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Web-survey

Formats to classify key occupations,

tick job content, skill level and

competency profiles

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Abstract

Contemporary European labour markets are structured along the lines of occupations. Therefore, occupation is a key variable in research within the EU. Despite the relevance of the occupation variable, the measurement of occupation in comparative research is often problematic. International datasets use the International Standard of Occupational Classification (ISCO), developed by the International Labour Office (ILO) of the United Nations. However, a problem with ISCO is that it does not allow skill levels to vary across different national contexts. Additionally, the correspondence tables to recode national occupational classifications into ISCO are often far from perfect, so that relatively large numbers of occupations end up in the 'Not elsewhere classified' categories. Therefore, there is a need for more detailed occupation data in Europe.

In order to facilitate researchers and policy makers to obtain insight in how occupations compare across countries and how problems of incomparability of occupations can be tackled, the EU funded project 'EurOccupations' aims to build a detailed European occupations database. The major aim of this project is twofold:

- to facilitate reliable measurement of the occupation variable in comparative research in Europe;
- to gain insight into the comparability of occupational structures and occupational content within Europe.

The EurOccupations database aims to provide a tool for response to the survey question "What is you occupation" in large-scale surveys. The 4-digit ISCO-list of occupations is enlarged to include occupational titles that will be recognised by respondents in survey research, without going into extreme detail.

The database will include occupation information for approximately 1.500 detailed occupations in 8 European member states (United Kingdom, Germany, France, Spain, Poland, Belgium, the Netherlands and Italy). For all 1,500 occupations, the database will include occupational titles, ISCO-codes, NOC-codes, as well as information about distribution of gender, education and age groups in each country. For a selection of 150 key occupations in 7 countries (all countries except Italy), the EurOccupations database will additionally include information on skill levels, occupational content and relevant social stratification measures. The information for these occupational dimensions is gathered through an expert research, in which occupational experts are asked to judge a number of key occupations on these dimensions. These experts are, for example, representatives of employers' or employees' organisations, professional organisations, interest groups, vocational training bodies or knowledge centres etc.

1. Introduction

Contemporary European labour markets are structured along the lines of occupations. Therefore, occupation is a key variable in research within the EU and in policy issues in the European labour market. For example, sociologists have a long tradition in analysing social stratification in contemporary societies, where people are classified in different social strata based on, amongst others, occupational status (e.g. Ganzeboom & Treiman, 1996; Sixma & Ultee, 1983). Occupation is also a key variable in research on gender wage gaps in Europe. Several generations of researchers have documented the role of occupational gender segregation in maintaining the gender wage gap by demonstrating that female-dominated jobs and occupations offer lower pay than male-dominated jobs and occupations (e.g. England, 1992; De Ruijter, 2002).

Despite the relevance of the occupation variable in research, the measurement of occupation in comparative research is often problematic. International datasets use the International Standard of Occupational Classification (ISCO), developed by the International Labour Office (ILO) of the United Nations.[1] ISCO classifies work according to tasks and duties related to an occupation and to relevant skills that are necessary for fulfilling the formal and practical requirements of a particular occupation (ILO, 1990). ISCO is a hierarchical classification and it distinguishes 10 major groups (1-digit), 28 sub-major groups (2-digits), 116 sub-groups (3-digits) and 390 unit groups (4-digits). A unit group consists of a number of occupations that share similar skills and duties, which subdivide into jobs.

However, a problem with ISCO is that it does not allow skill levels to vary across different national contexts. This hampers harmonisation of occupation data across Europe (Elias, 1997). Additionally, the correspondence tables to recode national occupational classifications into ISCO are often far from perfect, so that relatively large numbers of occupations end up in the 'Not elsewhere classified' categories.

Due to these problems, major socio-economic datasets covering EU member states, such as the European Working Conditions Survey and the European Social Survey, include an occupation variable at the 1- or 2-digit ISCO level only. This is not problematic in small datasets with less than a thousand respondents per country, because in these cases, further disaggregating would lead to empty cells. However, for European datasets with more observations per country, a highly disaggregated variable is useful and may evoke new, exiting analyses. Currently, the fact that most European datasets include occupation variables at the 1- or 2-digit level only results in an serious loss of information compared to national studies including more detailed occupation information at the 3- or 4-digit level (Bergman and Joye, 2001), since 1- and 2-digit ISCO occupational groups comprise many occupations and jobs.

Therefore, there is a need for more detailed occupation data in Europe. This need has become even more urgent in recent decades, due to the changing labour market conditions in the EU (e.g. Pollack, Simons, Romero & Haussers, 2002). Policy makers are increasingly confronted with issues

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[1] ISCO was developed in 1958, with revisions in 1968 and 1988. ISCO is currently updating the classification, the newest edition is expected to be published in 2008. In 1993, ISCO-88 (COM) was developed to report occupational statistics to Eurostat (Hoffman, 1997).

concerning the international differences and similarities in occupational structures in Europe. For policy-making in cross-country issues, detailed occupational information with respect to, for instance, competencies and educational requirements is required. Such information is indispensable for policy-making at a European level with regard to employment policies, policies to reduce gender wage gaps and the international comparability of credentials.

This paper describes the development of a European occupations database that aims to tackle the problems mentioned earlier in research and policy-making, and that allows variations in occupational dimensions across European countries. This database is currently being developed in the EU-funded project 'EurOccupations'. The major aim of this project is twofold:

- to facilitate reliable measurement of the occupation variable in comparative research in Europe;
- to facilitate policy makers by gaining insight into the comparability of occupational structures and educational requirements within Europe.

The EurOccupations database aims to provide a tool for response to the survey question "What is you occupation" in large-scale surveys. The current 4-digit ISCO08 list of occupations is not sufficient and is enlarged to include occupational titles that will be recognised by respondents in survey research, without going into extreme detail.

The database includes occupation information for approximately 1.500 detailed occupations in 8 European member states (United Kingdom, Germany, France, Spain, Poland, Belgium, the Netherlands and Italy). For all 1.500 occupations, the database will include occupational titles, ISCO-codes, NOC-codes, as well as information about distribution of gender, education and age groups in each country. For a selection of 150 key occupations in 7 countries (all countries except Italy), the EurOccupations database will additionally include detailed occupational information on skill levels, occupational content and relevant social stratification measures to facilitate both researchers and policy makers.

The project aims to develop a database of occupations, not jobs. The distinction between jobs and occupations is highly relevant. Occupations consist of similar sets of tasks that are performed independently of the corporate context. Jobs, on the other hand, are more detailed: they are comparable sets of tasks performed within an corporate context. The concept of occupation is especially relevant in comparative research, since studying jobs would limit generalisations to the corporate context and thus hamper international comparisons (Tomaskovic-Devey, 1995).

