

## COMPARISON OF ENTERPRISES EXTRACTING BUILDING MATERIALS IN THE CZECH REPUBLIC

*Michal VANĚK, Igor ČERNÝ, Jakub PITŘÍK, Tomáš KUBICA*  
*VŠB–TUO, Faculty of Mining and Geology, Department of Economics and Control Systems, Ostrava,*  
*Czech Republic*  
*E-mail: [michal.vanek@vsb.cz](mailto:michal.vanek@vsb.cz)*

### ABSTRACT

The article deals with the comparison of mining companies extracting building materials in the Czech Republic. First, the legal form of all companies operating in the selected raw material segment is analysed. Subsequently, the actual comparison of the enterprises is carried out, which includes the most important enterprises of the different raw material groups (brick raw material, dimension stone, building stone, gravel, and sand). Selected companies are compared in the period 2011–2018 using six indicators: ROA, inventory turnover, total debt, immediate liquidity, DHM productivity, net working capital turnover time. The weighted sum method is used for self-evaluation. Indicator weights are determined using the Fuller triangle. The comparison shows that the following companies are the best in the raw material groups: (i) Heluz s.r.o. (Ltd.) (brick clays), (ii) Granit Lipnice s.r.o. (Ltd.) (dimension stone), (iii) EUROVIA Kamenolomy, a.s. (Plc.) (building stone), (iv) Českomoravský štěrk, a.s. (Plc.) (gravel and sand). When comparing the companies in the whole building material segment, EUROVIA Kamenolomy, a.s. (Plc.) is the best company, followed by Kamenolomy ČR, s. r. o. (Ltd.) and KÁMEN Zbraslav (Plc.). The analysis also found that 54.24 % of mining companies in the Czech Republic use the legal form of s.r.o. (Ltd.) and 26.69 % are public or private limited companies – a.s. (Plc.). It was also found that the mining company with the highest production volume was not in first place in the group based on the comparisons made.

**Keywords:** Building materials; Comparison; Mining company; Ratio indicators.

## 1 INTRODUCTION

The economic development of each state is closely linked to the resources at its disposal. Mineral resources are also an important source. Economic geology, which focuses on mineral deposits, classifies mineral resources into ores, non-metallic minerals and energy raw materials [1]. The current exploitation of deposits in the Czech Republic focuses exclusively on minerals and energy raw materials. The data of the Czech Geological Survey [2] show that in 2017 energy raw materials accounted for 22.52 % of the total revenues of the branch. The non-metallic minerals then occupy a portion of 77.48 %. Non-metallic minerals represent a very heterogeneous group of mineral resources with variable genesis, use, but also economic importance in individual industries [3].

The most important group of non - ores are building materials, which include building stone, gravel and sand, brick clays and dimension stone. Building blocks consist of all solid igneous, sedimentary and metamorphic rocks as long as their technological properties correspond to the conditions specified by the intended use. It must have certain physically-mechanical properties resulting from genesis, mineralogical composition, structure, texture, secondary transformations and other characteristics. Gravel often consists of gravel and sand and is one of the more important raw materials of the building materials industry. They are unpaved sediments, created by drift and sedimentation of more or less worked fragments (gravel e.g. 2–128 mm, sands 0.063–2 mm) by ventilation of the disintegrated rocks. Brick raw materials are all types of raw materials suitable individually or mixed for brick production. The most commonly used types of rocks: loess, loess and slope clays, clays and claystone, marl, slate weather. Raw materials classified into the category of dimension stone are all types of rocks of igneous,

sedimentary and metamorphic origin, which are block-conquerable and their properties are suitable either for rough stone production (curbs, cobblestones, building blocks) or noble production (stonework, stone sculpture and special works).

The importance of building materials is given by many factors. Building materials are inputs into the construction industry, which directly or indirectly contributes to meeting our needs. Although the value of construction materials is low compared to other industrial minerals and / or minerals, the share of sales of construction materials in total revenues of the branch is about 30 %. Furthermore, data from [2] show that the biggest contribution to this result was the sale of building stone (16.45 %) and the dimension stone (1.19 %) contributed the least. Overall, the Czech Republic has extraordinarily large reserves of building materials, as it is clear from the statistics of the Czech Geological Survey [2], since in 2017 the total building stone reserves in the Czech Republic amounted to CZK 3,453,904,000 m<sup>3</sup>, gravel sand 4,203,545,000 m<sup>3</sup>, brick clays 1,224,461,000 m<sup>3</sup> and dimension stone 215,124,000 m<sup>3</sup>.

