

Suchánek, Petr; Štěrbá, Martin

Article

Models of value creation measurement in different manufacturing industry sectors in the Czech Republic

Trends Economics and Management

Provided in Cooperation with:

Faculty of Business and Management, Brno University of Technology

Suggested Citation: Suchánek, Petr; Štěrbá, Martin (2018) : Models of value creation measurement in different manufacturing industry sectors in the Czech Republic, Trends Economics and Management, ISSN 2336-6508, Brno University of Technology, Faculty of Business and Management, Brno, Vol. 12, Iss. 31, pp. 101-114,
<https://doi.org/10.13164/trends.2018.31.101>

This Version is available at:

<https://hdl.handle.net/10419/308885>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



<https://creativecommons.org/licenses/by/4.0/>

Models of Value Creation Measurement in Different Manufacturing Industry Sectors in the Czech Republic

Petr Suchánek, Martin Štěrba

Abstract

Purpose of the article: The subject of this article is the construction of a model which is able to measure whether an enterprise is creating or destroying value. In the light of our previous research, we are not seeking to create a universal model, instead we want to create a set of special models that consider the specificities of different sectors. Therefore, we have created three models especially for the food industry, engineering and transportation.

Methodology/methods: We used the financial analysis, portfolio analysis and logistic regression.

Scientific aim: The aim of the article is to construct value-measuring models in various sectors of the manufacturing industry. We start from the premise that it is very difficult to construct a universal model that is able to measure the value in different sectors equally well. Therefore, using the example of three manufacturing industries (namely the food industry, engineering and transportation), we constructed three models and then compared and discussed the differences observed.

Findings: The results confirmed that there are significant differences between the models of value creation within the three sectors which we studied. The main difference in each sector is its capital structure. For each model, we selected a different number of indicators using statistical methods to create the optimal model.

Conclusions: The first research limitation is that the focus is only on three sectors. As part of further research, it will be necessary to construct different models in other sectors as well. The second limitation of the research is that it focuses purely on finance, which does not allow many options to identify and discuss the internal and qualitative differences of the enterprises and sectors under examination, which could contribute to increasing the accuracy of the model. The model is constructed from publicly available data, which is both a limitation and an advantage.

Keywords: EVA ratio, value creation model, financial analysis, performance

JEL Classification: G31, L61, L62, L66

Introduction

The subject of this article is the construction of a model (value creation model – VCM), which is able to measure whether an enterprise is creating or destroying value. However, in the light of our previous research, we did not seek to create a universal model but, on the contrary, we wanted to create a set of special models that consider the specificities of different branches. Therefore, the objective of this article is to construct models to measure value creation in various sectors of the manufacturing industry. We start from the premise that it is very difficult to construct a universal model that is able to measure the value in different sectors equally well. Performance and the factors which affect it are different in different branches (Hawawini *et al.*, 2003). This is why we constructed three models on the basis of the three selected sectors of the manufacturing industry (food, engineering and transport), and we subsequently compare and discuss any differences discovered. In addition to the differences found within the models, we also want to discuss the causes of these differences, including general cross-sectoral differences.

There exist many concepts and definitions of value (Möller, Törrönen, 2003) and it depends on the perspective of the value, including the place, time and purpose of its definition (Wilson, Jantrania, 1994). In our research we looked at value from the perspective of the company, *i.e.* the financial value of the company as defined by Möller, Törrönen (2003). This concept corresponds with the definition of value in business markets which defines values as “the perceived worth in monetary units of the set of economic, technical, service and social benefits received by a customer firm in exchange for the price paid for a product offering, taking into consideration the available alternative suppliers’ offerings and prices” (Anderson *et al.*, 1992). This definition is used mainly

in marketing, and the authors also focus primarily on the customer and the value provided by the company to the customer. However, in our research we will focus on the company, emphasizing the value the customer places on the company through the price for its product. Here we can use the financial and accounting concept which identifies value with the value of the company’s (active) assets, whether this is the market value or the liquidation value, *etc.* (Wilson, Jantrania, 1994).

