NON-FINANCIAL FACTORS OF PERFORMANCE: THE CASE OF MECHANICAL ENGINEERING COMPANIES IN THE CZECH REPUBLIC

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Abstract: *Successful achievement of strategic goals requires an effective performance management system, i.e. determining the appropriate indicators measuring the rate of goal achievement. These indicators are known as key performance indicators or value drivers according to the principles of value-based management. Performance is monitored by both financial and non-financial indicators. In order to gain further insight into the topic, this paper presents the results of research identifying the non-financial factors that affect the performance of mechanical engineering enterprises in the Czech Republic. The data were obtained from a questionnaire survey of the enterprises' senior management. The results of the survey were evaluated on the basis of response rate. The evaluation also included a comparison of the managers' opinions and the performance of their enterprises – measured by return on equity. The results of the analyses show that the factors most detrimental to enterprise performance include the incompetence of responsible employees and the disregard of the customers' requirements. Factors most frequently shown to increase the value of the enterprise are the product quality, product innovation and flexibility in meeting customers' requirements.*

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JEL Classification: *G30, G32.*

Introduction

Business performance in the broadest sense is defined as the ability to efficiently utilise the resources available to achieve the objectives pursued by the company. This is why the identification of factors affecting business performance is the main task of company management. Value-based management (VBM) has developed since the mid-1990s for the identification of the factors of business performance (or value). Value-based management works on the assumption that the value of the business is derived from its ability to generate future revenues. It means that it is dependent on factors such as originality and quality of the product offered, market position, level of effective cost management, and innovation capability of business employees, which are reflected in the financial results of the business. The business performance measurement system must be based on financial as well as non-financial indicators. Financial ratios are most useful in strategic management, since they indicate whether a company's strategy implementation and execution are contributing to bottom line improvement. Non-financial indicators are mainly used for short-term decisions. Their identification is rather difficult and may show signs of subjectivity. They are determined mostly on the basis of knowledge and experience of managers who work in the companies, or on the basis of studying documents. However, in order for the factors

indicated by managers to be considered as performance indicators it is crucial to compare the managers' claims with the actual business performance achieved.

1 Performance indicators

Indicators clearly contributing to business value at all levels of management should become the starting point for measuring business performance. Since changes in business values are dependent on changes in the value drivers, it is an important task in value management to seek and identify factors that accelerate performance and value or, as the case may be, compromise the value. According to Frigo (2002), value-based management is a strategic performance measurement tool that provokes management to focus on internal performance and thus support business value creation, namely through motivation and definition of activities that maximise business value. Knight (1998) describes value-based management as an approach combining strategy, performance metrics and activities contributing to the maximisation of value for owners. Koller (1994) defines value-based management as a "link between ideas contributing to the business value and performance management systems". Similarly, Fourie (2011).comments on this topic saying that the goal of value-based management is to contribute to business value and identify value drivers in the enterprise. Performance indicators used in value- based management should enable the use of as much information as possible from the accounting and simultaneously overcome existing objections to accounting indicators capturing financial efficiency, particularly including risk calculation leading to business value identification. Cooper et al. (2001) see the advantage of applying value- based management principles in the ability to provide information for making decisions about the allocation of investments, comparison of business performance with competitors, reducing the capital demands of processes and formulating business strategy. However, they also point out its shortfalls, namely the difficulty of projecting financial indicators of performance metrics in the operational metrics and technical limitations in measuring performance in some areas (e.g. cost of capital metrics), stemming mostly from the difficulty in defining the value of businesses and forecasting their development. If value generators are properly defined they can help managers understand what creates business value and how it can be increased; subsequently they can coordinate value drivers with the managers' and employees' objectives (see Copeland et al, 2005). As stated by Ittner et al (2001), identification of these drivers and their interrelations is expected to improve resource allocation, performance measurement and the design of information systems by identifying the specific actions or factors that cause costs to arise or revenues to change. In terms of value-based management principles, value drivers can be identical with key performance indicators (KPI) that the company should follow and be able to influence. These indicators should use as much information as possible from accounting but, at the same time, overcome existing objections to accounting indicators used to measure the financial position of the business. Therefore they should be based on management accounting that focuses particularly on cost efficiency (see e.g. Ittner et al, 2001). At the same time, they should be structured in a way that considers the business risks. Economic value added (EVA) is perhaps the best known indicator associated with value-based management. It represents the difference between net profit and the opportunity cost, i.e. the cost of the firm's capital (see e.g. Young and Byrne, 2001). The strength of this indicator is that its calculation includes not only interest on outside capital but also the cost of equity. According to the authors of this indicator, changes in economic value measures track changes in shareholder wealth more closely than traditional accounting measures, and should therefore replace accounting measures for goal

