

COMPARISON OF EMPLOYEE STRUCTURE IN EU METALLURGICAL COMPANIES

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Abstract

The iron and steel industry plays an important role as a supplier to many other industries on an international scale. Given the strong dependence of economies on its products, maintaining its sustainability is essential. In addition to material and energy inputs, which are the biggest problem for companies in view of the conflict in Ukraine and sanctions against Russia, it is a long-term problem for companies not only to obtain qualified and already unskilled human resources from the metallurgical sector. Therefore, in recent years, there has been a more intensive replacement of people by technology and a related change in the optimal structure of employees. The article presents a comparison of statistics on the structure of employees in metallurgical companies from EU countries.

Keywords: Employee structure, metallurgical industry, Czech Republic, Slovakia, Poland, Germany

1. INTRODUCTION

The history of industrial steel production in Europe dates back as early as the 19th century in some European countries, such as the United Kingdom and Germany. Like many other regions, crude steel production was closely linked to the production of coal. One of Europe's largest producers of steel, Italy, was a world pioneer in the development of electric furnaces in the 20th century [1].

Nowadays the Russian invasion of Ukraine is a major humanitarian crisis affecting millions of people and a severe economic shock of uncertain duration and magnitude. Supplies of Ukrainian iron ore fell by 30 to 40%. Prior to the conflict, the global recovery from the pandemic was expected to continue in 2022 and 2023, helped by continued progress with global vaccination efforts, supportive macroeconomic policies in the major economies and favorable financial conditions [2].

In the European Union the steel industry was employing over 326,400 people Union in 2020, with Germany boasting the largest workforce at over 83,200 employees. This was over double the steel industry employment of Italy, which was second in the ranking. Poland had 24,000 employees in 2020. The Czech Republic employed 17,000 employees in 2020 and Slovakia 10,300 employees in the same year. Generally, in EU the number of employees went down from 2011 until 2020. In 2011 the number of employees was 365,610 and in 2020 was reduced for 10.7 % to number of employees 326,462. [3].

Germany was also the leading exporter of semi-finished and finished steel products in the EU over the past decade, with exports volumes reaching around 24 million metric tons. Turkey, with its important automotive manufacturing sector, was the leading importer of European steel in 2020. Hot rolled wide strip and hot dipped steel products were the most popular in the industry, each averaging outputs of 263,000 and 254,000 metric tons per month [1].

2. THE QUALIFICATION LEVEL IN THE CZECH AND SLOVAK METALLURGICAL COMPANIES

Since the second half of the 19th century, the Czech lands have been one of the most economically advanced regions in Europe. A large part of the development of the area of the Czech Republic was due to sufficient sources of mineral resources. The high concentration of mining and heavy industry activities in several localities resulted in changes in the orientation of the economy and restructuring (after 1989) therefore having a more significant impact on these regions.

According to the information of the National Institute for Education, the number of employed workers in the extraction and processing of raw materials and in metallurgy has been dramatically decreasing since 1991, when the total number of employees fell from 181 thousand to a total of 46 thousand by 2014. The decline in employed people continued in the following period, but it was already more continuous and not so dramatic. Significant changes have also taken place in the educational structure of workers of this class. Nowadays, there work just a part of workers with primary education [4].

Statistics of the education of employees of the Czech company Vítkovice Heavy Machinery a.s. confirm these changes between 2008 and 2019. The exact structure of the employees' education in selected years is displayed in **Table 1**.

Table 1 Education structure in Vitkovice Heavy Machinery [5,6,7]

| Education level | Year (in %) | | |
|--|-------------|-------|-------|
| | 2008 | 2014 | 2019 |
| Primary education | 12.10 | 9 | 8 |
| Secondary education with an apprenticeship certificate | 52.50 | 49.50 | 49.80 |
| Secondary vocational education with GCSE | 26.10 | 29.50 | 30.10 |
| Higher education | 9.30 | 12 | 12.10 |

An important change is also the total number of employees of the enterprise and its development in the monitored period. In 2008, the total number of employees was 2,008 employees, in 2014 there was a decrease to a total of 1,279 employees, and at the end of 2019, the number of employees was only 889 people.

For two decades, the company has been gradually introducing a range of activities to improve the situation with a gradual reduction in the number of workers, mainly blue-collar professions. One of the main focuses of the company is cooperation with technically oriented schools (for example Vitkovice secondary school, VŠB – Technical University of Ostrava and others) [5].