The accounting concept of value can also be linked to the shareholder value through measurement based on accounting data (Ezzamel *et al.*, 2008). Researching value in companies today shows that they focus on maximising shareholder value while economic value measurement and financial measurement are integrated to help management achieve their goals (Esbouei *et al.*, 2014). With this in mind, value creation can focus on shareholder value and when assessing it we can use financial indicators including the EVA indicator constructed on the basis of accounting data. Due to its focus on shareholder value, in our research the EVA indicator is constructed from the ROE (EVA equity) indicator (Varaiya *et al.*, 1987).

The EVA indicator also measures financial value, where it is also possible to use traditional ratio indicators (de Wet, 2005). It is also possible to divide into two groups those indicators which can measure financial value; traditional indicators (for example, ROE and ROA) and modern indicators (EVA), which measure the same financial value in a different way (Yalcin *et al.*, 2012).

The EVA indicator is a synthetic indicator which consists directly of accounting data which is arranged into certain relationships, or they are incorporated indirectly into them as part of the influence from the level of risk which the indicator enters into (more detail in the methodology section). If it is possible to measure shareholder wealth (as a healthy company – authors’ note) using the

EVA indicator (Lee, 1996), it is also possible to use a synthetic indicator assessing the financial health of a company to measure shareholder value. It is also possible to set up a different synthetic indicator to this one which consists of ratio indicators based on accounting data which would then identify the financial value drivers in the accounting of the respective companies. This approach was selected by, for example, the Neumaier (Neumaierová, Neumaier, 2002), who unlike us constructed one universal indicator for all of the sectors.

1. Methodology

Based on the value from the EVA indicator, companies will be divided into three groups. The first group (companies creating value) will consist of companies where the value of the EVA indicator is > 0 , the second group (companies from the grey zone – *i.e.* companies where it is impossible to categorically state whether they create or destroy value) will consist of companies where the value of the EVA indicator is < 0 and at the same time the value of the ROE indicator is > 0 . The third group (companies destroying value) will consist of companies where the EVA indicator is < 0 and at the same time the ROE indicator is < 0 .

The construction of the EVA indicator is based on methodology from the Czech Republic Ministry of Trade and Industry (Department of Economic Analysis, 2014), which is based on the so-called modular formula. This construction was used in order to compare results within the sectors (the sector average according to MPO \times the sector average of the selected sample). The general construction for the EVA indicator, which also contains the indicators ROE, cost of equity (r_e) and amount of equity capital (VK) is as follows:

$$EVA = (ROE - r_e) \cdot VK, \quad (1)$$

where:

<i>EVA</i>	economic value added,
<i>ROE</i>	return on equity,
r_e	alternative cost of equity,
<i>VK</i>	equity.

The cost of equity is calculated using the above-mentioned modular formula and represents the sum of the risk-free rate of return, business risk, financial stability risk, business size risk and financial structure risk.

After dividing the companies into their respective groups (companies creating value, companies destroying value and companies from the grey zone), a profile analysis will be carried out on each individual company in the groups where companies create and destroy value. The narrowing of the profile analysis to two groups of companies (without the grey-zone companies) is based on the assumption that, among the clearer and more precisely profiled groups of companies (*i.e.* the groups of companies with more distinct differences in the EVA indicator), the differences between the financial indicators will also be more distinct and obvious. This should then lead to the creation of a better (more accurate) VCM model from these financial indicators.

32 ordinary financial indicators will be used for this analysis (see appendix), again constructed according to the methodology of the Czech Republic Ministry of Trade and Industry (Department of Economic Analysis, 2014).

A profile analysis allows for a comparison of the individual financial indicators in both groups of companies and determines their differences. In order to create a model which would be best able to differentiate those companies creating and destroying value, all of the indicators will be used which will gradually be eliminated so that in the final model there remain only the statistically significant indicators, and at the same time the highest level of the model's explanatory power will also be achieved.

The second step leads to the modelling of indicators using logistic regression. Logistic regression can be used if there are only two expected outcomes – the company either creates or destroys value. This is another reason why the model is only constructed from the value of companies creating and destroying value (without grey-zone companies) according to the EVA indicator.

