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Occupational Skills Profile: Country specific OSP for the Czech Republic and related documentation for 2013 Country workbooks

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Occupational Skills Profile:

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Summary

This paper presents some results from the detailed set of country workbooks produced as part of the Cedefop Skillsnet project on *Mid-term skills supply and demand forecast*.

It contains three main parts. The first one presents some basic methodology how the Occupational Skills Profiles (OSPs) are constructed. Main data sources are introduced here. An Occupational Skills Profile summarises essential characteristics required for a given job: the level of education and training required (and hence the complexity of the occupation); the field of education and training required; and other main and supplementary requirements concerning knowledge, skills, personal abilities, attitudes and values. OSP structure is based on seven occupational dimensions forming three main groups. An Occupational Skills Profile of a specific individual occupation (sometimes the term occupational unit is used) sums up characteristics of all similar jobs, classified under the given occupation. At higher levels of classification, individual occupations are aggregated into corresponding occupational groups, thus representing all occupations with a certain degree of similarity reflecting the classification principle employed. For founding data sources 25 selected surveys have been examined and analysed. Should they be utilised for the construction of Occupational Skills Profiles, data sources (surveys) have to meet certain stringent stipulations. First, data from the survey have to be structured both by sector and by occupation. Second, occupations must be defined on the basis of the ISCO classification or on the basis of a classification convertible to the ISCO and sectors must be defined on the basis of the NACE classification or on the basis of a classification convertible to the NACE. Third, data from the survey must be quite robust and cover the bulk of the labour market. Following six surveys have met all criteria and have been included into the model serving for the construction of Occupational Skills Profiles:

- European Social Survey ESS 1-5 conducted during 2002-2011 (International)
- O*NET 2000-2013 (USA)
- US BLS Education and Training Requirements Categories 1996-2012 (USA)
- BIBB/BAuA Erwerbstätigenbefragung 2006 (Germany)
- Indagine sulle professioni 2007 (Italy)
- Kvalifikace 2008 (Czech Republic)

These six surveys are briefly characterized in the Chapter 1.

The Chapter 2 illustrates the use of Occupational Skills Profiles and presents results from Country Workbooks from December 2013. Occupational Skills Profiles (OSPs) have been calculated for each of 33 European countries (EU28 countries plus FYROM, Iceland, Norway, Switzerland and Turkey) as well as for the EU28 as a whole, for each of 38 sectors (based on NACE rev.2 classification) and 37 occupations (based on ISCO-08 classification), and for three years – 2000, 2010 and 2020. OSPs are presented in Excel files, one file with 16 sheets for each country.

To indicate the range and contribution of results obtained two examples have been chosen, each covering a different area and comparing different type of data at different levels. The first example summarises the development of all seven dimensions during the period 2000-2020 for the whole EU28 (see chapter 2.1). The second example looks into the different development of the Level of Qualification Requirements (Dimension 1) by sector and by occupation (see chapter 2.2).

The Chapter 3 illustrates possibility of developing country specific Occupational Skills Profile. Data from the Programme for International Assessment of Adult Competencies (PIAAC) survey were used for it. It is demonstrated for the Czech Republic as the first example. It is planned to produce similar country specific Occupational Skills Profiles for all the other countries in 2014.

OECD PIAAC – OECD Programme for the International Assessment of Adult Competencies – is the largest and most comprehensive international survey of adult skills ever undertaken. It measures the key cognitive and workplace skills needed for individuals to participate in society and for economies to prosper. This survey has been conducted in 33 countries.

EPC has identified in the PIAAC Questionnaire a number of questions that can be used for preparing country-specific Occupational Skills Profiles (see the chapter 3.2 indicating selected questions from the PIAAC Questionnaire). EPC has confronted current OSP values for all seven dimensions with the data from the PIAAC survey of the Czech Republic (PIAAC.CZ) by linking OSP values to all individual respondents in the PIAAC.CZ survey currently in employment with a defined sector (2D of the ISIC rev 4) and occupation (3D of the ISCO-08) of his/her job.

Up to now, Occupational Skills Profiles have been country specific only because of different cross-country sectoral x occupational structure/composition of employed people. OSPs defined for sector specific group of occupations have been similar for all countries.

Although the assumption that occupational skill measures from one country can be generalized is tested and is largely supported and Occupation-level skill scores from established national programmes, such as the Occupational Information Network (O*NET) database produced by the U.S. Department of Labor, can be merged onto Labour Force Survey data from other countries for analyses, the EPC makes country specific OSPs more accurate using data from PIAAC.

1. Concept of Occupational Skills Profiles

1.1 Definition

An *Occupational Skills Profile* summarises essential characteristics required for a given job: the level of education and training required (and hence the complexity of the occupation); the field of education and training required; and other main and supplementary requirements concerning knowledge, skills, personal abilities, attitudes and values.

In the context of this study, within the project *Forecasting of skills supply and demand in Europe 2020*, Occupational Skills Profiles have been developed for analysing, projecting and forecasting skill needs for determining and measuring education/skills matches and mismatches in different countries, sectors or occupations, and for comparing and monitoring differences between European countries as well as for determining change over time, identifying past and future developments[1].

Their application, however, is far wider. They can be also used for preparing educational and training programmes, both school and enterprise based, for the choice of a concrete job or of the best way how to prepare for it. They can be used by all main labour market partners, as decision makers, employers, educational institutions, education and career consultants, and individual students and workers. As part of a wider information system containing not only job characteristics but also information on offer of various types of corresponding education and training, Occupational Skills Profiles can become an important tool for matching the choice of education and training with the subsequent occupational placement at the labour market[2].

In order to be able to serve their key purpose at both European and national levels, Occupational Skills Profiles have to meet simultaneously certain specific requirements, which makes them quite unique:

- they are defined at such a level of occupational classification that allows identification of distinct, occupation-specific features adequately, while at the same time they can be transposed both to other classification levels and to other classification systems as necessary;
- their characteristics are not only quantifiable and measurable, but they are regularly measured, that is they are supported by available statistics and data sets, allowing the creation of time series and identification of changes over time;
- Occupational Skills Profiles of specific occupations can be aggregated into Occupational Skills Profiles of occupational groups, further into Occupational Skills

[1] Detail about Occupational Skills Profiles structure and its relationship to the core projections produced in the core project *Forecasting of skill supply and demand in Europe to 2020* are described in Chapter 2. The way, how they have been generated, is described in the Annex.

[2] Similar information systems have been developed and employed particularly in the USA (f.i. see the latest version of the 2012-2013 *Occupational Outlook Handbook* linking information on individual occupations with that on opportunities how to attain the required education and training). Lately they have emerged also in Europe but they are usually fragmented, atomised and not linked into an effective system.

Profiles of sectors, then into Occupational Skills Profiles of national economies, and finally up to Pan-European level;

- they are consistent as far as possible with concepts, classifications, and instruments used in Europe, in particular with the ISCO classification of occupation, the NACE classification of industry, and the European Qualification Framework (EQF).

To meet all the requirements at the same is not simple indeed. Many problems have to be dealt with including, in particular, problems how to define the appropriate level of classification, how to find usable and suitable data, how to transpose safely from one level and/or system of classification to another, and how to achieve reasonable consistency between conceptual frameworks and data sources coming from different sources.

1.2 Appropriate level of classification and availability of data

An Occupational Skills Profile of a specific individual occupation (sometimes the term occupational unit is used) sums up characteristics of all similar jobs, classified under the given occupation. At higher levels of classification, individual occupations are aggregated into corresponding occupational groups, thus representing all occupations with a certain degree of similarity reflecting the classification principle employed.

An Occupational Skills Profile makes sense only on condition that the respective occupational unit is not too broad, or in other words, it is still possible to take it as an individual occupation or a relatively homogenous group of occupations. Otherwise it would 'contaminated' by other occupations, and the resulting skill needs would come the closer to the average, the higher the level of aggregation. Hence Occupational Skills Profiles have to be elaborated at the level where the job structure and job characteristics are sufficiently detailed and specific as to identify important differences between groups of jobs and make them sufficiently visible, and at the same time when they are supported by empirical data. It is quite obvious that both aspects are mutually limiting – the more one is respected, the less the other one is met – and that a best possible trade-off has to be sought for. *Both aspects are paramount – the choice of the most suitable level of classification, and the availability of empirical data at European level*. This rather difficult proposition is central to the approach applied.

When choosing the level of the most suitable classification, we have to take into account the varying relationship between a job, an occupation and an occupational group at different levels of aggregation (see BOX 1).

BOX 1 Job/Occupation

A ***job*** ("a work place") represents a basic unit covering a certain set of work activities performed by one working person. Strictly taken, each job has a specific, slightly different Occupational Skills Profile. Nevertheless, there exist jobs with very or quite similar Occupational Skills Profiles and negligible differences. Those jobs then make up individual occupation.

An ***occupation*** (sometimes another term is used – "a profession") is then defined as a group of jobswith sufficiently similar characteristics to have one Occupational Skills Profile. Classifications of occupations are thus a means for grouping jobs by their similarity. Definitions of occupations vary in different countries, as well as classification systems are different.

For example, in the *USA* about 150 million of jobs in the labour market are classified. These jobs are described by 12 thousand of occupational titles and clustered into about one thousand individual occupations classified by the US Standard Occupation Classification System (SOC); their exact number is changing all over the time. Individual occupations are further clustered at several levels into still broader occupational groups. The number of jobs and employed in all individual occupations classified by the SOC is monitored by the Occupational Employment Statistics (OES). The *Italian* classification of occupations, developed during the last decade as a part of the project *Indagine sulle professioni*, contains over 800 basic (individual) occupations, all of them having their Occupational Skills Profiles.

The *Czech* Classification of Occupations (KZAM) was established in 1991 by adopting almost without a change all four levels of the international classification ISCO 1988, with about 500 groups of occupation. The Czech classification has gone beyond the 4^{th} level of ISCO, supplementing it by the fifth more detailed national level consisting of about 3500 individual occupations.

A decisive role is played by the classification system employed. The Eurostat database on occupations – as well as most comparisons of occupational structures between individual European countries – is based on the International Standard Classification of Occupations (ISCO), (see BOX 2). As the ISCO-88 was used by the Eurostat till the end of 2010, and all available data have been based on it since the beginning of the 90s, it was adopted in this study for the construction of Occupational Skills Profiles.

Nevertheless, ISCO classification is limited to the 4-digit level with only about 500 occupational groups, and, most importantly, only about a third of European countries provides data at this level, while comparable data for most European countries are available only at the ISCO 3-digit level which defines rather broad occupational groups. It is not surprising therefore that their Occupational Skills Profiles are not clear-cut, as they include some quite similar but at the same time also some quite different occupations.

BOX 2 ISCO

The *International Standard Classification of Occupations 1988* (ISCO-88) is based on two main concepts: the concept of the kind of work performed or *job*, and the concept of *skill*.

Job – defined as a set of tasks and duties executed, or meant to be executed, by one person – is the *statistical unit* classified by ISCO-88. A set of jobs whose main tasks and duties are characterised by a high degree of similarity constitutes an *occupation*. Persons are classified by occupation through their relationship to a past, present or future job.

Skill – defined as the ability to carry out the tasks and duties of a given job – has, for the purposes of ISCO-88 the two following dimensions:

(a) *Skill level* – which is a function of the complexity and range of the tasks and duties involved; and

(b) *Skill specialisation* – defined by the field of knowledge, the tools and machinery used, the materials worked on or with, as well as the kinds of goods and services produced.

On the basis of the skill concept thus defined, ISCO-88 occupational groups were delineated and further aggregated at four levels:

1st ISCO level – major groups with 10 occupation group titles,

2nd ISCO level – sub-major groups with 27 occupation group titles,

3rd ISCO level – minor groups with about 110 occupation group titles,

4th ISCO level – unit groups with about 500 occupation group titles.

The ISCO 88 also contains a complete list of more than five thousand Occupational titles grouped under corresponding unit groups (at the 4th ISCO level).

In 2008 a new classification has been introduced (ISCO-08), and since 2011 used for Labour Force Surveys in European countries. A new list of Occupational titles is under preparation. Transition to the ISCO-08 will be one of most important objectives to be achieved in the next stage of our work.

It is very important to consider that each job can be identified not only by ISCO occupation, but also by sector (or *industry*). For identifying sectors the Eurostat database uses the NACE classification (see BOX 3).

In Cedefop's forecasting the E3ME-CE model is based on classification NACE Rev.1.1, and the number of sectors has been reduced by different aggregations to 41. In this study we use the same classification but the number of sectors has been reduced to 38 due to data limitations. Aggregation concerns: Pharmaceuticals (10) and Chemicals (11); Electricity (22) and Gas Supply (23); Professional Services (36) and Other Business Services (37).

BOX 3 NACE

The *Statistical Classification of Economic Activities* in the European Community (NACE) Rev. 1.1 is the classification of economic activities corresponding to The *International Standard Industry Classification* (ISIC) Rev.3 at European level - though more disaggregated.

NACE Rev 1.1 is structured at four levels:

Level 1: 17 sections identified by alphabetical letters A to Q;

(an intermediate level: 31 sub-sections identified by two-character alphabetical codes);

Level 2: 62 divisions identified by two-digit numerical codes (01 to 99);

Level 3: 224 groups identified by three-digit numerical codes (01.1 to 99.0);

Level 4: 514 classes identified by four-digit numerical codes (01.11 to 99.00).

As the outcome of a major revision work of the international integrated system of economic classifications which took place between 2000 and 2007 the present NACE Rev. 2 (which is the new revised version of the NACE Rev. 1.1) has been introduced.

NACE Rev. 2 has been created based on ISIC Rev. 4 and adapted to the European circumstances by a working group of experts on statistical classifications from the Member States, candidate Countries as well as EFTA Countries, with the support and guidance of the classification section at Eurostat (European Communities, 2008b).

The transition from the NACE Rev.1 to the NACE Rev. 2 will be another major objective in the next stage of work.

1.3 Finding suitable sources

The next important stage is to analyse main conceptual, methodological and empirical ways of determining skill needs in various countries. This stage is important from three aspects: (i) theoretical background and conceptual approaches to define elements of skill needs, grouping them into dimensions and linkages, and acknowledging the impact of external factors; (ii) methodological approaches to operationalise concepts (dimensions, elements) used for definition of skill needs; (iii) assessing data available suitability and usability for the new concept of Occupational Skills Profiles (OSP).

Should they be utilised for the construction of Occupational Skills Profiles, data sources (surveys) have to meet certain stringent stipulations. First, data from the survey have to be structured both by sector and by occupation. Second, occupations must be defined on the basis of the ISCO classification or on the basis of a classification convertible to the ISCO and sectors must be defined on the basis of the NACE classification or on the basis of a classification convertible to the NACE. Third, data from the survey must be quite robust and cover the bulk of the labour market.

In order to define and quantify Occupational Skills Profiles, more than twenty of the most important surveys in Europe, USA and OECD was considered. Many of them proved to have

no or only a limited potential for use, and only few surveys have passed the selection process consisting of the following four steps.

Availability. All available documents, studies and other information (e.g. webpages) concerning the concept, methodology and survey in question have been thoroughly studied in order to find all necessary characteristics: what is its framework or conceptual model, main focus and scope, how is the survey conducted, whether it is periodical and at what interval it is repeated;, and how the information gathered generally fits into our theoretical and methodological concept. Only if the result of the first step has been positive, the second step has followed.

- *Usability*. Data from the survey is analysed to determine how it would enlarge the empirical database of our project, whether and to what degree it can be mapped into a common European database, particularly what level of classification is used and whether it can be transposed to required levels of classifications used by the Eurostat – the industry classification NACE and the occupational classification ISCO (national classifications often cause problems). Again, only if results have been positive, the next step has followed.
- *Accessibility*. Communication with experts of the country in question (or directly of the institution conducting the survey) has been established. Its objective has been to find out whether and under what conditions it is possible to obtain their data (sometimes they have been paid for) and also whether it is possible that those who had carried out the survey could assist us in solving problems mentioned in previous steps. Again, only if our negotiations have resulted in gaining access to the data, sometimes with some advice and recommendations, it has been possible to proceed to the final step.
- *Suitability*. The final step consisted in thorough analyses of data obtained, of statistical behaviour of variables and of their role in the overall concept, of transforming national classifications to Eurostat classifications, and of including new data to the final empirical model. Also in this step the survey in question could have been abandoned when its previous positive assessments have proved to be too optimistic.

The following table (Table 1.1) indicates 25 selected surveys that have been examined and analysed.

Table 1.1 Examined and analysed surveys

	Name of the Survey	Years	Coordinator / Country	Availability	Usability	Accessibility	Suitability
International projects	IALS	1993	OECD	Yes	No		
	SIALS	1998	OECD	Yes	No		
	ALL	2005	OECD	Yes	Yes	No	
	PIAAC	2011-2012	OECD	Yes	Yes	*only 2013*	
	European Social Survey ESS 1-5	2002-2011	City University London	Yes	Yes	Yes	Yes
	CHEERS	1998	UNI Kassel	Yes	Yes	*partly*	
	REFLEX	2005-2006	UNI Maastricht	Yes	Yes	*partly*	
	HEGESCO	2008-2009	UNI Maastricht	Yes	Yes	*partly*	
	REFLEX 2010	2010	Charles Uni.	Yes	Yes	*partly*	
	Advertisements for job vacancies (Annualy)	2007-2012	EURES	Yes	*partly*		
National projects	Skill Survey	1997	Great Britain	Yes	No		
	Skill Survey	2006	Great Britain	Yes	No		
	BIBB/IAB-Erhebung	1999	Germany	Yes	No		
	BIBB/BAuA - Erwerbstätigenbefragung	2006	Germany	Yes	Yes	*partly*	Yes
	BIBB/BAuA - Erwerbstätigenbefragung	2012	Germany	Yes	Yes	*only 2012*	
	Kooperationsprojekt Absolventenstudien - KOAB	2010	Germany	Yes	Yes	*partly*	
	Absolventenstudie - ARUFA	2010	Austria	Yes	Yes	*partly*	
	Indagine sulle professioni	2006-2007	Italy	Yes	Yes	Yes	Yes
	Advertisements for job vacancies (NIVE)	1999-2010	Czech Republic	Yes	Yes	*partly*	
	Kvalifikace (EPC)	2007-2008	Czech Republic	Yes	Yes	Yes	Yes
	Uplatnění (NIVE)	2002-2003	Czech Republic	Yes	Yes	*partly*	
	Složitost práce (CAS)	2000-2005	Czech Republic	Yes	Yes	*partly*	
	Tarify (Trexima)	2008-2012	Czech Republic	Yes	Yes	*partly*	
	DOT	1950-1996	USA	Yes	Yes	No	
	O*NET	2000-2012	USA	Yes	Yes	Yes	Yes
	BLS	1996-2012	USA	Yes	Yes	Yes	Yes

Source: EPC

For instance, the large and periodical German surveys (Erwerbstätigenbefragung. BIBB-IAB-BAuA, 1978-2006, 2012), with about twenty thousand respondents, can be only partly used as their time series is not quite consistent due to changes in the questionnaires and only some characteristics (and some occupations, too) are comparable and can be used. Actually, only the latest survey of 2006 can be fully exploited[3].

The *British Skills Survey* (periodically conducted since the mid-eighties) is beset with even more problems: the transposition of the British classification SOC to the international classification ISCO is problematic, its consistency and hence comparability in time is not clear, the survey comprising only about six thousand respondents is not sufficiently robust for the ISCO 3-digit level. Moreover, surveys similar to those conducted in Britain up to 2006, will be most probably not repeated. On the other hand, it is important that some concepts used in British surveys have been applied also in the OECD project PIAAC, to be conducted in about thirty countries in 2011-2012 with international data available in the autumn of 2013.

When the selection process described above has been completed (see Table 1.1), only the following six surveys have met all criteria and have been included into the model serving for the construction of Occupational Skills Profiles:

- European Social Survey ESS 1-5 conducted during 2002-2011 (International)
- O*NET 2000-2011 (USA)
- US BLS Education and Training Requirements Categories 1996-2012 (USA)
- BIBB/BAuA Erwerbstätigenbefragung 2006 (Germany)

[3] The data of the new 2012 survey will become available probably in 2014.

- Indagine sulle professioni 2007 (Italy)
- Kvalifikace 2008 (Czech Republic)

The six surveys are briefly characterized in the following paragraphs. Although it has not been considered suitable for the purposes of this study, at the end of the chapter the potential of EURES database is also described.

European Social Survey ESS

The *European Social Survey* (ESS) has been an important source utilised for defining some of the main dimensions of Occupational Skills Profiles, the level and the field of education.

The European Social Survey (ESS) is a research programme of the European Science Foundation focused particularly on value orientation and the social structure of current European societies. Although the ESS is not primarily focused on skill needs and qualifications of job holders, it contains relevant information in this respect. Its major advantage is its continuing nature and opportunity to obtain data for relatively extensive samples of adult population within a wide age span, containing almost 200 thousands respondents in about 30 European countries. The ESS surveys take place every two years and five rounds have been implemented so far: the ESS-1 in 2002/2003, the ESS-2 in 2004/2005, the ESS-3 in 2006/2007, the ESS-4 in 2008/2009 and the ESS-5 in 2010/2011.

In terms of the identification of skill needs the most interesting stages were the ESS-2 and ESS-5, as both contain an additional special module, focused on education, qualification, work and employment. Only data coming from countries participating in the project as well as in the ESS-2 and ESS-5 have been used for the analysis. The ESS-2 and ESS-5 data set developed and analysed by the EPC for the purpose of this study covers nearly 100 thousand respondents from 20 European countries (Austria, Belgium, the Czech Republic, Denmark, Finland, Germany, Greece, Hungary, Ireland, Italy, the Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, and the United Kingdom).

The characteristics of the respondents (job holders) also included identification of the sector where they work in line with the 2-digit NACE/ISIC, and identification of the occupation performed according to the 4-digit ISCO, as well as the level of educational attainment (in most countries it is possible to define 6-8 comparable levels of education; some countries do not have all the levels), and the field of education (ESS surveys distinguish 14 fields of education & training defined on the basis of the ISCED classification).

