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Highly qualified in the Czech Republic

Renata Čuhlová
Faculty of Economics, Technical University of Liberec
Czech Republic
renata.cuhlova@tul.cz

Zuzana Potužáková
Faculty of Economics, Technical University of Liberec
Czech Republic
zuzana.potuzakova@tul.cz

Abstract. The paper aims to analyse the current situation of the highly qualified in the Czech Republic applying the ISCO qualification. Previous studies suggest that educational attainment has an important impact on labour market performance and national competitiveness. Data analyses approved that highly qualified workforce positively influences economic situation of the EU–15 Member States they work in. However, this hypothesis was disapproved for the EU–10+3 Member States joining the EU after 2004. The difference can be explained by the various stage in convergence process since some New Member States are still in transformation period. We positively appraise the significant growth of fraction of the highly qualified in the Czech Republic since 2004, especially in the major group Professionals involving the most qualified workforce. The same trend happened also for the highly qualified foreigners in the Czech Republic, however their attracting still remains a challenge.

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INTRODUCTION

Widely held belief suggests that human sources are a key organisational competitive advantage and they play a crucial role in the economic development of the national economics. This ability emphasizes educational process since an educated labour force is pursued as more creative and successfully adopting changes, thereby better in generating growth. Statistics of the European Union (EU) members shows significant economic growth over the past thirty years although with a great variation among countries. Data of increasing investment in human resources, growing share of tertiary educated inhabitants and measuring

gross national product associates economic growth with increases in education and training (Wilson and Briscoe, 2004).

Globalization process, demographic changes and trends on labour market are important incentives for governments, policy makers as well as employers trying to attract highly skilled professionals from abroad as a source of future competitiveness. Ewers (2007) claims that adapting immigration strategies for highly skilled talents does not affect only instruments of immigration policies but also tax policy, foreign investment and national and international educational programmes. Especially nowadays, migration has become the centre of controversial economic and political debates.

The Czech Republic, same as other ex-communistic countries of the Central and Eastern Europe, started the transformation period with the considerable handicap, lack of the highly educated workforce which could positively influence the speed and success of the convergence process (Cazes and Nešporová, 2003). Despite the fact, that the end of the convergence cannot be determined conclusively, we consider the EU accession in 2004 as the milestone of the convergence process. It definitely turned the country back to the cultural environment it historically belongs to. However, low fraction of the highly qualified as a result of the pre-1990 education policy also has a long-term impact on the current qualification structure of the Czech labour force.

The aim of the paper is to analyse the current situation of the highly qualified in the Czech Republic applying the ISCO qualification. The rising fraction of the highly qualified can be interpreted as the further convergence to the EU-15 Member States known for a high economic level guaranteed, among others, also by high fraction of the highly qualified work force.

In the first part of the paper we describe a value of human capital for stimulation of economic growth and for competitiveness of companies as well as national economies. Highly skilled migrants as a source of human capital mobility and their accumulation have several impacts on both receiving and donor countries mentioned further ahead. In the next part of the paper we statistically demonstrate the impact of highly qualified on GDP of the EU Member States. The last part analyses the highly qualified situation development in the Czech Republic based on the ISCO qualification.

VALUE OF HUMAN CAPITAL

Human resources, as an organizational resource, are one of the key factors of economic development. It includes skills and capabilities of individuals leading to production and economic growth (Dumont and Lemaitre, 2004). Similarly, human capital has its crucial role in contribution to educational level for competitive advantage of companies and whole economies and their performance. Human resources require to be converted into human capital for long time organizational value creation.

During the last decades, the importance of raw materials as a quantitative source of innovation continuously has decreased and contrary, the significance and value of information as a qualitative factor of innovation have experienced rapid growth. Although industrial economic typical for 20th century was based on productivity, nowadays society is pushed by knowledge and innovative ideas. For the current trend when economics depend much more on highly skilled people than ever before we use a term "knowledge economy" (Guellec & Cervantes, 2002). Although this concept is not new, it is an access to knowledge source that has changed (Radosevic, 2006). Kowalska (2016) addresses an urgent issue of analysis of the financial sources for all three types of education; formal, non-formal and informal. In her research, the lack of legal regulations that allow the employment of new techniques and solutions for knowledge economy

was found as a barrier for financing education system in case of Poland. It is important to note that Poland, just as the Czech Republic, is transforming economy with the same characteristics.