The assumption of normality is important for logistic regression. This assumption is met in this model as the data is gathered from the basic set and not only from a selection of data (Pecáková, 2007). At the same time, it is essential that both results are adequately represented in the data (Hendl, 2012). Subsequently, it is possible to construct a logistic regression model (Hosmer, 2000). Specific calculations were made using GRETL statistical software (Gretl, 2016). To verify the reliability of the variables model, a t-test was used with a significance level of $p=5\%$.

To verify the validity of the model overall, a chi-squared test was used. The $p\text{-value}<0.05$ rejects a zero hypothesis, which states that a model without residue is better than had been assumed, which can then be interpreted as meaning the model is reliable (it gives the right results).

The individual financial indicators (including the EVA indicator) are interrelated due to the use of the same or similar input data. Therefore, the multicollinearity of the model variables is also tested within the resulting model. This test measures the intensity of the dependency between two or more explanatory variables, while assessing the capacity of the multicollinearity rate. The multicollinearity (VIF) value calculation is as follows:

$$VIF(j) = 1 / (1 - R(j)^2), \quad (2)$$

where:

j variable,
 $R(j)$ multiple correlation coefficient between the variable j and the other independent variables.

The collinearity test supports the model if the minimum value is greater than 1 and less than 10. Within this framework, multicollinearity is permissible.

The equation of the logistic regression of the VCM index model, capable of distinguishing between companies which can create or destroy value, and is constructed using logistic regression, will have the following form:

$$VCM = \frac{1}{1 + e^{-(a + b_1 \cdot x_1 + b_2 \cdot x_2 \dots b_n \cdot x_n)}}, \quad (3)$$

where:

x_1 to x_n financial indicators are used (see Appendix),
 b_1 to b_n their coefficients,
 a constant.

For a company to be classified as creating value, it has to achieve values on the VCM index according to established boundaries, boundaries which differ for different sectors and which can be easily read from the enclosed interpretive tables. Based on the boundaries shown in the tables, it can be determined whether a company creates or destroys value. In the interval between these values of the index, the company is classified as a company from the grey zone, where it is impossible to categorically decide if value is being created or destroyed.

The companies from the research sample are Czech companies with at least 25 employees and have existed since at least 2013. For the research we used data from 2014. This data is easily available on the Bisnode database. This approach also meant that there was the partial removal of the influence of a company's life cycle, or at least the first phase when a company's performance is significantly lower (Anthony, Ramesh, 1992). For this research the authors selected 2,852 companies (from a total of 3,467, i.e. 82.26%). Although other companies do exist, they do not comply with the statutory disclosure obligation and, therefore, it is impossible to

access their financial data.

The research set was divided into three groups according to sector (see Table 1 above). Table 1 demonstrates that the number of companies in the individual sectors was similar to the overall number of companies in these sectors. As part of the research each sector was then analysed separately.

2. Results

The first step was to carry out profile analyses. These gave the specific values of ratio indicators for the companies and sectors. The second step was to calculate the value of the EVA indicator for all of the companies in the individual sectors and these companies were then divided into companies which destroy value, create value and are from the grey zone (see methodology). The companies from the groups creating and destroying value were then modelled using logistic regression, where the relevant values of the ratio indicators for the companies were used. In this way three models were established for each sector separately. The results from these models were then retrospectively compared across the sample of companies for the individual sectors with the results of the EVA indicator.

2.1 Engineering

990 companies were analysed from this sector, of which 544 (55.96% of the companies) create value and 425 (44.04% of the companies) destroy value according to the EVA indicator. In the first phase of the calculation there were also grey-zone companies among the companies destroying value as the initial calculation was carried out directly according to the EVA indicator (these results are shown in Table 2). Afterwards, the grey-zone companies were removed from the companies destroying value (*i.e.* companies whose ROE was positive). Therefore, in reality the number of companies destroying value is smaller. From the results, it is also obvious that the majority of the companies in the sample created value.

For the next step a model was created for the relevant sector using logistic regression. All of the calculated values of the ratio indicators were used from the profile analyses and the statistically insignificant items were removed (according to the p-value above – $p > 0.05$). In this way every model was reduced to the point where it was no longer possible to reduce the number of indicators. Firstly, due to the low p-value ($p < 0.05$), and then due to the reduction of the model's explanatory power. Regardless, we proceeded using the two other models.