Supply chains ending at the customer have their origin in the raw material link [4]. Essentially, these chains begin with mining companies that extract mineral resources for the industrial user or end consumer. After their adjustment and eventual refinement, they become inputs into various production processes, at the end of which the diverse needs of man are satisfied. Extraction and processing of minerals are related to a number of industrial hazards and embody many specificities. Companies in the mining industry face many forms of operational risks, such as government policies, environmental incidents, survival circumstances and market threats [5]. Although the exploitation of minerals is a specific sector, mining companies operate on the market seeking profit, increasing market share, gaining and maintaining competitiveness. From this point of view, mining companies are quite standard companies in which standard management operates.

Many authors [6-8] understand the decision making as the core of management. Quality decisions are influenced, among other things, by the quality information available to managers. Numerous analyses and studies are the sources of this information. Comparison of enterprises is inseparably one of them. The performance of a company during a stated period of time is usually reflected by various financial ratios summarized from its financial statements; such as the balance sheet, the income statement and the trading account. These ratios provide useful information to the stakeholders of the company and reflect the company's performance from various perspectives [9].

Benchmarking has long been popular and developed into many types [10]. The issue of benchmarking and comparative analyses has long been addressed by one of the authors. The article builds on previous works [11-13], but focuses on the comparison of mining companies operating in the segment of building materials in the Czech Republic. The reason why the authors focused on this issue is because they had not come across any works focused on building materials in such a wide range to answer the questions and hypotheses formulated below.

Many questions can be asked, but the following research questions emerged from the authors' discussion:

- Are joint-stock companies more successful than other legal forms of companies?
- Is the economic success of the mining company undertaking directly related to the size of the production?
- Do economically successful mining companies focus on one or more raw materials?

This study was also based on the following hypotheses:

- Owners of mining companies extracting building materials prefer the legal form of a limited liability company. More than 60 % of companies have legal form Ltd.
- The enterprises with the highest production volume in a given segment of building materials achieve the best results (maximum rating).

The article aims to compare important mining companies extracting building materials using selected indicators. The comparison will be carried out from the point of view of the different groups of building materials and for the whole raw material segment.

## 2 METHODS AND DATA

The comparison of mining companies extracting building materials was performed on the basis of benchmarking. That means the first and second stages of the Xerox corp. benchmarking process were used [14]. In the first stage, the following activities are carried out: (i) Benchmarking object identification, (ii) Benchmarking partners' identification, (iii) Data collection method selection, (iv) Data collection. The second stage is devoted to the analysis, and in our article only one activity is used, i.e. data evaluation.

The comparison of mining companies focused on two main areas, namely the legal form and the economic results, for which the following financial ratios were used: (X1) Profitability indicators - ROA; (X2) Activity indicators – inventory turnover ratio; (X3) Debt indicators – total debt; (X4) Liquidity ratios – cash ratio; (X5) Operating indicators – tangible assets productivity; (X6) Financial fund and cash flow indicators – turnover time of net working capital.

Brigham [15] defines financial ratios as to be designed to extract significant data that need not be that clear from mere reading the financial reports. However, it is also important to mention some limitations of ratios, such as Lee [16]: (1) financial ratios are mainly based on accounting numbers disclosed in corporate financial reports; these numbers include the flexibility and subjectivity of accounting norms; (2) financial ratios are essentially used in a comparative context over time and between the companies although consistency under nowadays accounting regulations is ambiguous.

Despite the limitations, financial ratios are the most reliable source of information for external investors. Brealey [17] suggests that financial ratios are “no substitute for a crystal ball”, thus being a useful design how high amounts of financial data may be summarized and company performance contrasted.

Below we present a series of relations to calculate the selected indicators, including the vital inputs for the calculations.

$$ROA = \frac{EBIT}{assets} * 100 [\%] \quad (1)$$

$$Inventory\ turnover\ ratio = \frac{annual\ sales}{inventory} \quad (2)$$

$$Debt\ ratio = \frac{foreign\ capital}{assets} * 100 [\%] \quad (3)$$

$$Cash\ ratio = \frac{cash}{immediately\ payable\ liabilities} \quad (4)$$

$$Tangible\ assets\ productivity = \frac{annual\ sales}{tangible\ assets} \quad (5)$$

$$Turnover\ time\ of\ net\ working\ capital = \frac{net\ working\ capital * 365}{annual\ sales} \quad (6)$$

The indicators were selected based on the discussion among the authors of this article. We explain the choice of the indicators as follows. Profitability belongs among the most important proportional indicators as it expresses the capacity of assets to produce profit. Out of all the profitability indicators, ROA is the most important as it appraises total assets in a complex manner no matter what the effect of their source of financing is. Inventory turnover ratio is an indicator of the overall company activity. As inventories hold capital and they are the least liquid current assets, it is important to pay the inventories a due attention.