The construction of the extended list of 1.500 occupations as well as the selection of 150 key occupations are described in other EurOccupations research papers (e.g. Tijdens & Jacobs, 2006). In summary, the following steps were taken in the construction of this extended list of occupations:

1. The ISCO08 (draft 3 version) list with its 447 occupations at 4-digit level was taken as the point of departure.
2. The 585 occupations at 4-digit level of the US-DOT classification at the proper 4-digit number were converted into the ISCO08 classification. All occupations, specified in US-DOT but not present in ISCO08, were added to the Euroccupations list.
3. Next, we went carefully through the extremely detailed list of 9,626 occupational titles of the ALPHABETICAL INDEX OF OCCUPATIONAL TITLES for ISCO88(COM). Occupations not yet present

but that could be expected to have large numbers of job incumbents were added to the Euroccupations list.

4. Then, occupations often reported in the data of the WageIndicator web-survey, particularly from the German occupations list, were added to the Euroccupations list. This step allows for including new-arising occupations or for occupational titles that have to be detailed to a larger degree.

5. Finally, occupations not present yet in the Euroccupations list were added from national occupations classifications, notably the SBC classification from the Netherlands, the SOC (UK), the Belgian VDAB-lijst, the US O*Net occupations database (f.e. social workers), and the Canadian occupations website www.workfutures.bc.ca.

In total, a set of 1,335 unique occupational titles was created, classified according to the ISCO08 framework of 4-digit occupations.

This paper will focus on the measurement of skill level and occupational content in the occupations database for both researchers and policy makers. The information for these occupational dimensions is gathered through an expert research, in which occupational experts are asked to judge a number of key occupations on these dimensions. These experts are, for example, representatives of employers' or employees' organisations, professional organisations, interest groups, vocational training bodies or knowledge centres etc.

This paper describes the design (and, in a later version, the results) of this expert research. Section 2 describes relevant occupational dimension based on a literature review. In section 3, the research design of the expert data collection is discussed.

2. Relevant occupational dimensions: literature review

In comparative research, several occupational dimensions have proven to be relevant. For labour economists required human capital is important, for example in studies on wage structures. In the HRD literature, an important source of information for policy makers, occupations are often described in terms of relevant tasks and required competencies. For social stratification research, the socio-economic status of occupations is relevant. This section gives a short overview of the literature.

Skill level
In economic research, occupational skill levels are used as a proxy for human capital. Human capital theory (e.g. Becker, 1975) assumes a perfect fit between individuals and occupations: an individual's stock of human capital perfectly matches occupational skill requirements. The allocation of individuals to occupations thus depends on the abilities of workers and the skill requirements of occupations. Occupational skill requirements are often measured as required education, years of schooling, the blue- or white-collar nature of occupations (or production versus non-production) and labour market experience (e.g. De Ruijter, 2002; Portela, 2001). Please note that the required education for occupations may differ from the actual educational levels of workers in occupations. For example, Batenburg, Asselberghs, Huijgen & Van der Meer (2003) conclude for the Netherlands that workers in occupations often have enjoyed a higher education than actually is required. Occupational skill

requirements are not only important for understanding the allocation of workers to occupations but are also relevant in explaining, for example, occupational wage differences.

Additionally, the distinction between specific and general human capital is important in economic research (e.g. Tam, 1997; De Ruijter, Schippers & Sap, 2006). Specific human capital, like technical skills, has restricted applicability and is more vulnerable to depreciation than general types of human capital (Tam, 1997). For instance, investments in technical skills can lose their value relatively fast because of technological progress. Because of their restricted applicability and the need for continuous investments, the returns on investments in specific human capital in terms of wages are relatively high. In the literature, a distinction is made between firm-specific, sector-specific and occupation-specific human capital.

For general human capital, there are more opportunities to recoup investments. The main characteristic of general human capital is its widespread applicability, which means that it can be useful in varying contexts (also outside the context of paid labour). Following this line of reasoning, occupations that require less specific human capital have lower marginal productivity, since investments in specific human capital are more intensive (more incentives are required to trigger the marginal employee of occupations requiring specific human capital to invest in them). Therefore, it is relevant to know whether an occupation requires general or specific human capital when explaining, for example, occupational wage differences.

The so called 'comparable worth' research tradition also focuses on the explanation of occupational wage differences. More specifically, this tradition aims to provide insight in occupational gender wage gaps: why do workers in female-dominated occupations generally earn lower wages compared to male-dominated occupations? Comparable worth researchers use measures of 'occupational worth' to understand these occupational gender wage gaps. According to comparable worth researchers (e.g. England, 1992; Treiman and Hartmann, 1981), the 'worth' of occupations captures more than human capital proxies such as required education and skill. They extend measures of required education and skill with measures of responsibility and effort. Occupational working conditions are sometimes also included in the definition of occupational worth (e.g. Treiman and Hartmann, 1981). However, the choice for working conditions that do or do not contribute to occupational worth is rather arbitrary, as this depends on the preferences of occupational workers (e.g. England, 1992). Instead of a characteristic of occupational worth, working conditions are assumed to be a characteristic of compensation, i.e. outcome-related instead of input-related.

Based on insights from the human capital and comparable worth tradition, it is important to include measures of required education and skill, general versus specific human capital, responsibility and effort in an occupations database.

Occupational content: tasks and required competencies
In the Human Resource Development (HRD) literature, the concept of occupation *itself* is also a focus of study. These studies aim to provide insight in the type of work in a specific occupation and how tasks are performed (e.g. Morgeson & Campion, 2000). Findings from these studies are used to formulate HRD policies, for example concerning educational training programs, job evaluation systems or management development. More recently, in light of the European unification, labour migration

issues have become more important for HRD professionals. This development has increased the relevance of insights in differences and similarities in occupational content within the EU.

Traditionally, occupation studies in the HRD literature have focussed mainly on task analyses. The description of relevant tasks provides a rich source of information on occupational contexts and essential activities in an occupation.

Besides describing tasks, many HRD studies also identify required competencies. Due to the development of knowledge based economies in recent decades, the focus has shifted from traditional task analysis to more generalised competency modelling. It is argued that competencies are critical to organisational survival, productivity and continual improvement, and therefore, it is important to analyse and describe these competencies (e.g. Rodriguez, Patel, Bright, Gregory & Gowing, 2002). Please note that competencies are closely related to skill levels and comprise a combination of skill, knowledge and attitude that are necessary for particular occupations (Le Deist & Winterton, 2005; Winterton, Le Deist & Stringfellow, 2005). In this sense, the HRD approach relates to the human capital and comparable worth tradition.