Success in the globalized and interconnected economy is not given only by a comparative advantage in technological process, services and know-how, but it also depends on cultural and linguistic understandings (Tremblay, 2005). Highly skilled foreign professionals, so called expatriates, provide technical skills serving innovation but also intercultural competences for understanding the specifics of foreign markets.

There is a general empirical as well as theoretical consensus that improvements in human capital based on education, on-the-job training and work experiences have a huge impact on productivity in the labour market and contribute to economic growth (Mincer 1991 cited in Saxton 2000). The evidence shows that human capital through education process enhances productivity rather than just signals a level of individuals´ ability to employers.

According to Becker (1993), human capital is decisive factor of wealth creation in developed countries. Benhabib and Spiegel (1994) claim that the ability of nation to become a technological leader and implement new processes is a function of human capital stock. The importance of investment in human capital is supported by Becker (1993) with cases of post-war economic development of USA, Japan and Western Europe illustrating the impact of human capital on economic development. The „Asian Tigers", as Japan or Taiwan, are examples of reaching economic growth in countries with lack of natural sources in a short term thanks to investment in new technologies, research, human capital together with intensively working employees (Becker, 1993).

Human capital is an accumulated stock of skills and talents, and it manifests itself in the educated and skilled workforce in the region. It could be measured as person-years of education. Theory of human capital established in 1960ties discovered linear dependency between education and productivity. The theory has led to many studies integrating human capital into models of business success. The theory of human capital considers education as investment that brings future benefit in higher salary as reward for larger knowledge and developed skills displaying in higher work productivity or technological progress as benefit for the society (Becker, 1964, 1993). As Mathur (1999) emphasizes, the modern theory of human capital-based growth provides a basis for a regional economic development strategy.

Mathur (1999) states, the growth and development are stimulated by human capital both directly and indirectly. Human capital contributes to increase of knowledge and to knowledge stock of the economy. Consequently, the growth of human capital productivity increases with the knowledge stock accumulation. According to Lucas (1988), individuals enhance their earning ability through the investment in human capital and contribute to the aggregate level of productivity. Human capital also encourages the emergence of entrepreneurial activities and additionally it also attracts complementary physical capital (Lucas, 1990). Indirectly, it stimulates household investment in children due to lower fertility rates which further contributes to economic development (Mathur, 1999).

Although the direct impact of human capital on economic growth is not possible to quantify easily, statistics claim that education level is affecting macroeconomic performance positively. In particular, studies have demonstrated that increase of school enrolment by 1 % results in annual GDP per capita growth by 1-3 % (Barro, 1991), Sianesi and Van Reenen (2003) suggest that increasing average education rate by one year would raise the level of GDP per capita by 3-6 %. Denison (1962) claimed that more educated people entering the labour force display higher ability to implement technological advances. However, a time lag between educational expenditure and economic growth must be taken into account Sylwester, 2000). According to some authors, it is not only human capital but also social capital that has positive and significant contribution to economic growth (Woolcock & Narayan, 2000). Moreover, businesses employing highly qualified individuals create geographical clusters of can produce high productivity and strong local

economic growth. On the other hand, external benefits of skilled individuals are often not only economic. They influence the environment, enhance better health and reduce crime rates (Wilson and Briscoe, 2004).

MIGRATION OF HUMAN CAPITAL – HIGHLY SKILLED MIGRANTS

Knowledge creation can be generated domestically through education and training systems. Contrary, not all countries are successful in knowledge management or even identifying required skills. Consequently, the movement of personnel solve this issue as a mechanism for distributing tacit knowledge and skills across regions, countries and time (Almeida & Kogut, 1999). Knowledge is becoming in a great demand but as Kryk (2016) states, it is important to realize that process of learning must not be associated only with university environment but the orientation heads rather towards development of competences that are generally recognized. According to the study of Kryk (2016), 1/3 of the educational goals stated by EU in the Lisbon Strategy and the Europe 2020 have not been accomplished yet, mainly because of inability of some EU Member states to fulfil the aims in terms of adult non-formal and informal education.

Economic incentives are considered as a general driver of migration when migrants from countries with low GDP per capita move to countries with high GDP per capita, and this trend increases with geographical proximity (Freeman, 2006). Many developed countries, such as Germany, have experienced continuous migration flows over the past decades leading to permanent changes in composition of population and workforce.

Highly skilled migration is considered as the most beneficial on a temporary basis. If skilled emigrants return to the home country and transfer their added knowledge, the migration does not endanger the growth of developing countries (i.e. "brain drain"). Moreover, labour market imbalances in certain fields are often of a short-term character. Regarding to these reasons, programmes for the temporary recruitment of the highly skilled are more popular, especially in European countries (Doudeijns & Dumont, 2003).