The indicator of Debt Ratio was selected as it provides information on company's long-term financial stability. The Cash Ratio measures the capacity of a company to pay due debts, and thus it is another important benchmark. Tangible assets represent a substantial part of fixed costs in the form of depreciation. As such, the Tangible Assets Productivity expresses the level of their use. Turnover time of net working capital expresses a company's capacity to work effectively with available means.

The comparison of mining companies in terms of legal form included all the enterprises listed in the publication [2] from 2017<sup>1</sup>. However, if a mining company mines several raw materials, it is listed only once. Comparison based on financial analysis indicators was performed only for comparable companies. An overview of the mining companies included in the comparison with their basic data is then given in Table 1.

*Table 1. Overview of selected mining enterprises in m<sup>3</sup>*

Mining company	Mining 2011	Mining 2012	Mining 2013	Mining 2014	Mining 2015	Mining 2016	Mining 2017	Mining 2011-2017
Granit Lipnice s. r. o. (Ltd.) [1 raw material]	24 427	20 383	21 220	13 040	11 184	10 521	9 651	100 775
Herlín s.r.o. (Ltd.) [1 raw material]	21 071	20 457	23 132	23 726	21 979	37 953	41 467	189 785
Pižeňská žula a.s. (Plc.) [1 raw material]	9 717	9 707	10 582	11 128	9 935	9 724	9 759	70 522
Průmysl kamene, a.s. (Plc.) [1 raw material]	9 390	7 768	9 306	16 319	13 952	30 020	25 301	112 056
Cemex Sand, k. s. [2 raw materials]	1 155 708	1 216 360	1 181 110	1 184 667	1 557 900	4 626 670	2 014 100	12 957 515
České štěrkopísky, Inc. [1 raw material]	617 360	667 893	718 894	943 749	1 810 000	2 55 000	1 548 818	2 947 896
Českomoravský štěrk, a.s. (Plc.) [2 raw materials]	3 527 981	3 305 220	3 090 818	3 361 937	3 631 924	3 250 292	3 378 876	20 168 172
KÁMEN ZBRASLAV, a.s. (Plc.) [2 raw materials]	1 375 857	1 151 000	1 395 000	1 416 623	1 672 933	1 772 627	1 647 521	8 784 040
EUROVIA Kamenolomy, a.s. (Plc.) [2 raw materials]	2 135 000	1 554 000	2 122 000	2 453 000	2 667 000	2 265 000	2 348 000	13 196 000
KAMENOLOMY ČR, s.r.o. (Ltd.) [2 raw materials]	2 570 862	2 453 044	2 117 406	2 228 145	2 477 205	2 159 184	2 032 909	14 005 846
HELUZ cihlářský průmysl, v.o.s. (General Partnerships) [1 raw material]	458 721	474 158	336 732	227 000	231 000	383 714	234 482	2 345 807
Wienerberger cihlářský průmysl, a.s. (Plc.) [1 raw material]	399 000	267 000	325 000	363 000	376 000	414 000	402 000	2 546 000
Cihelna Hodonín, s.r.o. (Ltd.) [1 raw material]	29 500	38 900	25 600	29 500	42 200	54 000	56 000	275 700

Source: Mining Annuals 2011-2017 [18-24]

The criterion for the inclusion of the enterprise in the selection for comparison was the amount of raw material extraction given in the Mining Yearbook 2017 [24]. Only four enterprises with the largest volume of extraction in the given raw material group were included in the comparison. If the necessary data were not available about the company at the time of processing, the company was excluded from the comparison. These were two companies Očenášek-Mikulka, s.r.o. (Ltd.) (brick clays) and František Jampílek (gravel). The groups were evaluated separately and together for the whole segment of building materials.

