

# **JOB REQUIREMENTS AND PROFESSIONAL COMPETENCIES OF GRADUATES FROM THE CZECH TECHNICAL UNIVERSITY IN PRAGUE AND THE MOSCOW STATE UNIVERSITY OF MECHANICAL ENGINEERING**

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## **Abstract**

Based on the authors' scientific cooperation, research results and teaching experience the goal of the paper is to analyse and compare job requirements and professional competencies of graduates from the Czech Technical University in Prague and the Moscow State University of Mechanical Engineering. According to many employers from the Czech Republic as well as from the Russian Federation, there is a serious shortage of skilled specialists in technical professions. Today, employers are looking for specialists with both secondary and higher education, but the problem is that the professional and personal qualities of graduates often do not meet the requirements of employers. From the perspective of the current job requirements and professional competencies of graduates, the authors' research results support the assumption that the system, principles and methods of technical higher education must be oriented on the development of students' theoretical, practical and social skills.

**Key words:** higher education, graduates, employment, labour market

**JEL Code:** I21, J21

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## **Introduction**

In connection with constant and radical changes in business conditions in the global information economy, educated people are seen as the most important source and the greatest wealth of any country or organization. And so, the effectiveness of higher education has been highlighted in most developed countries, focusing on the efficient formation and development of professional and personal skills of young specialists in various technical, economic and humanistic professions. In this context it can be argued that the higher the level of education in the society, the higher the standard of living in the society, but under the condition that the education meets the needs of the society. Through the effective higher education system,

young people are systematically prepared for a successful life and a professional career in the society. The effectiveness of higher education affects the employability and competitiveness of graduates in the labour market. Well educated and motivated young people determine the future prosperity and competitiveness of the society.

Based on the authors' scientific cooperation, research results and teaching experience the goal of the paper is to analyse and compare job requirements and professional competencies of graduates from the Czech Technical University in Prague and the Moscow State University of Mechanical Engineering.

The authors' analysis is based on the view of employers from the Czech Republic (e.g. Doležalová & Vojtěch, 2013) as well as from the Russian Federation (e.g. Rosstat, 2012) according to which there is a serious shortage of skilled specialists in technical professions in the labour market. Today, employers are looking for specialists with both secondary and higher education, but the problem is that the professional and personal qualities of graduates often do not meet the requirements of employers. Graduates have usually better theoretical knowledge than practical experience in the field of their interest (Stanciu & Banciu, 2012). Many graduates of various specializations often lack relevant professional skills and social habits (Cutillas, Monfort & Tortajada, 2011). Some graduates also have no real idea about their future career, but often require positions that do not match their abilities, just to get a job of their dreams, a job promising them high earnings and rapid career (Garcia-Ariscal & Van der Velden, 2008). This leads to the fact that employers usually hire experienced workers than graduates with no relevant experience and unreal expectations. This significantly increases unemployment among young people, which is a serious problem for the whole society and is associated with significant costs (Sirůček & Pavelka, 2013).

From the perspective of the current job requirements and professional competencies of graduates, the authors' research results support the assumption that the system, principles, and methods of technical higher education must be oriented on the development of students' theoretical, practical and social skills. In terms of common job requirements, suitable job applicants must demonstrate both the professional capacity to perform the job, as well as the development potential for professional growth and career advancement. The basis for the successful fulfilment of these requirements is quality education that serves as an important source of self-motivation for continuing professional development (Němečková, 2012).

## **1 System of higher education**

At present days, there are many different public and private universities in the Czech Republic as well as in the Russian Federation that offer applicants various humanities, economic and technical specializations. In accordance with the European system of higher education, the higher education system in the Czech Republic consists of three levels – Bachelor's (3–4 years), Master's (2–3 years) and Doctoral (3–5 years) degree programmes – and the same system is implemented in Russian universities to be comparable with the European system. Bachelor's degree programmes constitute the first level of higher education and successful graduates may enter the labour market or continue their studies in master's programmes in related fields. Master's degree programmes are intended to provide theoretical knowledge and develop skills for creative and scientific activities. Doctoral degree programmes are intended for graduates from Master's degree programmes and are focused on scientific and research activities. The authors' analysis is oriented on professional competencies of graduates from the Czech Technical University in Prague and the Moscow State University of Mechanical Engineering.