In 2010, however, a new classification ES-ISCED was prepared which amalgamated existing distinct systems and defined new common educational levels. It was very carefully constructed using a very elaborate methodology (*Schneider, 2009*) in a close contact with experts of individual countries. The new classification, applied in the ESS-5 and also used for the re-classification of data gathered in in all previous surveys forming the ESS database, defines educational levels in various ways depending on how much detailed they are (compare the three columns in Table 1.2):

Table 1.2 Highest level of education, ESS – ISCED

Highest level of education, ESS - ISCED		
ELFS	**ESS-ISCED**	**ESS-ISCED subgroups (for ESS-5 only)**
Low	ES-ISCED I, less than lower secondary	Not completed ISCED level 1
		ISCED 1, completed primary education
		Vocational ISCED 2C < 2 years, no access ISCED 3
	ES-ISCED II, lower secondary	General/pre-vocational ISCED 2A/2B, access ISCED3 vocational
		General ISCED 2A, access ISCED 3A general/all 3
		Vocational ISCED 2C >= 2 years, no access ISCED 3
		Vocational ISCED 2A/2B, access ISCED 3 vocational
		Vocational ISCED 3C < 2 years, no access ISCED 5
Middle	ES-ISCED IIIb, upper secondary, vocational or no access V1	General ISCED 3 >=2 years, no access ISCED 5
		Vocational ISCED 3C >= 2 years, no access ISCED 5
		Vocational ISCED 3A/3B, access 5B/lower tier 5A
	ES-ISCED IIIa, upper secondary, genral and/or access to V1	General ISCED 3A/3B, access ISCED 5B/lower tier 5A
		General ISCED 3A, access upper tier ISCED 5A/all 5
		Vocational ISCED 3A, access upper tier ISCED 5A/all 5
	ES-ISCED IV, advanced vocational, sub-degree	General ISCED 4A/4B, access ISCED 5B/lower tier 5A
		General ISCED 4A, access upper tier ISCED 5A/all 5
		ISCED 4 programmes without access ISCED 5
		Vocational ISCED 4A/4B, access ISCED 5B/lower tier 5A
		Vocational ISCED 4A, access upper tier ISCED 5A /all 5
High		ISCED 5A short, intermediate/academic/general tertiary below
		ISCED 5B short, advanced vocational qualifications
	ES-ISCED V1, lower tertiary education, BA level	ISCED 5A medium, bachelor/equivalent from lower tier tertiary
		ISCED 5A medium, bachelor/equivalent from upper/single tier
	ES-ISCED V2, higher tertiary education, >= MA level	ISCED 5A long, master/equivalent from lower tier tertiary
		ISCED 5A long, master/equivalent from upper/single tier tertiary
		ISCED 6, doctoral degree

Source: ESS

The ESS-ISCED classification (second column of Table 1.2) has been adopted in this study. However, the seven levels as defined were supplemented with the eighth doctoral level (ISCED 6) indicated in the more detailed classification ES-ISCED subgroups (see the third column). Our new eight-level classification is closer to the new International classification of education (ISCED 2011). In some countries where the new classification has not been used, exceptionally all levels – that is the entire classification of education – have been re-calculated.

O*NET

Analyses of various available sources have shown that the most suitable source of information about qualification and other skill needs is to be found in the US *Occupational Information Network (O*NET)*.

The Occupational Information Network (O*NET) is a comprehensive on-line system for collecting, organising and disseminating occupational data. It was launched in 1998 by the US Department of Labor, replacing the Dictionary of Occupational Titles (D.O.T.), developed more than fifty years ago and existing up to mid-nineties in a printed form. O*NET data inform of important activities in workforce development, economic development, career development, academic and policy research, and human resource management.

A new version of the O*NET database is usually published annually in late June. After some structural changes and the introduction of the version 5.0 in April 2005, data have been consistent, characteristics of about 750 individual occupations have remained quite stable, and they have been regularly updated – every year approximately 100-120 occupations. Thus it is possible to monitor and analyse their development and change. The O*NET 18.0 database, published in July 2013, represents the most recent update of the data collection program.

Table 1.3 O*NET Release History

O*NET Release History		
O*NET 98	October 1998	Release of the original 'Analyst Database' based on the Occupational Employment Statistical (OES) classification
O*NET 3.0/3.1	August 2000/June 2001	Database classification converted to conform to the new Standard Occupational Classification (SOC) standard
O*NET 4.0	June 2002	Release of the final 'Analyst Database' with a revised database structure consistent with the OMB-approved Data Collection Program
O*NET 5.0	April 2003	First update of database from Data Collection Program with a comprehensive update of 54 occupations
O*NET 5.1	November 2003	Occupational-level and item-level metadata added to the O*NET database
O*NET 6.0	July 2004	Second update of database from Data Collection Program with a comprehensive update of 126 occupations
O*NET 7.0	December 2004	Third update of database from Data Collection Program with a comprehensive update of 100 occupations
O*NET 8.0	June 2005	Fourth update of database from Data Collection Program with a comprehensive update of 100 occupations
O*NET 9.0	December 2005	Fifth update of database from Data Collection Program with a comprehensive update of 100 occupations
O*NET 10.0	June 2006	Sixth update of database from Data Collection Program with a comprehensive update of 100 occupations; release of the updated O*NET taxonomy - O*NET-SOC 2006
O*NET 11.0	December 2006	Seventh update of database from Data Collection Program with a comprehensive update of 101 occupations
O*NET 12.0	June 2007	Eighth update of database from Data Collection Program with a comprehensive update of 100 occupations
O*NET 13.0	June 2008	Ninth update of database from Data Collection Program with a comprehensive update of 108 occupations
O*NET 14.0	June 2009	Tenth update of database from Data Collection Program with a comprehensive update of 117 occupations; release of the updated O*NET taxonomy - O*NET-SOC 2009
O*NET 15.0	June 2010	Eleventh update of database from Data Collection Program with a comprehensive update of 120 occupations
O*NET 15.1	February 2011	Release of the updated O*NET taxonomy - O*NET-SOC 2010, based on the 2010 SOC standard
O*NET 16.0	July 2011	Twelfth update of database from Data Collection Program with a comprehensive update of 107 occupations
O*NET 17.0	July 2012	Thirteenth update of database from Data Collection Program with a comprehensive update of 108 occupations

Source: BLS

The two O*NET core elements are a content model and an electronic database fed by a data collecting program.

The content model[4] provides a framework for more than 400 variables describing about 1100 occupations based on the SOC. The descriptors are organised into six major domains, which enable the user to focus on areas of information that specify the key attributes and characteristics of workers (the first three domains) and of jobs (the last three domains), and are either cross-occupational or occupation-specific:

Worker Characteristics, comprising enduring characteristics that may influence both work performance and the capacity to acquire knowledge and skills, such as abilities, occupational interests, work values and work styles;

Worker Requirements, representing attributes developed and/or acquired through experience and education, such as work-related knowledge and skills, which are divided into basic skills and cross-functional skills;

[4] More details at http://www.onetcenter.org/content.html

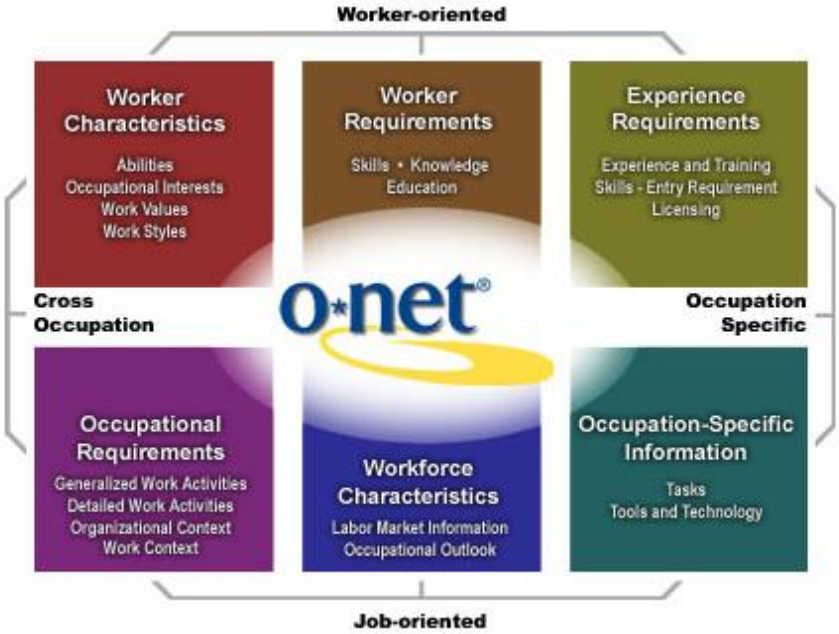
Experience Requirements, including information about the typical experiential background of workers including certification, licensure, and training data;

Occupational Requirements, describing typical activities required across occupations, as generalized and detailed work activities occurring on multiple jobs, plus contextual variables (factors physical, social and organizational);

Labour Market Characteristics, linking descriptive occupational information to statistical market information (including compensation and wage data, employment outlook and industry size information);

Occupation-Specific Information, applying to a single occupation or a narrowly defined job family.

Figure 1.1 The O*NET Content Model



Source: BLS

Although the O*NET has been used as a prime source for several characteristics, other sources have been used whenever possible. Among them two European surveys on occupation have closely followed the O*NET approach – the Italian survey *Indagine sulle professioni* and the Czech survey *Kvalifikace2008*.

US BLS Education and Training Requirements Categories

The Occupational Outlook Handbook, produced by the Office of Occupational Statistics and Employment Projections of the Bureau of Labor Statistics (BLS), gives detailed descriptions of the education and training requirements of about 750 occupations of the 2000 Standard Occupational Classification. Each of them is classified by education and training categories. This allows for estimates of the education and training needs for the population as a whole and of the outlook for workers with various types of educational and training attainment.

Since 1994, this classification system has been used for all employment projections that are carried out by the BLS every second years, always following the publication of a new US BLS projection.

Up to the projection published at the end of 2009, the BLS identified 11 education and training categories defined as the most significant source of education or training needed to become qualified in an occupation, also including non-educational paths of entry, such as on-the-job training and work experience. By construction, these categories were intended to be mutually exclusive and exhaustive, and BLS economists and other experts in the topic were asked to assign each occupation to one of these categories based on their knowledge and judgment. In consequence, the system did not show that an occupation might have multiple entry requirements, both on-the-job training and education.

This system has proved confusing, as it combines different dimensions of education, training, and work experience in a related occupation into one classification system. For example, in some occupations both postsecondary education and a long-term on-the-job training are important, but in the existing system these are two distinct and mutually exclusive categories. Other examples are occupations where both education and work experience in a related occupation are important. Also, the system does not include any category for education below the secondary level[5].

At the end of 2011 a new system has been published, eliminating the aforementioned problems and presenting a more complete picture of the education and training needed for entry into a given occupation. All occupations are assigned an education category, a training category, and a related work experience category, and the education categories include both high school and less than a high school level[6]:

- *Entry level education* — represents the typical education level needed to enter an occupation. There are eight possible assignments for this category.
    1. Doctoral or professional degree
    2. Master's degree
    3. Bachelor's degree
    4. Associate's degree
    5. Postsecondary non-degree award
    6. Some college, no degree
    7. High school diploma or equivalent
    8. Less than high school
- *Work experience in a related occupation* — indicates if work experience in a related occupation is commonly considered necessary by employers for entry into the occupation, or is a commonly accepted substitute for formal types of training. Assignments for this category will be more than 5 years, 1-5 years, less than 1 year, or none.

[5] At the same time we have to be aware of the fact that American high schools are very different and have different goals than many various types of secondary education institutions in European countries.

[6] Detailed definitions for the categories are available at http://www.bls.gov/emp/ep_definitions_edtrain.pdf

- *Typical on-the-job training* — indicates the typical on-the-job training needed to attain competency in the occupation. Assignments for this category include internship / residency; apprenticeship; long-term, moderate-term, or short-term on-the-job training; or none.

Under the new system an education assignment for several occupations could be naturally different from the prior system. The new system assigns a *typical entry level education*, while the prior system assigned *the most significant source* of education or training. Therefore some occupations will have a different education level assigned than they did previously.

Some occupations could have more than one way to enter. The assignments under the new system describe the typical education needed to enter, and the typical type of on-the-job training required to be competent. The work experience in a related occupation assignment represents what is commonly considered necessary by employers or is a commonly accepted substitute for formal training. The three assignments complement each other in that they would represent a typical *path of entry* into the occupation, but they are not necessarily equal in importance for entry into the occupation.

BIBB/BAuA Erwerbstätigenbefragung (Germany)

Periodical employment surveys on qualification and working conditions have been conducted in Germany every 5-7 years since 1979 by the Federal Institute for Vocational Education and Training (BIBB). The last 2006 survey was conducted by the BIBB in cooperation with the Federal Institute for Occupational Safety and Health (BAuA). At present a new survey *BIBB/BAuA-Erwerbstätigenbefragung 2012* is under preparation; its data will be not available before 2013 a most probably even before 2014.

It was possible to have access to the database of all respondents of the last survey so far – *BIBB/BAuA Erwerbstätigenbefragung 2006* – that was focused both on the job and on the matching between current job skill requirements and respondent´s qualification. The representative sample of 20 thousand respondents was selected from employed persons over 15 years of age having a paid work for more than 10 hours weekly (this definition covers 96 % of active labour force). The size of the sample allowed differentiation by occupational groups and identification of diverse target groups (such as old-age, female, non-formally qualified workers).

The 2006 survey had four main research themes: activities and requirements of, and access to, jobs; changing a job, job flexibility; use of qualification attained, job satisfaction and success; participation in lifelong learning. Correspondingly, the questionnaire was structured into four parts: job characteristics (job tasks, job skills requirements, other specific requirements, work load, working conditions, health, employment status, wage, changes and innovation); job holder characteristics; (e.g. educational and career history); matching between the job and the job holder characteristics (i.e. to what degree does the job holder meets job requirements); and supplementary questions relating to the respondent and the firm.

Indagine sulle professioni (Italy)

The Italian Survey on Occupations was conducted in 2006-2007, and involved interviews with a sample of 16,000 respondents from the Italian working population in employment. Its final objective was to construct an information system capable of describing the characteristics of all existing occupations in the Italian labour market. A great advantage of the Italian survey lies in the fact that it was modelled on the O*NET system, thus making it possible to test the degree of similarity between the American O*NET and the Italian system (and in a lesser degree also the Czech survey *Kvalifikace*) and to verify the suitability of using the O*NET database for dimensions 3 through 7 also in the European context.

The survey is focused on measuring the importance and complexity level of about 400 variables for 810 individual occupations of a new occupational classification (derived from the official classification of the Italian Statistics Office) that can be transposed to the 3rd level of the ISCO classification of occupation. The questionnaire is divided into ten sections covering what is required of the worker to perform the job (education and training, occupation, knowledge, skills, abilities), what would affect his performance (aptitudes, values, work styles), and finally further characteristics of the job (transversal activities common to many different occupations, environmental conditions, specific activities not adequately represented in the questionnaire).

Kvalifikace (Czech Republic)

An extensive survey on qualification was also conducted in the Czech Republic at the turn of 2007-2008 with a sample of nearly 6 thousand working active respondents. It followed upon a similar survey carried out in 2002-2003 and research into the employment situation of graduates implemented in 1997-1998 and again in 2011. It was informed by indicators used as part of the US O*NET and the British Skills Survey, and took account of questions used in the ESS-2 as well as of three EQF dimensions (knowledge, skills, competence). In the Czech Republic both regular surveys (f.i. the Czech LFS) and one-off research projects (f.i. the *Kvalifikace* project) use the valid ISSO classification of occupation for identifying the respondent´s job.

A substantial part of the survey *Kvalifikace* was concerned with qualification requirements for each job, the qualification of each job holder and the extent to which school education and other skills contributed to the acquisition of the qualification. The information about various aspects or dimensions of qualification requirements for a job includes some 30 characteristics and about 50 indicators. This is why it has been possible to use the survey *Kvalifikace* not only for constructing dimensions 1 and 2 of OSPs, but – together with the Italian survey *Indagine sulle professioni* – also for testing the degree of similarity between the outcomes of the US O*NET and both European surveys, and thus to verify the suitability of the O*NET database for constructing dimensions 3 through 7 also in the European context.

EURES database and further potential sources

Besides sources already mentioned that all can be classified as *employee surveys* and/or as *expert surveys*, also *EURES* data sets coming under the category of *employer requirements* have been analysed.

The European Job Mobility Portal *EURES* (*European Employment Services*) was set up at the European Commission in 1993. Its partnership includes public employment services, trade union and employers' organisations. Its main function is to advertise vacancies entered into the system by employers, its main objectives are to inform, guide and provide advice to potentially mobile workers on job opportunities as well as living and working conditions in the EEA, to assist employers wishing to recruit workers from other countries and to provide advice and guidance to workers and employers in cross-border regions. In recent years the offering has been between 600 and 800 thousand vacancies available from more than 20 thousand employers. The EPC have been obtaining the data from the EURES web page every May since the year 2007 up to now, and it is in this way capturing the instantaneous structure of educational requirements of employers across Europe.

The use of EURES has some pros and cons. Despite the considerable size of the EURES database its use is limited to about 10 % of the original sample as in some countries many ads do not specify education required. Moreover, the occupations presented are only classified at the ISCO 2-digit level. In order to disaggregate the EURES data from the ISCO 2-digit to the ISCO 3-digit more detailed national analyses of employer advertising have been used. Still, the EURES data is appropriate for an international comparison of qualification as required by employers within various groups of occupations, and the analyses carried out have confirmed a relatively high level of consistency in qualification requirements for jobs belonging to the relevant occupational groups in various countries.

In addition, during recent years the quality of EURES data (on occupation and particularly on education required) has gradually deteriorated. The economic crisis has confirmed that requirements of employers are highly dependent on the phase of the economic cycle and therefore are not reliable for long-term predictions of skills requirements. In 2007, when labour demand for labour was very high, advertisements were numerous and education was required less often and usually of a not so high level. In 2009 that is during the first wave of the financial and economic crisis demand for labour markedly fell down, far less advertisements were published (and the proportion of web ads increased) but education was required more often and of a markedly higher level. Analysing EURES database has proved that it is not possible to include it into the model. Yet it has been most interesting to use its results for comparing with results of other surveys.

Beside EURES also other extensive surveys of employer requirements based on advertisements in newspapers, journals and on the web and conducted in the Czech Republic in 2000, 2005, 2007 and 2009 have been analysed. A sufficient number – almost 28 thousand adds – contained qualification requirements for occupations at the ISCO 3-digit. The level of education, defined on a five-degree scale the same as in the case of EURES, has been translated into the eight-degree scale. The existence of a comparatively long time series has made possible to formulate some interesting conclusions concerning the relationship between qualification requirements and the economic cycle- They have confirmed that

requirements of employers are less demanding during the economic boom and a corresponding shortage of workforce.

Finally, other international surveys and projects – such as the *International Social Survey Programme* (ISSP), the OECD *International Adult Literacy Survey* (IALS and SIALS) from the nineties, or the new OECD *Programme for International Assessment of Adult Competencies* (PIAAC) just under way in many OECD countries – have been analysed and taken into account as well. The results of the OECD project PIAAC available in the autumn 2013 will be very important for developing the concept of Occupational Skills Profiles further as well as for gaining more adequate data. They will enable not only to verify and, if necessary, modify the current model of Occupational Skills Profiles, but particularly to create and test their country-specific versions.

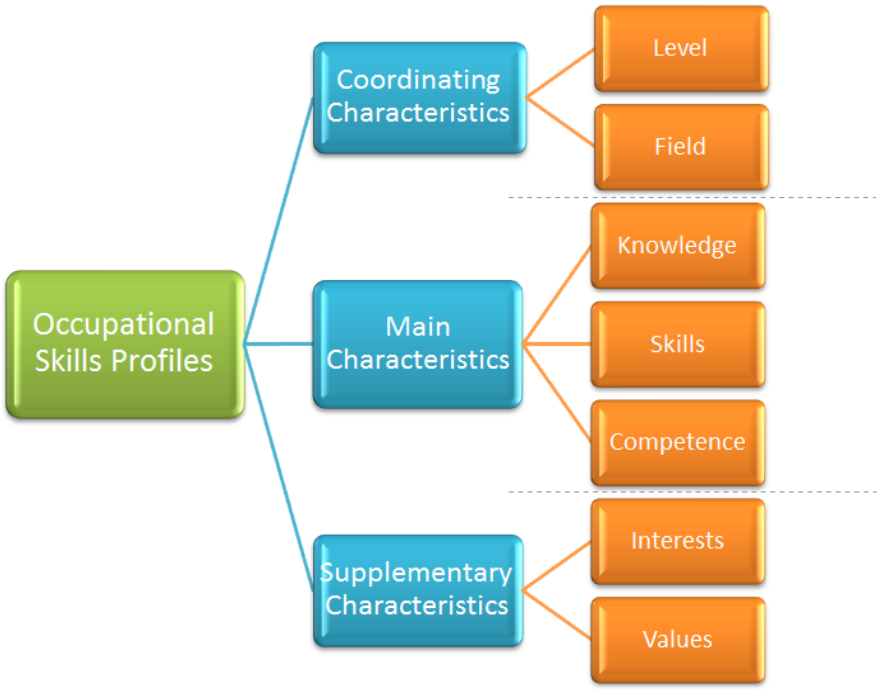
1.4 Structure and Contents of Occupational Skills Profiles

In this study data and information coming from different sources are used: different international and national classifications of occupations and of sectors, data gathered by the European Social Survey, American BLS data and German BIBB data and those contained in the US information system O*NET as well as in the Italian and Czech surveys.. None of them describe all jobs in a given occupation, and even when the same occupation is present in different sources it can have slightly different contents and qualification requirements even within different regions or enterprises of a country.. This is why we are convinced that information describing the contents and complexity of different jobs and occupations coming from the USA – that is from a country that is so diverse – is not necessarily worse than information coming from a European country or even from an international European survey.

In order to be able to use O*NET data also in Europe, a correspondence table for classifications of occupations has been completed using information and other support from the US Bureau for Labor Statistics. It has thus been possible to utilise the main benefit of the O*NET system that is able to define and quantify about 700-800 occupational units, far more than in Europe where only data at ISCO 3-digit level structured into 110-120 occupational groups are available.

On this basis, Occupational Skills Profiles (OSPs) summarise qualification requirements of occupations in a standard and comparable way. OSP structure is based on seven occupational dimensions forming three main groups, (see Figure 2.1). The first two Dimensions – grouped together as *Coordinating Characteristics* – relate to the level and field of education and training required (and hence to the complexity of the occupation). Three further Dimensions – together referred to as *Main Characteristics* – contain what is required to perform the job in terms of theoretical and factual knowledge, cross-functional skills, and personal, social and methodological abilities. They are defined and structured according the *European Qualification Framework* (see European Communities 2008). The last two Dimensions – under the heading of *Supplementary Characteristics* – add information relating to the profile and orientation of work, such as occupational interests (preferences for work environment) and work values (important to job satisfaction). They are important on the individual level as they allow us to compare job and job holder characteristics and matching.

