” on a daily basis; “franchisees” who invest a considerable amount of capital in the work-place, but who have limited operational freedom; and the “dependent contractors” who for tax purposes are registered as self-employed but whose work situations correspond to those of

¹⁴ Traditionally national statistical offices have been reluctant to create or use such typologies, but *Grais, 1999* reports that 10 statistical offices in EEA countries (out of the 13 providing information) use one for official statistics. The recommendations for the 1990 round of population censuses in the ECE region (Europe and North America) included this as a topic to be derived from other variables in the census, see paragraph 110 in *UN/ECE et al (1987)*. The corresponding recommendations for the 2000 round also mention this as a derived topic, but do not give a typology, see paragraph 155 in *UN/ECE et al (1998)*. For more information about “occupation”-based classifications of this type as developed by some national statistical offices, see e.g. *Scott (1985)* for France, *Rose & O’Reilly (1998)* for U.K., *Davis et al (1997)* for New Zealand and *Andersson (1990)* for the Nordic countries.

“employees”. *ILO (1993)* has a non-exhaustive list of different borderline situations and chapter 3 in *ILO (1998)* describes the lack of concern with such issues in national statistical offices, as found in a 1998 ILO survey of their practices. However, *Rose & O’Reilly (1998)* calls for further work on these issues.

The future of ISCO-88

45. When the proposal for the conceptual framework for ISCO-88 was prepared one hoped that one benefit would be to make it easier to retain the classification’s basic structure and principles for a long period, and to ensure that occupational consequences of the continuous changes could be taken care of within this structure through a process of up-dating within and extension of the established structure. Unfortunately, systematic work to up-date and extend ISCO-88 has been modest, even though the *World Health Organization* has provided new descriptive definitions for the following groups defined for *nursing* occupations: 223, 2230, 323, 3231, 3232 and 5133. In the future these and other updated descriptions will be found on the ILO web-site as they are being developed.

46. There are two main reasons for the lack of progress in up-dating ISCO-88: (i) The limited resources devoted to ISCO-related work. About one work-year per year, divided between two persons, have been allocated to this work in the ILO and most of the efforts have had to be devoted to providing guidance on understanding of ISCO-88, as well as on the development of national standard classifications of occupations (NSCO) and on the effective use of the NSCO to obtain reliable occupational statistics. (ii) As custodian of ISCO-88 ILO is even further removed from the realities of the world of work which the classification is supposed to reflect than are the custodians of NSCOs. On a world-wide basis these realities are also much more varied than those of a national labour market. Thus, even if ILO had allocated ample human and financial resources for this work one would be faced with difficult methodological issues: Where do we find relevant information, given that few national custodians have established systematic procedures for updating their NSCOs, and that those who have do not necessarily inform ILO about their activities and findings? What are the criteria by which we can judge whether a reported development is (sufficiently) significant and widespread to be reflected in ISCO-88?. Do we need to make such judgements?

47. In the face of these problems the ILO’s short term strategy will continue to be one of “muddling through”: Proposals for up-dating and extending the ISCO-88 classification structure may take several forms:

- (a) A number of more detailed occupational classes may be presented as subdivisions of appropriate ISCO-88 unit groups, with a two digit extension to the unit group code: "-xy". Such extensions will be proposed where it has been made clear that international exchange of occupational information, including statistics, on these groups will warrant their separate identification within the ISCO-88 structure. This may happen e.g. (i) at the initiative of e.g. international federations of organizations of people working in particular professions who can make a case for the separate identification of these professions in ISCO-88 as important for the international

recognition of such occupations¹⁵; (ii) because new occupations have emerged as a consequence of technological developments common to a number of countries; or (iii) because exchange of information between several countries for e.g. recruitment, job placements and the international migration of workers will be facilitated by references to detailed standard occupational classes.

- (b) Regional adaptations of ISCO-88 may introduce new unit and/or minor groups to the ISCO-88 structure, to bring together and highlight some important categories of occupations which in ISCO-88 are "hidden" in one or more unit groups, or which it is difficult to place within the ISCO-88 structure¹⁶.

We expect that an ISCO-dedicated web-site, which we hope to establish before the end of 1999, will be our main channel of communication with those who are closer than we are to the world of work. The web-site will be used to display answers to queries on ISCO-88 and its use, as well as proposals for up-dates and extensions. We hope to establish hyper-links to similar web-sites for NSCOs. The results of these efforts will be presented to the *17th International Conference of Labour Statisticians (ICLS)*, tentatively scheduled for 2003-04, with an invitation for the delegates to ICLS to consider whether proposals for a comprehensive revision of ISCO-88 should be prepared for discussion at the 18th ICLS in 2008-09. Obviously, all this will depend on whether a minimum of qualified staff and other resources will be allocated to the relevant activities.

48. As the ILO also is the custodian of ICSE-93 efforts will be made to explore further the issues referred to in paragraph 44 above, hopefully on the basis of research and experiences from developing and transition countries, as well as from the OECD countries which normally have the strongest statistical organisations as well as the best capacity for relevant academic research on these issues.

Concluding remarks

49. It is a major task to collect, organize, analyse and summarize effectively the large amount of information on the work which people do which is needed to construct a national occupational classification which will be and remain a reasonably faithful reflection of the world of work of the country. To judge whether ISCO-88 manages the even more formidable tasks of serving as a common denominator and model for such national classifications in a manner which is good, bad or indifferent is not up to its architect and custodian, but for the various users of this tool, this "map" of the world of work; and their judgement will differ as a function of what they want to use the tool for. What is clear, however, is that the combination of low commitment of resources to this type of map-making, both in countries and in the relevant international and regional organisations, as well as the complexity of the subject matter, does create a situation where ISCO-88 is and will continue to be, the dominant

¹⁵ One example is the proposal to create a group *2111-11 Medical Physicist*

¹⁶ One example is the group *247 Public service administrative professionals* created for ISCO-88(COM).

alternative for those who want to carry out cross-national comparisons of occupational data (to be) collected over the 20-25 year period stretching from about 1990 to about 2010-15, even if a new version of ISCO should be adopted by a 17th ICLS in 2008.

50. Given this “fact of statistical life”, the challenge to ILO as the custodian of ISCO is to make sure that ISCO-88 stays updated and that users are informed about the most effective ways of using this complex tool. The challenges to the users of ISCO-88 is (i) to make sure that they are using the tool as effectively as possible; (ii) to share with the ILO the problems and experiences with using ISCO-88, because this is the major possibility for the ILO to learn what it needs to know to improve ISCO-88; and (iii) to put pressure on the ILO to honour its obligations as custodian. Such pressure can be applied directly by contacting the ILO Bureau of Statistics, as well as indirectly through the representatives in the ILO bodies which determines its priorities, work-programme and budget. As one important group of users of ISCO-88 based or linked statistics social scientists as individuals and as a group should be concerned about the development of this tool, should make their requirements known to the tool-makers, and should contribute to improvements and effective use of national occupational classifications as well as ISCO-88.

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