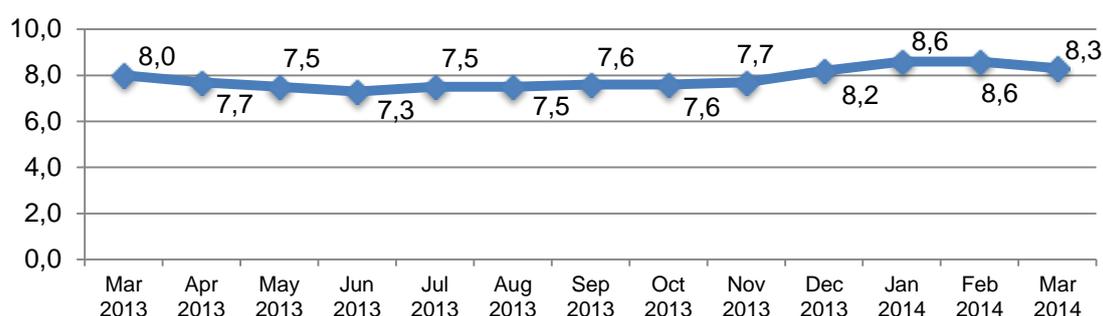
The Czech Technical University in Prague is one of the oldest, largest and best technical universities in the Czech Republic. The university was established in 1707 and currently provides different programmes for specialists (bachelors, engineers, doctors) of various technical and economic professions. At present, the university has about 22,000 students and offers different Bachelor's, Master's and Doctoral degree programmes in 8 faculties – Civil Engineering, Mechanical Engineering, Electrical Engineering, Nuclear Sciences and Physical Engineering, Architecture, Transportation Sciences, Biomedical Engineering and Information Technology.

The Moscow State University of Mechanical Engineering also has a long and interesting history, which begins with the foundation of a small vocational school in Moscow in 1865. At present, the university has more than 16,000 students and consists of 6 institutes – Automotive, Technological, Environmental and Chemical Engineering, Economics and Management, Additional Education, International – and 7 faculties – Automobile and Tractor Engineering, Power Machine and Instrument Engineering, Automation, Mechanical Engineering Technology, Chemical process equipment, Ecology, Cybernetics and information technologies. The university is the largest institution of higher education which prepares qualified specialists for various branches of engineering.

## 2 Situation in the labour market

In the Czech Republic, based on the date from the Ministry of Labour and Social Affairs of the Czech Republic (MPSV, 2014), the Fig. 1 shows the share of unemployed persons (the ratio of available job seekers aged 15 to 64 years in the population of the same age) from March 2013 to March 2014. By March 2014 job offices registered altogether 608,315 job seekers and 40,808 vacant jobs.

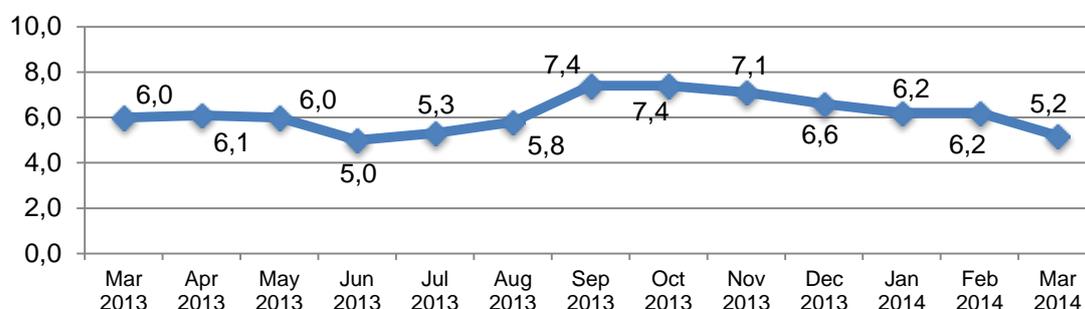
**Fig. 1: The share of unemployed persons in the Czech Republic (%)**