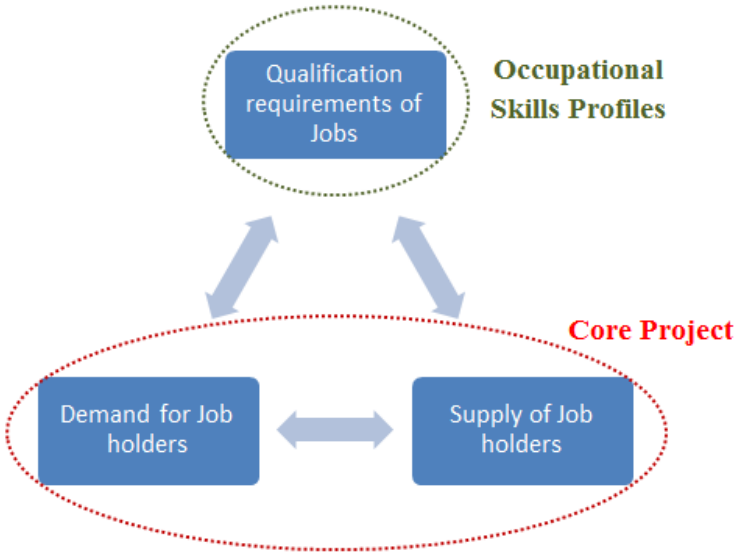
Figure 1.2 Occupational Skills Profile - Main dimensions



Source: EPC, BLS

Occupational Skills Profiles focus on the requirements of jobs, not on the qualification of job holders. Linking dynamically the characteristics of OSPs with Cedefop labour market forecasting in terms of number of jobs in sectors and occupations allows us to project also individual dimensions and characteristics of OSPs. What is important is the possibility of choosing different levels of aggregation: EU as a whole, selected countries, selected sectors etc. By comparing the estimates of labour demand with the estimates of labour supply by qualification it is possible to compare job's requirements with qualifications of job holders. (See Figure 2.2)

Figure 1.3 The OSPs and the Core Projections of Supply of and Demand for Qualifications



Source: EPC

As already mentioned the structure of Occupational Skills Profiles is basically consistent with the European Qualification Framework (EQF). The definition and contents of the most important dimensions correspond directly to the EQF: for the first dimension eight levels of reference were used originally, although later they have been aggregated into three broad levels corresponding to the aggregation used in Cedefop's forecast, and the third to the fifth dimensions are defined in terms of learning outcomes (knowledge, skills and competences).

As for the contents, this basic structure has been filled up with data taken mainly from two groups of major sources. The first one includes the European Social Survey (ESS) and other surveys whose data have been used for the elaboration of *coordinating characteristics*. The second one is the O*NET database that has been used for the elaboration of the three dimensions included in the *Main Characteristics* and the two dimensions of *Supplementary Characteristics*, and also contributed to the determination of the first dimension.

Out of the six O*NET domains (see Figure 1.1) only those have been used that concern general qualification requirements (that is those that correspond to our focus on generic skills), and definitely not those specific for a single occupation only. Theus three domains included in the O*NET – *Labour Market Characteristics*, *Occupation-Specific Information* and *Experience Requirements* – have been excluded from our analysis, together with four parts from other domains – *Detailed Work Activities, Education, Abilities* (partly), and *Organisational Context*.

The same approach has been followed by the Italian survey *Indagine sulle professioni* that used only the relevant parts of the O*NET defining them as *Knowledge, Skills, Abilities, Work Values, Work Styles,* and *Generalised Work Activities*. A similar approach has been also applied to selected characteristics in the Czech survey *Kvalifikace*.

In order to achieve a reasonable degree of consistency, the structure of Occupational Skills Profiles as proposed by the EPC basically conforms to the European Qualification Framework[7]. Their most important dimensions (the level of qualification requirements and the three dimensions of main characteristics) are defined exactly as in the EQF, and all available information on their characteristics has been restructured accordingly. Also other important European documents have been taken into account, notably the recommendations on key competences for lifelong learning.

[7] The **European Qualification Framework** is a common European reference framework which links countries´ qualification systems together. Its construction has three main features. First, it defines eight reference levels spanning the full scale of qualifications, from basic to the most advanced levels. Second, the eight reference levels are defined in terms of learning outcomes described by generally applicable descriptors. Third, learning outcomes – that is what a learner knows, understands and is able to do on completion of a learning process – are specified in three categories as *knowledge*, *skills* and *competence*.

2. Examples of results obtained in 2013 Country Workbooks

Occupational Skills Profiles (OSPs) have been calculated for each of 33 European countries (EU28 countries and FYROM, Iceland, Norway, Switzerland and Turkey) as well as for the EU28 as a whole, for each of 38 sectors (based on NACE rev.2 classification) and 37 occupations (based on ISCO-08 classification), and for three years – 2000, 2010 and 2020. OSPs are presented in Excel files, one file with 16 sheets for each country.

Just a few data should be mentioned in order to illustrate the magnitude of the exercise. For each country the results were presented in two basic tables – for sectors and for occupations: both tables have 75 columns, corresponding to the detailed structuring of dimensions as described in methodology (CEDEFOP 2013), the occupation table has 114 rows (37 occupations plus the economy as a whole for three years, that is 38 x 3), the sector table has 117 rows (38 sectors plus economy as a whole for three years, that is 39 x 3), which makes a total of more than 17 thousand cells for each country.

To indicate the range and contribution of results obtained two examples have been chosen, each covering a different area and comparing different type of data at different levels. The first example summarises the development of all seven dimensions during the period 2000-2020 for the whole EU28 (see chapter 2.1). The second example looks into the different development of the Level of Qualification Requirements (Dimension 1) by sector and by occupation (see chapter 2.2).

2.1 Change of OSP dimensions in time at EU level

This example illustrates the change in all seven main dimensions of an Occupational Skills Profile aggregated at the highest possible level, that of the whole economy of the EU28, in the period 2000-2010-2020. Detailed tables are introduced by Box 1 summing up extreme changes in EU28 in each dimension between the years 2010-2020.

BOX 4 Extreme changes in EU28 in OSP dimensions

Level of Qualifications Requirements: A limited increase (0.15 years) is expected for the Average Years of Education required for jobs in the EU28 in 2010-2020.

Fields of Study: In the EU28 is the highest growth expected for jobs where the required Field of Study is *Economics, commerce, business and administration*. On the other hand, jobs where the required Field of Study is *Technical and engineering* should decline the most.

Knowledge: The highest increase in Knowledge is expected in *Social sciences, Economy and Law* and *Business and Management* and *Health Services*.

Skills: The importance and level of *Communications in mother languages* and *Cognitive skills* will increase the most.

Competences: The importance of *Social abilities* and level of *Methodological abilities* will increase the most.

Occupational Interests: The importance of the personality type *Enterprising* will increase the most.

Working Values: The importance of *Recognition* and *Achievement* will be the most growing dimensions.

The detailed results for each dimension are condensed in the following tables. They have an identical structure, indicating for all categories (listed vertically as rows) of the respective dimension their relative proportion (for Dimensions 1 and 2 also absolute numbers) and the change between years 2000, 2010, and 2020 (horizontally as columns).

Dimensions 1 and 2 – Coordinating characteristics:

Table 2.1 Level of Qualification Requirements

EU 28		Number of jobs (in thousand)			% of total			Change 2000-2020		Change 2000-2010		Change 2010-2020	
		2000	2010	2020	2000	2010	2020	Number	Share of Total	Number	Share of Total	Number	Share of Total
Required Education Level	Low	52 931	51 995	50 317	24,77%	23,15%	22,05%	-2 614	-2,72	-936	-1,62	-1 678	-1,11
	Medium	106 942	109 106	107 225	50,04%	48,58%	46,98%	283	-3,06	2 164	-1,46	-1 881	-1,60
	High	53 845	63 487	70 697	25,19%	28,27%	30,98%	16 852	5,78	9 642	3,07	7 210	2,71
	Total	213 718	224 588	228 239	12,02	12,20	12,36	14 521	0,34	10 870	0,19	3 651	0,15
					Average years of education								

Source: EPC; EU28 Country workbook (December 2013)

Table 2.2 Field of Study

EU 28		Number of jobs (in thousand)			% of total			Change 2000-2020		Change 2000-2010		Change 2010-2020	
		2000	2010	2020	2000	2010	2020	Number	Share of Total	Number	Share of Total	Number	Share of Total
Field of Education	General/no specific field	32 039	32 959	33 141	14,99%	14,68%	14,52%	1 102	-0,47	921	-0,32	182	-0,16
	Art, fine/applied	2 949	2 961	3 380	1,38%	1,32%	1,48%	432	0,10	12	-0,06	420	0,16
	Humanities	3 328	3 765	3 983	1,56%	1,68%	1,74%	654	0,19	437	0,12	217	0,07
	Technical and engineering	66 052	65 166	64 366	30,91%	29,02%	28,20%	-1 687	-2,71	-887	-1,89	-800	-0,81
	Agriculture/forestry	10 819	10 278	9 881	5,06%	4,58%	4,33%	-938	-0,73	-540	-0,49	-397	-0,25
	Teacher training/ education	9 423	10 594	10 444	4,41%	4,72%	4,58%	1 021	0,17	1 171	0,31	-150	-0,14
	Science/mathematics/ computing etc	5 692	6 650	7 192	2,66%	2,96%	3,15%	1 500	0,49	959	0,30	541	0,19
	Medical/health services/ nursing etc	14 252	16 504	17 476	6,67%	7,35%	7,66%	3 224	0,99	2 252	0,68	972	0,31
	Economics/commerce/business administration	37 769	40 547	41 547	17,67%	18,05%	18,20%	3 778	0,53	2 778	0,38	1 000	0,15
	Social studies/administration/media/culture	8 838	10 266	11 251	4,14%	4,57%	4,93%	2 414	0,79	1 429	0,44	985	0,36
	Law and legal services	2 072	2 554	2 736	0,97%	1,14%	1,20%	664	0,23	483	0,17	182	0,06
	Personal care services	11 941	13 251	13 676	5,59%	5,90%	5,99%	1 735	0,40	1 310	0,31	425	0,09
	Public order and safety	3 579	3 965	4 057	1,67%	1,77%	1,78%	477	0,10	386	0,09	91	0,01
	Transport and telecommunications	4 965	5 126	5 109	2,32%	2,28%	2,24%	144	-0,08	160	-0,04	-16	-0,04
	Total	213 718	224 588	228 239	100,00%	100,00%	100,00%	14 521		10 870		3 651	

Source: EPC; EU28 Country workbook (December 2013)

Dimensions 3 to 5 – Main characteristics:

Table 2.3 Knowledge

EU 28			2000	2010	2020	2000-2020 (p. p.)	2000-2010 (p. p.)	2010-2020 (p. p.)
Knowledge	Importance	01 Education and Training	39,96%	40,28%	40,44%	0,48	0,32	0,16
		02 Arts and Humanities	22,34%	22,62%	22,90%	0,56	0,28	0,28
		03 Social sciences, Economy and Law	25,75%	26,51%	26,97%	1,21	0,75	0,46
		04 Sciences, Mathematics and Computers	22,25%	22,24%	22,19%	-0,06	0,00	-0,05
		05 Engineering, Technology, Production and Processing	25,08%	24,55%	24,42%	-0,66	-0,53	-0,13
		06 Health services	16,06%	16,80%	17,11%	1,05	0,74	0,31
		07 Services	35,56%	35,86%	35,93%	0,37	0,30	0,06
		08 Business and Management	34,65%	34,86%	35,09%	0,44	0,21	0,23
	Level	01 Education and Training	40,90%	41,22%	41,56%	0,65	0,32	0,33
		02 Arts and Humanities	20,52%	20,79%	21,06%	0,54	0,27	0,26
		03 Social sciences, Economy and Law	23,86%	24,55%	25,01%	1,15	0,69	0,46
		04 Sciences, Mathematics and Computers	22,05%	22,05%	22,08%	0,03	0,01	0,02
		05 Engineering, Technology, Production and Processing	23,95%	23,47%	23,40%	-0,54	-0,48	-0,07
		06 Health services	15,09%	15,74%	16,03%	0,95	0,65	0,30
		07 Services	30,27%	30,58%	30,76%	0,49	0,31	0,18
		08 Business and Management	32,09%	32,39%	32,79%	0,70	0,30	0,41

Source: EPC; EU28 Country workbook (December 2013)

Table 2.4 Skills

EU 28			2000	2010	2020	2000-2020 (p. p.)	2000-2010 (p. p.)	2010-2020 (p. p.)
Skills	Importance	01 Cognitive skills	54,34%	54,62%	54,91%	0,57	0,27	0,29
		02 Practical skills	33,22%	32,67%	32,48%	-0,74	-0,55	-0,19
		03 Communication in the mother language	57,99%	58,64%	59,03%	1,04	0,65	0,39
		04 Communication in foreign languages	13,81%	14,05%	14,14%	0,34	0,24	0,10
		05 Numeracy + basic SMT concepts	29,40%	29,60%	29,79%	0,40	0,20	0,19
		06 ICT/digital	9,14%	9,36%	9,61%	0,48	0,22	0,26
		07 Learning to learn	36,12%	36,63%	36,89%	0,77	0,51	0,26
	Level	01 Cognitive skills	44,98%	45,25%	45,57%	0,59	0,28	0,32
		02 Practical skills	27,00%	26,61%	26,52%	-0,48	-0,39	-0,09
		03 Communication in the mother language	45,58%	46,08%	46,43%	0,85	0,50	0,35
		04 Communication in foreign languages	12,24%	12,51%	12,66%	0,42	0,28	0,14
		05 Numeracy + basic SMT concepts	26,33%	26,57%	26,84%	0,51	0,24	0,26
		06 ICT/digital	7,44%	7,68%	7,96%	0,52	0,24	0,28
		07 Learning to learn	33,70%	34,09%	34,37%	0,67	0,39	0,29

Source: EPC; EU28 Country workbook (December 2013)

Table 2.5 Competences

EU 28			2000	2010	2020	2000-2020 (p. p.)	2000-2010 (p. p.)	2010-2020 (p. p.)
Competence	Importance	01 Personal abilities	64,56%	64,86%	65,10%	0,54	0,31	0,23
		02 Social abilities	47,74%	48,25%	48,59%	0,84	0,50	0,34
		03 Methodical abilities	46,73%	46,89%	47,11%	0,38	0,16	0,22
	Level	01 Personal abilities	41,49%	41,81%	42,16%	0,66	0,31	0,35
		02 Social abilities	39,53%	39,96%	40,32%	0,79	0,43	0,36
		03 Methodical abilities	34,88%	35,20%	35,58%	0,70	0,32	0,39

Source: EPC; EU28 Country workbook (December 2013)

Dimensions 6 and7 – Supplementary characteristics:

Table 2.6 Occupational Interests

EU 28		2000	2010	2020	2000-2020 (p. p.)	2000-2010 (p. p.)	2010-2020 (p. p.)
Occupational Interests	Artistic	17,96%	18,45%	18,84%	0,88	0,49	0,39
	Conventional	58,40%	58,23%	57,66%	-0,74	-0,17	-0,57
	Enterprising	43,20%	44,43%	45,40%	2,20	1,22	0,97
	Investigative	28,52%	29,15%	29,59%	1,07	0,63	0,44
	Realistic	64,07%	61,84%	60,39%	-3,68	-2,23	-1,45
	Social	26,54%	28,48%	29,01%	2,48	1,95	0,53

Source: EPC; EU28 Country workbook (December 2013)

Table 2.7 Working Values

EU 28		2000	2010	2020	2000-2020 (p. p.)	2000-2010 (p. p.)	2010-2020 (p. p.)
Work Values	Achievement	41,54%	42,62%	43,61%	2,07	1,08	0,99
	Independence	45,46%	46,08%	46,62%	1,17	0,62	0,54
	Recognition	36,03%	37,18%	37,99%	1,96	1,14	0,81
	Relationships	58,47%	59,46%	59,88%	1,42	0,99	0,43
	Support	53,20%	52,81%	52,74%	-0,46	-0,39	-0,07
	Working Conditions	42,96%	43,76%	44,42%	1,46	0,80	0,66

Source: EPC; EU28 Country workbook (December 2013)

2.2 Differences in Qualification Requirements by sector and by occupation

To better show the full potential of the OSP approach, in this example differences across individual sectors, occupations and countries in the Level of Qualification Requirements (Dimension 1 of OSPs) are analysed and illustrated. In the first part of this sub-chapter differences in Dimension 1 by sector will be examined.

Dimension 1 of OSPs distinguishes eight levels of qualification requirements based on the EQF. The characteristics of the Level of Qualification Requirements indicate a percentage distribution of jobs for all the eight levels (their sum making 100 %). For a better measurability of differences across countries (or sectors or occupations), one aggregated index is constructed – the Total Level of Qualification Requirements (TQR). It is calculated as a

scalar product of percentage distribution of jobs for all the eight levels of work complexity, corresponding to eight qualification levels (1-8).

The example below shows in detail how the TQR is calculated for two sectors (*01 Agriculture sector* and *02 Coal sector*) for the overall EU28 data in the year 2010. TQR values for groups of occupations or for individual European countries are calculated in the same way.

Table 2.8 Total Level of Qualification Requirements (TQR)

		Level of qualification requirements (EQF)								
		1	2	3	4	5	6	7	8	Total
2010	01 Agriculture	16.1%	24.3%	23.8%	15.9%	11.1%	4.4%	3.6%	0.8%	3.13
	02 Coal	8.1%	20.4%	24.8%	18.2%	14.1%	6.1%	6.7%	1.6%	3.63

TQR for Agriculture sector is equal to:

1*0.161+2*0.243+3*0.238+4*0.159+5*0.111+6*0.044+7*0.036+8*0.008 = **3.13**

TQR for Coal sector is equal to:

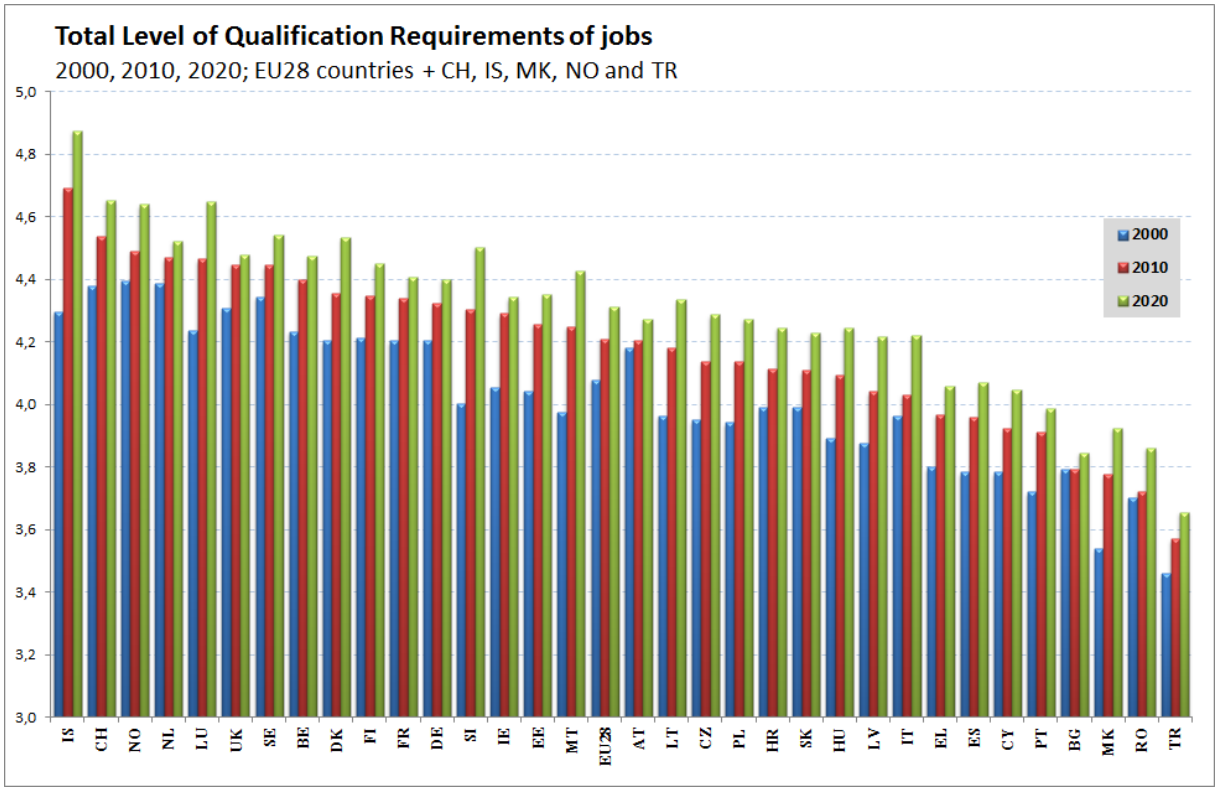
1*0.081+2*0.204+3*0.248+4*0.182+5*0.141+6*0.061+7*0.067+8*0.016 = **3.63**

Source: EPC

The TQR of jobs is calculated for each of the EU28 countries plus FYROM, Iceland, Norway, Switzerland and Turkey and for the EU28 as a whole.

Figure 2.1 illustrates changes in TQR in countries between 2000 and 2020. Countries are sorted descending by value of TQR in 2010 in the figure.

Figure 2.1 Total Level of Qualification Requirements of jobs by countries

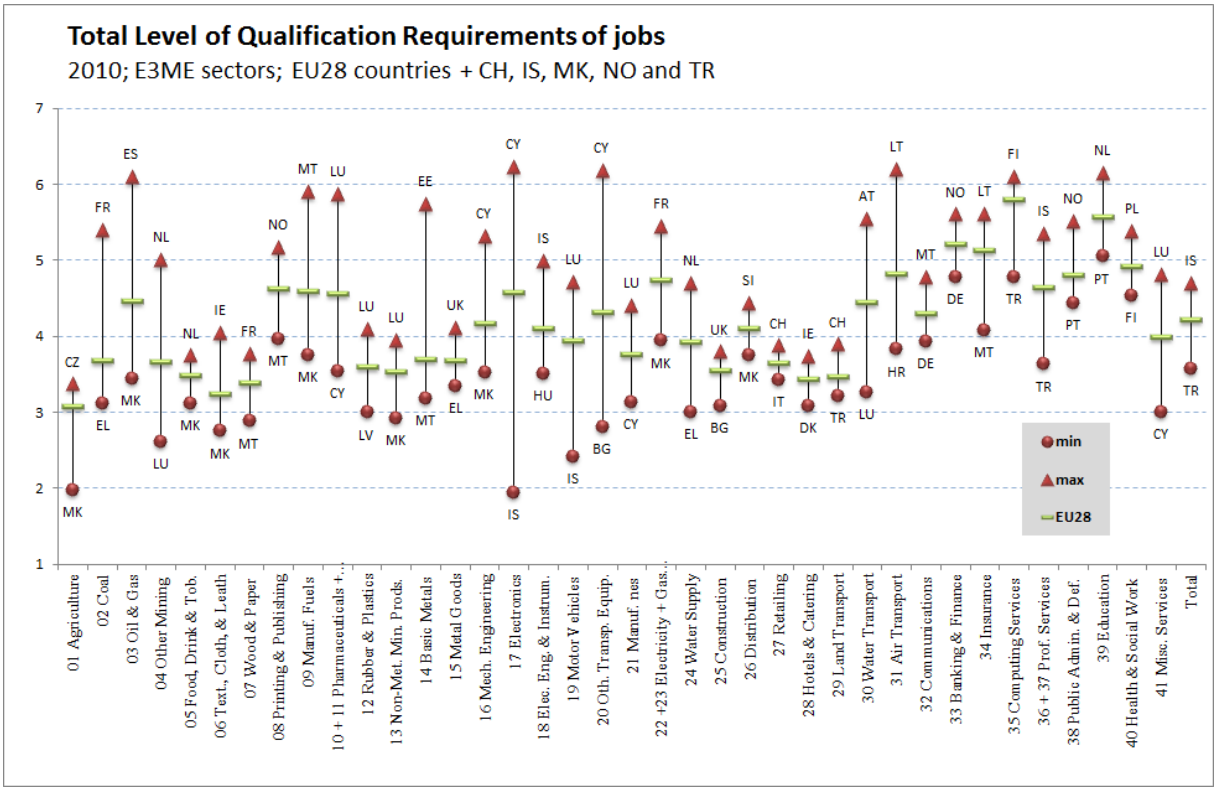


Source: EPC; Country workbooks (December 2013)

2.2.1 Analyses by sector

Differences between countries relating to individual sectors are quite marked, as illustrated by Figure 2.2 indicating for each sector three values: the countries with maximum and the minimum levels of TQR and the EU28.