Generally, educated migrants are provided with rewarding opportunities that are not available in their parent country. The empirical support on the macroeconometric impact of brain drain for sending countries is provided by Docquier (2006). According to the analysis, a certain skilled migration rate between 5 % and 10 % of the native skilled labour force was found to be beneficial for both sending and receiving countries. At the global level, the highly skilled migration leads to international research and technology clusters´ formation, as for example Silicon Valley or CERN.

Obviously, losing skilled labour force can retard growth and productivity of donor country. On the other hand, it can also trigger gains for sending country in the long run, as encouraging transfer of investments and venture capital through diasporas. Migration may stimulate trade between sending and receiving countries since immigrant networks like the familiar food and cultural products which enhances imports from their home country. Evidence (Head & Ries, 1998) suggests that 10 % immigrants´ growth results in approximately 4 % increase in international trade with given country.

Inflow of remittances and foreign exchange is common positive impact on sending country. Contrary, receiving country benefits from increased stock of human capital, new innovation capacity and from international dissemination of knowledge. Besides, it also affects educational sector since investments in subsidized education of emigrating individuals cause fiscal loss (Wickramasekara, 2003; Regets, 2002).

Migrants returning with new experiences and advanced skills are more productive. Consequently, they can give an important impulse to the economy of home country. It is important to emphasize the crucial role of skilled returnees so their contribution can be maximalized. If they come back after productive age, the benefits result mainly in increased consumption demand (Regets, 2002). Regarding to an (in)equal

distribution of wages, Matano & Naticchioni (2012) claim that workers with qualification receive higher wages when they migrate. Moreover, the results of Łaszkiewicz (2016) demonstrate positive impact of diversity of industries on the wages within particular metropolitan areas. This advocates a significant role of diversity externalities in the knowledge creation in European metropolises.

Skilled employees have several advantages for the employer. Skilled employees usually have an educational background that matches the job qualification. Although a learning curve will always exist as new employees become acclimated to company policies, there is no need to spend extra time for teaching basic job functions as in case of unskilled workers. Besides the job readiness, skilled workers with appropriate skills to expedite their careers, including communication, computer, planning, analytical and problem-solving; faster advance into higher positions which is usually the intention of hiring in small businesses. Skilled employees offer more flexibility to employers since they are more adept at learning and acquiring skills.

According to the Global talent index report from 2015 raking countries on their capacity for developing, attracting and retaining talent; the Czech Republic is evaluated as 25th with an overall score 47,6 out of 100. Within benchmarked categories of talent environment, openness (for example hiring of foreign nationals), quality of the labour force, proclivity to attracting talent with consideration of demographics and education, the Czech Republic reached the best ranking among countries from the Central and Eastern Europe. Following countries from the same region, as Poland on the 28th position and Slovakia reaching 29th position, improved their ranking during last years. Just as position of the Czech Republic compared to ranking from 2011, first performers of the Global talent index have not changed neither. Particularly in terms of Poland, important disparities in levels of regional development as a determinant of knowledge creation can be detected. Findings of Kondratiuk-Nierodzińska (2016) demonstrate a strong positive dependency between differences in new knowledge generation capabilities in the regions and variations in GDP per capita. Moreover, a time lag between the differences in regional efforts to generate new knowledge and the level of economic development can be found out (Kondratiuk-Nierodzińska, 2016). The best score (74.5) of Global talent index still belongs to United States which is well ahead of its closest competitors, countries from Nordic region, namely Denmark and Finland (Economist Intelligence Unit, 2015).

DEFINING THE HIGHLY QUALIFIED

Before focusing on the situation of the highly qualified on the Czech labour market we will determine who actually belongs among highly qualified workforce. For this purpose, we will apply the ISCO methodology (International Standard Classification of Occupation) and its skill levels. The ISCO is an internationally acknowledged classification adopted by International Labour Organisation in 1957. The aim of this classification was *organizing jobs into a clearly defined set of groups according to the tasks and duties undertaken in the job* (ILO, 2012). Current version of the classification (ISCO-08) was adopted in 2007. The four skill level hierarchical structured classification divides all jobs in the world into 436 unit groups. The unit groups are further aggregated into 130 minor groups, 43 sub-major groups and 10 major groups (ILO, 2012:3).