The source of data for the comparison itself were the records of the companies compared in the Public Register and the basic financial statements given in the Collection of Documents (<https://or.justice.cz/ias/ui/rejstrik>) [25]. As the comparison in one year brings the risk of bias of the result, the comparison of companies was performed for the period 2011–2018. The company Kámen Zbraslav, a. s. did not provide annual reports for the years 2017 and 2018, so the missing data were substituted by averages for the years 2011–2016. We are aware of certain distortion of the data, but an exclusion of this important mining company would disfigure the benchmarking project.

The evaluation of the obtained data was done by mathematical statistics (frequency, relative frequency) in case of legal entity of mining companies and by mathematical-statistical method of weighted sum of ranking.

<sup>1</sup> We chose 2017 as the decisive year as the Mining Annual 2018 did not publish the total production of the mining companies.

The application of the weighted sum method was performed in accordance with [26]. First, an initial matrix was created consisting of the ratios of the compared enterprises. Furthermore, weights of ratios are shown in the matrix. The last data in the matrix are the characteristics of the ratio indicators. If the indicator is expected to grow, the ratio indicator is assigned the value 1. Otherwise, the value -1.

The principle of the chosen method lies in the ranking of the comparison of companies according to each indicator. The company with the best value of the given indicator gets the ranking "1". The company with the worst value of the indicator reaches the order "n". If two or more indicators coincide, their order is determined from the average of the indicators the indicators would achieve [26].

The total achievement of the enterprise is determined by the integral indicator, which is calculated using Formula (7):

$$d_{1i} = \sum_{j=1}^m s_{ij} \cdot p_j \quad (7)$$

where:  $i = 1, 2, \dots, n$

$s_{ij}$  – ranking of the  $i$ -th company for the  $j$ -th indicator

$p_j$  – weight of  $j$ -th indicator [26].

The minimum value of the integral indicator shall determine the best mining undertaking.

The weights of the ratios were determined using the Fuller triangle method. The principle of the method is based on the fact that with a larger number of indicators (criteria) it is advantageous to compare only two indicators with one another, which will make it easier to decide which of them is more important. It is therefore a pair comparison. For each pair, the evaluator shall circle or otherwise indicate the number of the criterion which s/he considers more important [27].

The processing is as follows: (1) In the Fuller triangle we write pairs of indicators and boldly indicate the preferred indicator; (2) For each indicator we calculate the number of preferences; (3) Divide the number of preferences for each indicator by the number of all comparisons. This gives us the weight [27].

The disadvantage of the method used is that the zero-weight indicator may not be completely insignificant. This deficiency can be corrected by increasing the preference frequency of each indicator by 1 unit [27]. The achieved results of mining companies for individual years are added together, which creates an evaluation number VN, which determines the final ranking of the company.

### 3 RESULTS

Table 2 shows the legal form of mining companies extracting building materials.

*Table 2. Legal form of mining companies extracting building materials*

Legal form	Public or private limited companies (Plc.)	Limited Companies (Ltd.)	Limited partnership (k. s.)	General partnership	Another form
Brick raw material	1	8	0	1	1
Dimension stone	15	25	0	0	7
Building stone	24	50	2	0	10
Sand and gravel	30	51	2	0	24
Construction raw materials, total	70	134	4	1	42
Raw materials in total after removal of duplicates	63	128	3	1	41

In order to be able to compare mining companies economically using selected ratio indicators, it was necessary to first calculate these indicators and then to create starting matrices. These matrices were created for individual years of the period considered 2011–2018.

The weights of the individual ratios are an integral part of the starting matrix (Table 3). The authors used the Fuller triangle method.

*Table 3. Determination of weights of ratios*

Indicators	Number of preferences	Correction	Number of preferences after correction	Weight	Weight in%
X <sub>1</sub>	5	1	6	6/21	28.57
X <sub>2</sub>	1	1	2	2/21	9.52
X <sub>3</sub>	4	1	5	5/21	23.81
X <sub>4</sub>	2	1	3	3/21	14.29
X <sub>5</sub>	3	1	4	4/21	19.05
X <sub>6</sub>	0	1	1	1/21	4.76
Total	15		21		100.00

Table 4 shows the starting matrix for 2011; Table 5 shows the 2018 matrix.