Figure 2.2 Total Level of Qualification Requirements of jobs by sectors



Source: EPC; Country workbooks (December 2013)

It is apparent that there are high inter-country differences in each sector. Table 1.9 shows five sectors with the highest and five sectors with the lowest inter-country differences. They are measured as a difference between the highest and the lowest Total Level of Qualification Requirements of jobs (of countries) in a given sector.

Table 2.9 Maximal differences in Total Level of Qualification Requirements of jobs by sectors

	Sector	Difference
Sectors with the biggest inter-country differences	17 Electronics	4.29
	20 Oth. Transp. Equip.	3.38
	03 Oil & Gas	2.66
	14 Basic Metals	2.56
	04 Other Mining	2.39
Sectors with the lowest inter-country differences	26 Distribution	0.69
	29 Land Transport	0.67
	28 Hotels & Catering	0.65
	05 Food, Drink & Tob.	0.63
	27 Retailing	0.44
Average difference in all sectors		1.56

Source: EPC; Country workbooks (December 2013)

However, comparison of sectors and countries only by the difference between maximum and minimum values of TQR may be misleading because little is known about the distribution of qualification requirement within countries. Therefore, it is also necessary to compare the standard deviation of the level of qualification requirements between all countries in a given sector (Table 2.10).

Table 2.10 Standard deviation of Total Level of Qualification Requirements of jobs by sectors

Sector	SD	Sector	SD
34 Insurance	0.733	26 Distribution	0.286
03 Oil & Gas	0.729	19 Motor Vehicles	0.282
20 Oth. Transp. Equip.	0.587	35 Computing Services	0.282
01 Agriculture	0.571	25 Construction	0.252
02 Coal	0.534	17 Electronics	0.250
27 Retailing	0.483	28 Hotels & Catering	0.249
14 Basic Metals	0.453	41 Misc. Services	0.241
16 Mech. Engineering	0.445	09 Manuf. Fuels	0.241
30 Water Transport	0.420	33 Banking & Finance	0.224
07 Wood & Paper	0.415	05 Food, Drink & Tob.	0.219
32 Communications	0.398	10 + 11 Pharmaceuticals + Chemicals	0.218
22 +23 Electricity + Gas Supply	0.391	40 Health & Social Work	0.191
18 Elec. Eng. & Instrum.	0.390	36 + 37 Prof. Services	0.180
21 Manuf. nes	0.376	08 Printing & Publishing	0.172
24 Water Supply	0.344	39 Education	0.166
06 Text., Cloth, & Leath	0.341	13 Non-Met. Min. Prods.	0.159
15 Metal Goods	0.327	38 Public Admin. & Def.	0.146
31 Air Transport	0.324	04 Other Mining	0.129
29 Land Transport	0.309	12 Rubber & Plastics	0.116

Source: EPC; Country workbooks (December 2013)

The next table (Table 2.11) shows sectors with the highest and lowest TQR for each country. Countries are sorted in ascending order by difference between sector with the highest and lowest TQR in a given country.

Table 2.11 Differences in Total Level of Qualification Requirements of jobs by countries and sectors

Total Level of Qualification Requirements of jobs								
Country	Max		Whole economy	Min		Difference		
	TQR	Sector		TQR	Sector	Max-Tot	Tot-Min	Max-Min
IE	5.55	39 Education	4.29	3.17	01 Agriculture	1.26	1.12	2.38
CH	5.85	39 Education	4.54	3.34	01 Agriculture	1.31	1.20	2.51
AT	5.84	35 Computing Services	4.20	3.20	01 Agriculture	1.64	1.01	2.65
NO	5.90	35 Computing Services	4.49	3.23	01 Agriculture	1.41	1.27	2.67
DE	5.80	39 Education	4.32	3.12	01 Agriculture	1.47	1.20	2.68
CZ	5.78	35 Computing Services	4.14	3.10	06 Text., Cloth, & Leath	1.64	1.04	2.68
BE	5.81	35 Computing Services	4.40	3.11	01 Agriculture	1.41	1.29	2.69
EU28	5.78	35 Computing Services	4.21	3.07	01 Agriculture	1.57	1.14	2.71
FR	5.78	35 Computing Services	4.34	3.05	01 Agriculture	1.44	1.29	2.74
SE	5.94	35 Computing Services	4.45	3.16	28 Hotels & Catering	1.50	1.28	2.78
SI	5.75	39 Education	4.30	2.97	01 Agriculture	1.45	1.33	2.78
DK	5.88	35 Computing Services	4.36	3.09	28 Hotels & Catering	1.52	1.27	2.79
HR	5.74	35 Computing Services	4.11	2.95	06 Text., Cloth, & Leath	1.63	1.17	2.79
UK	5.88	35 Computing Services	4.45	3.09	01 Agriculture	1.44	1.36	2.79
PL	5.92	35 Computing Services	4.14	3.12	06 Text., Cloth, & Leath	1.79	1.02	2.81
RO	5.80	35 Computing Services	3.72	2.99	06 Text., Cloth, & Leath	2.08	0.74	2.82
IT	5.57	35 Computing Services	4.03	2.71	01 Agriculture	1.54	1.32	2.86
SK	5.83	35 Computing Services	4.11	2.94	06 Text., Cloth, & Leath	1.72	1.16	2.88
HU	5.80	35 Computing Services	4.10	2.90	06 Text., Cloth, & Leath	1.70	1.19	2.90
PT	5.97	35 Computing Services	3.91	3.06	06 Text., Cloth, & Leath	2.06	0.85	2.90
FI	6.09	35 Computing Services	4.35	3.16	04 Other Mining	1.75	1.18	2.93
TR	5.85	39 Education	3.57	2.90	01 Agriculture	2.28	0.67	2.95
EL	5.93	39 Education	3.97	2.96	01 Agriculture	1.96	1.01	2.97
BG	5.78	35 Computing Services	3.79	2.80	20 Oth. Transp. Equip.	1.98	0.99	2.98
NL	6.15	39 Education	4.47	3.15	01 Agriculture	1.68	1.32	3.00
MT	5.90	09 Manuf. Fuels	4.25	2.88	07 Wood & Paper	1.66	1.37	3.03
EE	6.05	35 Computing Services	4.26	3.02	06 Text., Cloth, & Leath	1.79	1.24	3.03
LT	6.20	31 Air Transport	4.18	3.06	06 Text., Cloth, & Leath	2.02	1.12	3.14
LV	6.15	17 Electronics	4.04	2.96	07 Wood & Paper	2.11	1.08	3.19
ES	6.10	03 Oil & Gas	3.96	2.73	01 Agriculture	2.13	1.23	3.37
CY	6.23	17 Electronics	3.92	2.83	01 Agriculture	2.31	1.09	3.40
LU	6.06	39 Education	4.46	2.61	04 Other Mining	1.59	1.85	3.45
MK	5.76	39 Education	3.78	1.97	01 Agriculture	1.98	1.81	3.79
IS	5.93	35 Computing Services	4.69	1.94	17 Electronics	1.23	2.75	3.98

Source: EPC; Country workbooks (December 2013)

It is evident that in most (20) countries the highest Total Level of Qualification Requirements of jobs is in Computing Services, while in nine countries the sector with the highest level of TQR is Education. On the contrary Agriculture is the most often sector with the lowest TQR (17countries), while followed by Textiles, Wearing Apparel and Leather (9 countries).

Table 2.12 shows the TQR in EU28 in 2010, while Table 2.13 shows TQR for whole economy for each country (data sorted in descending order).

Table 2.12 Total Level of Qualification Requirements of jobs by sectors in EU28

Sector	TQR	Sector	TQR
35 Computing Services	5.78	26 Distribution	4.09
39 Education	5.57	41 Misc. Services	3.98
33 Banking & Finance	5.20	19 Motor Vehicles	3.94
34 Insurance	5.12	24 Water Supply	3.90
40 Health & Social Work	4.91	21 Manuf. nes	3.75
31 Air Transport	4.81	14 Basic Metals	3.68
38 Public Admin. & Def.	4.79	15 Metal Goods	3.67
22 +23 Electricity + Gas Supply	4.72	02 Coal	3.66
36 + 37 Prof. Services	4.63	04 Other Mining	3.65
08 Printing & Publishing	4.61	27 Retailing	3.64
09 Manuf. Fuels	4.58	12 Rubber & Plastics	3.59
17 Electronics	4.56	25 Construction	3.53
10 + 11 Pharmaceuticals + Chemica	4.55	13 Non-Met. Min. Prods.	3.52
03 Oil & Gas	4.45	05 Food, Drink & Tob.	3.47
30 Water Transport	4.43	29 Land Transport	3.45
20 Oth. Transp. Equip.	4.30	28 Hotels & Catering	3.42
32 Communications	4.29	07 Wood & Paper	3.38
16 Mech. Engineering	4.15	06 Text., Cloth, & Leath	3.23
18 Elec. Eng. & Instrum.	4.10	01 Agriculture	3.07

Source: EPC; Country workbooks (December 2013)

Table 2.13 Total Level of Qualification Requirements of jobs by countries

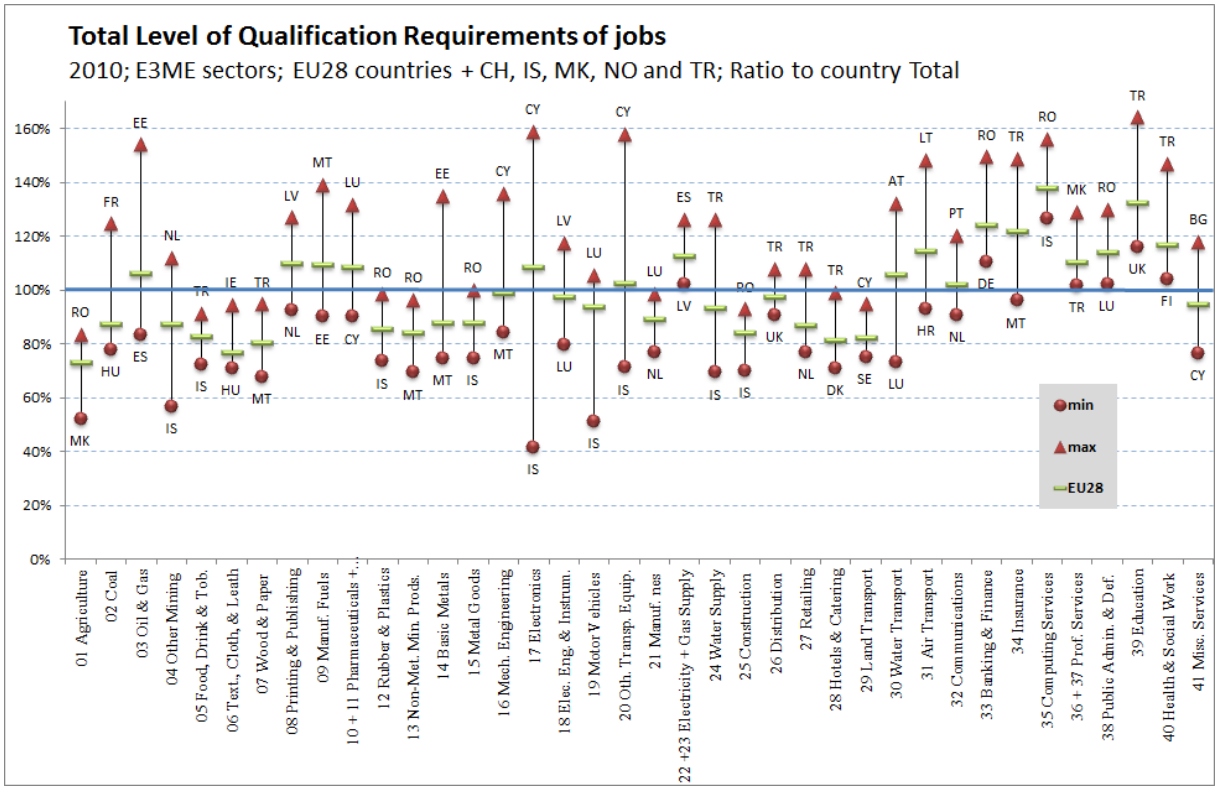
Country	TQR	Country	TQR
IS	4.69	AT	4.20
CH	4.54	LT	4.18
NO	4.49	CZ	4.14
NL	4.47	PL	4.14
LU	4.46	HR	4.11
UK	4.45	SK	4.11
SE	4.45	HU	4.10
BE	4.40	LV	4.04
DK	4.36	IT	4.03
FI	4.35	EL	3.97
FR	4.34	ES	3.96
DE	4.32	CY	3.92
SI	4.30	PT	3.91
IE	4.29	BG	3.79
EE	4.26	MK	3.78
MT	4.25	RO	3.72
EU28	4.21	TR	3.57

Source: EPC; Country workbooks (December 2013)

It is clear that differences in the Total Level of Qualification Requirements of jobs are different in different countries. In countries where TQR is lower, there is most probably also lower level of QR in most sectors in comparison with country with higher TQR. That is why it is necessary to compare not only the absolute value of level of TQR size (Figure 2.2), but also relative level

of QR for given sector in given country in comparison with the overall TQR in a given country. This shows Figure 2.3.

Figure 2.3 Relative Total Level of Qualification Requirements of jobs by sectors



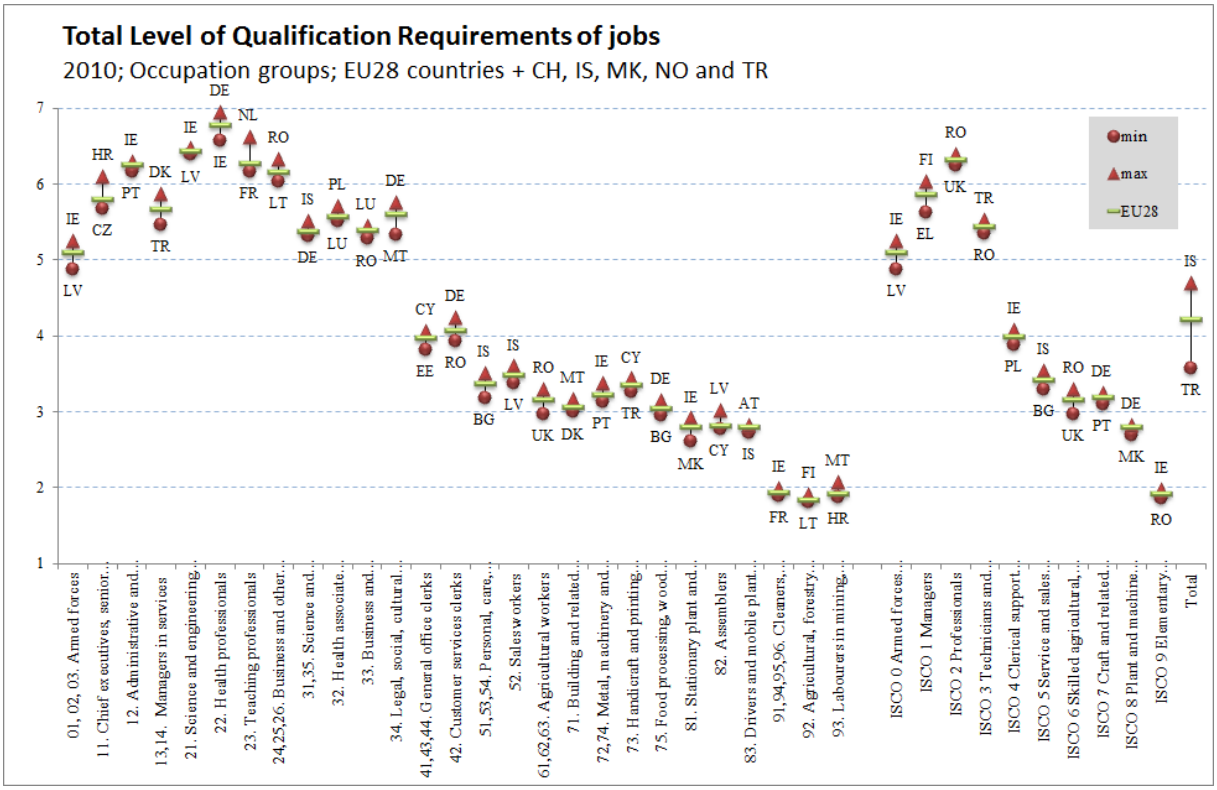
Source: EPC; Country workbooks (December 2013)

Comparing values in Figure 2.2 and Figure 2.3 one very interesting thing can be found. In sector Distribution (26) there is Total Level of Qualification Requirements of jobs in Turkey equal to 3.85. This is the third lowest absolute value of all countries in this sector. On the other hand, this means that level of TQR is in this sector in Turkey at 108 % (see Figure 2.3) of total TQR in Turkey. It is the highest value of all countries in this sector. Thus, while in Figure 1.2 there is Turkey as the one of the lowest value indicated in sector Distribution in Figure 2.3 in the same sector Turkey generated the maximum value. When interpreting the results is therefore necessary to be very careful and it is always necessary exactly specify what the results described.

2.1.2 Analyses by occupation

In the second part of this sub-chapter differences in Dimension 1 by occupations will be examined. As in the previous case of sectors, also for the occupations TQR are calculated for each country of the EU28 plus FYROM, Iceland, Norway, Switzerland and Turkey and the EU28 as a whole. Figure 2.4 shows maximum (of countries) TQR, minimum (of countries) TQR and TQR for EU28 as a whole in a given occupational group and total economy (it is, of course, the same as for total economy in Figure 2.2).

Figure 2.4 Total Level of Qualification Requirements of jobs by occupations



Source: EPC; Country workbooks (December 2013)

Occupations with the biggest and the lowest inter-country differences are in Table 2.14.

Table 2.14 Occupational inter-country differences

	Occupational group	Difference
Occupations with the biggest inter-country differences	23. Teaching professionals	0.46
	34. Legal, social, cultural and related associate professionals	0.42
	11. Chief executives, senior officials and legislators	0.42
	13,14. Managers in services	0.40
	01, 02, 03. Armed forces	0.38
Occupations with the lowest inter-country differences	12. Administrative and commercial managers	0.13
	91,94,95,96. Cleaners, refuse, street and related sevice occupations	0.11
	92. Agricultural, forestry and fishery labourers	0.10
	83. Drivers and mobile plant operators	0.09
	21. Science and engineering professionals	0.08
Average difference in all occupational groups		0.25

Source: EPC; Country workbooks (December 2013)

Differences between countries are smaller for individual occupations than for sectors. The average difference is now 0.25 compared to 1.56 for sectors. In this context, it is not surprising that also standard deviations are much lower for occupations than for sectors.

Table 2.15 Standard deviation of Total Level of Qualification Requirements of jobs by occupational groups

Occupational group	SD	Occupational group	SD
11. Chief executives, senior officials and legisla	0.115	52. Sales workers	0.047
01, 02, 03. Armed forces	0.101	72,74. Metal, machinery and electrical trades	0.045
22. Health professionals	0.097	82. Assemblers	0.044
13,14. Managers in services	0.090	31,35. Science and engineering associate profe	0.044
61,62,63. Agricultural workers	0.088	73. Handicraft and printing workers	0.039
34. Legal, social, cultural and related associate	0.085	93. Labourers in mining, construction, manufac	0.034
51,53,54. Personal, care, protective service	0.073	33. Business and administration associate prof	0.034
23. Teaching professionals	0.072	71. Building and related trades workers, excludi	0.033
81. Stationary plant and machine operators	0.067	12. Administrative and commercial managers	0.029
24,25,26. Business and other professionals	0.064	92. Agricultural, forestry and fishery labourers	0.028
42. Customer services clerks	0.062	91,94,95,96. Cleaners, refuse, street and related	0.026
32. Health associate professionals	0.059	21. Science and engineering professionals	0.021
41,43,44. General office clerks	0.055	83. Drivers and mobile plant operators	0.017
75. Food processing, wood working, garment a	0.047		

Source: EPC; Country workbooks (December 2013)

Table 2.16 shows occupations with the highest and lowest Total Level of Qualification Requirements of jobs for each country. In all countries the highest Total Level of Qualification Requirements of jobs is for occupational group ISCO 22 Health professionals. On the contrary occupational group ISCO 92 Agricultural, forestry and fishery labourers has the lowest level of TQR in all countries.

Countries are sorted in descending order by difference between occupation with the highest and lowest TQR in a given country.