There is much confusion and debate concerning the concept of competence, which is mainly caused by (international differences in) the aims of competence use (Merriënboer, Van der Klink & Hendriks, 2002). In the literature, three dominant approaches to competency modelling are distinguished: the behavioural approach from the US, the functional approach from the UK, and the multi-dimensional holistic approach from France, Germany and Austria (see for a description of these approaches: Van der Klink & Boon, 2002; Le Deist & Winterton, 2005; Winterton, Le Deist & Stringfellow, 2005). In the behavioural approach, competency is defined in terms of 'underlying characteristics of people that are causally related to effective or superior performance, generalizing across situations, and enduring for a reasonably long period of time'. The behavioural approach measures competency on the level of the individual employee, not on the level of the occupations. The functional approach, on the other hand, defines competency as 'the ability to perform tasks and activities within an occupation to the expected standards'. A problem with the traditional functional approach is, however, that it lacks the *integration* of knowledge, understanding and skills with attitudes and personal traits within competencies (Van der Klink & Boon, 2002). The multi-dimensional holistic approach (Gonczi, 1994; Tovey, 1993) is gaining ground over the narrower functional and behavioural approaches. This approach recognises the importance of social and behavioural competences in addition to knowledge (cognitive competence) and skills (functional competence). Competence is defined as an integration of knowledge, skills and attitudes (Winterton, Le Deist & Stringfellow, 2005).

Based on insights from the HRD literature, it is important to use a competency framework that does enclose combinations of skill, knowledge and attitude (Le Deist & Winterton, 2005; Winterton, Le Deist & Stringfellow, 2005). Competencies are defined as a coherent set of observable performance dimensions, including knowledge, skills and attitudes and behaviours, that are linked to high performance and refer to the capability of an individual to adequately perform the tasks of an occupation and to act according to the occupational requirements. This definition of competencies has been used as the basis for the construction of the levels in the European Qualification Framework, which has been developed to facilitate communication and co-operation between education and

training providers/authorities at different levels and in different countries (Commission of the European Communities, 2006).

A concern regarding the measurement of competencies is the validity as measurable constructs (e.g. Lievens, Sanchez & De Corte, 2004, p.882; Markus, Cooper-Thomas & Allpress, 2005). Most competency modelling approaches are directed to identifying relevant competencies without analysing the tasks of the occupation. Research indicates that the quality of competency measurements significantly increases when task-based information is available as well, i.e.: information on tasks decreases the complexity of competency judgements by experts and bolsters reliability of competency measurement (e.g. Dierdorff & Wilson, 2003; Lievens et al, 2004; Voskuijl & Van Sliedregt, 2002). Thus, it is important to include information on both relevant tasks and competencies in an occupations database. Additionally, the combination of describing unique tasks and identifying relevant general competencies provides a rich source of occupation information in the resulting occupations database.

3. Measuring occupational dimensions: expert research

The occupations database will include information on human capital, occupational content and social stratification measures. In order to develop indicators for these measures, an expert research is conducted. In this expert research, experts are asked to judge a number of key occupations on these dimensions. The main purpose of this expert research is to utilise available expert knowledge on the subject and gather the required occupation information in an efficient manner (De Wolf & Van der Velden, 2000).

Expert research: the choice of occupational experts
An obvious choice of occupational experts would be the workers in the occupations. In social-psychological research, workers are often asked to judge their own occupations on several dimensions (e.g. Ikaszak, Bottom & Drasgow, 1988). In job analysis research, job incumbents are preferred for their ratings compared to the ratings of naïve raters, usually college students (Lievens, Sanchez & De Corte, 2004). However, the judging of occupations by occupational workers has some major problems (which are extensively discussed by Morgeson & Campion, 1997). These problems are also acknowledged in job analysis research (Lievens, Sanchez & De Corte, 2004).

First, occupational workers tend to assess the level of their occupation higher than it actually is. Especially when the occupation is defined at a more abstract level, i.e. when they have to judge their occupation instead of their specific job, the tendency to upgrade the their occupation increases due to social desirability. Furthermore, workers might not describe the actual content of their occupation, but what they want others to think this occupational content is. For example, workers might indicate that they supervise others, while they in fact only instruct new colleagues. Additionally, occupational workers are strongly influenced by the corporate context in which they are employed, while the major characteristics of occupations is that they cross these corporate boundaries.

Because of these objections to consulting occupational workers as experts, we will mainly consult other types of experts in the data collection, namely: representatives of employers' or employees' organisations, professional organisations, interest groups, vocational training bodies or

knowledge centres, supervisors, researchers in the field of occupations (either from universities or from statistical offices), informants from a wide variety of branches of industry, vocational advisors, HRD professionals etc. These experts are 'meta level' experts, who can judge different occupations with a certain distance while at the same time having relative much knowledge on the specific content of occupations. If, however, due to a lack of information or due to the absence of relevant meta-level experts for certain occupations, occupational workers are also consulted as experts. Especially for higher-level occupations, the problems mentioned earlier of using occupational workers as experts are smaller compared to lower-level occupations (e.g. Van der Klink & Boon, 2002). Therefore, occupational workers are a useful source of additional information.

Expert data collection

In order to structure and streamline the expert data collection, eight expert groups are formed. These expert groups are organised along the lines of relevant clusters of occupations, corresponding to the division of labour in contemporary industrialised societies. In sum, the main objectives of these expert groups are:

- to build a network of experts with regard to occupational structures for the specific cluster of occupations;
- to describe job content for the key occupations (a total number of 150 key occupations, evenly distributed amongst the different clusters of occupations);
- to check job content, skill levels, required competencies for these key occupations, using existing data sources and by consulting experts using standardised questionnaires;
- to organise expert sessions to discuss the preparations;
- to prepare the 5-digit ISCO and ISCED classification for the occupations in the cluster.

By means of desk research and (if necessary) consultation of relevant experts, cross-national information on the job content of key occupations will be gathered. Based on this information, relevant tasks are described for each of the 150 key occupations as well as a short occupation description. In total, 10 tasks per key occupation are described, in order to include enough information per key occupation to identify country differences in tasks. At the same time, a maximum number of 10 tasks keeps the descriptions at a reasonable length. Each cluster coordinator in the EurOccupations research team will write these task descriptions following a standardised procedure, which will be elaborated upon later in this paper.

After identifying relevant tasks for the 150 occupations (using a cross-national perspective), all tasks will be listed and compared. Similarities between the tasks will be identified and if necessary, linguistic adjustments will be made to advance consistency in the way the tasks are described and so that, in a later stage, task comparisons between occupations are facilitated. In this phase, we can also identify possible overlap between occupations. Some occupations might comprise almost identical tasks. If this is the case, these occupations might, in fact, be identical and thus reflect only one instead of separate occupations.

The desk research phase is followed by the expert research, in which experts are asked to judge occupations regarding the various relevant aspects of the key occupations. Experts are approached through the network of the research institutes involved in the EurOccupations project. Experts are consulted in two ways:

1. by completing standardised questionnaires (using a web survey and, if needed, written copies);
2. by participation in expert sessions (web/video/conference).