*Table 4. Starting matrix in 2011*

Mining Enterprise	X1 – ROA	X2 – Inventory Turnover Ratio	X3 – Total Indebtedness	X4 – Cash Ratio	X5 – Product. of TFA	X6 – Time of Turnover of NWC
Granit Lipnice, s.r.o. (Ltd.)	2.30 %	5.81	25.74 %	0.63	3.83	109.44
HERLIN spol. s r.o. (Ltd.)	1.93 %	6.14	55.81 %	0.28	2.68	18.98
Plzeňská žula a.s. (Plc.)	-4.30 %	8.91	31.99 %	0.38	2.93	-
Průmysl kamene a.s. (Plc.)	2.99 %	5.48	8.51 %	3.00	1.06	186.64
CEMEX Sand, k.s. (Inc.)	5.63 %	13.61	80.34 %	0.07	1.20	82.77
České šterkopisky spol. s.r.o. (Ltd.)	8.70 %	0.00	59.73 %	0.04	1.23	-
Českomoravský šterk, a.s. (Plc.)	5.44 %	7.22	30.83 %	0.25	1.38	128.57
EUROVIA Kamenolomy, a.s. (Plc.)	3.08 %	23.36	15.78 %	0.63	1.73	149.35
KÁMEN Zbraslav, a.s.	5.84 %	51.82	45.36 %	3.13	1.74	533.41
KAMENOLOMY ČR s.r.o. (Ltd.)	12.85 %	10.66	33.28 %	0.21	1.36	43.33
HELUZ cihlářský průmysl v.o.s. (Inc.)	3.18 %	71.21	5.47 %	0.20	0.72	100.34
Wienerberger s.r.o. (Ltd.)	7.13 %	18.39	57.59 %	0.30	2.04	26.83
Cihelna Hodonín, s.r.o. (Ltd.)	-10.25 %	13.58	145.01 %	0.01	0.44	-
Weight	28.57 %	9.52 %	23.81 %	14.29 %	19.05 %	4.76 %
Character of indicator	1	1	-1	1	1	-1

*Table 5. Starting matrix in 2018*

Mining Enterprise	X1 – ROA	X2 – Inventory Turnover Ratio	X3 – Total Indebtedness	X4 – Cash Ratio	X5 – Product. of TFA	X6 – Time of Turnover of NWC
Granit Lipnice, s.r.o. (Ltd.)	3.10 %	6.25	20.88 %	1.30	5.01	134.96
HERLIN spol. s r.o. (Ltd.)	0.12 %	3.53	69.44 %	0.18	1.38	54.92
Plzeňská žula a.s. (Plc.)	2.04 %	62.33	29.03 %	0.74	3.86	15.63
Průmysl kamene a.s. (Plc.)	0.66 %	3.95	1.08 %	0.45	1.17	96.46
CEMEX Sand, k.s. (Inc.)	5.29 %	23.88	79.45 %	0.10	2.71	-
České šterkopisky spol. s r.o. (Ltd.)	16.16 %	186.71	44.09 %	0.49	1.09	124.72
Českomoravský šterk, a.s. (Plc.)	12.27 %	14.06	30.53 %	0.31	1.69	124.04
EUROVIA Kamenolomy, a.s. (Plc.)	19.89 %	23.01	41.05 %	0.53	1.84	78.67
KÁMEN Zbraslav, a.s.	12.23 %	58.66	48.94 %	1.12	1.58	196.64
KAMENOLOMY ČR s.r.o. (Ltd.)	12.88 %	10.51	25.69 %	0.61	1.34	148.40
HELUZ cihlářský průmysl v.o.s. (Inc.)	14.06 %	7.99	14.07 %	2.04	1.01	208.23
Wienerberger s.r.o. (Ltd.)	33.78 %	9.24	68.02 %	0.10	2.48	-
Cihelna Hodonín, s.r.o. (Ltd.)	-4.34 %	0.56	322.70 %	0.01	0.20	-
Weight	28.57 %	9.52 %	23.81 %	14.29 %	19.05 %	4.76 %
Character of indicator	1	1	-1	1	1	-1

Once the default matrices were created, the actual comparison could be made using the weighted sum order method. In accordance with the methodology, enterprises were first compared by individual raw material groups, see Tables 6-9. Subsequently, enterprises were compared for the whole segment of construction raw materials, see Table 10.