This classification handles with the occupations of the work force based on its educational attainment. The classification also distinguishes between job and occupation. Job is according to ILO (2007) *a set of tasks and duties performed, or meant to be performed, by one person, including for an employer or in self-employment*. Occupation on the contrary is *set of jobs whose main tasks and duties are characterised by a high degree of similarity (*ILO, 2007). Jobs are within the ISCO classified by occupation with respect to the type of work to be performed.

The benefit of ISCO classification is a long-term stability. Unlike the NACE classification, based on the organizing the work force according to the sectors of the national economy, the ISCO view is based on an achieved qualification which usually requires years to acquire. The person can therefore change a job or sector but the occupation remains the same. For example, a secretary can switch from the construction company to the logistic one changing the sector but her occupation and her duties remain unchanged.

According to ILO (2012), the occupations involved in the skill level 3 and the skill level 4 belong among highly qualified occupations. These skill levels are defined in terms of the ISCED-97 education levels illustrated in the table 1 below. As highly qualified occupations are considered those all involved in the skill level 4 requiring second stage of tertiary education and first stage of tertiary education (medium duration) and in the skill level 3 requiring first stage of tertiary education (short or medium duration). Skill level 4 involves the performance of task that requires complex problem-solving, decision making and creativity based on an extensive body of theoretical and factual knowledge in a specialized field (ILO, 2012:13). Skill level 3 involves the performance of complex technical and practical tasks that require an extensive body of factual, technical and procedural knowledge in a specialized field (ILO, 2012:13). In short, highly qualified occupations **require a tertiary education**.

Table 1

Mapping of the four ISCO-08 skill levels to ISCED-97 levels of education

ISCO-08 skill level	**ISCED-97 groups**
4	6 Second stage of tertiary education (leading to an advanced research qualification) 5a First stage of tertiary education. 1st degree (medium duration)
3	5b First stage of tertiary education (short or medium duration)
2	4 Post-secondary, non-tertiary education 3 Upper secondary level of education 2 Lower secondary level of education
1	1 Primary level of education

Source: ILO (2012)

In our case, we math the skill levels with the occupational level of the ISCO-08 qualification. There are three major groups of occupations that are considered for highly qualified. Those are further occupations (ILO, 2015):

– ISCO-08 major group 1: Managers requiring skill level 3+4

– ISCO-08 major group 2: Professionals requiring skill level 4

– ISCO-08 major group 3: Technicians and Associate Professionals requiring skill level 3

The three major groups cover a large set of occupations. A major group 1 Managers represents the only major mentioned group which can gain two different skill levels. The occupations involved in are e.g. Legislators and senior officials (minor group 111), Production managers in agriculture, forestry and fisheries (minor group 131) or Professional services managers (minor group 134) (ILO, 2012). The major group Professionals requires the highest education of all ISCO-08 major groups. Among the occupations belonging to this group are e.g. Physical and earth science professionals (minor group 211), Electro technology engineers (minor group 215) or medical doctors (minor group 221) (ILO, 2012). Technicians and Associate Professionals require lower skill level than Professionals and cover occupations such as Physical and engineering science technicians (minor group 311), Medical and pharmaceutical technicians (minor group 321) or Legal, social and religious associate professionals (minor group 341) (ILO, 2012).

Before focusing on the recent situation of the highly qualified in the Czech Republic, we will test the hypothesis: „**Highly qualified work force positively influences economic situation of the country they work in**". To approve or disprove this hypothesis we will correlate the share of the ISCO-08 major groups 2 on the total employment with GDP per head in EU–28 Member States in 2014, divided EU–15 and EU–10+3. The EU Member States were divided into two groups according to their stage in the convergence process. The EU accession in 2004 is considered as its milestone. The ISCO-08 group 2 – Professionals was chosen due to inclusion the most qualified occupations.

Linear dependency between the ISCO-08 group 2 and GDP in the countries was demonstrated on 5 % significance level. The interesting findings show a significant difference between the EU–15, joined the EU between 1957-1995, and EU–10+3, joined since 2004. Table 2 presents the correlation coefficients and p-Values.

