

# EFFECT OF CONTROLLING ON THE ECONOMIC PERFORMANCE OF SMES IN THE CZECH REPUBLIC

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**Abstract:** *This paper deals with the use of controlling in the management of small and medium-sized enterprises in the Czech Republic and its influence on their economic performance. Data from primary research are presented, which determined the extent of implementation of controlling activities in the examined enterprises. The aim of the secondary research was to evaluate the economic performance of enterprises with and without controlling and to determine whether it is possible to confirm the hypothesis of better economic (financial) results of the enterprises that apply controlling in their management process. The two groups of enterprises are compared by using calculated arithmetic means and medians of selected economic indicators. The source of data is the corporate database MagnusWeb. The compared data are also subjected to statistical analysis. Nonparametric tests i. e. the Mann-Whitney U test and the Kolmogorov-Smirnov test to determine statistically significant differences between the financial results of the enterprises that use and do not apply controlling.*

**Keywords:** *Management, Controlling, Economic performance, Financial analysis, Small and medium-sized enterprises (SME).*

**JEL Classification:** *M21.*

## Introduction

The current market environment places high demands on the competitiveness of enterprises. Pressure on the economic efficiency of enterprises has increased in recent years due to the influence of the previous economic crisis. Therefore, in order for enterprises to succeed on the market they use various management tools and practices, leading to an increase in their efficiency. One of the most widely used management tools is controlling. This tool allows enterprises to effectively analyze and manage their business economy in order to achieve long-term objectives. Controlling is actively used mainly in large and multinational companies who have the necessary organizational conditions and skilled employees. In practice, they benefit from considerable years of experience with the use of this management tool. SMEs also use or want to use controlling. The use of controlling by these enterprises is important because they have a relevant position in each country's economy in terms of their share of gross domestic product, employment, and innovation. However, due to their size they are somewhat limited in the number of skilled workers needed for each individual area of management. The question therefore arises as to whether small and medium-sized enterprises in the Czech Republic use controlling and what economic results they achieve.

The aim of the research is to determine the extent to which controlling is used in small and medium-sized enterprises, to analyze real economic data and to evaluate whether they achieve better economic results than enterprises that do not use this management tool. The article presents the results of primary and secondary research in this area.

# 1 Formulation of the issue

## 1.1 The philosophy of controlling

It is rather difficult to clearly define the concept of controlling because there are innumerable explanations of the term in the literature from various foreign as well as Czech authors. One reason for this is the difficulty in translating the English word controlling, which can be assigned up to 50 semantic equivalents in everyday speech.

The basis of the term controlling is the word “control”, which is usually understood in the sense of to control or to manage. Controlling is understood by some authors to mean control in the sense of the final function of a management system. Others look considerably longer at the issue. Freiberg, for example, states that controlling is a specific concept of corporate governance based on comprehensive information and the organizational links between planning and control processes. [5] This means that controlling is not only control but also a certain approach to the management system, a method of economic management of the company which is oriented towards the future. Some even talk of a type of managerial philosophy based on management by deviation. Eschenbach sees the basic difference between control and controlling as added value consisting of the evaluation and design of corrective changes, corrective and preventive measures for eliminating deviation, and the achievement or adjustment of planned objectives in the future. [4] Hence, control can be described as a kind of subsystem of controlling.

The general objective of controlling is to contribute to ensuring the viability of the enterprise in the present and especially in the future. Some of its most important tasks include planning, budgeting, costing, standard and special analyses, identification and evaluation of deviation, processing of information reports, administration, etc. The essence is to create a planning system which allows an enterprise to evaluate and influence the development of actually achieved results compared to planned ones. Controlling in an enterprise has primarily the function of coordination, innovation, information and consultancy. [9]

In terms of content, Král divides controlling into financial, cost and natural, which are usually applied in non-financial areas such as controlling production, sales, inventory, personnel etc. [8] Based on a temporal viewpoint, controlling can be divided into strategic and operational. Strategic controlling focuses on a longer period of time (several years) and the long-term strategic objectives of the organization. Its task is to manage and control measures required for the implementation and realization of the strategies of the organization. [14] In contrast, operative controlling focuses on a shorter time period, usually one year. Its main task is to optimize business operations and processes, leading to the more effective management of the generation of profit. Here, we constantly compare reality (the actually achieved results) and plans (target, planned results), identify deviation and propose measures to ensure the achievement of operational objectives, which contributes to the fulfilment of organizational strategies. [1] Relevant information obtained in real time is vital for reducing the risk of managers making incorrect decisions. Access to, and acquisition, transfer and evaluation of information are purposeful - their aim is to find and use hidden reserves to increase business potential. [12]

