



Measurement of Highly Qualified Employees Productivity

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ABSTRACT

Nowadays all economies are more and more based on knowledge and information. Economists therefore are increasingly interested in the measurement of productivity of highly qualified employees. While in the case of other factors of production (labour, land, capital) we know the number of economic and statistical approaches how to deal with the measurement of efficiency or productivity, there is no single methodology in relation to highly qualified employees. Also there is a lack of an internationally agreed definition of highly qualified employees. This article offers possible approaches in this field focusing mainly on a staff segment with tertiary education. Although measuring of qualitative impacts is sometimes difficult, it does not mean that it is impossible. On the contrary, properly interpreted and applied indicators increase employment on the labour market and reinforce the positive contributions of highly qualified employees in the business.

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1. Introduction

The development and easier access to information and communications technologies (ICT) had caused that the traditional factors of production were added with new factors. These are e.g. intellectual capital (intellectual property), information, time and quality, knowledge, ideas and values as well as social capital, cooperation and procedural involvement. The digitization of the world economy required not only investments in ICT but also investments in human capital especially through education. Knowledge based society requires more and more specialized knowledge and continuous sublimation of work skills and habits. Employee's creativity, proactive approach, active communication, safe working environment and their mutual interactivity improve both macro and microeconomics outcomes. According to experts, this exists because "the atmosphere of incentive new initiatives by individuals and teams can compare their own current direction and the results of the commitments that you have given, regardless of whether they existed in the plains or in the form of an on-going dialogue about finding new direction of the business" (Vodák - Kucharčíková, 2007). Although the theory understands formation of human capital as a part of individual's activity who wants to expand own skills, it is highly desirable to improve mainly the level of public investments in human resources.

2. Effectiveness and potential of highly qualified employee

By exploring and introducing the fourth production factor, which is human capital (Becker, 1964; Rosen, 1987) has changed the understanding of wealth and consequently also change the structure of the economy, because the traditional factors of production were added with skills and talents of people, science, education, qualification etc. Economic actors are keen to identify growth potential of their employees and subsequently to assess its contributions to the economy and society. Therefore an important task for management at the micro level (companies) as well as at the macro level (state) is to improve the efficiency of these resources. "Generally we can declare that companies today have the knowledge to create appropriate strategies in this regard and also most of them believe that their activities to improve the level of human capital can significantly impact their overall success." (Kozubíková, 2010). Knowledge "becomes a hidden asset of firms whose are facing fierce competition to produce without being able to sell necessarily results in failure" (Poniščiaková, 2012). Indicators that would measure the effectiveness of using human capital (hence highly qualified employees) would be therefore the most useful tools for comparison. Present economic theory provides various forms of measurement of efficiency of production factors supported by scientific analysis and statistical indicators. Productivity is a ratio to measure how well an organization (or individual, industry, country) converts input resources (labour, materials, machines etc.) into goods and services. Sutermeister (1976) defined the productivity as, "output per employee hour, quality considered" Productivity

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is also defined by Rolloos (1997) as, “productivity is that which people can produce with the least effort”. Dorgan (1994) defines productivity as, “the increased functional and organizational performance, including quality”.

Human capital is a relatively young factor of production, which closely related to and in some respects has similar features as labour. This caused many times that economic analysis and research didn’t distinguish between them explicitly didn’t mention them. A different angle on the human work activity and the increasing appreciation of the importance of quality human capital require new and different types of indicators that could better express the impact and benefits of human capital variables. It is difficult to quantify the impact of human capital because of its qualitative nature. Any detected partial relations and connections or modification of existing indicators, identification of new parameters contribute a better understanding of the overall impact of human capital on the economy.