Table 2

Correlations between the ISCO 2 and GDP in the EU Member States

Year	Correlations between the ISCO 2 and GDP in the EU–15 Member States		Correlations between the ISCO 2 and GDP in the EU–10+3 Member States	
	Correlation coefficient	p-Value	Correlation coefficient	p-Value
2010	0,7622	0,0010	-0,1105	0,7194
2011	0,7646	0,0009	0,0694	0,8217
2012	0,7786	0,0006	0,1802	0,5558
2013	0,8046	0,0003	0,2392	0,4313
2014	0,8356	0,0001	0,1808	0,5545

Source: Eurostat (2015a)

The gap between the impacts of highly qualified, specifically ISCO-08 group 2, on GDP within the EU Member States provokes a question influencing the economic performance. According to OECD (2012), 60 % or more of GDP growth in France, Norway, Switzerland and the United Kingdom is generated by tertiary educated. The figure No. 1 illustrates different dependency between the ISCO-08 group 2 and GDP among EU–15 and EU–10+3 on a scatter plot matrix.

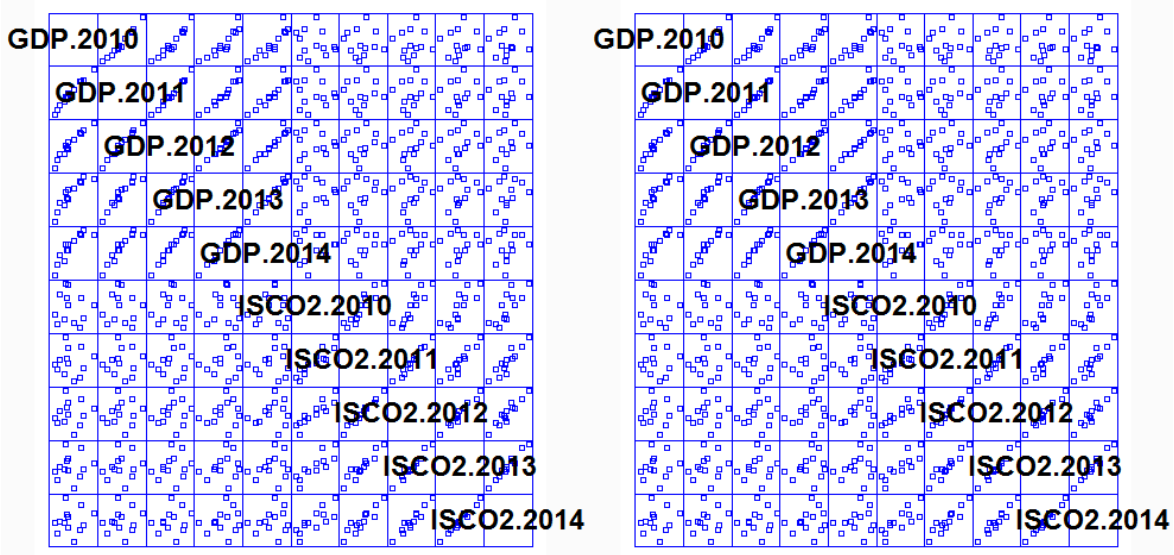

Figure 1. Dependency between the ISCO-08 group 2 and GDP in the EU Member States

Source: Source: Eurostat (2015a)

Hypothesis had been approved for the EU–15 Member States and disapproved for the EU–10+3 Member States. According to our opinion, the convergence process in the EU–10+3 has not been accomplished yet. However, the highly qualified will play a growing role together with rising economic level.

There are also further arguments about the importance of the highly qualified in the national economy. As the Global Competitiveness Report 2014-2015 suggests, there is an increasing trend of growing importance of human capital related to GDP per head for country´s competitiveness. The Czech Republic has reached the final stage 3 of development called innovation-driven where the weight for innovation and sophistication factors is 30 % so rising importance of human capital can be expected for the future (World Economic Forum, 2015). However, some EU–10+3 Member States still belong to the stage 2 (Bulgaria) or transition from stage 2 to stage 3 (e.g. Rumania, Croatia or Hungary) (World Economic Forum, 2015) which can also explain the difference in results.

Educational attainment also has an impact on labour market performance. Statistics of the OECD countries demonstrate that highly qualified people have the highest employment rate. Employment rates for tertiary educated individuals is 83 %, for people with upper secondary or post-secondary non-tertiary education is 73 % and for less than secondary educated the unemployment rate is 55 % (OECD, 2015). In terms of the Czech Republic, the unemployment rate of tertiary educated was 2,9 % in 2014 compared to those below upper secondary education with rate of 22,1 % in the same year (Czech statistical office, 2015d). Situation on the labour market is one of the important factors influencing economic performance through GDP indicators.