setting, capital budgeting and compensation purposes (see Stern et al, 1995). Looking into the performance of businesses that are not publicly tradeable makes it difficult to measure the value and identify value drivers. For this reason there are still various alternative financial indicators for measuring performance that are calculated on the basis of accounting data. It is possible to use the knowledge of relations between individual financial-ratio indicators to identify partial performance factors. Needles et al (2004) investigated the relationship between strategy and financial performance in firms in the chemical and mechanical engineering industries and promotion services. To this purpose they worked with asset turnover, profit margin, debt to equity, cash flow yield and turnover ratio, i.e. indicators that can be considered as value determinants. In our previous research (see Režňáková et al, 2013) a sensitivity analysis was used to identify factors that have the largest impact on the change in business value. Our point of reference was a model defining business value using the discounted free cash flow method. The research indicated the highest interrelation between the rate of return on investments and the resulting price. This finding was rather surprising in view of the fact that as a rule literature indicates a high sensitivity of pricing to the rate of increase in turnover in the second phase (g parameter). On the other hand, this finding can be considered as logical: the free cash flow growth rate is conditioned by the new investment return rate. The second highest level of positive correlation was achieved between operating profit and resulting pricing. According to Losbichler et al (2008) the identified value drivers can be different if a different approach is adopted in measuring business performance. In their research they concentrated on using the economic value added (EVA) concept. They concluded that EVA can be affected by four major value drivers: revenue growth, cost efficiency, fixed asset utilisation and cash-to-cash cycle time. In a large-scale empirical study in Europe they also concluded that the cash-to-cash cycle time is used as the key metric. In this context it is appropriate to mention that in their study the authors focus on the value for stakeholders from the point of view of the logistics and supply chain management. Tiwari and Kumar (2015) researched value drivers in the Indian manufacturing industry. Based on their model they determined that sales, net margin, book value of equity, dividend per share, beta factor and earnings per share are the six major financial drives.

2 Methods

The aim of our research is to identify performance factors in mechanical engineering companies in the Czech Republic, excluding businesses in the automotive industry which are developing differently from the rest of the industry. In this paper we will focus on the partial objective of identifying non-financial performance factors in companies which were measured by profitability indicators. Since typical performance indicators do not reflect risk factors, our research concentrates on a single industry because the business risk is conditional on the industry. Mechanical engineering was chosen because it is considered to be one of the indicators of the condition and future development of the Czech economy on account of the industrial history and orientation of the Czech Republic. This field is dominated by the production of machine tools, lifting and handling equipment, industrial refrigeration and air conditioning equipment (CZ-NACE 28). When identifying the performance indicators, we worked with published research which emphasises the importance of non-financial factors for business performance. In order to identify them we established the views of senior managers (qualitative data) and compared them to the performance of the enterprises they managed (quantitative data). The qualitative data were obtained from a questionnaire survey of the enterprises' senior management. For effective

performance management it is vital to avoid factors that may reduce (or even destroy) business value. Among the known factors reducing the enterprise value are the lack of capital, lack of strategic management system and poor quality of production. To this purpose we sought the views of managers concerning factors influencing business value by asking two questions. The questionnaire prompted managers to list factors which affect the business performance of their enterprises negatively and positively. The range of potential factors was based on secondary research – analysis of previously undertaken questionnaire surveys and research of studies published in the scientific literature. The respondents were allowed personal comments. The views of the respondents concerning the importance of factors was measured on a 1-10 scale where 1 is the least significant influence and 10 the most significant influence on business value. The importance of potentially negative value drivers was evaluated on the basis of the response rate for the whole sample. Subsequently, these factors were analysed in relation to the business performance measured by the return on equity and return on assets indicators. The questionnaire survey took place in 2014. The questionnaire was distributed to all enterprises active in this industry for which data were available in the AMADEUS database, i.e. 1,107 enterprises in total. Completed questionnaires were obtained from 80 respondents, which represents a return rate of 7.23%. The analysis used the most frequent responses because we consider them to be more conclusive in the evaluation of the importance of factors influencing business value than other statistical characteristics. The profit ratio indicators were analysed for the years 2009 – 2014, i.e. before the implementation of the questionnaire survey and in the year of the survey. We believe that the performance achieved can influence the attitude of the respondents. We can estimate from the responses which areas the managers consider to be most important (both in a positive and a negative sense) from the perspective of managing business performance. In order to identify factors influencing business performance we used the non-parametric chi-square test. To this end the return on equity (ROE) indicator values were split into categories. The applied chi-square test of independence tests the null hypothesis that the two qualitative features are independent. Tests' statistics, for the contingency table of r rows and s columns, can be written in the following form:

$$G = \sum_{j=1}^{k} \frac{\left(n_j - \Gamma_j\right)^2}{\Gamma_j} \tag{1}$$

Where: $\Gamma_j = n \cdot \pi_{0,j}$ is the theoretical frequency of jth class at range n, while n_j is the empirical frequency in the same j^{th} class. Under the null hypothesis, test statistics $\chi 2$ has a distribution with (k-1) degrees of freedom. Among the assumption of the test application is that, $\Gamma_j = n \cdot \pi_{0,j} > 1$ in all classes and at least in 80% of classes the $\Gamma_j = n \cdot \pi_{0,j} > 5$ (see Cyhelský et al (1999).

3 Results and discussion

Small and medium-sized enterprises prevailed among the respondents; their share in the total number of retrieved questionnaires was 65%. Large enterprises constituted 12.5% and micro-enterprises 22.5% of the research sample. The structure of the sample is similar to the structure of the population, where the proportion of small and medium is 73% of total number of companies (see CZSO, 2015). We therefore consider the structure of the sample as representative.

In terms of ownership, enterprises with majority owners in the Czech Republic (holding more than 50%), of which there were 47.50%, prevailed. One quarter

of respondents had foreign owners (mostly in Europe) and the remaining 27.50% of enterprises did not have majority owners. The survey period was greatly influenced by the global financial crisis which manifested itself in the Czech Republic in 2011 and 2012. The instability of the internal environment was projected mainly in the high variability of the ROE indicator where the values fluctuated from -1,862% in 2012 to 1,600% in 2009.

**Tab. 1: Basic descriptive statistics of ROE**

Indicator		Period					
		2009	2010	2011	2012	2013	2014
ROE (index)	Average	0.2776	0.1374	0.0257	-0.2330	0.2852	0.0100
	St. Deviation	1.8283	0.8740	0.6348	2.1687	2.0470	1.6326
	Median	0.0665	0.0900	0.0819	0.0616	0.0649	0.1084
	Min. value	-2.3535	-3.8526	-3.0490	-18.6186	-6.7523	-12.2487
	Max. value	16.0000	6.1387	1.7838	1.5795	12.3037	3.2808

Source: authors' own processing

3.1 Factors compromising business performance

The results of evaluating factors negatively influencing improvement of business performance are shown in the following figure which gives an overview of factors and their most common rating. For example, the factor "incompetence of responsible employees" was often rated 10, the "insufficient MIS" factor was rated 6 (see Figure 1).

Fig. 1: Most commonly rated factors compromising business performance
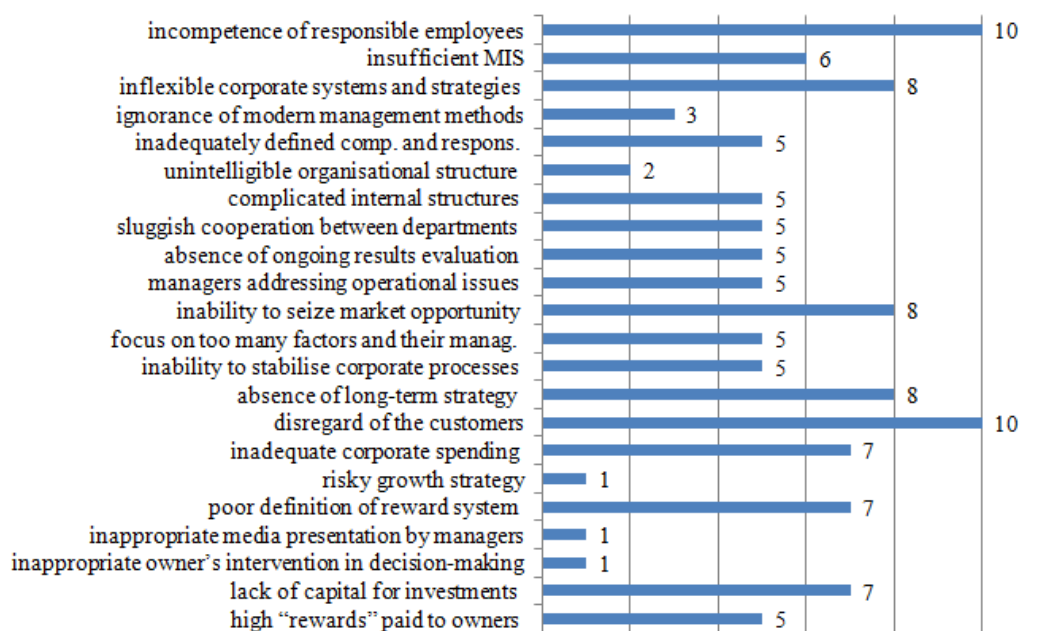
Source: authors' own processing