Source: Authors based on the data from the Ministry of Labour and Social Affairs of the Czech Republic (MPSV, 2014)

The Fig. 2 shows the share of school leavers with all levels of education and juveniles in the total unemployment, in both cases from March 2013 to March 2014. By March 2014, the number of school leavers with all levels of education and juveniles was 31,434. In general, among the unemployed are mainly unskilled workers, young people aged 20 to 29 years and people older than 50 years.

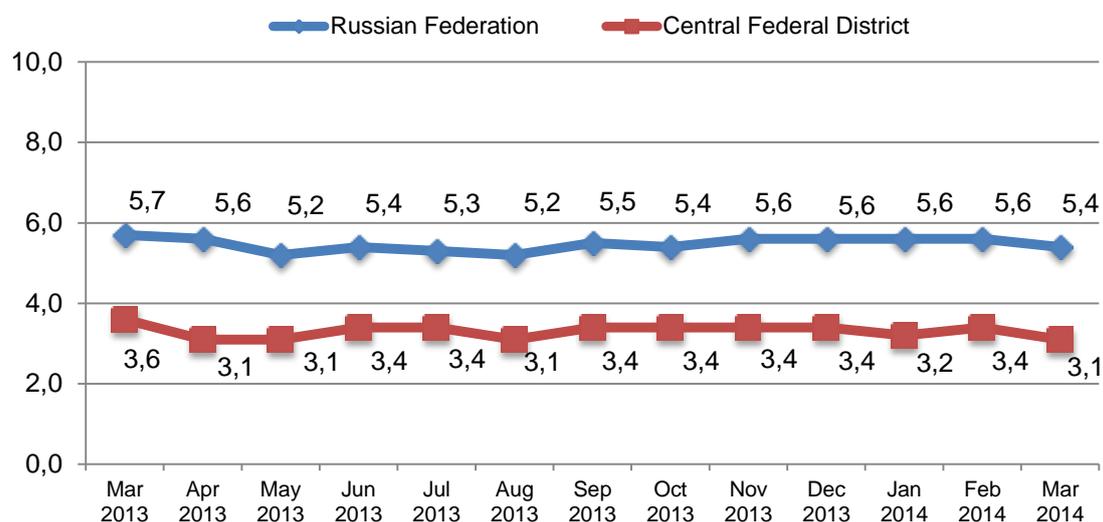
**Fig. 2: The share of school leavers with all levels of education and juveniles in the total unemployment in the Czech Republic (%)**



Source: Authors based on the data from the Ministry of Labour and Social Affairs of the Czech Republic (MPSV, 2014)

In the Russian Federation, based on the data from the Russian Federal State Statistics Service (Rosstat, 2014), the Fig. 3 shows the unemployment rate (the ratio of the unemployed to the economically active population aged 15 to 72 years) from March 2013 to March 2014 both in the Russian Federation and the Central Federal District, where the average number of the economically active population aged 15 to 72 years in the first quarter of 2014 was 21.0 million people (of which was 20.3 million employed and 0.7 million unemployed).