Table 2.16 Occupation with maximum and minimum Total Level of Qualification Requirements of jobs

Country	Total Level of Qualification Requirements of jobs							
	Max		Whole economy	Min		Difference		
	TQR	Sector		TQR	Sector	Max-Tot	Tot-Min	Max-Min
IT	6.94	22. Health professionals	4.10	1.82	92. Agricultural, forestry and	2.84	2.28	5.12
DE	6.95	22. Health professionals	4.14	1.84	92. Agricultural, forestry and	2.81	2.30	5.11
SK	6.92	22. Health professionals	4.46	1.81	92. Agricultural, forestry and	2.46	2.65	5.11
AT	6.93	22. Health professionals	4.29	1.83	92. Agricultural, forestry and	2.64	2.47	5.10
EE	6.92	22. Health professionals	4.21	1.82	92. Agricultural, forestry and	2.71	2.39	5.10
EL	6.90	22. Health professionals	4.34	1.81	92. Agricultural, forestry and	2.56	2.53	5.08
HU	6.92	22. Health professionals	4.14	1.85	92. Agricultural, forestry and	2.78	2.29	5.07
LV	6.88	22. Health professionals	3.57	1.83	92. Agricultural, forestry and	3.31	1.74	5.05
SI	6.86	22. Health professionals	3.92	1.81	92. Agricultural, forestry and	2.93	2.11	5.04
FR	6.83	22. Health professionals	4.11	1.84	92. Agricultural, forestry and	2.72	2.27	4.99
MK	6.78	22. Health professionals	3.97	1.81	92. Agricultural, forestry and	2.82	2.16	4.97
TR	6.78	22. Health professionals	3.78	1.81	92. Agricultural, forestry and	3.01	1.96	4.97
HR	6.79	22. Health professionals	4.45	1.83	92. Agricultural, forestry and	2.34	2.62	4.96
CH	6.79	22. Health professionals	3.72	1.84	92. Agricultural, forestry and	3.07	1.89	4.96
EU28	6.77	22. Health professionals	4.30	1.82	92. Agricultural, forestry and	2.47	2.48	4.95
NL	6.77	22. Health professionals	4.47	1.83	92. Agricultural, forestry and	2.30	2.64	4.95
FI	6.86	22. Health professionals	4.36	1.91	92. Agricultural, forestry and	2.50	2.44	4.94
BE	6.80	22. Health professionals	4.54	1.86	92. Agricultural, forestry and	2.26	2.68	4.94
MT	6.73	22. Health professionals	3.79	1.81	92. Agricultural, forestry and	2.93	1.98	4.92
NO	6.76	22. Health professionals	4.25	1.86	92. Agricultural, forestry and	2.51	2.39	4.90
LU	6.80	22. Health professionals	4.35	1.91	92. Agricultural, forestry and	2.45	2.44	4.89
ES	6.70	22. Health professionals	4.45	1.82	92. Agricultural, forestry and	2.26	2.63	4.89
PT	6.70	22. Health professionals	4.18	1.82	92. Agricultural, forestry and	2.52	2.36	4.89
LT	6.69	22. Health professionals	3.91	1.81	92. Agricultural, forestry and	2.78	2.10	4.88
IS	6.75	22. Health professionals	4.11	1.88	92. Agricultural, forestry and	2.65	2.23	4.88
CY	6.70	22. Health professionals	4.49	1.83	92. Agricultural, forestry and	2.21	2.66	4.88
BG	6.69	22. Health professionals	4.20	1.82	92. Agricultural, forestry and	2.49	2.39	4.88
PL	6.68	22. Health professionals	4.26	1.82	92. Agricultural, forestry and	2.43	2.44	4.86
CZ	6.69	22. Health professionals	4.32	1.83	92. Agricultural, forestry and	2.36	2.49	4.86
RO	6.66	22. Health professionals	4.04	1.81	92. Agricultural, forestry and	2.62	2.23	4.85
DK	6.68	22. Health professionals	4.40	1.86	92. Agricultural, forestry and	2.28	2.54	4.82
UK	6.65	22. Health professionals	4.69	1.83	92. Agricultural, forestry and	1.96	2.86	4.82
IE	6.58	22. Health professionals	4.03	1.82	92. Agricultural, forestry and	2.55	2.21	4.75
SE	6.66	22. Health professionals	3.96	1.90	92. Agricultural, forestry and	2.70	2.06	4.75

Source: EPC; Country workbooks (December 2013)

Table 2.17 shows Total Level of Qualification Requirements of jobs in EU28 in 2010. Occupations follow in the descending order.

Table 2.17 Total Level of Qualification Requirements of jobs in EU28 by occupational group

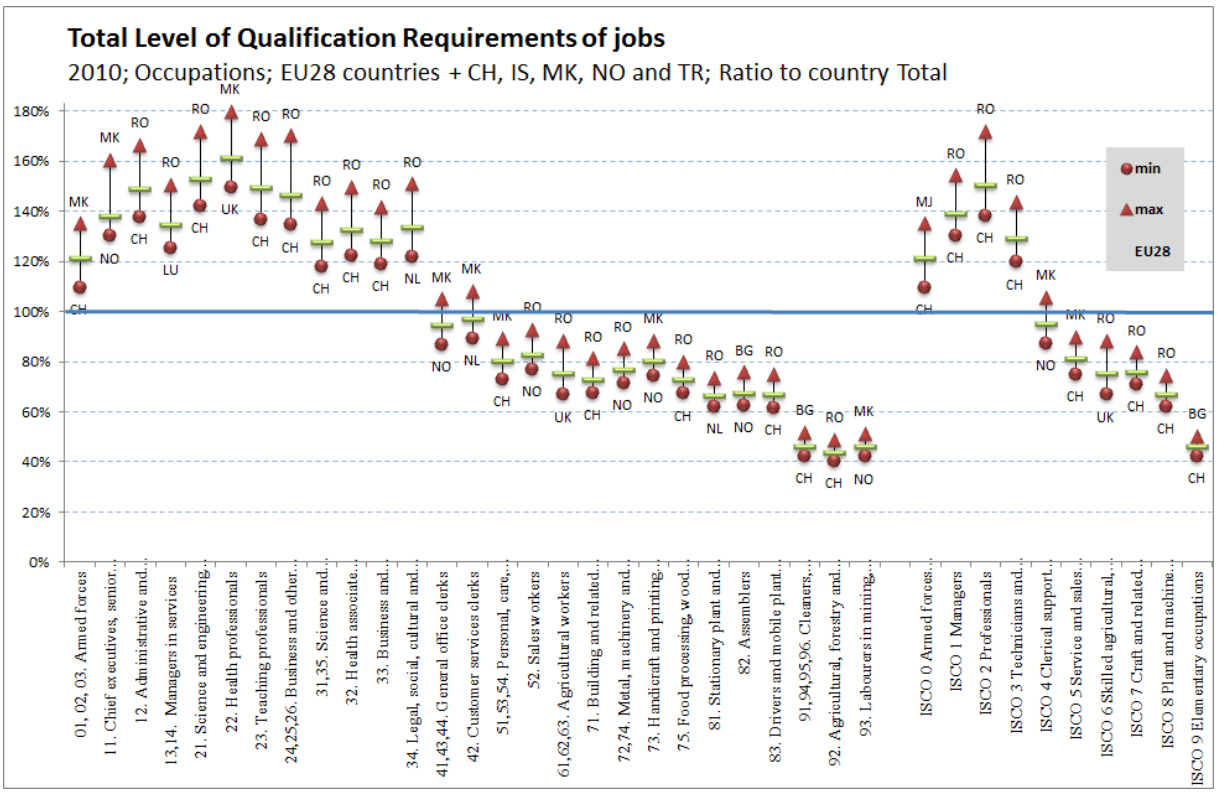
Sector	TQR	Sector	TQR
22. Health professionals	6.77	52. Sales workers	3.47
21. Science and engineering professionals	6.43	51,53,54. Personal, care, protective service	3.36
23. Teaching professionals	6.26	73. Handicraft and printing workers	3.35
12. Administrative and commercial managers	6.25	72,74. Metal, machinery and electrical trades	3.22
24,25,26. Business and other professionals	6.15	61,62,63. Agricultural workers	3.15
11. Chief executives, senior officials and legisla	5.79	71. Building and related trades workers, excludi	3.05
13,14. Managers in services	5.65	75. Food processing, wood working, garment a	3.04
34. Legal, social, cultural and related associate	5.60	82. Assemblers	2.81
32. Health associate professionals	5.56	83. Drivers and mobile plant operators	2.79
33. Business and administration associate prof	5.38	81. Stationary plant and machine operators	2.78
31,35. Science and engineering associate profe	5.36	91,94,95,96. Cleaners, refuse, street and related	1.92
01, 02, 03. Armed forces	5.09	93. Labourers in mining, construction, manufac	1.91
42. Customer services clerks	4.06	92. Agricultural, forestry and fishery labourers	1.82
41,43,44. General office clerks	3.96		

Source: EPC; Country workbooks (December 2013)

The table which shows Total Level of Qualification Requirements of jobs for whole economy for each country is not displayed here, because it is the same regardless of whether it is based on sectors or occupations (see Table 2.13).

Figure 2.5 shows the TQR for a given occupational group in a given country compared with TQR for a given country.

Figure 2.5 Relative Total Level of Qualification Requirements of jobs by occupations



Source: EPC; Country workbooks (December 2013)

The previous analyses show a large difference between sectoral and occupational data. However, while occupational groups show quite small inter-country differences and quite high inter-occupation differences in a given occupation, for sectors it is the opposite. While in the EU28 is the difference between the highest and lowest Total Level of Qualification Requirements of jobs in sectors only 2.71 points (5.78 points in Computing Services minus 3.07 points in Agriculture), for occupational groups is this difference 4.94 points (6.77 points for Health professionals minus 1.82 points for Agricultural, forestry and fishery labourers).

It means that in a given sector, differences in the level of TQR across countries are mainly caused by different occupational structures within the sector.

3. Developing country specific OSP based on PIAAC data

Up to now, Occupational Skills Profiles have been country specific only because of different cross-country sectoral x occupational structure/composition of employed people. OSPs defined for sector specific group of occupations have been similar for all countries.

Although the assumption that occupational skill measures from one country can be generalized is tested and is largely supported – see e.g. Handel (2012), Koucky et al. (2012), CEDEFOP (2013), – and Occupation-level skill scores from established national programmes, such as the Occupational Information Network (O*NET) database produced by the U.S. Department of Labor, can be merged onto labour force survey data from other countries for analyses, the EPC makes country specific OSPs more accurate using data from PIAAC. As a pilot country the Czech Republic were chosen.

3.1 About PIAAC survey

OECD PIAAC – OECD Programme for the International Assessment of Adult Competencies – is the largest and most comprehensive international survey of adult skills ever undertaken. It measures the key cognitive and workplace skills needed for individuals to participate in society and for economies to prosper. This survey has been conducted in 33 countries. Two rounds of the Survey of Adult Skills are under way: Round 1 (2008-13) with 24 participating countries (Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Ireland, Italy, Netherlands, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, United Kingdom, Australia, Canada, Japan, Korea (Republic of), Russian Federation and United States), whose results were be released in October 2013, and Round 2 (2012-16) with 9 participating countries (Chile, Greece, Indonesia, Israel, Lithuania, New Zealand, Singapore, Slovenia and Turkey), whose results will be released in 2016. Round 3 is scheduled to begin in May 2014.

EPC has identified in the PIAAC Questionnaire a number of questions that can be used for preparing country-specific Occupational Skills Profiles (see the chapter 3.2 indicating selected questions from the PIAAC Questionnaire). EPC has confronted current OSP values for all seven dimensions (see OSP Country Workbooks and CEDEFOP, 2013) with the data from the PIAAC survey of the Czech Republic (PIAAC.CZ) by linking OSP values to all individual respondents in the PIAAC.CZ survey currently in employment with a defined sector (2D of the ISIC rev 4) and occupation (3D of the ISCO-08) of his/her job.

As regards extending OSPs to ISCO 3-digit (3D) in the new set of Workbooks, the extension from the PIACC data seems to be very problematic. Next table shows the number of respondents by ISCO 3D and by countries participating in the PIACC survey in the 30 most frequent occupational groups.

It can be seen that only 12 of the 28 EU countries have data in the PIACC survey at ISCO 3-digit level. Most of the remaining countries either did not participate in this PIAAC round or their occupation code (ISCO) cannot be sufficiently identified. In some cases (e.g. DE) the country identifies the occupation of respondents only at the second level of ISCO, (for AT it is only available at the first level of ISCO). Furthermore even some of the 12 countries shown

are missing some occupational groups (e.g. ISCO 222 in Italy, and ISCO 411 and ISCO 344 in UK).

Number of respondents by ISCO 3D and countries in PIACC survey

30 most frequent occupational groups

ISCO 3D	BE	CY	CZ	DK	ES	FR	IT	NL	NO	PL	SK	UK
522	130	198	167	208	88	194	199	173	279	396	172	352
911	126	77	67	144	178	259	105	97	82	75	75	226
532	102	11	13	244	68	101	91	140	200	20	68	267
234	71	100	76	303	67	53	54	70	194	104	88	115
711	65	69	67	119	98	96	53	49	80	221	73	85
411	124	4	81	53	172	118	48	79	59	97	15	
441	49	84	53	83	47	27	31	53	10	32	48	373
332	64	24	87	103	66	97	69	75	61	70	57	100
431	37	41	85	129	53	87	64	81	35	60	41	146
531	50	27	10	89	36	102	8	66	146	31	16	250
311	40	11	99	109	27	115	68	33	147	73	39	51
432	102	35	74	43	81	40	36	101	57	141	59	42
334	54	174	15	81	7	144	82	66	54	55	58	2
833	62	49	69	65	66	68	53	39	51	96	91	82
331	37	59	137	40	7	47	89	42	28	66	67	149
541	25	81	83	30	84	69	29	63	28	103	68	86
723	66	33	122	71	55	42	30	33	63	103	58	71
235	73	73	50	78	88	15	15	88	45	61	53	104
233	92	67	37	46	52	106	74	40	40	63	16	91
222	100	51	66	119	44	57		51	75	39	1	
513	21	26	56	42	98	33	61	62	61	73	47	83
422	37	34	52	44	57	27	62	84	32	63	21	147
132	37	19	49	44	32	96	23	42	48	30	85	133
121	76	22	32	75	7	62	8	65	50	34	39	161
134	39	10	28	113	47	77	11	164	13	27	32	47
933	24	16	30	97	58	84	42	70	1	40	63	82
524	9	72	97	27	119	18	26	39	45	108	22	18
312	65	29	35	20	31	153	36	36	42	36	62	
341	32		33	36	9	106	22	102	98	16	4	74
322	4	1		22	39	38	41	25	74		66	143

The second strategy could be to use PIAAC more directly to develop alternative OSPs and to use this information to assess and validate the existing OSPs based on O*NET and other data. It could be developed a methodology, using technologies of Multi-level and Small Area Estimation Modelling, to give estimates of the skills profiles of 2-digit occupations using the PIAAC data.

In principle, PIAAC provides a good opportunity for developing a set of occupational skills profiles per country. The challenge is to do this in such a way that makes optimal use of the data. As rich as the PIAAC dataset is, it has some of important limitations that should be recognized when embarking on this exercise. First and foremost, the number of cases available per country for this analysis is quite small. This limitation is the reason why it is not feasible currently to derive profiles at a more detailed level than 2-digit ISCO codes. However, even at this level there are only around 100 observations per country per occupational group, which would mean a fairly low level of precision in estimating the skill levels for each group. This problem becomes even more severe for some occupational groups where the number of observations is tiny, and in some cases there are no observations at all at that level.

This problem can be dealt with to some extent by estimating skill levels in a multi-level design in which 2-digit occupational codes are nested within 1-digit codes as well as within

2-digit codes across clusters of similar countries. In this way the lack of precision inherent in the 2-digit codes will be adjusted by taking into account that the distribution of skills across countries and occupational codes is not random, but follows a clear pattern that can be used by imposing a particular structure on the analyses.

Although such a design helps smooth out the estimations of skills based on relatively small numbers of cases, in itself, this approach may not provide the best possible estimates, because of the heterogeneity of the group of people represented in a given occupational category in any given country, in terms of such features as age, gender and educational qualifications. Recent advances in the field of small area estimation offer the prospect of obtaining better estimates of key parameters for sub-populations of particular interest within larger surveys. In this case the populations of interest are the occupational groups, and the aim is to make use of fuller information about the precise constellation of background characteristics in order to arrive at a more precise estimate of the skills in each occupation. A big advantage of such techniques is that the estimates of the distribution of these background characteristics that are obtained from the larger survey itself – a second shortcoming of the PIAAC data being that these estimates will be as imprecise as those of the skills themselves – but can be based on larger datasets such as the EU-LFS or comparable national surveys. By using precise data obtained from external sources it should be possible to estimate the skill profiles per occupational group with a higher degree of precision than would otherwise be possible.

The lack of detailed information in PIAAC strengthens the need to use additional national data, for example, the German *BIBB/BAuA Erwerbstätigenbefragung* survey. EPC have access to the latest 2012 version of the latter and are looking into it.

Other national data can be used as well. Some of the national systems of occupation supported by structural funds are very promising, as they are linked to the ESCO project. EPC will analyse the development of ESCO to explore how it could be used in this project, now and in the future.

National projects of this type include the Czech National System of Occupation (*Národní soustava povolání*) that can be used extensively, as well as a very similar approach in Slovakia. In 2012 the Italians carried out a second version of the *Indagine sulle professioni* survey (the first survey was carried out in 2006). As this survey has adopted the US O*NET methodology directly, a detailed comparison of outcomes of both Italian surveys with O*NET results can shed more light on the validity of the transfer both of the methodology and of survey results not only between the USA and European countries generally, but also between individual European countries. The sixth round of the European Social Survey, ESS-6, covering 22 member countries of the EU 28, can also be used (together with ESS 1-5).

EPC will develop two sets of Country OSP workbooks in 2014. The first set of Country workbooks will be prepared for all 28 EU countries. They will include OSPs by 38 sector groups (the same as in 2013) and by ISCO-08 3-digit occupations. Occupations accounting for less than 1% of employment will not be presented in workbooks although they will be used in calculations. For an indication of how many such 3 digit occupation there are in individual countries, see Table 3.2 below. Generally only 30-40 3 digit occupations reach that threshold.

Country	Number of occupations (ISCO-08 3digit level) with more than 1 % of employed	Country	Number of occupations (ISCO-08 3digit level) with more than 1 % of employed
IE	40	HU	33
LV	39	SE	33
FI	37	EU27	33
MT	37	AT	32
UK	37	EE	32
DE	36	PL	32
PT	36	CY	31
BG	35	EL	31
DK	35	SI	31
LT	35	CZ	30
NL	35	LU	29
BE	34	SK	29
FR	34	ES	28
IT	34	RO	28

ECP have in previous years prepared a set of non-country specific OSPs. The OSP for example for occupation 1 in sector 1 is the same for all countries. However if countries differ in their detailed occupation by sector employment structure this will cause differences between country workbooks for any two countries.

Where it is possible to develop country specific OSPs (e.g. by using country specific OSP based on PIACC data, such as those computed for the Czech Republic in 2013), there is a different OSP for particular occupations in particular sector.

The differences between country workbooks for and two countries at the upper levels of sectoral aggregation (i.e. the 38 sectors used in the OSPs) will then be caused not only by differences in their sector-occupational structure but also by differences in the country specific OSPs.

For the first set of workbooks, the PIACC country specific data will not be used. The first set of workbooks will be prepared based on a non-country specific OSP, with updating from some national data sources that can be used generically such as the US O*NET 2014 data, ESS 6, the new US BLS projection 2012-2022 from December 2013, and some European national sources. The latter include the German *BIBB/BAuA Erwerbstätigenbefragung* survey, the *Czech National System of Occupation* (*Národní soustava povolání*, as well as a very similar approach in Slovakia and the Italian *Indagine sulle professioni* survey (which was carried out for a second time in 2012).

At the lowest level of resolution (38 sectors by about 100 groups of occupations on ISCO-08 3rd digit levels) only common OSPs will be used (i.e. the updated, non-country specific OSPs as used in previous years). The differences between countries at the upper levels will be caused by their different sector-occupational structures, not by their country specific OSPs. It is not necessary to have all occ.-sector combinations in all data sources. Each data source will be used to update only the occ,-sector combinations which are available for it.

The second set of OSP country workbooks EPC will prepare will be based on further development of the ideas presented in Deliverable 10 in 2013. These will be country specific OSPs based on using the PIAAC data. EPC will combine OSPs that are not country specific with PIAAC data (as they did for the Czech Republic in 2013 in Deliverable 10). This will be done for as many countries as possible. It seems likely it will be possible for 12 European countries – BE, CY, CZ, DK, ES, FR, IT, NL, NO, PL, SK and UK – and maybe also for AT and DE (if the data are available). Workbooks with country specific OSPs will be computed for these 12 (or 14) countries. Differences between countries will be caused not only by differences in their sector-occupational structure but also by country specific OSPs. The 12 (or 14) workbooks with country specific OSPs will be presented by 38 sectors and 27 occupations (ISCO-08 2 digit levels) – the same as in 2013. For countries where no national PIAAC data are available, the so-called European OSPs will be used instead, based on cumulative PIAAC data from all 12 (or 14) countries in order to prepare their workbooks (38 sectors and 27 occupations based on ISCO-08 2nd digit level).

Data from the PIAAC.CZ have shown, for instance, that in the Czech survey there are about 6.1 thousand of respondents aged 16-65 years, of which about a half – about 3 thousands – is currently in employment with a defined sector (2D of the ISIC rev 4) and occupation (3D of the ISCO-08) of his/her job. As the number of Czech respondents has been optionally increased by adding the age group of 16-29 years, it is expected that PIAAC Round 1 data from 24 countries will yield about 50-70 thousand respondents currently in employment with identified sector and occupation of the job.

The analysis of the first dimension of the OSP (Required Level of Education, levels 1 - 8) has confirmed that it has been roughly the same as the subjective opinion of about two thirds of job-holders responding to the PIAAC.CZ survey. For about one third of respondents major or minor differences can be observed caused by various reasons, one of them being too high qualification requirements, which can be identified by the PIAAC survey (by analysing subjective opinions of the respondent). In the Czech Republic a quarter of respondents (and a third of higher graduate respondents) thinks that job qualification requirements have been overestimated.

Overall conclusions of EPC's analysing the PIAAC.CZ set, in particular of the first OSP dimension, can be summarised as follows:

- The whole set of the PIAAC Round 1 (24 countries) will significantly increase the updating and precising of some OSP dimensions (particularly of the first dimension, that is of the most important one) at the overall level.
- Follow-up analyses will show differences in skill requirements in different sectors and occupations between individual countries (not only in Europe but also with the USA) and vis-a-vis the overall OSP, and thus will enable to define national specific patterns of skill requirements.
- Detailed information about education attained, its duration and field of study will make possible to discover what labels such as Low, Mid, and High Level of Education really mean in individual countries, and to what extent and between what countries they are more or less comparable.
- The comparison of detailed description of education, skill requirements (formal and real ones) and OSP characteristics for each respondent in different countries, in

different sectors and different occupations will yield a fundamental and deep insight into diverse qualification patterns, an area we know too little of.

- Linking and analysing PIAAC and OSP data will provide highly interesting data on mismatches (both horizontal and vertical; structural and positional) both generally and in individual European countries, and also in comparison with the USA and other overseas countries participating in the PIAAC Survey.

On the other hand there are some inherent limitations to PIAAC:

- PIAAC Round 1 includes just 23 countries altogether (including the USA), There are only 16 countries from the EU 28;
- There are some problems with PIAAC data as regards occupational classification – in Germany only ISCO 2 digit and in Austria only ISCO 1 digit have been used. This increases the importance of using national data.

3.2 PIAAC Questionnaire

This chapter contains questions from PIAAC questionnaire that were used for computing country specific OSP for the Czech Republic.