Finally, despite the fact the hypothesis had been disproved for the EU–10+3, there is evidence that highly qualified have a growing impact on economic performance with rising economic level. Beside this, they influence countries' competitiveness and the labour market performance positively and reduce the unemployment rate. Those are main reasons for further stimulation of the highly qualified in the EU–10+3, including the Czech Republic.

HIGHLY QUALIFIED IN THE CZECH REPUBLIC

This part of the paper focuses on the situation of the highly qualified in the Czech Republic. To analyse the local highly qualified labour force we will use the date from the Labour Force Survey coming from the years 2004-2014. Based on this survey we will analyse the situation of the highly qualified. The data are structured into the sub-major groups to provide more detailed view. The starting year is 2004 when the Czech Republic joined the EU. Other years covered in the table are 2008 when the global crisis hit the Czech labour market and 2014 which are the recent available data from.

As the trend of changes in the particular major and sub-major groups show, the highly qualified development since 2004 was mostly positive and all the analysed and registered major groups grew. Between 2004 and 2014 the major group 1 – Managers grew by 3 %, major group 2 – Professionals by 37 % and by the major group 3 – Technicians and associate professionals by almost 8 %.

This growth was mainly caused by the rising number of the university graduates which grew during the whole observed period. According to the Czech Statistical Office (2015c), a number of 234 thousand students studied at the Czech universities in 2004 and it increased up to 347 thousand in 2014, which means the growth by almost 50 %. Another specific feature of the Czech education system is the strong preference of the master degree. This type of the degree was historically considered for only "proper" university education by many employees. The bachelor degree is relatively new and it is not fully accepted as tertiary education on the labour market. Many students therefore continue in studying after gaining the bachelor

degree. Despite the fact that the trend is changing slowly, the number of the master degree students is still remarkable. For illustration, 211 thousand students studied bachelor level and 121 thousand studied master level at the Czech universities in the academic year 2014-15 (Czech Statistical Office, 2015c). Both these factors contribute to the rising number of the highly qualified in the Czech Republic, especially in the major group ISCO-02 requiring master degree. Table 3 illustrates numbers of highly qualified at the Czech universities in selected years.

Table 3

Highly qualified in the Czech Republic, 2004-2014, in thousand, changes in %

	Major/ sub-major group	**2004**	**2008**	**2014**	**2014/2004, in %**	**2014/2008, in %**
Major groups 1-9 (0) total workforce	**Total**	4 706,6	5 002,5	4 974,3	5.7	-0.6
Chief executives, senior officials and legislators	**11**	48,8	52,7	41,1	-15.7	-22.0
Administrative and commercial managers	**12**	49,0	60,2	74,1	51.2	23.1
Production and specialised services managers	**13**	103,0	120,6	102,3	-0.7	-15.2
Hospitality, retail and other services managers	**14**	49,1	52,0	39,0	-20.5	-25.0
Managers total	**1**	249,9	285,5	256,6	2.7	-10.1
Science and engineering professionals	**21**	74,8	88,7	107,2	43.3	20.8
Health professionals	**22**	80,7	75,0	134,6	66.8	79.4
Teaching professionals	**23**	177,4	190,0	228,2	28.7	20.1
Business and administration professionals	**24**	72,6	82,0	110,2	51.8	34.4
Information and communications technology professionals	**25**	37,3	45,2	63,4	70.1	40.4
Legal, social and cultural professionals	**26**	100,9	110,1	102,4	1.5	-7.0
Professionals total	**2**	543,7	591,0	746,0	37.2	26.2
Science and engineering associate professionals	**31**	270,6	307,1	287,9	6.4	-6.3
Health associate professionals	**32**	117,9	106,4	89,0	-24.5	-16.3
Business and administration associate professionals	**33**	321,2	397,8	373,0	16.1	-6.2
Legal, social, cultural and related associate professionals	**34**	48,7	58,6	61,5	26.2	4.8
Information and communications technicians	**35**	58,7	69,1	68,9	17.3	-0.3
Technicians and associate professionals - total	**3**	817,1	939,1	880,3	7.7	-6.3

Source: Czech Statistical Office (2015a), Labour Force Survey (LFS), internal database

The recent development was therefore strongly positive in the ISCO-02 major group which grew impressively by more than a third. However, the growth was not uniform. The most significant changes occurred in the sub-major groups requiring education in information, technologies, medicine and technical engineering. The growth was especially significant the sub-major groups Information and communications technology professionals (25) which grew by 70 %, Health professionals (22) which grew by almost 77 % and Science and engineering professionals (21) which grew by 43.3 %. On the other hand, sub-major group Legal, social and cultural professionals (26) grew only by 1.5 %. The same trend occurred, except the last mentioned sub-major group, also between 2008-2014. We can therefore say that there was no interruption caused by the global crisis.