Production and metal processing is one of the most important segment also in the Slovak economy. It is very significant for an employment in Slovak and even makes the higher percentage of industrial production. This production ensures main product for other processing, especially for an engineering, where inputs are mainly made from metal. Engineering makes products, which are intermediates of next metal processing like a metal construction or automotive industry. Automotive is next to the steel processing one of the important segment too and belong among the biggest export of Slovak. Metal production and processing apply a result of research and development in practice, help regional development beginning with education, healthcare, culture and sport.

Generally, metallurgy in Slovak and other countries of European Union, face to strict ecological rules come from regulation of European Commission, which make for producers, higher investment and operating costs. Due to countries in European Union have competitive disadvantage comparing with countries, which do not need to follow European Union's rules. These rules are connected with emission, amount and quality of waste gas, quality of wastewater and also quality of work place in metallurgy production [8].

In the actual situation supplies issue of iron ore are the most problematic. Russia is the eighth largest producer of iron ore in the world and many Slovak companies relied on it with supplies before the sanctions were implemented. Recently, imports from Ukraine were halted as well. Ukraine is another key supplier for Slovak metallurgists and many metallurgical products from the country are used by Slovak engineering and construction companies [9].

The strict restriction and tax burden cause high cost production and it leads to changes in number of workers, but in the qualification area there are not such obvious changes. The actual conflict in Ukraine could also make it worse.

In the **Table 2** is visible the structure of workers in U.S.Steel Košice. The Košice region also has the higher percentage of workers in metallurgy, which is 5.23 %.

Table 2 Education level in U. S. Steel Košice [10]

| Education level | Year (in %) | | |
|---|-------------|------|------|
| | 2008 | 2014 | 2019 |
| Primary education | 3 | 2 | 1 |
| Secondary education with an apprenticeship certificate and GCSE | 81 | 79 | 81 |
| Higher education | 16 | 19 | 18 |

In the **Table 2** is obvious almost same percentage of particular education level. The higher number of workers are with secondary education, because the employees with this type of education have their application in production and it is the most important part of metallurgy. Majority of workers studied technical secondary school like mechanic or machine operator and other the most required are engineering education, secondary school or college [11].

As was written, only number of workers are changing. For year 2009 it was up 13,000, in the year 2014 it was 10 309 and 10,478 employees have worked in the company in year 2019. The highest decrease was between years 2009 and 2014. In this period, there were probably the biggest changes in economy and then also metallurgical production became economically disadvantageous. That fact has led to further release of their workers.

Nevertheless, there was not only the economic reason for the human resource decrease. Also an attraction of sector was declining, especially for young people and thanks to that there has been a lack skilled workforce. There could be a way out of the bad situation for example in a stronger governmental support of related educational programs, and also some motivation incentives both financial and non-financial ones. Even lifelong learning can help, especially related with technological and ecological changes in the industry evolving more options of education via internet [12].

3. EMPLOYEE STRUCTURE IN POLISH AND GERMAN METALLURGICAL COMPANIES

After year 1989 many non – profit and obsolete mines were demolished. It brought about decline in black coal mining and its export was not profitable. Import from Russia, Ukraine and even from India was cheaper than a purchase from local mines. So it was necessary to reduce a mining and restructure working mines [13].

In the surroundings of mines, people were moving out, smelter were closing and it leads to increase of unemployment. It has become necessary to change education system as well as labor training and development. Nowadays education for the metallurgy profession requires different qualities than in the past because of changes in the education level of the society, employees' exact career growth and active company policy due to a decreased number of people with primary education. In 2019, there were just 3% of people with primary education, the percentage of people with professional education in metallurgy was 29%. In year

2015, there was a decrease in these numbers of 2 and 6 percentage points. To work as a miner, it is necessary to get an appropriate education such as a technical school, vocational school or a professional course. The study period is finished by an examination after which candidates will get a degree of a miner technic. Then, a growth in career or further development is possible. A miner technic can continue in metallurgical studies and get a master degree [14].

In 2010, 1.84 million people studied in Poland and 1,853 (0.1%) from this amount were in metallurgy segment. In the academic year 2009/2010, only 468 students of metallurgy from the total amount of 478,000 finished their studies.

Companies in Poland support their employees by different types of education. For example, in 2019 the company ArcelorMittal Poland (AM Poland) opened a modern center for employee training in their branch in Dabrovia Gornicza. This center can be used by every worker of the company, that means by about 14 thousand persons. AM Poland have developed their own education program for employees, it is called "Akademia Mendeżera ArcelorMittal Poland" where around 1,200 employees have participated in. The second program is called ZainSTALuj się and can be visited also by other people, not only by employees. It should be primarily used by students. The number of participating students is 5,000 and 1,350 began work in that company after finishing school in 2010. In 2015, AM Poland offered opportunity of education like courses of soft skills, which were visited by 700 employees, language courses and World Class Manufacturing, where 446 employees participated.