Questions for sectoral x occupational identification

- Current/Last Job Occupation - Respondent (ISCO 2008)
- Current/Last Job Industry - Respondent (ISIC rev 4)

1st Dimension – Required Level of Education

Education - Highest qualification – Level

Which of the qualifications on this card is the highest you have obtained?

01 No formal qualification or below ISCED 1
02 ISCED 1
03 ISCED 2
04 ISCED 3C shorter than 2 years
05 ISCED 3C 2 years or more
06 ISCED 3A-B
07 ISCED 3 (without distinction A-B-C, 2y+)
08 ISCED 4C
09 ISCED 4A-B
10 ISCED 4 (without distinction A-B-C)
11 ISCED 5B
12 ISCED 5A, bachelor degree
13 ISCED 5A, master degree
14 ISCED 6
15 Foreign qualification

Time spent at school (number of years spent in formal education during respondents life)

- Current work - Requirements - Education level

Still talking about your current job: If applying today, what would be the usual qualifications, if any, that someone would need to GET this type of job?

01 No formal education or below ISCED 1
02 ISCED 1
03 ISCED 2
04 ISCED 3C shorter than 2 years
05 ISCED 3C 2 years or more
06 ISCED 3A-B
07 ISCED 3 (without distinction A-B-C, 2y+)
08 ISCED 4C
09 ISCED 4A-B
10 ISCED 4 (without distinction A-B-C)
11 ISCED 5B
12 ISCED 5A, bachelor degree
13 ISCED 5A, master degree
14 ISCED 6

- Current work - Requirements - To do the job satisfactorily

Thinking about whether this qualification is necessary for doing your job satisfactorily, which of the following statements would be most true?

01 This level is necessary
02 A lower level would be sufficient
03 A higher level would be needed

- Current work - Requirements - Related work experience

Supposing that someone with this level of qualification were applying today, how much related work experience would they need to GET this job? Would that be ...

01 None
02 Less than 1 month
03 1 to 6 months
04 7 to 11 months
05 1 or 2 years
06 3 years or more

2nd Dimension – Fields of Study

- Education - Highest qualification - Area of study

Dimensions 3-5 (Knowledge, Skills and Competence)

- Skill use work - Time cooperating with co-workers
- Skill use work - How often - Sharing work-related info
- Skill use work - How often - Teaching people
- Skill use work - How often - Presentations
- Skill use work - How often - Selling
- Skill use work - How often - Advising people
- Skill use work - How often - Planning own activities
- Skill use work - How often - Planning others activities
- Skill use work - How often - Organising own time
- Skill use work - How often - Influencing people
- Skill use work - How often - Negotiating with people
- Skill use work - Problem solving - Simple problems
- Skill use work - Problem solving - Complex problems
- Skill use work - How often - Working physically for long
- Skill use work - How often - Using hands or fingers
- Skill use work - Not challenged enough
- Skill use work - Need more training
- Skill use work - Literacy - Read directions or instructions
- Skill use work - Literacy - Read letters memos or mails
- Skill use work - Literacy - Read newspapers or magazines
- Skill use work - Literacy - Read professional journals or publications
- Skill use work - Literacy - Read books
- Skill use work - Literacy - Read manuals or reference materials
- Skill use work - Literacy - Read financial statements
- Skill use work - Literacy - Read diagrams maps or schematics
- Skill use work - Literacy - Write letters memos or mails
- Skill use work - Literacy - Write articles
- Skill use work - Literacy - Write reports
- Skill use work - Literacy - Fill in forms
- Skill use work - Numeracy - How often - Calculating costs or budgets
- Skill use work - Numeracy - How often - Use or calculate fractions or percentages
- Skill use work - Numeracy - How often - Use a calculator
- Skill use work - Numeracy - How often - Prepare charts graphs or tables
- Skill use work - Numeracy - How often - Use simple algebra or formulas
- Skill use work - Numeracy - How often - Use advanced math or statistics
- Skill use work - ICT - Internet - How often - For mail
- Skill use work - ICT - Internet - How often - Work related info
- Skill use work - ICT - Internet - How often - Conduct transactions
- Skill use work - ICT - Computer - How often - Spreadsheets
- Skill use work - ICT - Computer - How often - Word
- Skill use work - ICT - Computer - How often - Programming language
- Skill use work - ICT - Computer - How often - Real-time discussions
- Skill use work - ICT - Computer - Level of computer use

3.3 Country specific OSP for the Czech Republic

This chapter shows some tables with basic PIACC characteristics and tables with country specific OSP for the Czech Republic. It was computed based on the PIAAC data. Some comparison of country specific and country non-specific OSP for the Czech Republic is presented too.

3.3.1 Czech PIACC main characteristics

In the PIAAC survey for the Czech Republic (PIACC.CZ), there is 6 102 respondents. 3 641 (59.7 %) of them is in employment with a defined sector (2D of the ISIC rev 4) and occupation (3D of the ISCO-08) of his/her job. Tables 2.1 and 2.2 show number of respondents (and how many employed their represent after weighting) in PIACC.CZ for 38 sectors and 27 occupational groups used in the OSP. Sectors and occupational groups are there sorted in descending order by number of respondents.

Result from PIACC.CZ for groups with less than 60 respondents (less than 1 % of total numbers of respondents in the PIACC.CZ) should be interpreted with caution.

Table 3.1 PIACC.CZ by sectors

Sectors	Number of respondents	Cumulative %	Number of employed	Cumulative %
27 Retailing	354	9,7%	393 335	8,2%
39 Education	275	17,3%	342 832	15,3%
36 + 37 Prof. Services	273	24,8%	320 323	22,0%
38 Public Admin. & Def.	250	31,6%	336 996	29,0%
25 Construction	235	38,1%	373 477	36,8%
40 Health & Social Work	211	43,9%	186 371	40,6%
41 Misc. Services	189	49,1%	207 745	45,0%
28 Hotels & Catering	186	54,2%	152 850	48,1%
26 Distribution	182	59,2%	236 562	53,1%
29 Land Transport	158	63,5%	258 660	58,5%
19 Motor Vehicles	144	67,5%	271 497	64,1%
16 Mech. Engineering	111	70,5%	186 428	68,0%
32 Communications	88	72,9%	138 446	70,9%
33 Banking & Finance	84	75,3%	90 726	72,7%
01 Agriculture	78	77,4%	111 959	75,1%
05 Food, Drink & Tob.	77	79,5%	98 720	77,1%
35 Computing Services	69	81,4%	74 134	78,7%
21 Manuf. nes	66	83,2%	90 664	80,6%
15 Metal Goods	60	84,9%	93 816	82,5%
10 + 11 Pharmaceuticals + Chemicals	60	86,5%	72 869	84,0%
22 +23 Electricity + Gas Supply	47	87,8%	69 366	85,5%
17 Electronics	45	89,0%	59 821	86,7%
12 Rubber & Plastics	45	90,3%	57 139	87,9%
07 Wood & Paper	43	91,5%	67 105	89,3%
06 Text., Cloth, & Leath	42	92,6%	73 925	90,8%
14 Basic Metals	37	93,6%	70 025	92,3%
13 Non-Met. Min. Prods.	37	94,6%	58 576	93,5%
08 Printing & Publishing	37	95,7%	49 260	94,5%
18 Elec. Eng. & Instrum.	33	96,6%	91 806	96,5%
34 Insurance	33	97,5%	36 090	97,2%
20 Oth. Transp. Equip.	31	98,3%	42 895	98,1%
24 Water Supply	13	98,7%	22 878	98,6%
31 Air Transport	8	98,9%	14 108	98,9%
02 Coal	5	99,0%	4 915	99,0%
04 Other Mining	4	99,1%	2 136	99,0%
30 Water Transport	2	99,2%	2 475	99,1%
09 Manuf. Fuels	1	99,2%	184	99,1%
03 Oil & Gas	0	99,2%	0	99,1%
N/A	28	100,0%	44 889	100,0%
Total	3 641		4 806 002	

Source: EPC; PIACC.CZ data

Table 3.2 PIACC.CZ by occupational groups

Occupational group	Number of respondents	Cumulative %	Number of employed	Cumulative %
41,43,44. General office clerks	345	9.5%	467 687	9.7%
33. Business and administration associate professi	313	18.1%	432 199	18.7%
51,53,54. Personal, care, protective service	313	26.7%	293 713	24.8%
52. Sales workers	294	34.7%	279 490	30.7%
72,74. Metal, machinery and electrical trades	237	41.3%	439 856	39.8%
31,35. Science and engineering associate professio	223	47.4%	317 488	46.4%
24,25,26. Business and other professionals	188	52.5%	211 457	50.8%
23. Teaching professionals	184	57.6%	219 295	55.4%
83. Drivers and mobile plant operators	175	62.4%	306 217	61.7%
13,14. Managers in services	171	67.1%	233 826	66.6%
81. Stationary plant and machine operators	156	71.4%	282 081	72.5%
91,94,95,96. Cleaners, refuse, street and related ser	125	74.8%	155 549	75.7%
22. Health professionals	114	77.9%	60 514	77.0%
71. Building and related trades workers, excluding	112	81.0%	207 198	81.3%
93. Labourers in mining, construction, manufacturi	106	83.9%	117 586	83.7%
75. Food processing, wood working, garment and	102	86.7%	131 635	86.5%
21. Science and engineering professionals	85	89.1%	129 478	89.2%
82. Assemblers	69	91.0%	124 950	91.8%
34. Legal, social, cultural and related associate prof	69	92.9%	74 806	93.3%
12. Administrative and commercial managers	64	94.6%	65 100	94.7%
42. Customer services clerks	62	96.3%	74 169	96.2%
61,62,63. Agricultural workers	31	97.2%	54 456	97.4%
32. Health associate professionals	31	98.0%	12 195	97.6%
11. Chief executives, senior officials and legislators	30	98.8%	30 701	98.2%
92. Agricultural, forestry and fishery labourers	18	99.3%	29 332	98.9%
73. Handicraft and printing workers	12	99.7%	39 519	99.7%
01, 02, 03. Armed forces	12	100.0%	15 505	100.0%
Total	3 641		4 806 002	

Source: EPC; PIACC.CZ data

It is evident that into groups with less then 60 respondents belongs in PIACC.CZ 14.5 % of employed by sectors and only about 2.6 % by occupational groups.

Despite this fact, country specific OSP, based on PIACC.CZ data, can be for the Czech Republic computed.

3.3.2 Country specific OSP for the Czech Republic – Dimension 1; Level of qualification requirements (EQF) and Required Education Level

In the Czech educational system there are some significant differences in comparison with EU28 as a whole. There is much more people with Medium education and on the other hand less ratio of people with Low and High education. The PIAAC.CZ data should change Dimension 1 of the OSP according to these national patterns.

Table 3.3 shows share of 8 levels of qualification requirements (EQF) and 3 levels of required education in the PIACC.CZ data divided by sectors. These data were used for computing country specific OSP by sectors.

Table 3.3 Share of Fields of Education in PIACC.CZ by sectors

	Level of qualification requirements (EQF)									Required Education Level		
	1	2	3	4	5	6	7	8	Total	Low	Medium	High
01 Agriculture	10%	30%	42%	14%	0%	2%	3%	0%	2,81	40%	55%	5%
02 Coal	0%	6%	94%	0%	0%	0%	0%	0%	2,94	6%	94%	0%
04 Other Mining	0%	0%	32%	2%	0%	31%	35%	0%	5,35	0%	34%	66%
05 Food, Drink & Tob.	1%	29%	42%	21%	0%	3%	5%	0%	3,17	30%	63%	8%
06 Text., Cloth, & Leath	1%	17%	16%	23%	0%	30%	13%	0%	4,46	18%	39%	43%
07 Wood & Paper	0%	9%	54%	34%	0%	2%	0%	0%	3,32	9%	88%	2%
08 Printing & Publishing	0%	8%	40%	40%	0%	6%	5%	0%	3,70	8%	80%	11%
09 Manuf. Fuels	0%	0%	0%	100%	0%	0%	0%	0%	4,00	0%	100%	0%
10 + 11 Pharmaceuticals + C	0%	2%	28%	49%	0%	3%	17%	2%	4,32	2%	77%	22%
12 Rubber & Plastics	0%	15%	37%	44%	0%	4%	1%	0%	3,42	15%	81%	4%
13 Non-Met. Min. Prods.	3%	25%	49%	18%	0%	0%	4%	0%	3,03	29%	67%	4%
14 Basic Metals	0%	16%	48%	23%	0%	0%	13%	0%	3,58	16%	71%	13%
15 Metal Goods	7%	6%	42%	31%	0%	9%	4%	0%	3,54	13%	74%	13%
16 Mech. Engineering	0%	17%	34%	40%	3%	2%	3%	0%	3,49	17%	77%	6%
17 Electronics	8%	13%	35%	22%	0%	10%	12%	0%	3,69	21%	57%	21%
18 Elec. Eng. & Instrum.	0%	19%	40%	37%	0%	0%	3%	0%	3,34	19%	78%	4%
19 Motor Vehicles	4%	14%	42%	36%	0%	2%	3%	0%	3,31	18%	78%	5%
20 Oth. Transp. Equip.	0%	2%	43%	36%	0%	6%	3%	11%	4,18	2%	78%	20%
21 Manuf. nes	3%	12%	41%	25%	3%	13%	2%	0%	3,61	15%	69%	15%
22 +23 Electricity + Gas Sup	0%	0%	22%	47%	0%	3%	28%	0%	4,65	1%	69%	30%
24 Water Supply	0%	22%	35%	34%	0%	9%	0%	0%	3,39	22%	69%	9%
25 Construction	3%	11%	46%	26%	0%	6%	8%	0%	3,62	13%	72%	14%
26 Distribution	1%	13%	28%	48%	0%	2%	7%	0%	3,70	14%	76%	10%
27 Retailing	3%	14%	34%	41%	0%	5%	3%	0%	3,46	18%	75%	8%
28 Hotels & Catering	4%	19%	42%	31%	0%	2%	2%	0%	3,19	22%	73%	4%
29 Land Transport	4%	10%	35%	40%	0%	8%	2%	0%	3,56	14%	75%	11%
30 Water Transport	0%	0%	11%	89%	0%	0%	0%	0%	3,89	0%	100%	0%
31 Air Transport	0%	0%	0%	85%	0%	9%	6%	0%	4,35	0%	85%	15%
32 Communications	5%	13%	5%	59%	0%	13%	6%	0%	3,98	17%	64%	19%
33 Banking & Finance	0%	1%	2%	43%	0%	15%	38%	0%	5,39	1%	45%	53%
34 Insurance	0%	7%	0%	44%	0%	30%	20%	0%	5,05	7%	44%	50%
35 Computing Services	0%	1%	0%	23%	0%	11%	65%	0%	6,12	1%	23%	75%
36 + 37 Prof. Services	1%	12%	10%	33%	0%	17%	25%	2%	4,80	14%	42%	44%
38 Public Admin. & Def.	1%	2%	8%	46%	3%	23%	17%	0%	4,84	3%	57%	40%
39 Education	3%	6%	6%	22%	1%	18%	40%	5%	5,46	9%	29%	62%
40 Health & Social Work	3%	13%	16%	45%	0%	13%	10%	0%	4,07	16%	61%	23%
41 Misc. Services	6%	16%	27%	34%	0%	4%	12%	0%	3,69	22%	62%	17%
N/A	0%	9%	39%	48%	0%	0%	3%	0%	3,52	9%	87%	3%
CZ Total	3%	12%	28%	36%	0%	9%	12%	1%	3,97	14%	64%	21%

Source: EPC; PIACC.CZ data; shadowed are sectors with less than 60 respondents in the PIACC.CZ

Table 3.4 shows share of 8 levels of qualification requirements (EQF) and 3 levels of required education in the PIACC.CZ data divided by occupational groups. These data were used for computing country specific OSP by occupations.

Table 3.4 Share of Fields of Education in PIACC.CZ by occupational groups

	Level of qualification requirements (EQF)									Required Education Level		
	1	2	3	4	5	6	7	8	Total	Low	Medium	High
01, 02, 03. Armed forces	0%	0%	32%	36%	0%	20%	12%	0%	4,44	0%	68%	32%
11. Chief executives, seni	0%	0%	0%	37%	0%	23%	39%	0%	5,64	0%	37%	63%
12. Administrative and co	0%	0%	0%	45%	0%	12%	42%	2%	5,55	0%	45%	55%
13,14. Managers in servi	0%	0%	4%	35%	0%	21%	36%	4%	5,60	0%	40%	60%
21. Science and engineer	0%	0%	0%	35%	6%	7%	43%	8%	5,83	0%	42%	58%
22. Health professionals	0%	0%	15%	38%	1%	30%	14%	1%	4,94	0%	54%	46%
23. Teaching professiona	0%	0%	3%	15%	1%	26%	50%	5%	6,20	0%	19%	81%
24,25,26. Business and ot	0%	0%	0%	12%	3%	19%	64%	1%	6,37	0%	15%	84%
31,35. Science and engin	0%	2%	4%	61%	0%	22%	11%	0%	4,69	2%	66%	33%
32. Health associate prof	0%	0%	3%	25%	0%	39%	33%	0%	5,73	0%	28%	72%
33. Business and adminis	1%	1%	1%	64%	0%	19%	15%	0%	4,79	1%	64%	34%
34. Legal, social, cultural	0%	2%	14%	56%	4%	12%	12%	0%	4,45	2%	74%	24%
41,43,44. General office cl	0%	5%	14%	60%	0%	11%	9%	0%	4,24	5%	75%	20%
42. Customer services cle	0%	6%	5%	87%	0%	1%	0%	0%	3,84	7%	92%	1%
51,53,54. Personal, care, p	4%	11%	36%	43%	1%	4%	1%	0%	3,43	14%	81%	5%
52. Sales workers	4%	11%	39%	42%	0%	2%	3%	0%	3,41	15%	80%	5%
61,62,63. Agricultural wo	3%	43%	43%	11%	0%	0%	0%	0%	2,62	46%	54%	0%
71. Building and related t	2%	20%	72%	3%	0%	3%	0%	0%	2,88	22%	75%	3%
72,74. Metal, machinery a	1%	2%	53%	44%	0%	0%	0%	0%	3,43	2%	97%	0%
73. Handicraft and printin	0%	8%	86%	5%	0%	0%	0%	0%	2,97	8%	92%	0%
75. Food processing, wo	3%	16%	63%	18%	0%	0%	0%	0%	2,96	19%	81%	0%
81. Stationary plant and	2%	28%	55%	15%	0%	0%	0%	0%	2,82	30%	70%	0%
82. Assemblers	9%	27%	53%	10%	0%	0%	0%	0%	2,67	36%	64%	0%
83. Drivers and mobile pl	6%	24%	53%	17%	0%	0%	0%	0%	2,82	29%	71%	0%
91,94,95,96. Cleaners, refu	18%	63%	19%	0%	0%	0%	0%	0%	2,02	80%	20%	0%
92. Agricultural, forestry	2%	45%	53%	1%	0%	0%	0%	0%	2,52	47%	53%	0%
93. Labourers in mining,	11%	44%	41%	4%	0%	0%	0%	0%	2,39	55%	45%	0%
CZ Total	3%	12%	28%	36%	0%	9%	12%	1%	3,97	14%	64%	21%

Source: EPC; PIACC.CZ data; shadowed are occupational groups with less than 60 respondents in the PIACC.CZ

Based on data in Tables 3.3, 3.4 and non-country specific OSP for the Czech Republic, new country specific OSP were computed.

Table 3.5 shows the first dimension, Level of qualification requirements (EQF) and Required Education Level, of country specific OSP for the Czech Republic by sectors, Table 3.6 by occupational groups.