"Disregard of the customers" requirements" (with 37.5% respondents rating the highest score) and "incompetence of responsible employees" (43.75% respondents) were indicated as factors that most compromise business performance; while respondents less frequently chose the following factors: "risky growth strategy", "inappropriate media presentation by managers" and "inappropriate owner's intervention in decision-making". When analysing responses by **size of enterprise**, the biggest differences were identified between respondents from micro and small businesses on one hand and those from large corporations on the other. This was manifested mainly in factors such as "ignorance of modern management methods"; managers consider this factor to be very important as it might adversely affect business value; on the other hand, managers of micro-enterprises find

it to be the least important. Managers of large corporations consider the factor of "risky growth strategy" to be the least important in terms of a negative impact on business value but managers of small enterprises consider it to be important (mostly rated 8). The most frequent responses by size of enterprise are provided in Table 2.

Tab. 2: Most commonly rated factors compromising business performance by size of enterprise

Factor	Micro	Small	Medium	Large
Incompetence of responsible employees	10	10	10	10
Insufficient MIS	9	5	5	6
Inflexible corporate systems and strategies	8	3	8	8
Ignorance of modern management methods	2	5	3	8
Inadequately defined competences and responsibilities	10	3	5	8
Unintelligible organisational structure	5	5	2	2
Complicated internal structures	8	5	5	6
Sluggish cooperation between departments	5	6	5	5
Absence of ongoing results evaluation	10	5	5	3
Managers addressing operational issues	8	5	5	5
Inability to seize market opportunity	8	4	8	4
Focus on too many factors and their management	5	5	5	5
Inability to stabilise corporate processes	5	5	5	10
Absence of long-term strategy	5	8	7	10
Disregard of the customers' requirements	10	10	10	10
Inadequate corporate spending	10	7	7	8
Risky growth strategy	1	8	3	1
Poor definition of reward system	3	7	4	4
Inappropriate media presentation by managers	1	6	1	4
Inappropriate owner's intervention in decision-making	1	7	1	3
Lack of capital for investments	3	7	9	5
High "rewards" paid to owners	1	10	1	2

Source: authors' own processing

When analysing the rating by ownership structure the differences are less distinct: in 12 factors the enterprises agreed on the same rating regardless of the ownership structure. In this analysis we compared the responses of managers in enterprises with majority owners (foreign or local) with responses of managers with fragmented ownership structures (without a majority owner). The biggest differences were observed in the following factors:

- "Absence of long-term strategy" – respondents in companies with majority owners rated this factor as one of the most important (mostly rated 8 in enterprises with a foreign majority owner and 10 with a local majority owner); in enterprises with a fragmented ownership structure it was considered one of the least important factors (most often rated 3).

- "Inappropriate owner's intervention in decision-making" – enterprises without majority owners most often rated 10; those with a majority owner consider this the least important factor (rated 1).

- "Inflexible corporate systems and strategies" – respondents in companies with majority owners mostly rated 8; those without majority owners rated it 3.

- "Risky growth strategy" – this factor was rated as important by respondents from companies with foreign majority owners (mostly 6); in other groups it was mostly rated 1.

This selection of results shows that perception of factors compromising business performance varies depending on the enterprise size as well as on the ownership structure. It clearly follows from differences in managerial problems that are associated with the management of different types of businesses and the specifics of their business.

3.2 Factors supporting business performance

Factors that positively influence business performance growth and their most frequent rating are shown in the following figure (see Figure 2).