Controlling inherently leads to the continuous formation of innovation (improvement) in spheres of interest, and variables in the form of corrective or preventive measures against deviation. This has a certain connection with the so-called Deming PDCA cycle of continuous improvement or adaptation to the external and internal conditions

of an enterprise. [2] In the framework of which, planning (Plan) takes place, whereby the target values of the variables and paths (procedures, actions) to reach them are determined. In the next stage the plans are implemented and monitored and the actually achieved values of the attributes are measured (Do). Subsequently, the control is performed (Check), which identifies deviations from the plan. In the last phase (Act), these deviations, their causes and consequences are analyzed, and then corrective and preventive actions are proposed and implemented. [3]

## **1.2 Small and medium-sized enterprises**

Small and medium-sized enterprises (SMEs) are a very important part of the market economy of each country. They have a crucial influence not only on the economic performance of the national economy but they are also significant in the context of social benefits. Up to 99% of all business entities in the European Union are classed as small and medium-sized enterprises. Annually, they account for approximately three-quarters of all jobs and 60% of the total produced gross domestic product. For this reason they are often referred to as the main engine of the economy, or its spine. [6] SMEs in the Czech Republic are one of the most important segments of the business environment. Small and medium-sized enterprises make up 99.8% of all subjects and provide more than 60% of the total employment in the Czech business sector, producing about 35% of the total gross domestic product of the Czech Republic. [13]

To be clear what an SME is and what it is not, an exact quantitative definition has been created. According to the methodology of the European Union a small and medium-sized enterprise is considered to be a business entity that: [10]

- employs a maximum of 249 employees,
- while its annual turnover does not exceed 50 million EUR (approximately 1.4 billion CZK),
- or its balance sheet total (assets and liabilities) does not exceed 43 million EUR (approximately 1.2 billion CZK).

One of the major advantages of SMEs is their flexibility. Smaller businesses can usually respond much faster and more effectively to various changes in their surroundings and try to adapt to them. This also relates to their more effective innovation activities. SMEs are able to innovate faster and more effectively due to their flexibility and less complex structure. They are also continuously forced to innovate in order to survive on a highly competitive market in comparison to larger corporations. In contrast, disadvantages of SMEs include their difficulty in accessing financial resources and thus their smaller overall financial strength. This is often associated with a lack of qualified human resources, limited support opportunities and lower bargaining power with stronger trading partners. Nevertheless, SMEs are the main source of economic prosperity and their existence is strongly encouraged by both the European Union and by the individual Member States. [11]

## **2 Methods**

In order to analyze and determine the possible impact of controlling on the economic results and performance of SMEs in the Czech Republic, we conducted secondary research using data from the MagnusWeb database implemented at the Faculty of Economics and Administration of the University of Pardubice. This database contains information on most enterprises operating in the Czech Republic, including financial data. A research

segment comprising 218 companies was selected from the database according to the following criteria:

- Number of employees 100-249,
- working in the manufacturing industry,
- geographically located in the region NUTS 2 (North-east Cohesion Region) – the regions of Hradec Králové, Pardubice and Liberec,
- active enterprises with data available from 3-5 years in the analysis period 2009-2013.

The evaluation of economic performance was preceded by primary research, during which 218 enterprises were contacted by email with the following question: “We would like to ask you whether controlling is performed in any way at your company. Either in the form of a controlling department, a specialized employee, or only a partial incorporation of controlling principles into management”.

The representativeness of the selected sample for the research can be statistically determined by the formula: [7]

$$n \geq \frac{t_{\alpha}^2 * p * (1-p)}{d^2} \tag{1}$$

where: n is the required minimum sample size,  
 $\alpha$  is the reliability,  
 $t_{\alpha}$  is the reliability coefficient of  $\alpha$ ,  
 p is an estimate of the relative frequency of the studied feature in the base set,  
 d specifies the permissible error in the survey.