*Table 6. Comparison of selected mining companies extracting brick material*

Mining Enterprise	2011	2012	2013	2014	2015	2016	2017	2018	Value Number	Final Rank
HELUZ cihlářský průmysl v.o.s. (Inc.)	2	1	1	2	1	2	1	1	11.00	1
Wienerberger s.r.o. (Ltd.)	1	2	2	1	2	1	2	2	13.00	2
Cihelna Hodonín, s.r.o. (Ltd.)	3	3	3	3	3	3	3	3	24.00	3

*Table 7. Comparison of selected mining companies extracting dimension stone*

Mining Enterprise	2011	2012	2013	2014	2015	2016	2017	2018	Value Number	Final Rank
Granit Lipnice, s.r.o. (Ltd.)	1	1	2	1	1	1	3	2	12.00	1
HERLIN spol. s r.o. (Ltd.)	4	2	1	3	2	4	4	4	24.00	3-4
Plzeňská žula a.s. (Plc.)	3	4	4	4	4	3	1	1	24.00	3-4
Průmysl kamene a.s. (Plc.)	2	3	3	2	3	2	2	3	20.00	2

*Table 8. Comparison of selected mining companies extracting building stone*

Mining Enterprise	2011	2012	2013	2014	2015	2016	2017	2018	Value Number	Final Rank
Českomoravský štěrk, a.s. (Plc.)	4	4	4	4	4	4	4	3	31.00	4
EUROVIA Kamenolomy, a.s. (Plc.)	2	2	3	2.5	1	2	1	1	14.50	1
KÁMEN Zbraslav, a.s. (Plc.)	1	3	2	2.5	2	1	2.5	4	18.00	3
KAMENOLOMY ČR s.r.o. (Ltd.)	3	1	1	1	3	3	2.5	2	16.50	2

*Table 9. Comparison of selected mining companies extracting sands and gravel*

Mining Enterprise	2011	2012	2013	2014	2015	2016	2017	2018	Value Number	Final Rank
CEMEX Sand, k.s. (Inc.)	2	1	2	2	3	2	3	3	18.00	2
České štěrkopísky spol. s r.o. (Ltd.)	3	3	3	3	1	3	2	1	19.00	3
Českomoravský štěrk, a.s. (Plc.)	1	2	1	1	2	1	1	2	11.00	1

*Table 10. Comparison of selected mining companies extracting building materials*

Mining Enterprise	2011	2012	2013	2014	2015	2016	2017	2018	Value Number	Final Rank
Granit Lípnice, s.r.o. (Ltd.)	5	3	6	7	3	5	9	6	44.00	5
HERLIN spol. s r.o. (Ltd.)	10	4	1	10	7	10	12	11	65.00	9
Plzeňská žula a.s. (Plc.)	9	12	11	11	11	9	6	2.5	71.50	10
Průmysl kamene a.s. (Plc.)	8	7	8	8	9	8	8	8	64.00	8
CEMEX Sand, k.s. (Inc.)	11	8	9	9	12	11	11	12	83.00	12
České štěrkopísky spol. s r.o. (Ltd.)	12	11	10	12	6	12	10	4	77.00	11
Českomoravský štěrk, a.s. (Plc.)	7	9	7	6	8	7	7	7	58.00	7
EUROVIA Kamenolomy, a.s. (Plc.)	2	2	4	4.5	1	2	1	1	17.50	1
KÁMEN Zbraslav, a.s.	1	5	3	4.5	2	1	4.5	9	30.00	3
KAMENOLOMY ČR s.r.o. (Ltd.)	4	1	2	1	5	4	4.5	5	26.50	2
HELUZ cihlářský průmysl v.o.s. (Inc.)	6	6	5	3	4	6	2	2.5	34.50	4
Wienerberger s.r.o. (Ltd.)	3	10	12	2	10	3	3	10	53.00	6
Cihelna Hodonín, s.r.o. (Ltd.)	13	13	13	13	13	13	13	13	104.00	13

## 4 DISCUSSION

According to the data from the Czech Geological Survey [2], mining of building materials was carried out by 236 entities in 2017. Of these, 15 companies benefit from more than one raw material. This, in turn, adds the number 251. Distributing the companies to each group of raw materials, most companies extract gravel and sand (107), followed by building stone (86) and dimension stone (47). The fewest companies (11) are then engaged in the extraction of brick raw material. For the sake of completeness, it is necessary to state that this description did not distinguish between the extraction of exclusive and non-reserved deposits.

The data in Table 2 show that in the construction raw materials segment the most common legal form is a limited liability company (54.24 %) followed by a joint stock company (26.69 %). In total, 80.93 % of mining companies have the most frequent legal forms. Our analysis also revealed that 41 entities with different legal forms (individuals, cooperatives, municipalities) also operate in the segment. Limited liability companies and joint stock companies dominate all raw material groups.