3. Methods

International institutions and national statistical offices, like Eurostat, OECD, WTO, ILO, etc. are providing some statistics and indicators, which are demonstrating actual data and development of highly qualified human capital. These data are presented in their publications, yearbooks and used for international comparison. The key aspects about matter of highly qualified staffs are covered by following topic, for example a/an:

- ◆ number of universities, colleges, vocational schools, research institutes,
- ◆ number of human resources (employees) in research and development,
- ◆ number of students of universities, colleges, vocational schools, lifelong learning,
- ◆ tertiary level educational attainment for age group 25-64,
- ◆ number of employees in enterprises with innovation activity by economic activity (NACE),
- ◆ expenditure on education as % of GDP or public expenditure,
- ◆ registry of study programs, departments and research tasks,
- ◆ investment in human capital, which represents the percentage share of gross domestic expenditure on research & development to GDP,
- ◆ academic staff (ISCED 5-6) by employment status (full-time, part-time, full-time equivalence) and sex etc.

Figure n.1 below from years 2010-2010 contains the total number of persons who were enrolled in tertiary education (including university and other higher education studies) in the regular education system selected EU countries. It provides data of the number of persons who had access to higher education and are expected complete their study and contributing to an increase of the educational attainment level of the population in the country in case they continue to live and work in the country at the end of their studies. Whereas given individual countries differs from amount of GDP, number of population, market conditions, etc. Figure 1 captures only the number of a given type of human capital (static), but says nothing about the actual effectiveness or productivity of their usage.

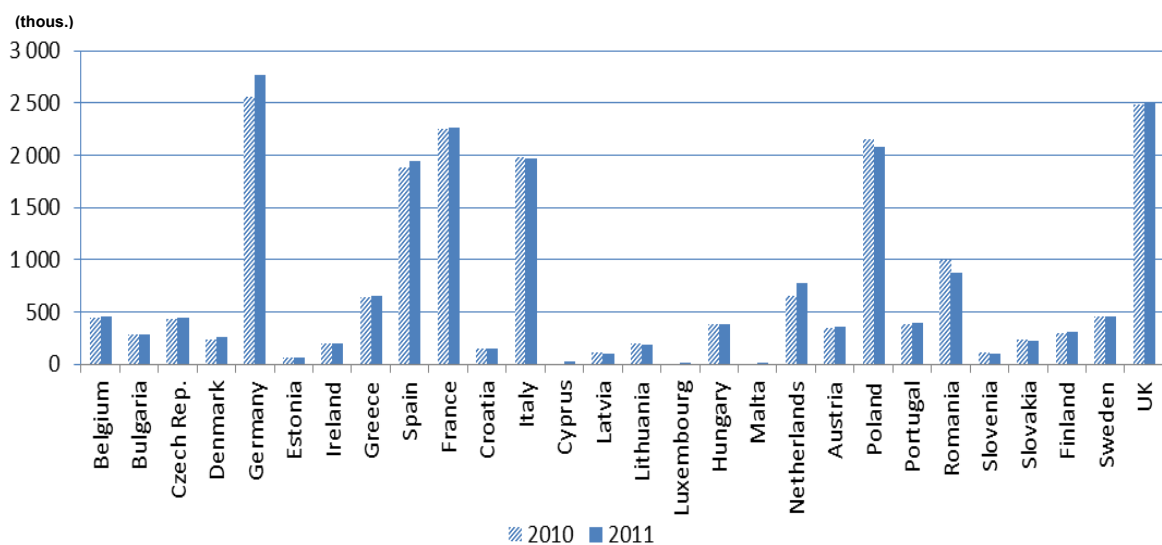


Figure 1. Number of tertiary education participation in selected EU countries in 2010-11 (thous.)
Source: Eurostat (LFS)

It should be noted, that the use of proportional or partial indicators, allowing detailed analysis and in-depth survey would provide a better explanatory power of reality on this issue. Trying to fill this gap in economic theories led to the formation of human capital index (HCI).