Fig. 2: Most frequently rated factors increasing business performance
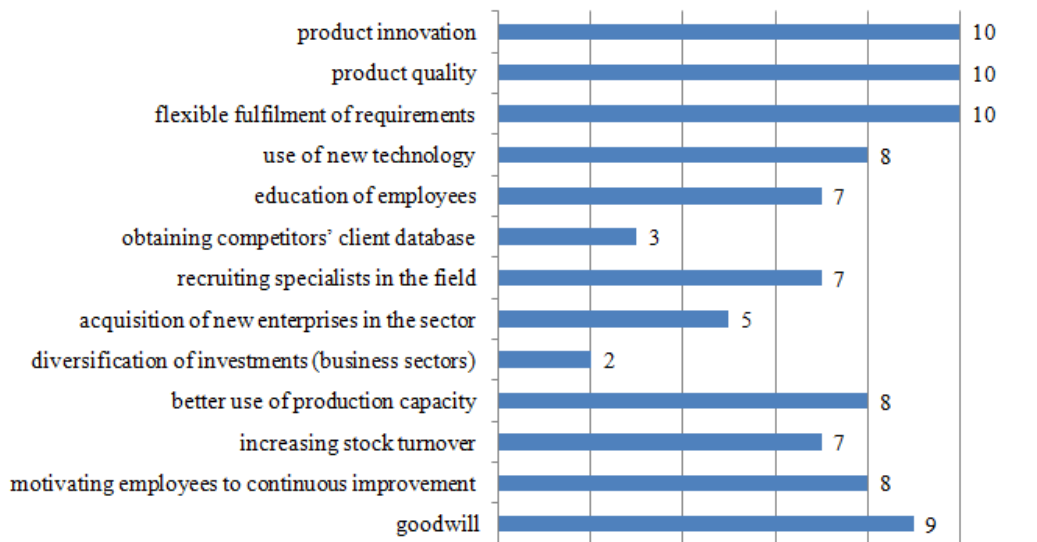
"Product quality" (52.5% of respondents assigned the highest rating for this factor), "flexible fulfilment of requirements" (35% of respondents assigned the highest rating), "product innovation" (29% of respondents assigned the highest rating) and "goodwill" (50% of respondents assigned two highest ratings) are most often considered the most important factors contributing to improvements in the performance of mechanical engineering companies. The least significant factors are the "diversification of investments (business sectors)" and "obtaining competitors' client database". When analysing the responses **by enterprise size** the differences are less distinct than in the analysis of factors compromising business value. The most striking difference in ratings was observed in the factor pertaining to the "better use of production capacity": managers of medium-sized enterprises rated this factor mostly 9; while managers of micro-enterprises rated it only 2, i.e. they do not consider it to be a major factor. Detailed results are shown in Table 3.

Tab. 3: Most frequently marked factors increasing business performance by size of enterprise

Factor	Micro	Small	Medium	Large
Product innovation	10	8	8	10
Product quality	10	10	10	10
Flexible fulfilment of requirements	10	10	10	8
Use of new technology	7	8	8	8
Education of employees	7	6	7	10
Obtaining competitors' client database	2	5	3	1
Recruiting specialists in the field	5	7	7	8
Acquisition of new enterprises in the sector	6	5	5	2
Diversification of investments (business sectors)	2	5	1	6
Better use of production capacity	2	7	9	4
Increasing stock turnover	7	7	5	10
Motivating employees to continuous improvement	8	6	7	7
Goodwill	9	10	9	10

Source: authors' own processing

When analysing the rating by ownership structure the differences are less distinct. In the case of factors such as "product innovation", "product quality", "flexible fulfilment of requirements", "better use of production capacity", "motivating employees to continuous improvement" and "goodwill", they were almost in agreement. A difference of three points was recorded in the following factors:

- "Use of new technology" – managers of enterprises without majority owners consider this factor to be one of average importance; managers of enterprises with majority owners find it to be very important.

- "Acquisition of new enterprises in the sector" – enterprises with local majority owners consider this factor to be unimportant (rating 2).

- "Diversification of investments (business sectors)" – managers of enterprises with foreign majority owners assign average importance to it; other enterprises find it unimportant (rating 2).

3.3 Non-financial factors determining business value and performance

When analysing the responses we tried to identify the relationship between ratings assigned to various factors and the business performance achieved. Business performance was measured using Return on Equity (ROE) indicators. By comparing managers' claims (rating assigned to individual factors) and the performance achieved by enterprises we tried to identify business performance factors. Firstly, we investigated whether the rated performance differed significantly in enterprises of various size or ownership structure. To this purpose we used the chi-square test of statistical independence. The results are shown in the following table.