Table 3.5 Country specific OSP for the Czech Republic by sectors – Dimension 1 – Level of qualification requirements (EQF) and Required Education Level

Country specific OSP - Czech Republic												
	Level of qualification requirements (EQF)									Required Education Level		
	1	2	3	4	5	6	7	8	Total	Low	Medium	High
01 Agriculture	11%	26%	32%	15%	7%	4%	5%	1%	3,15	37%	54%	9%
02 Coal	9%	22%	28%	18%	13%	4%	4%	1%	3,38	31%	60%	9%
03 Oil & Gas	4%	16%	20%	19%	15%	14%	9%	3%	4,17	20%	53%	26%
04 Other Mining	8%	22%	26%	14%	13%	7%	9%	1%	3,63	30%	54%	17%
05 Food, Drink & Tob.	9%	25%	31%	18%	7%	4%	5%	1%	3,27	34%	56%	10%
06 Text., Cloth, & Leath	11%	23%	24%	17%	8%	11%	6%	0%	3,48	34%	48%	18%
07 Wood & Paper	10%	19%	33%	22%	8%	5%	3%	1%	3,27	29%	63%	8%
08 Printing & Publishing	4%	9%	18%	24%	13%	15%	13%	3%	4,46	13%	55%	31%
09 Manuf. Fuels	5%	11%	13%	20%	16%	21%	12%	2%	4,55	16%	48%	36%
10 + 11 Pharmaceuticals + Chemicals	5%	10%	21%	31%	9%	8%	14%	3%	4,20	15%	61%	24%
12 Rubber & Plastics	9%	20%	28%	26%	9%	5%	3%	1%	3,40	28%	62%	9%
13 Non-Met. Min. Prods.	11%	22%	29%	18%	9%	4%	5%	1%	3,30	33%	56%	10%
14 Basic Metals	7%	19%	29%	20%	10%	5%	9%	1%	3,63	26%	59%	15%
15 Metal Goods	8%	15%	31%	23%	8%	8%	5%	1%	3,54	24%	63%	13%
16 Mech. Engineering	4%	17%	26%	28%	10%	7%	7%	1%	3,79	21%	64%	15%
17 Electronics	10%	15%	22%	19%	11%	10%	11%	2%	3,91	25%	52%	23%
18 Elec. Eng. & Instrum.	9%	20%	26%	22%	10%	5%	6%	1%	3,52	29%	58%	13%
19 Motor Vehicles	8%	18%	30%	25%	8%	5%	5%	1%	3,47	26%	63%	11%
20 Oth. Transp. Equip.	7%	16%	24%	23%	12%	8%	6%	4%	3,83	23%	59%	18%
21 Manuf. nes	8%	17%	30%	22%	10%	9%	3%	1%	3,55	24%	63%	13%
22 +23 Electricity + Gas Supply	3%	9%	18%	30%	13%	9%	18%	2%	4,48	11%	61%	28%
24 Water Supply	8%	19%	21%	19%	12%	8%	10%	2%	3,82	28%	52%	20%
25 Construction	7%	17%	33%	21%	8%	6%	7%	1%	3,59	24%	61%	15%
26 Distribution	4%	14%	22%	32%	11%	7%	10%	1%	4,00	17%	65%	18%
27 Retailing	5%	17%	28%	29%	11%	5%	4%	1%	3,59	22%	68%	10%
28 Hotels & Catering	8%	20%	31%	24%	9%	5%	2%	0%	3,32	29%	64%	8%
29 Land Transport	7%	18%	29%	28%	9%	7%	3%	1%	3,48	24%	65%	10%
30 Water Transport	7%	16%	17%	19%	15%	11%	12%	4%	4,19	22%	51%	27%
31 Air Transport	4%	9%	11%	25%	24%	14%	11%	2%	4,54	13%	60%	27%
32 Communications	4%	11%	10%	39%	13%	13%	8%	1%	4,22	15%	63%	22%
33 Banking & Finance	1%	2%	4%	29%	12%	19%	30%	3%	5,41	3%	45%	52%
34 Insurance	1%	4%	5%	28%	16%	22%	20%	4%	5,21	5%	49%	46%
35 Computing Services	0%	1%	2%	19%	10%	20%	44%	4%	5,92	2%	31%	68%
36 + 37 Prof. Services	4%	10%	9%	25%	10%	17%	22%	5%	4,86	14%	44%	43%
38 Public Admin. & Def.	3%	5%	8%	33%	13%	19%	17%	3%	4,84	8%	54%	38%
39 Education	4%	5%	6%	15%	7%	21%	34%	8%	5,55	9%	28%	63%
40 Health & Social Work	5%	10%	12%	27%	8%	17%	16%	5%	4,68	15%	47%	39%
41 Misc. Services	6%	14%	21%	26%	10%	9%	12%	2%	4,02	21%	57%	22%
CZ Total	6%	14%	22%	25%	9%	10%	12%	2%	4,07	20%	56%	24%

Source: EPC; PIACC.CZ data

Table 3.6 Country specific OSP for the Czech Republic by occupational groups – Dimension 1 – Level of qualification requirements (EQF) and Required Education Level

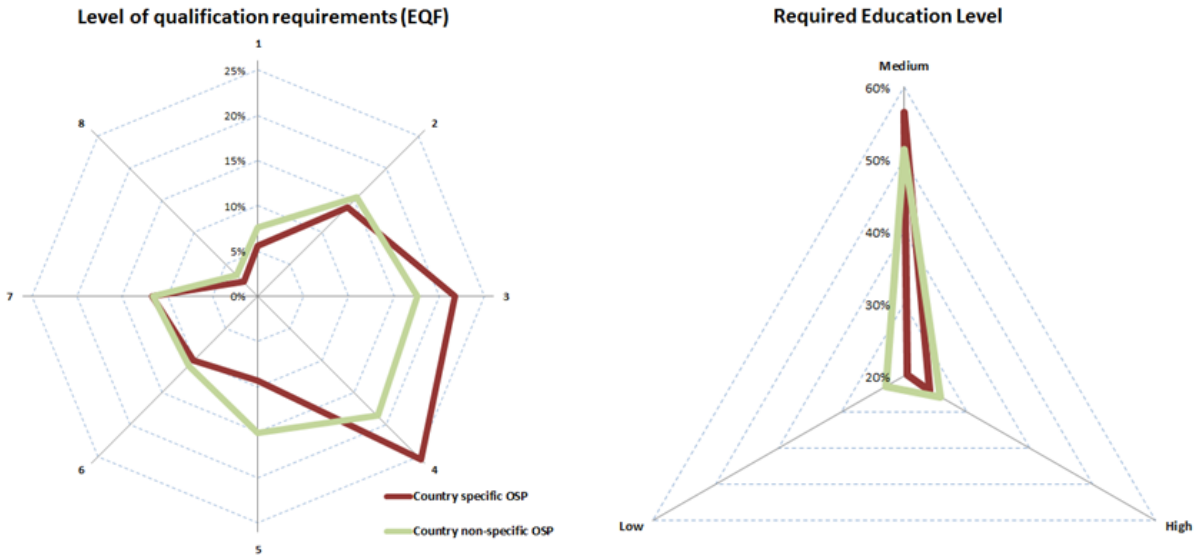
	Country specific OSP - Czech Republic											
	Level of qualification requirements (EQF)									Required Education Level		
	1	2	3	4	5	6	7	8	Total	Low	Medium	High
01, 02, 03. Armed forces	2%	5%	11%	22%	16%	19%	19%	6%	5,05	7%	49%	43%
11. Chief executives, senior officials a	1%	3%	4%	19%	14%	20%	34%	5%	5,66	3%	37%	60%
12. Administrative and commercial ma	0%	0%	1%	23%	6%	21%	43%	5%	5,95	0%	31%	69%
13,14. Managers in services	0%	1%	4%	22%	15%	21%	31%	6%	5,68	1%	40%	58%
21. Science and engineering profession	0%	0%	1%	18%	7%	21%	43%	11%	6,20	0%	25%	75%
22. Health professionals	0%	0%	7%	17%	4%	28%	30%	14%	5,99	0%	28%	72%
23. Teaching professionals	0%	0%	2%	11%	7%	27%	43%	10%	6,26	0%	20%	80%
24,25,26. Business and other professio	0%	0%	1%	12%	8%	25%	47%	7%	6,25	0%	21%	79%
31,35. Science and engineering associa	0%	2%	5%	39%	13%	18%	19%	3%	5,09	3%	57%	41%
32. Health associate professionals	0%	1%	3%	22%	16%	29%	23%	6%	5,61	1%	41%	58%
33. Business and administration associa	1%	1%	3%	39%	13%	21%	19%	3%	5,15	2%	55%	43%
34. Legal, social, cultural and related a	1%	2%	9%	32%	11%	22%	19%	3%	5,12	3%	53%	45%
41,43,44. General office clerks	2%	8%	15%	45%	15%	9%	5%	0%	4,10	10%	76%	14%
42. Customer services clerks	2%	8%	11%	58%	14%	5%	1%	0%	3,98	10%	83%	7%
51,53,54. Personal, care, protective se	8%	17%	29%	30%	10%	4%	1%	0%	3,34	26%	69%	6%
52. Sales workers	5%	17%	32%	30%	11%	2%	2%	0%	3,42	22%	73%	5%
61,62,63. Agricultural workers	11%	30%	32%	15%	9%	2%	1%	0%	2,93	41%	56%	4%
71. Building and related trades workers	7%	24%	46%	13%	6%	3%	0%	0%	2,97	31%	66%	3%
72,74. Metal, machinery and electrical	4%	16%	40%	29%	9%	2%	0%	0%	3,29	20%	78%	2%
73. Handicraft and printing workers	7%	21%	31%	21%	16%	3%	1%	0%	3,32	28%	68%	4%
75. Food processing, wood working, ga	8%	22%	42%	19%	7%	2%	0%	0%	3,01	30%	68%	2%
81. Stationary plant and machine oper	9%	28%	41%	15%	5%	1%	0%	0%	2,82	38%	61%	1%
82. Assemblers	12%	28%	41%	12%	5%	1%	0%	0%	2,75	41%	58%	1%
83. Drivers and mobile plant operators	10%	28%	42%	15%	5%	1%	0%	0%	2,79	38%	61%	1%
91,94,95,96. Cleaners, refuse, street a	31%	46%	19%	2%	1%	0%	0%	0%	1,96	78%	22%	0%
92. Agricultural, forestry and fishery la	41%	33%	23%	2%	1%	0%	0%	0%	1,91	73%	27%	0%
93. Labourers in mining, construction,	30%	37%	28%	4%	1%	0%	0%	0%	2,09	67%	33%	0%
CZ Total	6%	14%	22%	25%	9%	10%	12%	2%	4,07	20%	56%	24%

Source: EPC; PIACC.CZ data

Figure 3.1 shows difference between country specific and country non-specific OSP for the Czech Republic by Dimension 1.

The highest increases in country specific OSP show Level 3 and 4, it means increase of number of job where Medium education is required. This fully corresponds with assumption from the beginning of this subchapter.

Figure 3.1 Difference between country specific and country non-specific OSP by Level of qualification requirements (EQF) and Required Education Level



Source: EPC; PIACC.CZ data

3.3.3 Country specific OSP for the Czech Republic – Dimension 2; Fields of Education

In the PIAAC.CZ data there is only 11 Fields of Education defined. It is necessary to convert 14 groups used in country non-specific OSP to 10 groups that are compatible with the PIACC.CZ data. Table 3.7 shows how individual fields were transferred.

Table 3.7 Correspondence table for Fields of Education between Country non-specific and Country specific OSP

Country non-specific OSP		Country specific OSP	
1	General/no specific field	1	General programmes
2	Art, fine/applied	3	Humanities, languages and arts
3	Humanities	3	Humanities, languages and arts
4	Technical and engineering	7	Engineering, manufacturing and construction
5	Agriculture/forestry	8	Agriculture and veterinary
6	Teacher training/ education	2	Teacher training and education science
7	Science/mathematics/ computing etc	6	Science, mathematics and computing
8	Medical/health services/ nursing etc	9+10	Health and Welfare
9	Economics/commerce/business administration	5	Business and law
10	Social studies/administration/media/culture	4	Social sciences
11	Law and legal services	5	Business and law
12	Personal care services	11	Services
13	Public order and safety	11	Services
14	Transport and telecommunications	11	Services

Table 3.8 shows share of 10 groups of Fields of Education in the PIACC.CZ data divided by sectors. These data were used for computing country specific OSP by sectors.

Table 3.8 Share of Fields of Education in PIACC.CZ by sectors

	1 General programmes	2 Teacher training and	3 Humanities, languages	4 Social sciences	5 Business and law	6 Science, mathematics	7 Engineering, manufacturing	8 Agriculture and	9+10 Health and Welfare	11 Services
01 Agriculture	0,1%	0,0%	0,5%	0,0%	14,0%	0,1%	43,6%	35,5%	0,0%	6,3%
02 Coal	0,0%	0,0%	0,0%	0,0%	0,0%	15,6%	17,6%	0,0%	0,0%	66,8%
04 Other Mining	0,0%	0,0%	0,0%	0,0%	0,0%	31,5%	68,5%	0,0%	0,0%	0,0%
05 Food, Drink & Tob.	0,3%	6,4%	0,0%	0,0%	20,7%	2,1%	41,5%	10,4%	0,0%	18,6%
06 Text., Cloth, & Leath	15,4%	1,4%	4,0%	8,6%	4,6%	0,0%	46,4%	0,0%	0,8%	18,7%
07 Wood & Paper	2,8%	0,0%	5,6%	0,0%	15,9%	2,2%	54,3%	6,0%	0,0%	13,2%
08 Printing & Publishing	1,7%	0,0%	12,2%	2,9%	10,3%	5,5%	35,8%	9,5%	4,3%	17,9%
09 Manuf. Fuels	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	100,0%	0,0%	0,0%	0,0%
10 + 11 Pharmaceuticals	5,2%	0,2%	0,0%	0,0%	17,8%	3,5%	62,6%	0,8%	2,2%	7,8%
12 Rubber & Plastics	1,9%	0,0%	0,0%	0,0%	1,8%	0,6%	71,3%	7,8%	0,4%	16,3%
13 Non-Met. Min. Prods.	0,0%	0,0%	1,1%	0,0%	13,9%	7,5%	53,8%	13,7%	2,1%	7,9%
14 Basic Metals	5,3%	0,0%	0,0%	0,0%	0,6%	0,0%	84,2%	2,8%	0,5%	6,6%
15 Metal Goods	2,5%	2,5%	0,0%	0,0%	4,8%	4,0%	75,1%	1,1%	0,0%	10,0%
16 Mech. Engineering	0,6%	0,6%	1,8%	0,0%	5,2%	1,7%	78,5%	0,4%	0,0%	11,3%
17 Electronics	1,5%	3,7%	1,4%	0,0%	8,1%	2,7%	71,6%	4,9%	0,0%	6,1%
18 Elec. Eng. & Instrum.	0,0%	0,0%	0,0%	0,0%	6,9%	1,1%	70,9%	3,8%	0,0%	17,1%
19 Motor Vehicles	5,6%	0,6%	0,6%	0,3%	6,4%	2,1%	53,6%	8,4%	0,2%	22,2%
20 Oth. Transp. Equip.	1,3%	10,4%	0,5%	0,0%	2,6%	1,5%	78,5%	0,2%	0,1%	4,9%
21 Manuf. nes	6,8%	3,2%	2,6%	0,0%	19,4%	0,6%	43,5%	6,7%	0,1%	17,0%
22 +23 Electricity + Gas S	4,0%	0,0%	0,0%	0,0%	21,3%	5,1%	67,3%	0,3%	0,0%	2,1%
24 Water Supply	1,1%	0,0%	0,0%	0,0%	5,0%	18,1%	65,1%	3,5%	0,0%	7,1%
25 Construction	3,0%	0,2%	0,6%	0,0%	4,5%	3,0%	68,9%	2,3%	0,0%	17,5%
26 Distribution	2,6%	0,2%	0,2%	0,7%	24,8%	2,6%	54,9%	3,4%	0,3%	10,5%
27 Retailing	7,1%	0,6%	6,1%	2,0%	19,6%	2,2%	39,9%	5,7%	1,3%	15,5%
28 Hotels & Catering	0,9%	4,0%	3,1%	0,8%	30,2%	4,2%	15,9%	1,8%	0,4%	38,6%
29 Land Transport	3,1%	0,4%	0,6%	0,1%	10,7%	2,8%	62,7%	9,8%	0,3%	9,6%
30 Water Transport	0,0%	0,0%	0,0%	0,0%	89,0%	0,0%	11,0%	0,0%	0,0%	0,0%
31 Air Transport	0,0%	0,0%	0,0%	0,0%	8,6%	1,7%	87,8%	0,0%	0,0%	1,8%
32 Communications	8,4%	0,7%	8,8%	2,6%	17,1%	5,1%	46,2%	4,4%	1,2%	5,4%
33 Banking & Finance	3,2%	2,0%	1,8%	0,0%	68,1%	0,8%	5,9%	7,0%	3,3%	7,9%
34 Insurance	0,7%	0,0%	0,0%	1,0%	55,7%	4,2%	29,9%	1,4%	1,3%	5,8%
35 Computing Services	4,4%	0,0%	6,2%	0,2%	27,2%	14,9%	43,5%	0,7%	2,1%	0,7%
36 + 37 Prof. Services	4,0%	2,0%	4,5%	1,4%	37,6%	3,4%	37,8%	3,4%	0,6%	5,2%
38 Public Admin. & Def.	4,0%	3,0%	1,2%	1,4%	38,6%	2,1%	31,6%	4,0%	6,5%	7,6%
39 Education	1,8%	44,7%	11,2%	2,2%	16,8%	3,8%	10,5%	2,2%	0,8%	6,1%
40 Health & Social Work	6,9%	5,1%	0,9%	0,2%	17,6%	0,3%	27,6%	3,0%	31,8%	6,6%
41 Misc. Services	5,1%	3,8%	8,3%	0,5%	21,2%	1,9%	38,0%	8,1%	1,2%	12,0%
N/A	3,8%	2,0%	0,0%	0,0%	0,0%	0,1%	83,5%	1,6%	8,0%	1,0%
CZ Total	3,8%	4,7%	3,1%	0,9%	18,8%	2,8%	46,6%	5,1%	2,4%	11,7%

Source: EPC; PIACC.CZ data; shadowed are sectors with less than 60 respondents in the PIACC.CZ

Table 3.9 shows share of 10 groups of Fields of Education in the PIACC.CZ data divided by occupational groups. These data were used for computing country specific OSP by occupations.

Table 3.9 Share of Fields of Education in PIACC.CZ by occupational groups

	1 General programmes	2 Teacher training and	3 Humanities, languages	4 Social sciences	5 Business and law	6 Science, mathematics	7 Engineering, manufacturing	8 Agriculture and	9+10 Health and Welfare	11 Services
01, 02, 03. Armed forces	0,0%	27,1%	0,0%	0,0%	0,0%	0,0%	65,4%	0,0%	0,0%	7,5%
11. Chief executives, seni	0,7%	2,2%	14,0%	0,9%	45,7%	3,7%	27,9%	3,4%	0,0%	1,6%
12. Administrative and c	0,8%	4,0%	3,9%	1,8%	50,8%	1,4%	27,5%	4,4%	1,3%	4,1%
13,14. Managers in servi	2,5%	8,9%	1,7%	0,1%	25,8%	5,2%	44,8%	3,0%	2,5%	5,5%
21. Science and engineer	0,4%	0,7%	1,4%	0,3%	3,5%	2,0%	89,9%	1,5%	0,0%	0,4%
22. Health professionals	1,5%	3,5%	0,0%	0,0%	0,0%	0,0%	19,9%	1,6%	72,1%	1,4%
23. Teaching professiona	3,4%	61,0%	13,6%	1,5%	8,9%	4,1%	4,8%	1,7%	0,5%	0,4%
24,25,26. Business and o	1,2%	4,4%	10,3%	2,8%	48,8%	6,7%	19,5%	3,8%	2,0%	0,5%
31,35. Science and engin	2,1%	0,4%	0,6%	2,0%	5,6%	5,0%	79,7%	1,9%	0,4%	2,3%
32. Health associate prof	2,9%	0,0%	0,0%	0,0%	0,0%	38,0%	0,0%	5,3%	52,9%	0,8%
33. Business and adminis	4,1%	1,7%	6,0%	1,6%	40,0%	1,6%	34,2%	3,3%	3,1%	4,5%
34. Legal, social, cultural	6,5%	12,8%	11,6%	0,7%	15,3%	0,4%	23,3%	3,3%	15,7%	10,5%
41,43,44. General office cl	6,5%	1,2%	1,8%	1,9%	45,8%	3,5%	30,1%	2,9%	1,4%	5,0%
42. Customer services cle	17,5%	7,1%	10,2%	1,2%	24,5%	10,3%	2,6%	7,8%	3,1%	15,6%
51,53,54. Personal, care, p	2,2%	1,2%	0,5%	0,5%	20,0%	1,0%	35,3%	5,7%	0,6%	33,0%
52. Sales workers	8,1%	1,1%	2,1%	1,2%	28,2%	1,4%	33,7%	4,6%	1,0%	18,6%
61,62,63. Agricultural wo	0,2%	0,0%	1,0%	0,0%	18,9%	0,0%	36,0%	37,0%	0,0%	7,0%
71. Building and related t	3,2%	0,0%	0,0%	0,0%	0,1%	5,3%	62,3%	2,2%	0,0%	26,9%
72,74. Metal, machinery a	0,9%	0,0%	1,0%	0,0%	0,5%	0,7%	86,8%	6,1%	0,0%	4,0%
73. Handicraft and printir	0,0%	0,0%	1,5%	0,0%	0,0%	0,0%	78,2%	14,2%	0,0%	6,2%
75. Food processing, wo	1,9%	0,6%	2,3%	0,6%	0,8%	2,2%	42,0%	17,6%	0,0%	32,1%
81. Stationary plant and r	6,1%	0,3%	0,3%	0,0%	4,8%	3,4%	61,1%	5,4%	0,3%	18,3%
82. Assemblers	6,6%	1,6%	0,0%	0,0%	2,4%	0,0%	49,2%	6,2%	0,1%	33,8%
83. Drivers and mobile pl	3,0%	1,3%	1,5%	0,0%	6,6%	1,9%	61,2%	9,1%	0,0%	15,4%
91,94,95,96. Cleaners, refu	9,8%	0,0%	2,1%	0,1%	9,4%	0,7%	44,6%	8,6%	1,6%	23,0%
92. Agricultural, forestry	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	72,4%	16,6%	0,0%	11,0%
93. Labourers in mining,	4,8%	0,8%	5,1%	0,0%	8,6%	0,6%	37,7%	1,1%	4,6%	36,7%
CZ Total	3,8%	4,7%	3,1%	0,9%	18,8%	2,8%	46,6%	5,1%	2,4%	11,7%

Source: EPC; PIACC.CZ data; shadowed are occupational groups with less than 60 respondents in the PIACC.CZ

Based on data in Tables 3.8, 3.9 and non-country specific OSP for the Czech Republic, new country specific OSP were computed.

Table 3.10 shows the second dimension, Fields of Education, of country specific OSP for the Czech Republic by sectors, Table 3.11 by occupational groups.