First, experts are consulted by using standardised expert questionnaires. For each key occupation, a questionnaire is designed in order to measure the relevant occupational characteristics as described in section 2. The English version of this questionnaire is included in Appendix A.
The questionnaire includes questions concerning:
- skill level;
- relevant tasks;
- required competencies;
- social stratification measures.

For each key occupation, a minimum number of 5 experts will complete a questionnaire.[2] If necessary (if not enough 'meta level' experts are available or when occupation information is limited), workers in a particular occupation are additionally consulted, i.e. are asked to complete a standardised questionnaire about their occupation.

If there is not sufficient agreement amongst the experts on issues such as educational level, additional requirements, relevant tasks and competencies etc. of key occupations, (national or internation) expert cluster sessions (web/video/meetings) are organised in which problematic occupations will be discussed.

So far, we elaborated on the research design of the expert research. The remainder of this section describes the operationalisation of skill level, tasks and competencies.

Measuring skill level
Required education is an important indicator of skill level. However, this variable should not be used as a single indicator of occupational skill level. Educational structures and occupational requirements vary greatly between different EU member states. Institutions, like educational systems, have evolved over time, and this evolution is often shaped by the specific national patterns of industrialisation and other historical events (e.g. Ramirez, 2004). Therefore, we will include more indicators of occupational skill level based on the research literature, namely:
- required educational level (measured according to the ISCED International Standard Classification of Education and CASMINX[3]);
- field of education (based on the ISCO broad fields of education, e.g. teacher training, health and welfare, social sciences, business and law);
- required on-the-job training (in months);

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[2] For example, a study of Lievens et al (2004) indicates that, when occupational experts rate both relevant tasks and competencies of occupations, a number of 4 experts is sufficient in order to obtain reliable ratings of tasks and required competencies.
[3] With CASMINX, we refer to the revised coding scheme of CASMIN as suggested by Brauns & Steinmann (1997) and Kerckhoff, Ezell & Brown (2002). The value of the CASMIN educational classification was proven in comparable social stratification and labour market research, bur the original classification does not capture the institutional changes in Europe after WWII. Additionally, the CASMIN classification does not adequately capture the US educational system. Due to these reasons, we choose to use the revised CASMIN in the EurOccupations project.

- general versus specific human capital (transfer of skills, frequency of updating knowledge and skills);
- responsibility (supervision, coaching, planning of personnel and materials);
- required mental and physical effort.

To facilitate policy makers, additional information about skill level is included in the database. Next to educational requirements, occupations may entail additional requirements in order to enter an occupation. In order to facilitate labour migration, it is necessary to gain insight in these additional occupational requirements. Therefore, we also include:

- additional occupational requirements (e.g. diploma, certification, working according to a professional code or protocol);

Measuring tasks and competencies

In order to offer insight in occupational context and to increase the reliability of competency measurement, both relevant tasks as well as required competencies will be described for the key occupations.

First, unique tasks are identified and described for each key occupation. Tasks are a set of sub-tasks that are logically clustered based on the work process in a specific occupation. A rule of thumb that is used in the identification of relevant tasks is that different tasks can be performed *independently* from one another.

Experts are asked to rate the tasks based on both the frequency, 'key-ness' of the task (is the task of key importance in the occupation) and whether the task is performed independent or under supervision of others. Research on scales for task analyses indicates that these task ratings provide rather independent and valuable information about tasks (e.g. Sanchez & Fraser, 1992).

The following guidelines are used in the description of the tasks (these guidelines are partly based on the guidelines for the description of tasks in O*net (O*net, 2002)):

1. relevant cross-national occupation information is gathered from a minimum number of five sources (for example from the US O*net, a German, a French and a UK occupations database and other sources such as (national and international) competency profiles, task surveys etc.). Where necessary, experts are consulted;
2. the lists of relevant tasks from the different sources are compared. In this step, special attention is paid to the usability of the information for the task description and the level of aggregation in which the tasks are described when comparing the three sources. What information applies to the specific occupation under study, what information applies to other occupations?
3. relevant information on related occupations is noted;
4. the information from the different sources is combined into a description of (preferably) 10 tasks and a short, general description of the occupation (max. 1 or 2 sentences that summarise the core of the occupation). If necessary, experts are consulted. Where adequate and suitable, O*net information is used as the starting point for this description of tasks.
5. The task descriptions will be checked on international validity and consistency by the international EurOccupations research team.

Because different partners in the EurOccupations project are involved in the writing process, the following standardised procedure is used in order to synchronise the descriptions:

- use the standardised format for the task description;
- use the present tense and a direct style to describe tasks, for example 'manage and maintain schedules';
- try to prevent using enumerations, since there is a risk of incompleteness and information might be aged quite soon (bad example: 'assemble and secure pipes, tubes, fittings, and related equipment, according to specifications, by welding, brazing, cementing, soldering, and threading joints', good example: 'assemble and secure pipes, tubes, fittings, and related equipment, according to specifications, by using techniques such as welding, brazing, cementing, soldering, or threading joints');
- try to sketch the context of the specific occupation, e.g. by including examples that illustrate the task;
- use up-to-date examples and avoid mentioning too specific software and machines (f.e.: instead of 'manage and maintain schedules using MS Outlook' use 'manage and maintain schedules');
- use easy, straight-forward language, try to avoid very specific jargon and being pompous in task descriptions;
- use, where possible, 20 or fewer words for the tasks to keep them from being too complex;
- do not include tasks that are conditional, for example 'climb poles and ladders, use truck-mounted booms, and enter areas such as manholes and cable vaults, in order to install, maintain, or inspect equipment' in the task profile of a telecommunication equipment repairer and installer is not a task in itself but is conditional for other tasks (such as 'inspect equipment on a regular basis in order to ensure proper functioning');
- refer to sources in a correct manner.

For the operationalisation of competencies in the expert research, we include two types of competency measurement: (1) the competence levels of the European Qualification Framework, and (2) the SHL competency framework. Competence is used mainly for two different purposes: in the field of education and in the field of human resources. These types of purposes require different competence approaches (Merriënburg, Van der Klink & Hendriks, 2002).

To facilitate comparisons of competencies in the educational field, we include the competence measurement of the European Qualification Framework. This framework entails eight levels of competence, defined by a set of descriptors indicating the learning outcomes relevant to qualifications in any system of qualifications (Commission of the European Communities, 2006). Three types of competencies are included: cognitive competence (knowledge), functional competence (skills), and social and meta-competence (behaviours and attitude).

In the field of human resources, we include a competency framework that is widely used in organisations. The SHL competency framework aggregates 112 competency components, 20 competency dimensions and 8 general factors (Bartram, 2005). These 'Great Eight Competencies' have

emerged from factor and multidimensional scaling analyses of self- and manager ratings or workplace performance. We choose to use this competency framework because (see Bartram, 2005):

1. The SHL framework offers a reasonably good balance between a high level of differentiation and overly broad constructs. The danger of highly differentiated models is that these are not generalisable, while too broad models fail to capture the between-occupation variance in required competency.
2. It provides an articulation of the work performance domain that is consistent with a wide range of models used by practitioners in competency practice and supported empirically by the way in which competency ratings cluster when subjected to factor analysis.
3. It was proven to predict job performance consistently across occupations and different national contexts.