The results of our investigation confirmed the conclusions of the analysis of 2011 [13], which revealed the legal form of a limited liability company as the dominant one. We can only speculate about the reasons why companies remain in the legal form of a limited liability company. It may be a question for further research. However, there is no doubt that the size of capital is not entirely decisive for the legal form. Take the example of the company Kamenolomy ČR, s. r. o., which has a registered capital of CZK 106.2 million. LB Minerals, s. r. o., with a registered capital of CZK 635.2 million, is a good example in the non-metallic minerals segment.

Comparison of selected mining companies within the individual raw material groups showed that the best companies are: (i) Heluz cihlářský průmysl (brick industry), v. o. s. (Inc.) (brick clays), (ii) Granit Lipnice s. r. o. (Ltd.) (dimension stone), (iii) EUROVIA Kamenolomy, a. s. (Plc.) (building stone), (iv) Českomoravský štěrk, a.s. (Plc.) (gravel and sand). In the comparison of companies in the whole segment of building materials, EUROVIA Kamenolomy, a. s. (Plc.) reached the highest position.

If we look at the entire construction material segment, it is clear that companies with a large volume of construction stone and gravel and sand are at the forefront. However, it would be a mistake to assume that other raw material groups do not allow for interesting economic results in the long term. Companies Granit Lipnice, s. r. o. (dimension stone), HELUZ cihlářský průmysl (brick industry), v. o. s. (Inc.) (brick clays) are a proof of that. Although the mining company Cihelna Hodonín, s. r. o. (Ltd.) came always last during the observed period, we cannot claim that this raw material segment had the worst economic results. Looking at Table 10, it is clear that the obtained results are not limited by the given raw material segment. The cause can be seen both in the volume of extracted raw material (building stone, gravel and sand) and in the price of raw material (dimension stone), which is positively reflected in the relevant ratio indicators.

It is also true that many stone-exploiting businesses often also extract gravel and sand. While brick mining and dimension stone companies are more targeted to one raw material. Our analysis identified the best companies in the given raw material groups and in the whole segment of building materials, i.e. set their order. The next logical step would therefore be to investigate the causes that led to the success of these businesses. However, the scope of such an analysis deviates from our framework. This does not mean, though, the authors will not pursue this issue further and will share their knowledge in another article.

So that the reader of this article is not deprived of some of the data, we bring a comparison of the best business with the worst business of our choice. Table 11 shows the average values for the reference period 2011–2018.

*Table 11. Comparison of the best and the worst mining company of the choice*

AVERAGE	EUROVIA Kamenolomy, a.s. (Plc.)	Cihelna Hodonín, s.r.o. (Ltd.)
X1 – ROA	12.02 %	-15.78 %
X2 – Inventory turnover	14.72	4.19
X3 – Total debt	47.76 %	237.65 %
X4 – Cash ratio	1.91	0.01
X5 – Productivity of TFA	1.78	0.22
X6 – Turnover time of net working capital	127.14	-

It can be seen from Table 11 that, in all benchmarks, the company Cihelna Hodonín, s. r. o. (Ltd.) reported worse results than EUROVIA Kamenolomy, a. s. (Plc.). The most significant difference is seen at total debt. The inventory turnover and cash ratio are also alarming. It is, therefore, no wonder that ROA is negative, and a value that is relatively high in absolute terms.

## 5 CONCLUSION

Perhaps nowhere more than in the analysis, Socrates' statement "Scio me nihil scire!" is valid. The authors are fully aware of the need to further investigate and analyse the causes that lead to the success of the individual

mining companies. This knowledge can be useful both for managers of successful companies and for managers of companies that are still waiting for their success.

As the authors have already indicated in the discussion, they will continue to address the issue. There is also a natural consideration to expand the portfolio of companies analysed and other mining companies from the non-metallic minerals and energy raw materials segment. We are convinced that this comprehensive analysis could reveal not only the champions in the individual raw material groups, but also reveal their success and whether these aspects of success can be seen across the raw material industry.

Our article could not be complete and correct if we did not comment on the hypotheses formulated by us. Based on our findings, we can state that our assumption regarding the dominance of the legal form of mining companies has not been confirmed. Despite the fact that the limited liability company was identified in 54.24% of mining companies, the 60% threshold set in hypothesis H1 was not reached. The second hypothesis cannot be confirmed either, as the best companies did not achieve the highest production in the given groups of raw materials.

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