Tab. 4: Test of statistical importance of size and ownership factors

Factor	Period	Chi-square	p-value	Factor	Chi-square	p-value
Size	2009	15.95801	0.193167	Ownership	6.02101	0.987867
	2010	6.725926	0.665630		7.590175	0.816281
	2011	10.82953	0.543582		7.83049	0.953753
	2012	3.987981	0.262765		1.092780	0.895416
	2013	19.47857	0.362927		13.58141	0.955547
	2014	1.081413	0.781563		1.226054	0.873791

Source: authors' own processing

According to the result of the chi-square test, neither the size nor the type of ownership are important factors significantly affecting performance measured by ROE at any standard significance level. Therefore there is no need to divide the responses by size and type of ownership and evaluate the performance of different groups of enterprises separately. We again used the chi-square test of statistical independence for the evaluation of the impact of non-financial factors on business performance.

Tab. 5: Statistically significant factors of business performance

Factor	Year	Chi-sq.	p-value
Ignorance of modern management methods	2011**	52.47042	0.037427
Inadequately defined competences and responsibilities	2010***	50.09947	0.004432
	2013***	109.4579	0.000012
Unintelligible organisational structure	2011**	53.56772	0.02995
Focus on too many factors and their managem.	2011**	54.21918	0.026168
Inability to stabilise corporate processes	2011**	56.32829	0.016677
Inappropriate media presentation by managers	2009*	42.74089	0.0972
	2010**	42.18864	0.012291
Inappropriate owner's intervention in decision-making	2009*	47.54166	0.094439
Product innovation	2012***	38.99359	0.000002
Flexible fulfilment of requirements	2012***	38.99359	0.000002
Education of employees	2014**	20.65608	0.014268
Obtaining competitors' client database	2009*	49.90604	0.061551
Recruiting specialists in the field	2011**	52.73059	0.035519
Acquisition of new enterprises in the sector	2011***	67.7845	0.001054
Obtaining competitors' client database	2010***	49.95912	0.001433
	2011**	49.46407	0.02509
	2013**	67.4115	0.033656
Better use of production capacity	2011***	62.55969	0.003947

Note: *significant at 10% level of significance, **significant at 5% level of significance, ***significant at 1% level of significance.

Source: authors' own processing

The tables above contain the results of the testing of non-financial factors showing only those factors that achieve a level of significance of at least 10% in at least one of the evaluated periods; 14 such factors were identified. Of these 14 factors there are only six which are at the level of 1% significance in at least one period. If we evaluated factors which reach the defined level of significance in at least two periods there would be a single factor, "inappropriately defined competences and responsibilities", i.e. a factor that compromises business performance and was important in the years 2010 and 2013. Other factors that reach this level of significance are: "acquisition of new businesses in the sector", "product innovation", "flexible fulfilment of requirements", "recruitment of specialists" and "better use of production capacity". The "acquisition of new enterprises in the field" factor has a 5% level of significance in as many as three periods (2010, 2011, 2013). Other factors improving business performance at this level of significance are "education of employees" and "obtaining competitors' client database". Four factors exacerbating business performance are on the same level of significance: "ignorance of modern management methods", "focus on too many factors and their management", "unintelligible organisational structure" and "inappropriate media presentation by managers". The last factor compromising business performance which achieved some statistical significance,

specifically 10%, is the "inappropriate owner's intervention in decision-making". The results of statistical tests only partially correspond with the perception and evaluation of factors under assessment. One reason could be the high variability of performance affected by the global financial crisis (see Table 1). Another reason might be the fact that managers rated the significance of factors from the point of view of their own personal experience which had not yet been reflected in business operations (i.e. if it had worked, the enterprise could have achieved better performance).

Conclusion

The aim of this paper was to identify qualitative factors that affect the performance of mechanical engineering companies in the Czech Republic. Data used in this research were obtained in a questionnaire survey among senior managers. As part of the questionnaire survey the respondents rated factors which cause reductions in business performance as well as factors that improve business performance, i.e. the potential value drivers. Based on the questionnaire survey, factors compromising business performance are "disregard of the customers' requirements" and "incompetence of responsible employees". A statistically significant relationship was, however, not established between these two factors. "Product quality", "flexible meeting of customers' requirements", "product innovation" and "goodwill" are most often regarded by managers as the most important factors supporting the increase of performance in mechanical engineering companies. We compared the responses obtained with actual business performance, i.e. we tried to verify whether the evaluation of factors by managers corresponded to performance achieved. To this purpose we used the chi-square test of statistical independence. The tester evaluated 14 statistically significant factors. The factor rated as most significant was: "inadequately defined competences and responsibilities".

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