The development in the other two major groups, Managers and Technicians and associate professionals was more variant. In the ISCO-01 major group grew between 2004-2014 only one sub-major group, Administrative and commercial managers (12) by 51.2 %. This group also grew between 2008-2014 and it therefore was not hit by the financial crisis. All other sub-major groups declined, the most severe decline occurred in the sub-major group Hospitality, retail and other services managers (14) which declined by a fifth. Other significant decline occurred in the sub-major group Chief executives, senior officials and legislators (11). Anyway, decline in this sub-major group does not have to be necessarily interpreted negative because it could be a result of the growing effectivity of the state administration.

In the last analysed major group, Technicians and associate professionals, occurred deep decline by a forth in the sub-major group Health associate professionals (32) and same growth in the sub-major group Legal, social, cultural and related associate professionals (34). The decline in the sub-major group Health associate professionals is the only negative among the highly qualified because into this sub-major group are concentrated especially health care professionals as Nursing and midwifery associate professionals, Ambulance workers or Pharmaceutical technicians and assistants which are essential for securing the heath care availability. The decline also contrasts with the related occupational sub-major group Health professionals (22) which grew very strong. In the context of the ageing population trend, this decline, mainly caused by lower wage standard, could negatively influence the health care provision. Other analysed sub-major groups, Business and administration associate professionals (33) and Information and communications technicians (35), grew between 2004-2014, however the development between 2008-2014 was negative.

To sum up, the rise within the analysed major groups of the can also be interpreted as another sign of the convergence to the Westers European standards due to the unfavourable education structure before 1990. Based on the education policy of the communistic regime, the fraction of the highly educated people was for decades strictly limited. As a result, in 1990, in the beginning of the transformation period, according to census only 7.2 % of the population older 15 years achieved tertiary education (Czech Statistical Office, 2015c). This policy has a long-term effect. When we compare current tertiary attainment in the age-group 30-34 years (people born 1981-1986) we can see it reached 28.2 % in the Czech Republic in 2014 (Eurostat, 2015a). In Demark and Finland, two leading countries within the Global talent index mentioned above, the value was 44.9 % respectively 45.5 %. Same picture we get when using the ISCO-08 major groups. According to the Eurostat, 37.7 % of the workforce belonged to the major groups ISCO-08 1–3 in 2014 in the Czech Republic. In Denmark, the fraction was 44.8 % and in Finland 41.3 % (Eurostat, 2015b). Both figures confirm the remaining gap in the amount of the highly qualified workforce available in the Czech economy.

One of the way how to raise the amount of the highly qualified in the Czech Republic is to use the foreign workforce coming via immigration. Further we will analyse also the qualification level of the foreigners which are in the most of the cases not covered in the Labour Force Survey due to the methodology used. However, the statistical data of the foreigners are limited due to the fact that the occupational statistics is available only for employed foreigners and does not involves foreigners with the trading licence. The fact that the data are sorted only into the major groups is another limit. The comparison among the local and foreign labour force is therefore not complex. The table 4 includes the number of the foreigners in the analysed major groups in 2004 and 2014. The years are for better compatibility the same as in the first table. The last three columns include the changes in per cents between 2004 and 2014.

Table 4

Highly qualified foreigners in the Czech Republic, 2004, 2014, changes in %

ISCO – 08 Major group	2004			2014			2014/2004		
	Total foreign, %	EU	Non-EU	Total foreign, %	EU	Non-EU	Total foreign, %.	EU,%	Others, %
1 - Managers	3 468	2 446	1 022	9 924	7 276	2 648	186.2	197.5	159.1
2 - Professionals	7 970	5 357	2 613	31 969	24 819	7 150	301.1	363.3	173.6
3 - Technicians and associate profession.	8 750	7 127	1 623	21 866	18 148	3 718	149.9	154.6	129.1
Total 1+2+3 major group	20 188	14 930	5 258	63 759	50 243	13 516	215.8	236.5	157.1
Total major groups 1- 9	107 984	75 017	32 967	260 999	196 345	64 654	141.7	161.7	96.1

Source: Czech Statistical Office (2015b), Foreigners in the Czech Republic

Based on the data in the table 4 we can see the amount of the highly qualified foreigners grew significantly. It is a result of ongoing setting up the branches of the Western companies to the Czech Republic which started already in the 1990ties. Another impact is a growing attractiveness of the Czech Republic based on the growing living standard.