In the expert data collection, we include the 20 competency dimensions of the SHL Competency Framework in the questionnaire, with some minor linguistic adjustments since so that the competency dimensions are understandable for experts in the questionnaire and in order to better capture occupations from assistant-level to managerial occupations.

We choose to use this general competency framework in the questionnaire, so that the resulting occupations database will allow comparisons across occupations with regard to competencies. Additionally, by using a general competency framework, the database will provide information that can be used to identify occupations with similar competency requirements (Rodriguez, Patel, Gregory & Gowing, 2002). Due to (rapidly) changing requirements in contemporary labour markets, using a common framework of competencies offers the opportunity to capture the content of occupations in a more general manner (Athey & Orth, 1999).

Social stratification measures[4]
Included in the expert research section of the original research proposal was the intention to supply EurOccupations database users with a measure of social stratification. It was said then that a conversion algorythm would be developed for the database, so that this would be made possible. At that time, however, the idea of starting of from ISCO08 to develop the EurOcuppations extended list of occupations did not exist, which implied that a complete conversion scheme for a social stratification measure would have to be drawn up. The decision to progress from ISCO08 made the conversion issue less of a problem (see Tijdens & Jacobs, 2006). Conversion schemes of ISCO88 to a variety of stratification measures (e.g.: EGP class schema, European Socio-economic classification (ESEC), measures of socio-economic status (e.g. ISEI) do already exist . The modifications to ISCO88, needed for the updating process to ISCO08, do not seem to be very drastic or extensive. This means that providing some stratification measures for the occupations included in the EurOccupations extended list will probably require less effort than expected. This left some room within the stratification package to explore new possibilities within the EurOccupations project as far as social stratification is concerned.

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[4] This paragraph is authored by Yves DeWeerdt (HIVA Leuven).

The EurOccupations team agreed to an opportunity in this regard, suggested by the Belgian partner, responsible for the stratification part of the expert research. The idea behind the suggestion was to grab the opportunity offered by the new approach to the extended occupations list to focus on the idea of validating the supposed harmonisation of socio-economic measures, stratification included. After all, harmonisation through validation is a core issue in the EurOccupations project. In addition, stratification research so far mainly focused on validating its measurement instruments as such (test of construct validity, like e.g. Evans & Mills, 1998; Evans, 1996), or tried to assess its explanatory power in a comparative research design (Evans, 1999; Clark & Lipset, 2001). Still, a validation of the measurements used in these researches is lacking, even though it is of crucial importance to the validity of these comparative studies. Even more, harmonized measures have been missing up to recently. Researchers before tried their best to adapt stratification measures in each country in the best way possible, often using occupation as a coding key. Occupation, as this research project goes to show, can hardly be considered a harmonized classification tool.

Nevertheless, a first important step towards harmonization of socio-economic classifications and stratification measures has been an issue of a project called ESEC, which recently came to a successful end. This project, funded through the Sixth Framework program of the European Union, was undertaken between October 2004 and September 2006 The strategic objectives addressed by the proposal were the integration and promotion of socio-economic research across the European Research Area. The project addressed the problem that comparative analysis of many aspects of the quality of life and of social cohesion, for the economic situation of Europe's population, seeking to understand variation between member states, is hampered by the lack of an agreed, harmonized and validated classification of socio-economic positions, including social stratification measures. The project has delivered a proposal for a harmonized socio-economic classification instrument, to a large extent building upon the EGP-class schema, which is the social stratification measure that was of main interest to the EurOccupations researchers. Validation of this classification for use in comparative research settings is however lacking, as was noted before.

The EurOccupations expert research offered the opportunity to validate the central measure of stratification for the EurOccuaptions database (namely EGP derived on the basis of ISCO08 codes), by deriving the ESEC (which can be tuned to the EGP-schema) for each of the participating countries, for the 150 key occupations. This offers a unique opportunity to develop a stratification measure, and to have a, although limited, check of its cross-national validity in the same project. The EurOccupations team therefore decided to try and explore this opportunity to the extent the project and the allocated resources allow them to.

4. The occupations database: resulting measures, reliability and validity

The input from the expert research is used to construct measures for occupational skill level, job content and social stratification[5]. This information will be included in the occupations database. To be more precise: for each of the 150 occupations, the database will include the following variables:

- for each measure: the average expert score for each of the 7 countries;
- for each measure: the heterogeneity in expert judgements in the 7 countries;
- for each measure: the generalised variance (this variable will capture the overall heterogeneity across the 7 countries and allows us to distinguish between 'stable', 'internationally comparable' occupations and occupations that vary greatly between countries with respect to, for example, skill level and required competencies).

Next, it might be interesting to analyse how well the skill measures that are developed based on the findings from the expert research predict wages in the different European countries, using the WageIndicator data.

5. Use of the occupations database

The EurOccupations database will be made publicly available trough the website of the project: www.euroccupations.org. The database will include an extended list of approximately 1.500 occupations and will include, for all 1.500 occupations, occupational titles, ISCO-codes and skill level (CASMINX, ISCED). For the 150 key occupations, the EurOccupations database will additionally include the resulting measures from the expert research, i.e. information on skill levels, occupational content and relevant social stratification measures.

Once the database is made available, researchers and policy makers can download the database, free of charge, in both Access and SPSS format. The files will be accompanied by a user manual in order to display the possibilities of the database to the potential user.

To ensure that the database is used in surveys, a user-friendly search program is built, both in an online and an offline version, that provides searching in the EUROCCUPATIONS database by title or synonym, code or search tree, for several categories of users, such as survey respondents in self-administered computer-based questionnaires, re-coders for paper or telephone-based questionnaires, interviewers and researchers.

Additionally, a toolkit will be made available through the website that will allow for an easy update for National Occupation Classifications (NOC's) of EU member states that are not involved in the EurOccupations project. This way the database can expand by including more European countries, which, in turn, will lead to greater possibilities of cross-national research and increased comparability.

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[5] Social stratification measures are under construction by HIVA Leuven.

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Web-survey

The web survey will be divided into three parts:
- 1. general questions
- 2. questions on education level in the extended list (selection can be made from all 1500 occupations)
- 3. questions on key occupations (selection of 150 occupations)

National flags of each country (2 flags/languages for Belgium)

Thank you for registering as a EurOccupations expert! We would like you to enter some information about your background and expertise on one or more of the occupations shown. This will only take a few minutes of your time.

After completing this short registration form, you will receive an e-mail including the weblink(s) to the web questionnaire(s) of the occupations of your choice.

All the information you submit will be treated as confidential. We will contact you only at your request.