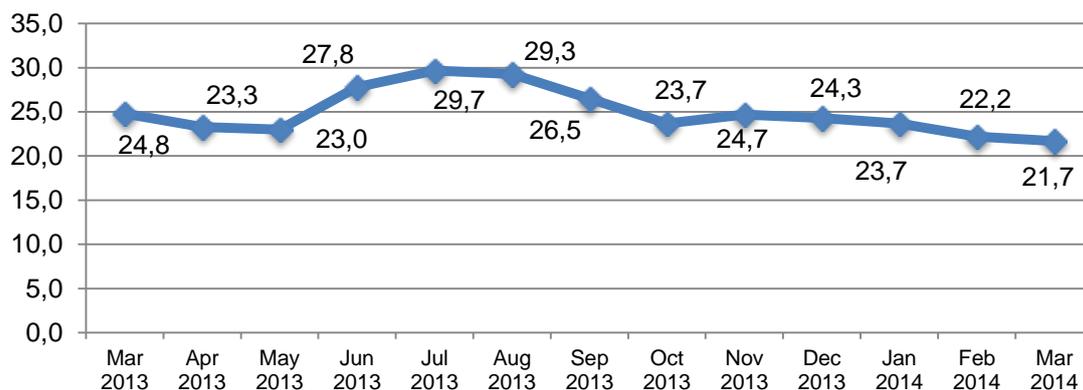
**Fig. 3: The unemployment rate in the Russian Federation and the Central Federal District (%)**



Source: Authors based on the data from the Russian Federal State Statistics Service (Rosstat, 2014)

In March 2014, the number of the economically active population aged 15 to 72 years (employed plus unemployed) in the Russian Federation was 75.1 million people, which is more than 52.0 % of the total population and 4.0 million people were unemployed. The average age of the unemployed was 36.6 years. The Fig. 4 shows the unemployment rate of young people less than 25 years of age from March 2013 to March 2014. In March 2014, the unemployment rate of young people less than 25 years of age was 21.7%, including 3.7 % young people aged 15 to 19 years and 18.0 % young people aged 20 to 24 years.

**Fig. 4: The unemployment rate of young people less than 25 years of age in the Russian Federation (%)**



Source: Authors based on the data from the Russian Federal State Statistics Service (Rosstat, 2014)

### 3 Employment of graduates

According to many employers from the Czech Republic (e.g. Doležalová & Vojtěch, 2013) as well as from the Russian Federation (e.g. Rosstat, 2012), there is a serious shortage of skilled specialists in technical professions. At present days, employers are looking for specialists with both secondary education (e.g. lathe operators, welders, electricians, programmers, etc.) and higher education (e.g. specialists in transport and logistics, mechanical engineers, civil engineers, electrical engineers, etc.). In this situation, it seems that graduates from the Czech Technical University in Prague as well as from the Moscow State University of Mechanical Engineering have a great chance to easily find a good job and the unemployment rate is very low, less than 1 %. However, most of them meet the same problem in the labour market. The problem is that employers usually hire experienced workers than graduates without practice.

The professional and personal qualities of graduates often do not meet the requirements of employers. In terms of common job requirements, suitable job applicants must demonstrate both the professional capacity to perform the job, as well as the development potential for professional growth and career advancement. According to many employers, most of today's graduates do not meet the requirements for professional skills and experience, as well as social behaviour and professional motivation.

Coming to work, most of today's graduates do not have any real idea about their profession. They often do not know the main duties or primary responsibilities of the work. Even if they worked during their studies, they usually have no understanding of how

to perform daily work tasks and how to solve real professional problems. They do not know how to use their theoretical knowledge in practice. They also do not have the teamwork skills. They lack the ability to collaborate and communicate with colleagues, managers and clients. They are not able to analyse the available information, identify key issues, express their views and discuss alternative solutions.

According to the results of sociological surveys of graduates from the Czech Technical University in Prague (Šafránková, 2003, 2005, 2009, 2010, 2011), the most important skills necessary for successful employment are problem-solving skills, the ability to learn new knowledge, communication and teamwork skills. In terms of professional qualification, on the one hand, graduates appreciate general knowledge in the field of their interest. On the other hand, they feel the lack of relevant practical experience. According to the graduates, they had to improve their knowledge of foreign languages, their computer skills or their knowledge in the field of economics, management, marketing, informatics or law.