3.1. Human capital index (HCI) in Europe

The human capital index is a result of studies on the measurement of human capital (particularly in terms of knowledge and education in EU countries (Ederer, 2006). The index looks at countries' ability to develop and deploy their human capital. HCI includes various aspects of relations and ties of human capital, like:

- ◆ *Subsidies for Human Capital* - reflect the cost of all types of education and training in the country per person active in the labour force. Specifically are following five different types of learning: learning at work, adult education, university, elementary and secondary education and parental education,
- ◆ *Human Capital Utilization* - examines the actual HC deployment and measures HC consumption as a proportion of the overall population.
- ◆ *Human Capital Productivity* - instead of the traditional reporting how many hours labour force works, focuses on examining employment of human capital with better qualifications and expertise, and its impact on GDP.
- ◆ *Demography and Employment* - monitoring economic, demographic and migratory trends to estimate the number of employed (or unemployed) labour force in the future.

Another HCI methodology by Watson Wyatt shows that superior human resources practices are not only correlated with improved financial returns, they are, in fact, a leading indicator of increased economic actor's value. In other words: the Human Capital Index shows that better an organization is doing in managing its human capital, the better its returns for shareholders.

In addition to the HCI studies recommendations derived statistical data files of the stages of this study also can be used for further in-depth examination of the impact of HC and the creation of sub-indicators which could be used to:

- ◆ analysis of the economic impact of any education in the country,
- ◆ calculation of unit costs of education and training,
- ◆ breakdown of expenditure on education, science and research from public or private sources, and their comparison in terms of efficiency,
- ◆ assessment survey about the knowledge level of pupils and students as well as their interest in science and technology,
- ◆ create reports about the number and quality structure of scientific publications,
- ◆ carry out surveys about the application of scientific innovations and about of amount granted patents,
- ◆ analysis correlation between curricula and specific job requirements,
- ◆ finding how research results are used in social and industrial practice,
- ◆ report student mobility for all types of education,
- ◆ calculate the ratio of the number of students per teacher.

Table 1. Human capital index, 2007

NB.	COUNTRY	VALUE
1.	Slovenia	22,3
2.	Turkey	24,9
3.	Latvia	25,6
4.	Czech Republic	26,3
5.	Estonia	26,8
6.	Lithuania	28,2
7.	Romania	29,9
8.	Hungary	30,6
9.	Slovakia	31,7
10.	Bulgaria	32,7
11.	Poland	34,0
12.	Croatia	35,0

Source: www.lisboncouncil.net

The results of HCI's study in twelve countries of Central and Eastern Europe (2007) are given in Table. 1, (a value of 0 is the best result, while 48 worst result). Using the European Human Capital Index

methodology as a guide, the author's recommendations for better development and deployment of human capital are:

- ◆ Even if the school systems in given countries are at a good level, they must to improve the level of public investment in education and training, when they want to catch up Western Europe's living standard.
- ◆ All efforts must be concentrated to integrate all socio-demographic groups into in modern labour markets.
- ◆ Central and Eastern European countries have to build a global knowledge networks supporting universities, research institutes in the field of technology and research networks in Europe.

Poor demographic prospects and ageing society can't be ignored and query to reduce the negative impacts of demographic shifts.

4. Discussion

As economists have shown, wealth is the result of several things – natural, financial and human capital – and the productivity (or efficiency) with which these inputs are used, including innovation. Businesses need not only educated, but also creative, innovative, proactive and flexible employees. If employees do not meet these criteria, are in an era of globalization and high competition for business rather risk factor. (Klučka, 2011) While labour productivity is measured as output per hour worked, human capital productivity, or the efficiency and effectiveness with which active human capital is able to work comparing the consumption share of gross domestic product (GDP) to each amount of human capital invested. How we can measure a productivity of highly qualified employees? Measuring of that one may pose a greater challenge, because there is even such a lack an internationally agreed definition of a „highly qualified employees. Many different terms and definitions are used to in this case: qualified personnel, highly skills workers, brains, human resources in science and research, etc. What we exactly know, that human capital productivity can be influenced in two ways:

- ◆ Raising input efficiency: Improving education that provides more highly qualified and readily employable skills for the economy.
- ◆ Improving output efficiency: Increasing the quality of a country's institutional framework to allow factors of production, e.g. human or financial capital, to trade more efficiently within the economy.