If, in our case, the required reliability is 90% with a permissible error of 11% and an estimated relative frequency of 0.6, then the following is true:

$$n \geq \frac{1.645^2 * 0.6 * 0.4}{0.11^2} = 53.67 \cong 54 \tag{2}$$

This means that the minimum number of enterprises in the sample in order to ensure its representativeness should be at least 54.

The sample is defined by non-random selection based on the answers to the question on the use of corporate controlling. From the 218 surveyed enterprises selected according to the above criteria answers were received from 57 respondents included in the research. This figure, therefore, satisfies the condition for the minimum number of enterprises and thus the sample can be considered representative. The response rate to the question was 26.1%.

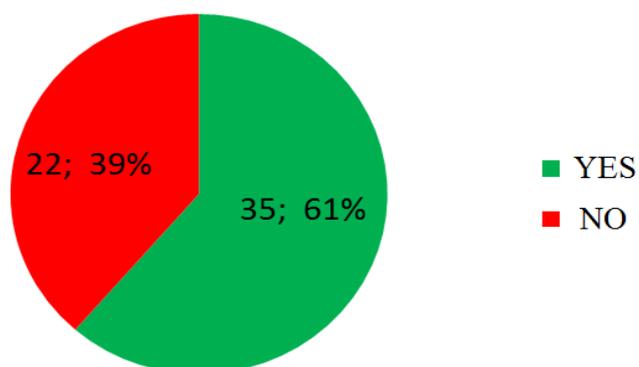
A total of 10 economic indicators are included in the analysis of economic performance, of which 4 absolutely indicate the characteristics of the selected enterprises and the remaining 6 proportional indicators are used for a comparison. The arithmetic averages

of the individual values are calculated and evaluated for each enterprise, and subsequently the means and medians are calculated for both groups of enterprises.

### 3 Results of the research

During the primary research it was found that out of the 218 surveyed enterprises 35 companies actively use controlling. The majority mentioned the existence of an independent controlling department or at least one employee specializing in controlling procedures. The remaining 22 respondents gave a negative response to implementing even the basic principles of controlling. The structure of the responses is shown in Figure 1.

*Fig. 1: Use of controlling*



*Source: own work*

For the purposes of the secondary research using economic and financial data we applied the following hypothesis **H1: The use of controlling in the management of small and medium-sized enterprises achieves better economic results**. It is supposed that SMEs using controlling activities have better values of indicators, especially in profitability, liquidity and indebtedness.

Table 1 includes the mean and median values of basic economic data characterizing the surveyed enterprises.

*Tab. 1: Characteristics of the surveyed enterprises*

Indicator (CZK)	YES		NO	
	Mean	Median	Mean	Median
<b>A – Total assets</b>	223 837 046	192 704 000	171 084 845	139 137 000
<b>E – Equity</b>	104 047 235	76 524 000	91 796 867	85 018 000
<b>L – Liabilities</b>	119 789 087	88 459 976	79 287 888	54 205 544
<b>PTP – Pre-tax profit</b>	11 116 549	6 251 000	9 782 359	5 467 000

*Source: own work*

It is evident that on average enterprises using controlling (YES) have greater assets (balance sheet total) and both components of liabilities than companies without controlling management (NO). On average, enterprises with controlling conduct business with a higher proportion of liabilities, while companies without controlling exhibit a greater proportion of equity. Enterprises with controlling have both higher mean and median pre-tax profit.

Table 2 summarizes the mean and median values of the selected proportional indicators of economic performance of enterprises in the monitored period. It also shows their mutual index and percentage of above-average values separately for both of the groups.

**Tab. 2: Comparison of economic proportional indicators**

Indicator	YES		NO		Index YES/NO		% above average values	
	Mean	Median	Mean	Median	Mean	Median	YES	NO
<b>L1 – Immediate liquidity</b>	0.39	0.09	1.31	0.10	0.30	0.90	22.86	22.73
<b>ROE – Return on equity (%)</b>	1.56	8.30	5.26	5.72	0.30	1.45	80.00	54.55
<b>ROA – Return on assets (%)</b>	4.57	3.69	2.69	3.59	1.70	1.03	48.57	59.09
<b>LP – Labour productivity (CZK)</b>	542 248	527 062	506 816	430 478	1.07	1.22	37.14	40.91
<b>Percentage change in pre-tax profit (%)</b>	63.94	4.72	60.33	44.33	1.06	0.11	42.86	54.55
<b>Debt Ratio (%)</b>	54.20	52.08	60.01	42.37	0.90	1.23	42.86	18.18

*Source: own work*

It is then possible in Table 3 to compare the percentage of above average values of the individual enterprises over the overall mean and median (both groups of enterprises) for each indicator.