Table 3.10 Country specific OSP for the Czech Republic by sectors – Dimension 2 – Fields of Education

	Country specific OSP - Czech Republic									
	1	2	3	4	5	6	7	8	9+10	11
	General programmes	Teacher training and education science	Humanities, languages and arts	Social sciences	Business and law	Science, mathematics and computing	Engineering, manufacturing and construction	Agriculture and veterinary	Health and Welfare	Services
01 Agriculture	11%	1%	1%	2%	10%	1%	34%	37%	0%	4%
02 Coal	10%	0%	1%	2%	8%	2%	71%	1%	0%	4%
03 Oil & Gas	3%	0%	0%	0%	1%	4%	91%	0%	0%	0%
04 Other Mining	13%	1%	1%	1%	11%	2%	64%	2%	0%	5%
05 Food, Drink & Tob.	12%	3%	1%	1%	19%	2%	41%	7%	2%	14%
06 Text., Cloth, & Leath	23%	1%	2%	3%	11%	0%	48%	1%	1%	10%
07 Wood & Paper	13%	1%	2%	1%	13%	1%	58%	4%	0%	7%
08 Printing & Publishing	8%	1%	17%	6%	14%	6%	36%	4%	1%	6%
09 Manuf. Fuels	12%	0%	1%	0%	20%	10%	48%	1%	1%	8%
10 + 11 Pharmaceuticals + Chemicals	7%	0%	1%	1%	18%	10%	50%	2%	4%	6%
12 Rubber & Plastics	10%	1%	1%	1%	10%	3%	60%	4%	0%	9%
13 Non-Met. Min. Prods.	12%	0%	2%	1%	13%	3%	58%	5%	1%	6%
14 Basic Metals	12%	0%	1%	1%	8%	1%	72%	1%	1%	4%
15 Metal Goods	6%	1%	0%	1%	9%	2%	73%	1%	0%	6%
16 Mech. Engineering	5%	1%	1%	1%	12%	2%	73%	1%	0%	6%
17 Electronics	9%	2%	1%	1%	14%	3%	59%	3%	1%	6%
18 Elec. Eng. & Instrum.	10%	0%	1%	1%	13%	2%	61%	3%	1%	8%
19 Motor Vehicles	9%	0%	1%	1%	10%	2%	59%	5%	0%	13%
20 Oth. Transp. Equip.	7%	2%	1%	0%	9%	3%	74%	1%	0%	3%
21 Manuf. nes	11%	2%	3%	1%	14%	1%	54%	4%	1%	9%
22 +23 Electricity + Gas Supply	7%	1%	0%	1%	18%	4%	63%	1%	1%	4%
24 Water Supply	7%	0%	0%	3%	15%	4%	61%	4%	2%	4%
25 Construction	8%	0%	1%	0%	6%	2%	73%	2%	0%	8%
26 Distribution	9%	1%	1%	2%	26%	2%	48%	3%	1%	8%
27 Retailing	10%	3%	3%	3%	34%	2%	29%	4%	3%	11%
28 Hotels & Catering	13%	2%	3%	2%	19%	3%	13%	1%	1%	42%
29 Land Transport	9%	1%	1%	1%	12%	2%	51%	5%	0%	17%
30 Water Transport	13%	1%	3%	1%	4%	0%	45%	1%	0%	33%
31 Air Transport	12%	1%	3%	3%	17%	2%	38%	0%	1%	23%
32 Communications	13%	1%	5%	5%	19%	5%	33%	3%	1%	15%
33 Banking & Finance	7%	2%	1%	2%	67%	3%	8%	3%	2%	5%
34 Insurance	9%	3%	2%	3%	53%	3%	18%	3%	1%	5%
35 Computing Services	5%	1%	3%	2%	21%	30%	33%	1%	2%	1%
36 + 37 Prof. Services	9%	2%	5%	3%	36%	4%	30%	3%	2%	6%
38 Public Admin. & Def.	9%	3%	2%	8%	30%	3%	25%	4%	4%	13%
39 Education	6%	47%	9%	4%	11%	4%	8%	2%	1%	6%
40 Health & Social Work	8%	3%	1%	2%	11%	1%	15%	2%	51%	6%
41 Misc. Services	12%	3%	12%	4%	15%	2%	26%	4%	3%	19%
CZ Total	9%	4%	3%	2%	19%	3%	41%	4%	4%	10%

Source: EPC; PIACC.CZ data

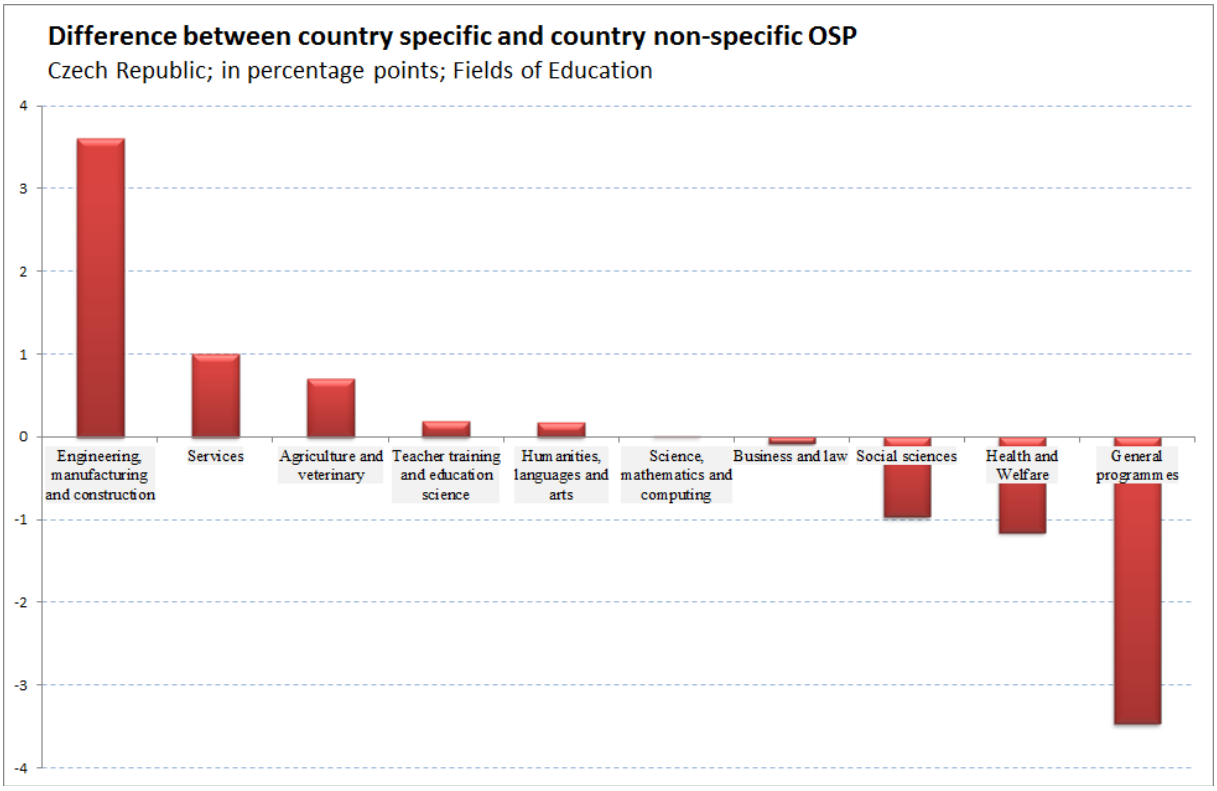
Table 3.11 Country specific OSP for the Czech Republic by occupational groups – Dimension 2 – Fields of Education

	Country specific OSP - Czech Republic									
	1	2	3	4	5	6	7	8	9+10	11
	General programmes	Teacher training and education science	Humanities, languages and arts	Social sciences	Business and law	Science, mathematics and computing	Engineering, manufacturing and construction	Agriculture and veterinary	Health and Welfare	Services
01, 02, 03. Armed forces	7%	3%	1%	1%	4%	1%	35%	1%	0%	48%
11. Chief executives, senior officials a	10%	3%	5%	5%	31%	2%	32%	6%	1%	5%
12. Administrative and commercial ma	4%	3%	3%	3%	49%	5%	26%	3%	1%	4%
13,14. Managers in services	5%	7%	2%	1%	24%	4%	41%	4%	3%	10%
21. Science and engineering profession	2%	1%	1%	0%	4%	10%	76%	4%	1%	1%
22. Health professionals	1%	2%	0%	0%	1%	1%	8%	3%	83%	1%
23. Teaching professionals	4%	63%	11%	3%	6%	4%	4%	2%	2%	1%
24,25,26. Business and other professio	3%	3%	12%	9%	42%	10%	15%	2%	1%	1%
31,35. Science and engineering associa	3%	0%	1%	2%	7%	7%	71%	4%	1%	3%
32. Health associate professionals	2%	0%	0%	0%	3%	8%	3%	2%	80%	1%
33. Business and administration associa	7%	2%	3%	7%	44%	2%	26%	3%	2%	4%
34. Legal, social, cultural and related a	10%	9%	18%	10%	10%	1%	16%	2%	18%	6%
41,43,44. General office clerks	13%	3%	2%	3%	46%	2%	20%	3%	1%	7%
42. Customer services clerks	19%	5%	6%	4%	35%	5%	5%	4%	3%	15%
51,53,54. Personal, care, protective se	11%	1%	1%	1%	13%	2%	24%	3%	5%	37%
52. Sales workers	10%	3%	1%	3%	38%	1%	26%	3%	1%	12%
61,62,63. Agricultural workers	19%	0%	1%	3%	8%	0%	22%	42%	0%	3%
71. Building and related trades workers	8%	0%	0%	0%	2%	2%	74%	1%	0%	12%
72,74. Metal, machinery and electrical	3%	0%	1%	0%	3%	0%	87%	3%	0%	2%
73. Handicraft and printing workers	7%	0%	3%	0%	3%	0%	81%	2%	0%	3%
75. Food processing, wood working, ga	11%	0%	2%	1%	5%	1%	53%	8%	0%	18%
81. Stationary plant and machine oper	13%	0%	1%	0%	6%	4%	60%	4%	1%	11%
82. Assemblers	13%	1%	0%	1%	8%	0%	55%	4%	0%	18%
83. Drivers and mobile plant operators	11%	1%	1%	0%	5%	1%	58%	7%	0%	17%
91,94,95,96. Cleaners, refuse, street a	28%	1%	2%	1%	11%	1%	29%	4%	2%	22%
92. Agricultural, forestry and fishery la	38%	0%	1%	2%	5%	0%	21%	29%	0%	4%
93. Labourers in mining, construction,	23%	0%	2%	0%	13%	0%	36%	3%	2%	20%
CZ Total	9%	4%	3%	2%	19%	3%	41%	4%	4%	10%

Source: EPC; PIACC.CZ data

Figure 3.2 shows difference between country specific and country non-specific OSP for the Czech Republic by Fields of Education. The highest increases in country specific OSP show Engineering, manufacturing and construction, Services and Agriculture and veterinary. On the contrary, the higher decreases show Social sciences, Health and Welfare and especially General programmes. This fully correspondence with national particularity in the Czech education system – very high ration people with Medium level of education and most of them with Engineering, manufacturing and construction Field of study and on the other hand very low ration of person with Low education (ant it means with the General programmes).

Figure 3.2 Difference between country specific and country non-specific OSP by Fields of Education



Source: EPC; PIACC.CZ data

3.3.4 Country specific OSP for the Czech Republic – Dimensions 3-7; Knowledge, Skills, Competence, Occupational Interests and Work Values

As using PIACC.CZ data for computing country specific OSP for the first and the second Dimension offer quite good and complex information, for Dimension 3-7 it is much poorer situation. Only four areas can be modifying as country specific by the PIAAC.CZ data:

- Level of Computer skills
- Importance of Computer skills
- Importance of Numeracy skills
- Importance of Communication in the mother language

Table 3.12 shows these four areas in the PIACC.CZ data divided by sectors. These data were used for computing country specific OSP by sectors.

Table 3.12 Computer Skills, Numeracy skills and Communication in the mother language in PIACC.CZ by sectors

	Computer skills - Level	Computer skills - Importance	Numeracy skills - Importance	Communication in the mother language - Importance
01 Agriculture	42%	27%	28%	21%
02 Coal			13%	10%
04 Other Mining	83%	71%	41%	59%
05 Food, Drink & Tob.	47%	31%	30%	25%
06 Text., Cloth, & Leath	50%	45%	54%	36%
07 Wood & Paper	49%	31%	44%	31%
08 Printing & Publishing	62%	36%	34%	38%
09 Manuf. Fuels	33%	11%	4%	48%
10 + 11 Pharmaceuticals	61%	37%	49%	34%
12 Rubber & Plastics	44%	20%	32%	33%
13 Non-Met. Min. Prods.	42%	24%	31%	24%
14 Basic Metals	48%	33%	37%	35%
15 Metal Goods	51%	36%	42%	34%
16 Mech. Engineering	56%	31%	39%	35%
17 Electronics	55%	31%	26%	29%
18 Elec. Eng. & Instrum.	46%	21%	41%	33%
19 Motor Vehicles	50%	34%	32%	32%
20 Oth. Transp. Equip.	61%	45%	45%	38%
21 Manuf. nes	56%	37%	43%	33%
22 +23 Electricity + Gas S	61%	43%	49%	43%
24 Water Supply	55%	27%	37%	35%
25 Construction	47%	41%	41%	32%
26 Distribution	53%	46%	50%	44%
27 Retailing	53%	42%	49%	37%
28 Hotels & Catering	49%	36%	40%	27%
29 Land Transport	49%	35%	37%	35%
30 Water Transport			2%	2%
31 Air Transport	46%	45%	31%	44%
32 Communications	62%	46%	44%	45%
33 Banking & Finance	65%	61%	65%	62%
34 Insurance	62%	63%	64%	62%
35 Computing Services	85%	66%	55%	57%
36 + 37 Prof. Services	63%	54%	53%	51%
38 Public Admin. & Def.	60%	49%	36%	51%
39 Education	58%	48%	33%	47%
40 Health & Social Work	54%	38%	28%	34%
41 Misc. Services	52%	44%	38%	33%
CZ Total	54%	41%	41%	39%

Source: EPC; PIACC.CZ data; shadowed are sectors with less than 60 respondents in the PIACC.CZ

Table 3.13 shows these four areas in the PIACC.CZ data divided by occupational groups. These data were used for computing country specific OSP by occupations.

Table 3.13 Computer Skills, Numeracy skills and Communication in the mother language in PIACC.CZ by sectors

	Computer skills - Level	Computer skills - Importance	Numeracy skills - Importance	Communication in the mother language - Importance
01, 02, 03. Armed forces	62%	37%	24%	41%
11. Chief executives, seni	61%	66%	64%	64%
12. Administrative and c	68%	65%	65%	63%
13,14. Managers in servi	65%	61%	62%	58%
21. Science and engineer	67%	56%	65%	53%
22. Health professionals	48%	26%	28%	39%
23. Teaching professiona	57%	43%	31%	50%
24,25,26. Business and o	70%	59%	49%	57%
31,35. Science and engin	70%	53%	53%	48%
32. Health associate prof	62%	44%	50%	42%
33. Business and adminis	62%	57%	60%	55%
34. Legal, social, cultural	62%	49%	36%	46%
41,43,44. General office cl	57%	50%	49%	46%
42. Customer services cle	53%	34%	45%	41%
51,53,54. Personal, care, p	48%	32%	29%	31%
52. Sales workers	50%	40%	49%	35%
61,62,63. Agricultural wo	47%	32%	28%	21%
71. Building and related t	43%	38%	36%	27%
72,74. Metal, machinery a	50%	30%	35%	34%
73. Handicraft and printin	46%	25%	33%	27%
75. Food processing, wo	44%	30%	31%	21%
81. Stationary plant and r	44%	13%	30%	23%
82. Assemblers	39%	25%	21%	25%
83. Drivers and mobile pl	40%	26%	28%	24%
91,94,95,96. Cleaners, refu	49%	37%	7%	10%
92. Agricultural, forestry	33%		9%	7%
93. Labourers in mining,	44%	15%	16%	12%
CZ Total	54%	41%	41%	39%

Source: EPC; PIACC.CZ data; shadowed are occupational groups with less than 60 respondents in the PIACC.CZ

Based on data in Tables 3.12, 3.13 and non-country specific OSP for the Czech Republic, new country specific OSP were computed.

Table 3.14 shows Computer Skills, Numeracy skills and Communication in the mother language in country specific OSP for the Czech Republic by sectors, Table 3.15 by occupational groups.

Table 3.14 Country specific OSP for the Czech Republic by sectors – Computer Skills, Numeracy skills and Communication in the mother language in country

	Country specific OSP - Czech Republic			
	Computer skills - Level	Computer skills - Importance	Numeracy skills - Importance	Communication in the mother language - Importance
01 Agriculture	27%	19%	29%	34%
02 Coal	9%	10%	28%	47%
03 Oil & Gas	13%	14%	37%	57%
04 Other Mining	10%	12%	32%	55%
05 Food, Drink & Tob.	30%	21%	29%	35%
06 Text., Cloth, & Leath	24%	22%	38%	42%
07 Wood & Paper	25%	18%	35%	40%
08 Printing & Publishing	32%	24%	31%	51%
09 Manuf. Fuels	13%	15%	38%	58%
10 + 11 Pharmaceuticals + Chemicals	40%	27%	44%	43%
12 Rubber & Plastics	23%	14%	30%	42%
13 Non-Met. Min. Prods.	20%	14%	30%	41%
14 Basic Metals	22%	18%	33%	44%
15 Metal Goods	34%	26%	38%	40%
16 Mech. Engineering	38%	24%	37%	42%
17 Electronics	32%	22%	29%	43%
18 Elec. Eng. & Instrum.	21%	14%	34%	45%
19 Motor Vehicles	33%	24%	31%	39%
20 Oth. Transp. Equip.	26%	23%	34%	47%
21 Manuf. nes	37%	26%	38%	39%
22 +23 Electricity + Gas Supply	35%	28%	41%	52%
24 Water Supply	14%	12%	33%	54%
25 Construction	31%	28%	38%	41%
26 Distribution	35%	32%	42%	50%
27 Retailing	33%	27%	36%	43%
28 Hotels & Catering	31%	24%	34%	38%
29 Land Transport	31%	23%	33%	44%
30 Water Transport	5%	7%	32%	56%
31 Air Transport	11%	13%	31%	62%
32 Communications	42%	33%	38%	50%
33 Banking & Finance	44%	43%	53%	64%
34 Insurance	28%	30%	45%	68%
35 Computing Services	66%	55%	49%	57%
36 + 37 Prof. Services	42%	37%	45%	56%
38 Public Admin. & Def.	40%	34%	34%	56%
39 Education	38%	33%	33%	55%
40 Health & Social Work	35%	26%	32%	47%
41 Misc. Services	34%	29%	34%	44%
CZ Total	36%	29%	37%	46%

Source: EPC; PIACC.CZ data

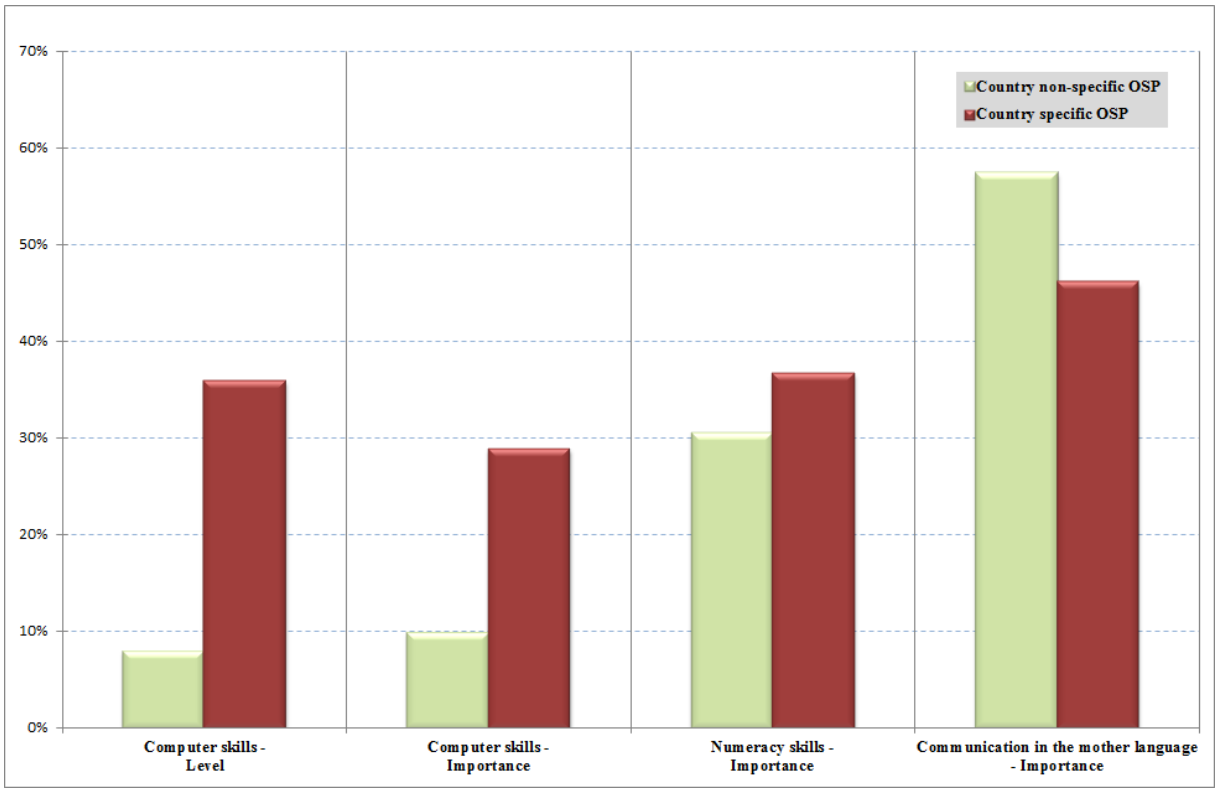
Table 3.15 Country specific OSP for the Czech Republic by occupational groups – Computer Skills, Numeracy skills and Communication in the mother language in country

	Country specific OSP - Czech Republic			
	Computer skills - Level	Computer skills - Importance	Numeracy skills - Importance	Communication in the mother language - Importance
01, 02, 03. Armed forces	62%	37%	24%	41%
11. Chief executives, senior officials a	26%	29%	44%	67%
12. Administrative and commercial ma	48%	47%	57%	68%
13,14. Managers in services	45%	44%	53%	65%
21. Science and engineering profession	53%	45%	63%	60%
22. Health professionals	32%	20%	38%	54%
23. Teaching professionals	38%	30%	33%	58%
24,25,26. Business and other professio	49%	43%	43%	61%
31,35. Science and engineering associa	50%	41%	48%	53%
32. Health associate professionals	24%	21%	44%	60%
33. Business and administration associa	41%	39%	49%	61%
34. Legal, social, cultural and related a	41%	34%	34%	56%
41,43,44. General office clerks	38%	34%	43%	53%
42. Customer services clerks	35%	25%	39%	51%
51,53,54. Personal, care, protective se	30%	21%	27%	40%
52. Sales workers	30%	25%	35%	40%
61,62,63. Agricultural workers	17%	13%	30%	43%
71. Building and related trades workers	27%	24%	35%	37%
72,74. Metal, machinery and electrical	34%	23%	33%	39%
73. Handicraft and printing workers	14%	13%	29%	48%
75. Food processing, wood working, ga	28%	21%	28%	30%
81. Stationary plant and machine oper	28%	10%	28%	31%
82. Assemblers	24%	17%	23%	33%
83. Drivers and mobile plant operators	24%	17%	27%	35%
91,94,95,96. Cleaners, refuse, street ar	30%	22%	7%	23%
92. Agricultural, forestry and fishery la	7%	4%	13%	36%
93. Labourers in mining, construction,	27%	11%	17%	23%
CZ Total	36%	29%	37%	46%

Source: EPC; PIACC.CZ data

Figure 3.3 shows difference between country specific and country non-specific OSP for the Czech Republic for Computer Skills, Numeracy skills and Communication in the mother language. The highest increases in country specific OSP show Required Level and Importance of Computer skills. It is not surprising, because in the O*NET, the Computer Skills are defined as a Programming while in the PIACC survey it is defined much more widely (using Internet, using Word and/or Spreadsheets) and programming is only minor part of this Skills. In PIACC survey it reflects reality much better. On the contrary, some decrease shows Importance of Communication in the mother language.

Figure 3.3 Difference between country specific and country non-specific OSP by Level of qualification requirements (EQF) and Required Education Level



Source: EPC; PIACC.CZ data

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Country specific OSP for the Czech Republic and related documentation for 2013 Country workbooks

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CHARLES UNIVERSITY IN PRAGUE
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EDUCATION POLICY CENTRE

The Education Policy Centre (EPC) was set up in 1994 as a research and advisory unit within the Faculty of Education of Charles University in Prague. Since its establishment, main tasks have included analysing and evaluating the development of the Czech education system, setting it in a wider social and economic context and in an international perspective, identifying new requirements on education and human resource development and formulating its aims and objectives, as well as carrying out research in specific areas.

Thus the EPC has been engaged in comprehensive studies focusing on the relationship between the overall development of society and corresponding transformation of education systems and stressing the interdependence of individual aspects and measures of education policy. At the same time, the EPC has been carrying research focusing on selected themes of special interest, such as level, sources and effects of inequity in education (particularly in access to tertiary education), evaluation and monitoring of schools and education systems, higher education financing and typology, the transition from school to work and the position of graduates on the labour market, and anticipation and forecasting of qualification requirements.

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