### 3.1 The view of graduates

The common problems that graduates meet during a job search include: *salary level* (graduates' expectations are usually higher than the real wage that an employer can offer to a newcomer with the lack of relevant work experience); *professional skills* (following the previous problem, of course graduates lack relevant professional skills, even if they worked during their studies, but every employer has specific requirements); *starting position* (graduates do not want to start from scratch, overestimate themselves and require a position that does not match their abilities); *hard working* (graduates do not have needed work attitude and are not ready for the hard work at the beginning of their career).

With the respect to the comparison of the results of researches, it can be said that in spite of the fact that the monitored groups of the graduates (1985–2011) differ with regard to practice and experience, their evaluation of teaching is remarkably similar. They are satisfied above all with their theoretical knowledge (Šafránková, 2003, 2005, 2009, 2010, 2011).

Most of the graduates appreciate acquired ability of “technical thought” (85 %) and more than three quarters of them appreciate their theoretical preparedness. In addition, they appreciate ability to orientate themselves in their line (75 %), ability to analyse and work systematically (83 %), special knowledge in the line (55 %) and ability to work on PC and apply software programmes (64 %; nevertheless, there are evident differences among

the graduates with the respect to the year of graduation). On the contrary, the graduates find insufficiencies in their ability of self-presentation (34 %), ability to communicate with people (18%), ability to manage and organise (15 %) and the knowledge of foreign languages (20 %). With the respect to the evaluation of knowledge acquired at school, the opinions of the graduates from 1985 to 2010 do not differ.

### **3.2 The view of employers**

The common problems that employers meet during graduates hiring follow the above mentioned problems of graduates and include: *professional experience* (employers prefer hiring experienced workers to inexperienced graduates); *particular specialization* (graduates normally do not have the required professional specialization and it always means additional expenses for training of graduates); *professional orientation* (graduates usually have no idea about their future career, but they often prefer to work in big international companies, such as banks or consultancy companies, and they less tend to work in industry); *work and social habits* (graduates lack required work attitude and teamwork skills); *uncertain investment* (employers invest in training of graduates who, however, use different opportunities and often change jobs).

### **3.3 The view of universities**

It follows that in the current business environment, with regard to the specific requirements of employers the technical higher education must be directed to the development of both professional and personal qualities of students, who must gain the relevant theoretical knowledge, practical skills and social habits.

In this context, the main problems that universities meet include: *relationships with employers* (in general, universities search for partner companies, however, only some universities are actually ready to effective cooperation and appropriate relationships with suitable employers are very rare); *educational programs* (educational programs are not flexible enough to reflect permanent changes in various fields and meet the changing requirements of employers and the needs of the labour market); *academic staff* (many academics who teach at universities lack real practical experience, cannot apply their theoretical knowledge through practical examples and therefore the educational process lacks real authority).

Therefore, in the educational process, it is important to efficiently and effectively apply modern interactive teaching methods (discussions, simulations, demonstrations, case studies, role plays) that develop the ability to analyse, discuss, argue, communicate and collaborate. In this connection, it is necessary to improve presentation, communication and practical skills of teachers. At the same time it is needed to establish and maintain effective relationships with suitable employers to get to know their requirements as well as the needs of the labour market. It is a good idea to create educational programs in collaboration with key employers.

## Conclusion

At present, there are many different public and private universities in the Czech Republic as well as in the Russian Federation that provide different programmes for specialists (bachelors, engineers, doctors) of various technical, economic and humanities professions. A serious problem is that the professional and personal qualities of graduates often do not meet the requirements of employers.

Many graduates of various specializations often lack relevant professional skills and social habits. They have general knowledge in the field of their interest, but they do not know how to use their knowledge in practice. They usually have no understanding of how to perform daily work tasks and how to solve real professional problems.

With regard to the specific requirements of employers, the technical higher education must be directed to the development of relevant theoretical knowledge, practical skills and social habits of students. Academics have to learn how to efficiently and effectively apply modern interactive teaching methods and educational programs must be created in collaboration with suitable employers. These issues open up new possibilities for further research in the field of technical higher education.

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