**Tab. 3: Percentage of above average values**

Indicator (%)	% of above average values over the overall mean		% of above average values over the overall median	
	YES	NO	YES	NO
<b>L1 – Immediate liquidity</b>	14.29	27.27	57.14	54.55
<b>ROE – Return on equity</b>	74.29	54.55	62.86	54.55
<b>ROA – Return on assets</b>	54.29	50.00	54.29	50.00
<b>LP – Labour productivity</b>	42.86	36.36	51.43	40.91
<b>Percentage change in pre-tax profit</b>	45.71	54.55	71.43	77.27
<b>Debt Ratio</b>	40.00	22.73	54.29	45.45

*Source: own work*

Immediate liquidity expresses an enterprise's ability to immediately pay its short-term liabilities from freely available funds. Enterprises without controlling reported significantly better mean values; however, the median values are around the same level. This is due to several extreme values which increase the mean. Compared to the recommended range for this indicator (0.2-0.5) the mean for enterprises with controlling is in the specified interval, whereas the value for enterprises not using controlling is greatly above-average. Therefore, Table 3 shows better values for enterprises without controlling for the percentage

of above average values over the total mean but when comparing above average values with the overall median the opposite conclusion can be inferred.

One of the most followed indicators ROE expresses the ratio of profit over the amount of capital invested. When comparing the means enterprises without using controlling win again. However, the median values indicate better profitability of the enterprises with controlling. This is backed up by 80% of above average values within this group. Likewise, a comparison of the above average values over the overall mean and median for ROE shows enterprises using controlling principles dominating.

Another important indicator is return on assets (ROA) which is the ratio of profit over the total amount of managed assets. The mean and median values are greater in the group using controlling. In addition, a higher percentage of above average values over the overall mean and median ROA demonstrates better results for enterprises using controlling in their management practices.

Labour productivity specifies the volume of revenue generated on average by one employee of a business entity. Again, the mean and median for enterprises using a controlling philosophy are higher and reach more than half a million CZK. The improved performance of this group of enterprises for the indicator of labour productivity is also confirmed by the higher percentage of above average values over both the overall mean and median.

The indicator of percentage change of pre-tax profits reflects the annual percentage change in the amount of profit generated. An enterprise using controlling fares better on average but the median values, which are significantly lower, suggest otherwise. This shows a kind of higher variability of percentage changes in enterprises with controlling and extreme positive but also negative values of this indicator. Above average values over the overall mean and median are relatively higher for enterprises not using controlling.

The last indicator to be compared is total debt. This indicates the ratio of external resources over total utilized resources (value of liabilities or assets). On average, enterprises without controlling activities have more debt; however the median total debt is larger for enterprises with controlling. All of the values are in the range of 40-60%, which corresponds to the recommended values of the indicator based on to the individual specifics of each organization. The percentage of above average values in Table 3 indicates in both cases higher debt of enterprises that implement controlling processes.

The economic data were further statistically evaluated using the Statistica software. The average values of all 57 companies are analyzed in the monitored period for individual indicators separated into the groups YES or NO – based on the use of controlling of functions. Due to the fact that the data do not meet the condition of the Gaussian normal distribution, it was necessary to perform the analysis using so-called nonparametric tests. Two independent tests were used to increase the credibility of the results.

The first was the Mann-Whitney U test corrected for continuity, which is used to verify the null hypothesis that the two varieties come from the same distribution, therefore, that there is no statistically significant difference between the two groups of enterprises. The second is the Kolmogorov-Smirnov test, whose null hypothesis also states that the two varieties correspond to the same probability distribution. This test is based on cumulative frequencies. The tests are performed at a significance level of 0.05.