In 2004, more than 20 thousand highly qualified worked in the Czech Republic and most of them belonged to the major group 3. Highly qualified created about 19 % of all the foreigners employed in the Czech Republic. The EU citizens created about two thirds of all highly qualified foreigners. Within the ten years later the number of the employed foreigners grew by more than 140 % to almost 261 thousand. The growth in the major group 2 – Professionals, by 300 % to almost 32 thousand was the most impressive trend. Two thirds of them came from the other EU Members States who have easy access on the Czech labour market thanks to the internal market. Anyway, the growth of the non-EU highly qualified exceeded 100 % as well.

In 2014, almost 25 % of all employed foreigners belonged among highly qualified. However, the fraction of the highly qualified still remains smaller than in case of the local workforce. In case the Czech Republic wants to base the further economic growth on knowledge economy and innovation, it should focus on attraction more highly qualified foreigners. The inspiration can be found in the countries like Canada or Australia that continuously offer green cards and easy and fast access on the labour market to the highly qualified foreigners.

Table 5

Comparison of the local and foreign highly qualified, 2004 and 2014

ISCO-08	2004			2014		
	Local	Foreign	Total highly qual.	Local	Foreign	Total highly qual.
1 - Managers	249 900	3 468	253 368	256 600	9 924	266 524
2 - Professionals	543 700	7 970	551 670	746 600	31 969	778 569
3 - Technicians and associate professionals	817 100	8 750	825 850	880 300	21 866	902 166
Total 1+2+3 major groups	1 610 700	20188	1630888	1 883 500	63 759	1 947 259
Total major groups 1 - 9	4 760 600	107984	4 868 584	4 974300	260 999	5 235 299
Highly qual./total, in %	34.3	18.7	33.9	37.9	24.4	37.2

Source: Czech Statistical Office (2015a,b), LFS and Foreigners in the Czech Republic

Finally, the table 5 illustrates the recent development of the highly qualified workforce in the Czech Republic. Between 2004 and 2014 there was a growth of this group by the local and by the foreign workforce. Despite the fact, that the fraction of the highly qualified on the total workforce grew more significantly by the foreigners then by the local workforce, the fraction of highly qualified foreigners was in 2014 almost 13 percentage points lower. However, all the analysed major groups grew since 2004, the most impressive growth occurred within the major group 2 – Professionals which requires the highest educational level.

In the future, the Czech Republic should focus on more intensive attraction of the highly qualified foreign work force and together with supporting the university education by the local population. Despite the positive trend of the growing fraction of the highly qualified since 2004, the Czech Republic still lags behind the old EU Member States especially behind the Nordic and West European countries that lead the competitiveness and talent rankings.

CONCLUSION

Current trends such as knowledge economy and innovation and competitiveness rankings emphasize the crucial role of the human capital and skilled labour force. Beside continuously rising fraction of the highly qualified in the EU, the Member States are also trying to attract highly skilled foreigners as a source of competitiveness and dynamic knowledge-based economy to further improve the economic performance.

Although it is not easy to measure the direct impact of human capital on economic performance indicators, there are several studies (Barro, 1991; Denison, 1962; Sianesi & Van Reenen, 2003) that claim the educational level positively affects economic growth of national economies. Moreover, skilled and more educated people have higher ability for innovative thinking and implementation of technological advances (Denison, 1962).

The paper demonstrates the development of the highly qualified work force in the Czech Republic between 2004 and 2014. The statistics show positive trend of the growing local as well as foreign work force. Although a share of the highly qualified on the total work force grew more significantly by the foreigners then by the local work force, it is not sufficient and level of highly qualified remains a challenge. Despite the growing attractiveness, the Czech Republic still lags behind the Nordic and West European countries that lead the rankings of competitiveness and talent.

Statistical analyses proved the difference between EU–15 and EU–10+3 in impact of ISCO-08 group 2 on GDP. Due to the gaps in convergence process´ stages among EU Member States, labour markets performances are affected. Based on the findings we claim that the convergence process in the EU–10+3 has not been accomplished yet. Considering the growing importance of human capital related to GDP per head for country´s competitiveness (World Economic Forum, 2015), we suppose that national economies of the EU will be inspired from countries with long immigration history, such as Canada and Australia, and they will aim to create more incentives to attract highly qualified.

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