According to research, increasing productivity of highly qualified employees has a synergistic effect and helps to increase the national multivariate productivity. Recommended indicators reflecting the efficiency of utilization of human capital than can be measured as:

- ◆ proportion of university graduates in the total workforce,
- ◆ proportion of professionals educated in the total workforce,
- ◆ proportion of the number of women in the total workforce,
- ◆ share of R & D employees in the total number of the workforce.

Analogously, indicators for unused human capital are e.g. the proportion of university-educated unemployed in total unemployment rates, professionally educated in the total number of unemployed, the proportion of unemployed women in the total number of unemployed, etc. These indicators tell us not only about qualifying and gender structure of the unemployed, but also on factors traceable troubled labour market. Negative consequences demands of a knowledge society in the workforce are in fact worsening interchange ability of employees in jobs that often result in unemployment and highly qualified staff

Another suggested measurement of productivity of highly qualified employees should be that one developed by the OECD (Canberra Manual, 1995), which provides methodologies for international comparisons of human resources in science and technology (related with persons whose have completed third-level education and are employed in scientific technical and professional occupations). By OECD "human resources devoted to science and technology (HRST) are defined as those who have successfully completed education at the tertiary level in an S&T field and/or those not formally qualified in this way but employed in an S&T occupation where such qualifications are normally required." The HRST statistics focus on two main aspects:

- ◆ *stocks*, about the characteristics of the current labour force involved in science and technology;
- ◆ *flows* showing the job-to-job mobility and the inflow from education into the science and technology labour force; particular attention is paid to scientists and engineers, who are often the innovators at the centre of technology-led development.

Then according to the International Standard Classification of Education (ISCED) tertiary- level education is defined:

- ◆ ISCED category 5: "education at the tertiary level, first stage, of the type that leads to an award not equivalent to a first university degree".
- ◆ ISCED category 6: "education at the tertiary level, first stage, of the type that leads to a first university degree or equivalent".
- ◆ ISCED category 7: "education at the tertiary level, second stage, of the type that leads to a postgraduate university degree or equivalent".

HRST statistic on Figure n.2 is shown the number of persons in 1000s. There were 92 million HRST in the EU in 2011 and 94 million HRST in 2012. Among these, about 72 million (73 million) were employed in an S&T occupation and 64 million (66 million) had a tertiary-level education.