If you complete the questionnaire(s), you will receive in return:
free access to the EurOccupations database
a report in your language that provides insight into international occupational structures and the content of occupations in varying national contexts within Europe (required education and certification levels, core tasks and competencies)
You will receive these results automatically as soon as they are available.

Please tick the box below if you want to subscribe to the EurOccupations newsletter
[]
Name……
Organisation………………………………………………………………………………………………
Address……………………………………………………………………………………………………
Postal code………………………………………………………………………………………………
City……
Country……………………………………………………………………………………………………
E-mail………………………………………………………………………………………………………

1. EXPERT REGISTRATION

1. At what type of organisation do you work?

Note for national coordinators: in the translation of the questionnaire, please translate only those organisation types that are known in your country. If certain types of organisations do not occur, please leave these out in your national questionnaire.

☐ Employer organisation   ☐ Research institute
☐ Union   ☐ Employment agency
☐ Chamber of commerce   ☐ Branch organisation
☐ Labour mediation organisation   ☐ Vocational advise agency
☐ Occupational interest group   ☐ Governmental institution
☐ Educational institute   ☐ Consultancy firm
☐ Knowledge centre   ☐ Other, namely…………………………………
☐ University   ……………………………………………………

2. What is your job?

☐ HR manager   ☐ Vocational advisor
☐ HR employee   ☐ Researcher
☐ Educator   ☐ Teacher
☐ Policymaker / policy employee   ☐ Other, namely…………………………………………..

3. Below, you can provide more information about your job – if necessary.

………
………
………

4. Would you be willing to: **Yes**

…complete a web survey on the content of one or more key occupations in your area of expertise?   ☐

→ *respondents that tick yes will make a selection of key occupations in question 5, on the occupations they mark in question 5, they will receive a web survey by e-mail*

…indicate the required educational entry level for a number of occupations in your area of expertise?   ☐

→ *respondents that tick yes make a selection of the key occupations in question 6, on the occupations in the area of work they mark in question 6, they will receive a web survey by e-mail*

…do both?   ☐

5. We would like to ask you to complete a short web survey on a selection of occupations.
This takes approximately 15 minutes per occupation. *Optional: click here to see the list of all key occupations.*

We would like to ask you to indicate below for which occupations you would be willing to complete a short web survey?

If experts tick 'yes', the list of key occupations in the specific area of work is presented and experts are asked to tick for which key occupations they would like to complete a web survey

Area of work	Yes
1. Clerks, secretaries, post, telephone	
Occupation 1	☐
Occupation 2	☐
Occupation 3	☐
2. Guards, army, police	
Occupation 1	☐
Occupation 2	☐
Occupation 3	☐
3. Legal, administration, inspection, policy adviser	
Occupation 1	☐
Occupation 2	☐
Occupation 3	☐
4. Staff, management, direction	
5. Care, children, welfare, social work	
6. Cleaning, housekeeping, garbage, waste	
7. Health care, paramedics, laboratory	
8. Agriculture, nature, animals, environment (including animal care)	
9. Commercial, shop, buy and sale	
10. Construction, fittings	
11. Education, research, training	
12. HRM, labour mediation, organisation	
13. Language, library, archive, museum	
14. Cars, mechanics, technicians, engineers	
15. Food manufacturing	
16. Industrial production, manufacture, metal & plastics	
17. Oil, gas, mining, utilities	
18. Finances, bank, insurance	
19. IT, automation, telecommunication	
20. Marketing, PR, advertising	
21. Media, graphic, printing, culture, design	
22. Hospitality, tourism, leisure, sports	
23. Transport, logistics, port, airport	

6. We would like to ask you to indicate below for which area of work you would be willing to indicate the required educational entry levels for occupations.

Area of work	Yes
1. Clerks, secretaries, post, telephone	☐
2. Guards, army, police	☐
3. Legal, administration, inspection, policy adviser	☐
4. Staff, management, direction	☐
5. Care, children, welfare, social work	☐
6. Cleaning, housekeeping, garbage, waste	☐
7. Health care, paramedics, laboratory	☐
8. Agriculture, nature, animals, environment (including animal care)	☐
9. Commercial, shop, buy and sale	☐
10. Construction, fittings	☐
11. Education, research, training	☐
12. HRM, labour mediation, organisation	☐
13. Language, library, archive, museum	☐
14. Cars, mechanics, technicians, engineers	☐
15. Food manufacturing	☐
16. Industrial production, manufacture, metal & plastics	☐
17. Oil, gas, mining, utilities	☐
18. Finances, bank, insurance	☐
19. IT, automation, telecommunication	☐
20. Marketing, PR, advertising	☐
21. Media, graphic, printing, culture, design	☐
22. Hospitality, tourism, leisure, sports	☐
23. Transport, logistics, port, airport	☐

We also want to ask some general questions.

7. What is your year of birth?

19……

8. What is your gender?

☐ male
☐ female

9. Do you want to remain anonymous or do you want to be known for being a member of the EurOccupations expert network?

☐ I want to remain anonymous
☐ I want to be known for being a member of the EurOccupations expert network

10. If you want to be known for being a member of the EurOccupations expert network: can you please fill out your personal information?

Name	………………………………………………………………………………………………………
Organisation	………………………………………………………………………………………………………
Address	………………………………………………………………………………………………………
Postal code	………………………………………………………………………………………………………
City	………………………………………………………………………………………………………
Country	………………………………………………………………………………………………………
E-mail	………………………………………………………………………………………………………

11. For certain groups of occupations, we might organise expert sessions or discussions in which you might be interested.

In what way would you perhaps like to contribute to the development of the occupations database? You can mark more than one box.

☐ Participation in national expert (video-/web-)conferences
☐ Participation in Internet discussions
☐ Participation in a European expert conference
☐ Other, namely ……………………………………………………………………………………………

12. How well is your command of the English language?

☐ Very good
☐ Good
☐ Moderate
☐ Bad
☐ I do not command the English language at all

13. Do you possibly know any other experts who might participate in the expert network? If yes, could you note their names and addresses below? *Of course, we will treat this information as confidential. The provided information will be used once to invite the specific expert to participate in the network of experts. If the specific person does not want to participate, the name- and address information of this person will be deleted.*

Name ………………..………………………………………………………………………………………
Organisation ………………..………………………………………………………………………………………
Phone number ………………………………………………………………………………………………………
E-mail address ………………………………………………………………………………………………………

Name ………………..………………………………………………………………………………………
Organisation ………………..………………………………………………………………………………………
Phone number ………………………………………………………………………………………………………
E-mail address ………………………………………………………………………………………………………

Thanks very much for your time and effort!!!

Shortly, you will receive an e-mail including the weblink(s) to the web questionnaire(s) of the occupations of your choice.

2. EXPERT QUESTIONNAIRE EDUCATIONAL REQUIREMENTS

This questionnaire includes question on the educational requirements of occupations. Earlier, you have indicated your areas of expertise.