**Tab. 4: Mann-Whitney U test**

Variable	The indicated tests are significant at the level $p < 0.05000$						
	U	Z	p-value	Z	p-value	Y valid	N valid
ROE	310.0000	1.221202	0.222010	1.221202	<b>0.222010</b>	35	22
ROA	330.0000	0.893363	0.371664	0.893363	<b>0.371664</b>	35	22
LP	318.0000	1.090066	0.275685	1.090066	<b>0.275685</b>	35	22
L1	358.5000	-0.426191	0.669969	-0.426226	<b>0.669944</b>	35	22
% change	344.0000	-0.663875	0.506771	-0.663875	<b>0.506771</b>	35	22
Debt Ratio	308.0000	1.253986	0.209848	1.253986	<b>0.209848</b>	35	22

*Source: own work***Tab. 5: Kolmogorov-Smirnov test**

Variable	The indicated tests are significant at the level $p < 0.05000$						
	Max negative	Max positive	p-value	Mean	Mean	Y valid	N valid
ROE	-0.080519	0.241558	<b>p &gt; .10</b>	2.9	4.3	35	22
ROA	-0.051948	0.206494	<b>p &gt; .10</b>	4.8	2.6	35	22
LP	-0.107792	0.277922	<b>p &gt; .10</b>	532428.2	502505.2	35	22
L1	-0.141558	0.089610	<b>p &gt; .10</b>	0.4	1.2	35	22
% change	-0.174026	0.050649	<b>p &gt; .10</b>	47.7	59.3	35	22
Debt Ratio	-0.090909	0.209091	<b>p &gt; .10</b>	53.8	63.7	35	22

*Source: own work*

Table 4 shows the result of the Mann-Whitney U test for the examined indicators. Looking at the individual p-values it is clear that the null hypothesis is not rejected for any of the indicators because the p-values are greater than the level of significance. In this case it can be said that there is no statistically significant difference in the various indicators between enterprises with and without controlling. Absolutely the same conclusion can be reached for the results of the Kolmogorov-Smirnov test shown in Table 5. Here, the p-values for the individual indicators are greater than 0.1 and are therefore also greater than the significance level of the test and again the null hypothesis is not rejected for any of the indicators.

For a higher degree of accuracy the tests were further carried out with all the individual indicators in the monitored period. This helps avoid any distortion of values, as in the previous analysis of their averages.

**Tab. 6: Mann-Whitney U test for all values**

Variable	The indicated tests are significant at the level $p < 0.05000$						
	U	Z	p-value	Z	p-value	Y valid	N valid
ROE	6596.000	1.61301	0.106744	1.61301	<b>0.106744</b>	150	100
ROA	7478.000	0.69025	0.490040	0.69025	<b>0.490039</b>	153	103
LP	5238.000	2.44404	0.014524	2.44404	<b>0.014524</b>	136	95
L1	6527.500	-2.09147	0.036487	-2.09456	<b>0.036211</b>	153	101
% change	5986.000	0.06691	0.946657	0.06691	<b>0.946657</b>	118	102
Debt Ratio	6081.000	3.09492	0.001969	3.09492	<b>0.001969</b>	153	103

Source: own work

Different results can be deduced from Table 6 than in the case of testing the average values after conducting the Mann-Whitney U test. For the indicators labour productivity indicators, immediate liquidity and total debt the p-value is less than the tested significance level and therefore the null hypothesis of equality of probability distributions for these indicators is rejected. It is therefore possible to state that for these three indicators there is a statistically relevant difference between the two groups of enterprise.

**Tab. 7: Kolmogorov-Smirnov test for all values**

Variable	The indicated tests are significant at the level $p < 0.05000$						
	Max negative	Max positive	p-value	Mean	Mean	Y valid	N valid
ROE	-0.060000	0.206667	<b>p &lt; .025</b>	1.6	5.3	150	100
ROA	-0.064471	0.093407	<b>p &gt; .10</b>	4.6	2.7	153	103
LP	-0.034752	0.209830	<b>p &lt; .025</b>	542247.7	506816.3	136	95
L1	-0.142755	0.000000	<b>p &gt; .10</b>	0.4	1.3	153	101
% change	-0.070954	0.076105	<b>p &gt; .10</b>	63.9	45.3	118	102
Debt Ratio	-0.071134	0.186052	<b>p &lt; .05</b>	54.2	60.0	153	103

Source: own work

The results of the Kolmogorov-Smirnov test shown in Table 7 confirm the rejection of the null hypothesis of a statistically significant difference between enterprises with and without controlling in the case of labour productivity and total debt. It also confirms that the null hypothesis is not rejected in the context of ROA and the percentage change in pre-tax profit. Conversely, the difference can be seen for immediate liquidity, where the null hypothesis is not rejected. For ROE the null hypothesis is rejected compared to the previous test and there is a statistically relevant difference between enterprises implementing and not implementing controlling activities.