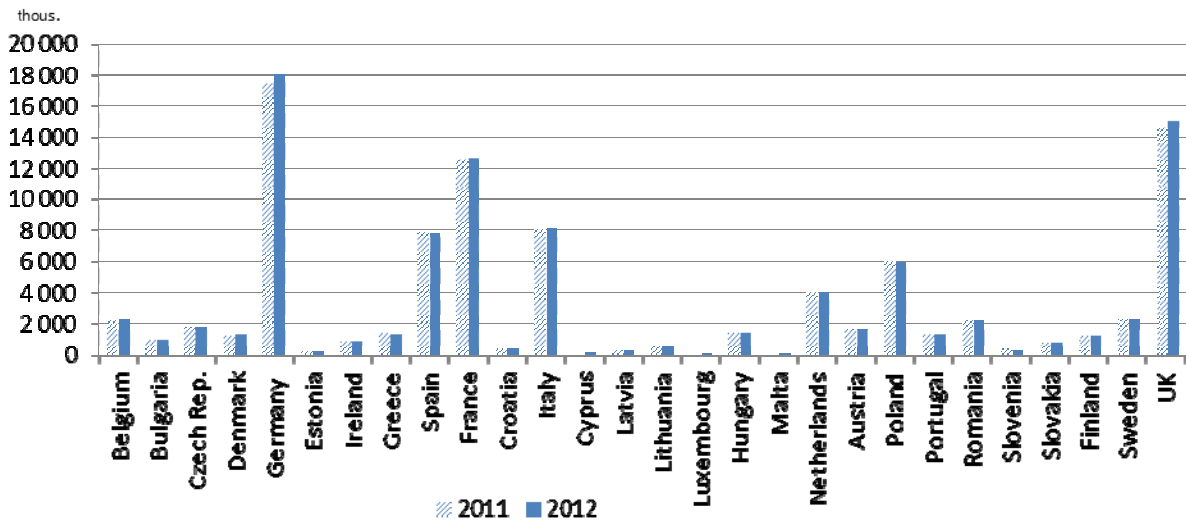


Figure 2. Annual data about HRST in EU (2011-2012)

Source: Eurostat (LFS)

Unemployment rates of HRST at 2013Q1 (Figure 3) are about half the unemployment rates of the overall labour force, although the levels are related to those of overall unemployment. Unemployment rates of HRST are below 3% in Austria, Germany and the Czech republic, while they are 16% or more and above the average EU level (6,5%) in Spain and Greece.

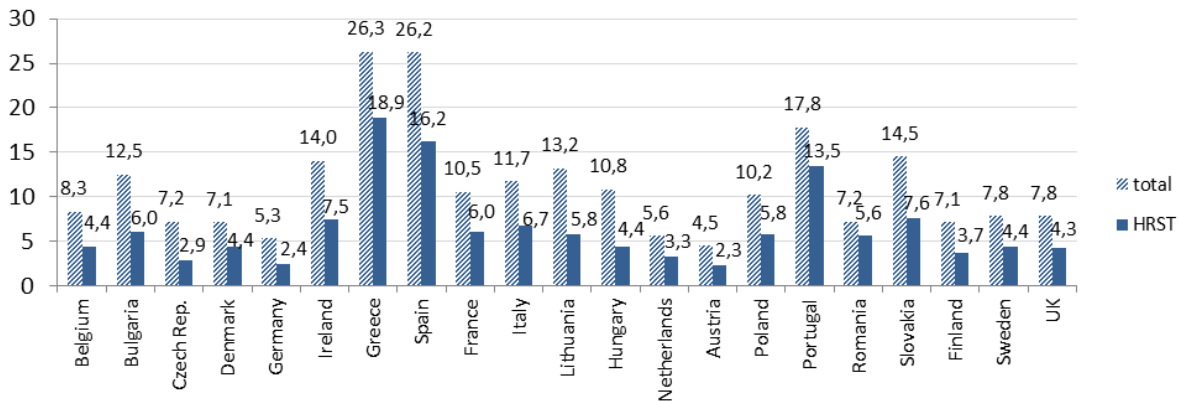


Figure 3. Unemployment rates of HRST as compared to overall unemployment rates 2013 (Q1)

Source: Eurostat (LFS)

5. Conclusion

„Reflecting the company's efforts to increase economic efficiency, profit is a very useful indicator for assessing economic activity, but not enough” (Virlanuta,2012). Increasing the efficiency of utilization of highly qualified employees from a macroeconomic perspective is the source of economic growth, national competitiveness and continuous quality improvement of living standards. It leads to greater competitiveness and produces a profit, which is "the fundamental motive of every business decision's criteria and can be the basis of economic interest of employees." (Đurišová - Jacková, 2007). While in the case of labour, land and capital we know several economic and statistical measurements of efficiency in the context of human capital there is no uniform methodology. This is mainly caused by the qualitative nature of this earliest production factor. This article provides possible approaches in this area. Given that a university degree is the highest degree of increase in the value of human capital, the suggested indicators are focus on highly qualified employees. While in some cases the measurement of the qualitative impact is difficult, it does not mean that this negligible. On the contrary, properly interpreted and applied indicators increase employment in the labour market as well as enhance the positive benefits of highly qualified employees for business and economics at whole.

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