1. For how many occupations in your area(s) of expertise are you willing to indicate the required educational entry level?

☐ 5
☐ 10
☐ 15
☐ 20
☐ 25

Experts will answer the question below for a random selection of occupations in their area(s) of work, the number based on their answer to the question above.

2. What is the <u>required</u> educational entry level for this occupation in your country? Please note that the required educational entry level may differ from the average educational level of the people working in an occupation. We asked you to tick the <u>required</u> educational entry level. You can mark more than 1 box.

COUNTRY SPECIFIC CODING SHEET

Thanks very much for your time and effort!!!

3. EXPERT QUESTIONNAIRE KEY OCCUPATION [OCCUPATIONAL TITLE]

This questionnaire includes questions on the content of the occupation [occupational title]. It does **NOT** concern [list of related occupations]. Some questions might be difficult to answer. If you do not know the answer to certain questions, you can mark the box 'I don't know'.

Short description of the occupation

....
- here, a short occupational description as developed by the EurOccupations research team will be included - ....
....

1. If any, what alternative job titles are used in your country for [occupational title] (max. of 3 job titles, please include those most frequently used)?

1...
2...
3...

Below, the main tasks of this occupation are suggested. Please note that these task descriptions are preliminary. They are based on international deskresearch. You are more than welcome to provide comments and suggestions to revise the task list.

Suggested tasks:

Insert task 1
Insert task 2
Insert task 3
Insert task 4
Insert task 5
Insert task 6
Insert task 7
Insert task 8
Insert task 9
Insert task 10

2. Are any key tasks missing in the task list?

1...
2...
3...
If respondents add tasks in this question, these tasks will automatically be included in questions 3, 4 and 5.

Room for comments on the task list

....
....
....
....
....

3. Could you indicate for each of the tasks how frequently the task is performed (never or on a daily, weekly, monthly or yearly basis)?

If respondents tick in 'never' or 'I don't know' for certain tasks, these tasks will not be included in the list of tasks in questions 4 and 5.

	Never, this is not a task of this occupation	Yearly	Monthly	Weekly	Daily	I don't know
Insert task 1	☐	☐	☐	☐	☐	☐
Insert task 2	☐	☐	☐	☐	☐	☐
Insert task 3	☐	☐	☐	☐	☐	☐
Insert task 4	☐	☐	☐	☐	☐	☐
Insert task 5	☐	☐	☐	☐	☐	☐
Insert task 6	☐	☐	☐	☐	☐	☐
Insert task 7	☐	☐	☐	☐	☐	☐
Insert task 8	☐	☐	☐	☐	☐	☐
Insert task 9	☐	☐	☐	☐	☐	☐
Insert task 10	☐	☐	☐	☐	☐	☐
Insert new task 1 (question 2)	☐	☐	☐	☐	☐	☐
Insert new task 2 (question 2)	☐	☐	☐	☐	☐	☐
Insert new task 3 (question 2)	☐	☐	☐	☐	☐	☐

4. How important is competent performance of this task in this occupation?

	Not at all important	Of some importance	Of major importance	I don't know
Insert task 1	☐	☐	☐	☐
Insert task 2	☐	☐	☐	☐
Insert task 3	☐	☐	☐	☐
Insert task 4	☐	☐	☐	☐
Insert task 5	☐	☐	☐	☐
Insert task 6	☐	☐	☐	☐
Insert task 7	☐	☐	☐	☐

Insert task 8	☐	☐	☐	☐
Insert task 9	☐	☐	☐	☐
Insert task 10	☐	☐	☐	☐
Insert new task 1 (question 2)	☐	☐	☐	☐
Insert new task 2 (question 2)	☐	☐	☐	☐
Insert new task 3 (question 2)	☐	☐	☐	☐

5. Is the task mainly performed under direct supervision of others or autonomous?

	Mainly under direct supervision	Mainly *not* under direct supervision	I don't know
Insert task 1	☐	☐	☐
Insert task 2	☐	☐	☐
Insert task 3	☐	☐	☐
Insert task 4	☐	☐	☐
Insert task 5	☐	☐	☐
Insert task 6	☐	☐	☐
Insert task 7	☐	☐	☐
Insert task 8	☐	☐	☐
Insert task 9	☐	☐	☐
Insert task 10	☐	☐	☐
Insert new task 1 (question 2)	☐	☐	☐
Insert new task 2 (question 2)	☐	☐	☐
Insert new task 3 (question 2)	☐	☐	☐

6. How many subordinates do people working in this occupation, in general, formally supervise (*EXCLUDING* the coaching of less experienced co-workers, students or trainees)?

☐ none
☐ ≤ 10 employees
☐ 11 – 100 employees
☐ > 100 employees
☐ It varies
☐ I don't know

7. How often does the work involve coaching or training of less experienced co-workers, students or trainees (*EXCLUDING* the subordinates that are formally supervised)?

☐ Regularly
☐ Occasionally
☐ Never
☐ It varies
☐ I don't know

8. How much physical effort is generally required in this occupation?

☐ Not at all

☐ Some

☐ Much

☐ I don't know

9. How much mental effort is generally required in this occupation?

☐ Not at all

☐ Some

☐ Much

☐ I don't know

10. Is organising part of the work in this occupation?

☐ Yes, it involves the organisation of personnel/staff

☐ Yes, it involves the organisation of equipment/material

☐ Yes, it involves the organisation of both personnel/staff and equipment/material

☐ No

☐ I don't know

11. Which of these categories best describes the use of computers required in this occupation?

☐ Not at all

☐ Routine (e.g., word processing, spreadsheets and/or e-mail)

☐ Complex (e.g., for gathering/analysing information, design)

☐ Advanced (e.g., programming, IT development)

☐ I don't know

12. What is the <u>required</u> educational entry level for this occupation in your country? Please note that the required educational entry level may differ from the average educational level of the people working in an occupation. We asked you to tick the <u>required</u> educational entry level. You can mark more than 1 box.

COUNTRY SPECIFIC CODING SHEET

13. Are there additional formal or legal requirements for this occupation and how are these additional requirements established/laid down?

	No, not	Required by:	I don't

	required	collective labour agreement	law/ legal require-ment	federal govern-ment	branch of industry	other, please specify	know
A. diploma (full educational program)	☐	☐	☐	☐	☐	………………	☐
B. certification (training / course)	☐	☐	☐	☐	☐	………………	☐
C. working according to a professional code or protocol	☐	☐	☐	☐	☐	………………	☐
D. Other, please specify …… ………………………………………	☐	☐	☐	☐	☐	………………	☐

14. When can people start working in this occupation?

☐ Immediately after completing formal education
☐ Via in-company dual-learning trajectories after completing formal education
☐ Via apprenticeships
☐ Other, namely………………………………………………………………………………………………………
☐ I don't know

15. How long does it generally take, after completing the required formal education, to become competent in this occupation?