From the analysis of the economic results of the surveyed enterprises and the statistical evaluation it follows that the hypothesis H1: "The use of controlling in the management of small and medium-sized enterprises achieves better economic results" was not clearly confirmed in the synopsis of all of the monitored indicators.

## **4 Discussion**

The results obtained through the primary and secondary research are determined by the selection of the sample of enterprises. Enterprises were only selected from the manufacturing industry and enterprises employing less than 100 workers were excluded as SMEs. This restriction is based on the consideration that the smaller the company, the more difficult it is to provide controlling in terms of organization and personnel and hence the assumption that it is used more in manufacturing companies. The other selection criteria i.e. territorial restrictions to NUTS 2 regions and the availability of data for at least three years did not significantly affect the objectivity of the research.

Thirty-five enterprises declaring the use of controlling shows that controlling is implemented in nearly two-thirds of the 57 surveyed enterprises. From this it follows that there is still considerable space in small and medium-sized enterprises for the expansion of an important management tool such as controlling.

There were no collectively and unambiguously better economic results of enterprises with controlling. However, the analysis did show differences in individual indicators, mostly in favour of enterprises with controlling. These related in particular to the comparison of median values which have better predictive ability than arithmetic means. Here, enterprises with controlling achieved better results in the indicators of immediate liquidity, ROE, total debt ratio and labour productivity. On the contrary, the results were worse in the dynamics (changes) of pre-tax profit and ROA. This suggests that enterprises with controlling place a greater emphasis on the efficiency of management and use more financial leverage for higher debt, which may be related to the practical use of controlling in corporate governance and management decision-making. The statistical evaluation carried out using several tests showed that the use of all of the values of the indicators in the monitored period provides a more accurate evaluation of the results than the use of means and medians. This demonstrated statistically relevant differences between the two groups of evaluated enterprises.

The research of the use of controlling in the Czech enterprises will continue. During further work the research should be extended to include a larger number of enterprises without territorial or sectoral restrictions. Primary research should focus on the qualitative aspects of the use of controlling. Therefore, the questionnaire survey will involve two sets of questions i.e. how controlling is provided in terms of organization personnel and qualifications and how its use is combined with other management tools. This concept of research focused on the qualitative aspects of the use of controlling will provide a more objective view of the application of controlling in small and medium-sized enterprises in the Czech Republic.

## **Conclusion**

Today's dynamically changing times and increasing market competition require enterprises to use effective management tools to ensure economic prosperity. There are a number of tools and management methods available for this purpose that focus on individual activities of enterprises. One of the most important tools for evaluating and influencing the economy of an enterprise is controlling. Foreign enterprises have long-term experience in the use of controlling. Czech enterprises gradually began to introduce modern methods and tools with the deepening transformation of the economy. Large enterprises with foreign owners had an advantage in this. Small and medium-sized

enterprises without foreign ownership structures were in a more difficult situation as they could not rely on previous experience. Therefore, it is useful to determine the extent to which SMEs are currently putting controlling into practice and how this is reflected in their economic results.

Primary research of selected small and medium-sized enterprises in the manufacturing industry in the Czech Republic showed that less than two-thirds of enterprises use controlling in any form. This means that there is ample space for the expansion of this efficient management tool in small and medium-sized enterprises. A summary of the secondary research which focused on the analysis, evaluation and comparison of financial results of enterprises with and without controlling failed to clearly show that enterprises using controlling achieve better results. Enterprises with controlling had better results in the case of the median values of certain indicators. In addition, the evaluation of all of the values of the indicators for the whole time period of three to five years showed that enterprises with controlling had more positive results. Nevertheless, it can be concluded that should controlling be effectively used in corporate governance the results of these enterprises should be significantly better. Research of the use of controlling in enterprises in the Czech Republic will continue and will focus primarily on the qualitative aspects of controlling processes in terms of organization, personnel and qualifications. It will also examine the connection between controlling and other management tools, which should lead to a synergistic effect. The ongoing research will further characterize in detail the position and use of controlling in enterprises in the Czech Republic.

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