Overall, the steel industry in Germany represents the most important economic sector in this country. Germany has the highest number of employees in leading steel industries in the whole European Union. The steel industry is a part of a network that is crucial for the international competitiveness of the German economy [15].

Since 2010, steel production in Germany has dropped by around 10% (approx. 4 million tonnes) from 43.8 million tonnes to 39.7 million tonnes. The workforce has declined by around 4,000 to 86,000 to 2019 year. This has led to certain adjustment measures, with further measures planned or in preparation. A continuation and acceleration of this development could sooner or later endanger the survival of this important industrial sector [16].

In Germany, the information on the number of employees and the wage bill is widely available in surveys of firms conducted by the statistical offices all over the world. More detailed information on the qualification of the workforce (like the share of employees with a certain level of education attained or vocational training concluded), however, is only rarely available at the firm level in this type of data. The data from companies has no information on the share of employees with a university degree or the share of employees that successfully passed the exams following apprenticeship. However, statistics from companies, which agreed to share their data external, shows, that in German enterprises the level of highly qualified employees is 6.42% (including the number of employees with a polytech or university degrees) and medium qualified employees is 61.72% (which includes the number of employees with either the high-school diploma or with vocational training) [17].

German companies support students from local schools and educational institutions. In practice, this works by the company reaching out to students with an offer of financial support for their education (successful competition of school, university and courses), thereby offering educational activities which would help employees in their work in the future. In such cases, an employment contract may be concluded with the requirement to complete certain courses of study at an educational institution [18].

4. COMPARISON AND RESULTS

Historically, the Czech Republic and Slovakia had common metallurgical development. In these countries, we can see a similar trend in employee education level changes. In the last years, there was decreasing in the

number of employees with primary education level and on the other hand the increase of high education level (from 2008 to 2019 years). It was caused by the higher number of people who wanted to reach more technician skills and knowledge. People also wanted to be more successful in labor market and self-development. Changes were also caused by closer cooperation between an educational institution and metallurgy enterprises at the last years.

Most of the employees have a secondary education level, which is connected with the requirements of manual work. In the last years, we see the changes in the education level, more workers become higher educated because technologies are more automatized, workers have to handle more technical skills. That is why, companies have to focus on the education of managers' skills, soft and language skills and sharing of work skills between employees inside the company. Even they should support students by internships and practice. For work in metallurgy sector, countries which are discussed in the article, required similar skills, qualifications and education.

The decrease in the number of employees in discussed countries was also caused by a reduction in sales and production, mainly liquidation of older technologies, which is connected with global automatization. This fact is obvious even in other industrial sectors and then is necessary to promote employees to get higher qualifications related to new technologies and processes. Each country in the world is experiencing similar problems, and all of them are subsequently applying their own support and training programs to create more favorable and attractive conditions for work in this field. Companies should focus on the skills and qualification development of their workers through professional courses and other learning activities, which also can motivate employees to be more engaged in the company. Managers have the main role in employee's satisfaction, that is why people on these positions should support and help employees in their self and profession life. If employees felt satisfied and they are in good relations with their managers, their work will be more attractive and fluctuation level will decrease inside of company.

In Germany, companies typically pay for high education programs or qualification courses for secondary school students. In this way, they prepare workers, who will have the skills, required for their future position. While in the Czech Republic and Slovakia this trend is not that common because of lower financial support from the government and each company to these activities. The government should also increase its financial investment in vocational education, encourage students to receive vocational education, provide subsidies for school-enterprise joint education, subsidize skilled labor to improve workers' skills independently, and increase and promote the training of skilled mentors and highly-skilled talent. Enterprises should draft plans for incentives in career development and salary to motivate technical personnel.

Because Ukraine and Russia are one of the most important importers of iron materials to the EU, there could be a problem with production, which can affect other sectors in the EU (for example automotive). Looking for alternative suppliers is not easy as Brazil, Australia, and South Africa have the closest suitable mines for EU metallurgy enterprises. It can cause not only lower production, but also dismissal of employees with lacking qualifications. This all leads to higher unemployment, then people will need to being requalified.

5. CONCLUSION

The paper contains the statistical information about employee development in selected countries, their activities and changes in labor market. Companies should support the employee's education and motivate them to get higher qualifications. Younger generations are more focused on working in administration with computers. This situation is also evident beyond the selected countries. Each country in the world is experiencing similar problems, and all are subsequently applying their own support and training programs to create more favorable and attractive conditions for work in this field.

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