☐ Up to 1 week   ☐ 6 months – 1 year
☐ 1 week – 1 month   ☐ 1 – 5 years
☐ 1 – 3 months   ☐ ≥ 5 years
☐ 3 – 6 months   ☐ I don't know

16. How often do people working in this occupation have to update their knowledge and skills?

☐ Never
☐ Yearly
☐ Monthly
☐ Weekly
☐ Daily
☐ I don't know

17. **We want to know more about the transferability of skills. Therefore, we would like to know the relevance of the competencies mentioned below for this occupation.[6]**

To be presented on 2 separate pages in web survey (A-I, J-Q)

		Relevance			
		Not at all important	Of some importance	Of major importance	I don't know
A	Initiating action	☐	☐	☐	☐
B	Instructing co-workers	☐	☐	☐	☐
C	Supervising	☐	☐	☐	☐
D	Co-operating with colleagues	☐	☐	☐	☐
E	Communicating	☐	☐	☐	☐
F	Relating and networking	☐	☐	☐	☐
G	Negotiating	☐	☐	☐	☐
H	Reporting	☐	☐	☐	☐
I	Applying know-how, professional expertise	☐	☐	☐	☐
J	Problem solving	☐	☐	☐	☐
K	Developing new procedures and working methods	☐	☐	☐	☐
L	Forming strategies	☐	☐	☐	☐
M	Planning and organising	☐	☐	☐	☐
N	Following instructions and procedures	☐	☐	☐	☐
O	Dealing with contingencies	☐	☐	☐	☐
P	Coping with stressful situations	☐	☐	☐	☐
Q	Commercial thinking	☐	☐	☐	☐

18. **Are you familiar with the European Qualification Framework?**

☐ Yes → *go to question 19*
☐ No → *go to question 22*

19. **Which of the following descriptions characterises the level of knowledge of this occupation best (you can mark 1 box)?[7]** *If you do not know the answer to this question, you can mark the box 'I don't know'.*

This occupation requires:
☐ … basic general knowledge
☐ … basic factual knowledge of a field of work
☐ … knowledge of facts, principles, processes and general concepts, in a field of work

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[6] The list of competencies is based on the SHL Competency Framework (Bartram, D. (2005). The great eight competencies: A criterion-centric approach to validation. *Journal of Applied Psychology*, 90 (6): 1185-1203.
[7] This question is base don the knowledge measure in the European Qualification Framework.

- [ ] … factual and theoretical knowledge in broad contexts within a field of work
- [ ] … comprehensive, specialised, factual and theoretical knowledge within a field of work and an awareness of the boundaries of that knowledge
- [ ] …. advanced knowledge of a field of work, involving a critical understanding of theories and principles
- [ ] … highly specialised knowledge of a field of work and critical awareness of knowledge issues in a field and at the interface between different fields
- [ ] … knowledge at the most advanced frontier of a field of work and at the interface between fields
- [ ] I don't know

20. Which of the following descriptions characterises the skill level of this occupation best (you can mark 1 box)?[8] *If you do not know the answer to this question, you can mark the box 'I don't know'.*

Definition:

Cognitive skills: use of logical, intuitive and creative thinking

Practical skills: involving manual dexterity and the use of methods, materials, tools and instruments

This occupation requires:
- [ ] … basic skills required to carry out simple tasks
- [ ] … basic cognitive and practical skills required to use relevant information in order to carry out tasks and to solve routine problems using simple rules and tools
- [ ] … a range of cognitive and practical skills required to accomplish tasks and solve problems by selecting and applying basic methods, tools, materials and information
- [ ] … a range of cognitive and practical skills required to generate solutions to specific problems in a field of work
- [ ] … a comprehensive range of cognitive and practical skills required to develop creative solutions to abstract problems
- [ ] … advanced skills, demonstrating mastery and innovation, required to solve complex and unpredictable problems in a specialised field of work
- [ ] … specialised problem-solving skills required in research and/or innovation in order to develop new knowledge and procedures and to integrate knowledge from different fields
- [ ] … the most advanced and specialised skills an techniques, including synthesis and evaluation, required to solve critical problems in research and/or innovation and to extend and redefine existing knowledge or professional practice
- [ ] I don't know

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[8] This question is base don the knowledge measure in the European Qualification Framework.

21. Which of the following descriptions characterises the level of responsibility and autonomy of this occupation best (you can mark 1 box)?[9] *If you do not know the answer to this question, you can mark the box 'I don't know'.*

This occupation involves:
- ☐ … working under direct supervision in a structured context
- ☐ … working under supervision with some autonomy
- ☐ … taking responsibility for completion of tasks and adapting own behaviour to circumstances in solving problems
- ☐ … exercising self-management within the guidelines of work contexts that are usually predictable, but are subject to change and supervising the routine work of others, taking some responsibility for the evaluation and improvement of work activities
- ☐ … exercising management and supervision in work contexts where there is unpredictable change and review and develop performance of self and others
- ☐ … managing complex technical or professional activities or projects, taking responsibility for decision-making in unpredictable work contexts and taking responsibility for managing professional development of individuals and groups
- ☐ … managing and transforming work contexts that are complex, unpredictable and require new strategic approaches and taking responsibility for contributing to professional knowledge and practice and/or for reviewing the strategic performance of teams
- ☐ … demonstrating substantial authority, innovation, autonomy, scholarly and professional integrity and sustained commitment to the development of new ideas or processes at the forefront of work contexts including research
- ☐ I don't know

We now want to ask some questions about expected changes and developments in the occupation.

22. Do you expect the content of this occupation to change within the next 5 years?
- ☐ Yes, in the following way:………
- ☐ No
- ☐ I don't know

23. Do you expect the educational requirements for this occupation to change within the next 5 years?
- ☐ Yes, in the following way: ……..……
- ☐ No
- ☐ I don't know

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[9] This question is base don the knowledge measure in the European Qualification Framework.

24. Do you expect the size of this occupation (how many people are working in the occupation) to decline, increase or remain stable in the next 5 years?

☐ Declining occupation size

☐ Stable occupation size

☐ Increasing occupation size

☐ I don't know

25. In your country, is the occupation typically performed in: (you can mark more than 1 box)

☐ Small organisations and firms (≤ 10 employees)

☐ Medium-sized organisations and firms (11 – 100 employees)

☐ Large organisations and firms (> 100 employees)

☐ I don't know

26. In your country, is this occupation typically carried out in the public or private sector?

☐ Public sector

☐ Private sector

☐ Both

☐ I don't know

27. How certain are you about the answers you provided in this questionnaire?

☐ Very certain

☐ Certain

☐ Not certain, not uncertain

☐ Uncertain

☐ Not at all certain

28. Do you have any additional comments?

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Thanks very much for your time and effort!!!