Table 1. Characteristics of the companies in the sample.

Sector	CZ NACE	Selected companies overall	Selected companies as a % of the whole	Total number of companies
Engineering	C 27, C 28	979	75%	1,320
Transport	H 49	886	76.8%	1,151
Food	C 10, C 11	870	88.15%	996

Source: the authors.

Table 2. Engineering – characteristics of the companies.

Group of companies	Number	EVA average	EVA max	EVA min	ROE average	ROE max	ROE min
Creating value	544	350,012	44,968,063	20	20%	639%	0.01%
Destroying value	425	-675 125	-19	-33,170,502	-30%	-0.09%	-531%

Source: the authors.

Table 3. Results of the collinearity test of the model variables.

Variable	Value of the correlation coefficient	p-value
Costs	1.185	0.0099
ROS	1.179	0.0001
Turnover of equity	1.012	0.0005
Interest coverage	1.001	0.0004

Source: the authors.

Table 4. Engineering – Results from testing the model with input data.

	CVM values	Number of companies	% of the sample	Conformity
area of companies creating value	<0.248	549	56.1%	95.1%
area of “grey zone” companies	between	22	2.3%	not identified
area of companies destroying value	>0.502	408	41.6%	96.8%

Source: the authors.

As the data comes from internal company documents, there is the potential proximity of individual data and potential interaction. This is why a test was carried out to discover potential collinearity (see Table 3). With regard to the values arrived at, it is possible to state that the resulting model is acceptable and potential collinearity in the indicators was not found. The p-value was also monitored to see if the individual parameters did not exceed a value 0.05. This was also not found. The chi-squared test of the model achieves a value of 316.51, which is a value indicating that the zero hypothesis can be rejected. The model can be considered to be reliable.

The result is a linear regression equation model. For engineering, the following model was constructed:

$$VCM(engineering) = \frac{1}{1 + e^{-(3.599 - 3.75 \cdot F_1 + 4.059 \cdot F_2 + 48.632 \cdot F_3 + 0.127 \cdot F_4)}}, \quad (4)$$

where:

- F_1 costs,
- F_2 interest coverage,
- F_3 ROS,
- F_4 turnover of equity.

The results show that four indicators are decisive for creating value in engineering:

costs, interest coverage, ROS and turnover of equity. A growth in these indicators leads to a growth in value with the exception of the costs indicator. With the construction of this indicator, however, it is logical that with a growth in costs the value of the company will drop and vice versa. It demonstrates that in order to increase the value of the company, there are important indicators in engineering within the areas of activity (operation), profitability and company indebtedness. It can be stated that an increase in return on equity leads to an increase in profitability (ROS), which is furthermore supported by a decrease in cost. A growth in interest coverage then indicates that a growth in value can be achieved either by increasing the returns from existing sources or by increasing indebtedness, which will not increase costs (*i.e.* by increasing the amount of short-term liabilities from trading).

The chi-squared test and the p-value were verified by the individual indicators in the model and the model can be said to be reliable. The model was then retrospectively applied to companies from the engineering sector including those which were originally removed from the sample (the grey-zone companies). This provided information on the explanatory power of the model, and on

the basis of this power the company could be arranged into the same group according to the EVA indicator. The results are shown in Table 4.

Despite a certain imbalance in the individual groups of companies where the value-creating enterprises predominated, the results of the conformity assessment by the VCM and the EVA indicator are very good. Therefore, it is assumed that the model will determine the engineering companies' value creation to a high degree of accuracy.

2.2 Transportation

For this sector there were 884 companies, of which 612 (69.11% of the companies) create value and 274 (30.89% of the companies) destroy value according to the EVA indicator. For the results shown in Table 5, the same characteristics apply as for the engineering companies. Here too the number of companies creating value is higher than for companies destroying value, and to a more significant degree than for the engineering companies.

The data acquired from the transport sector was used to create the following linear regression model:

$$VCM(transportation) = \frac{1}{1 + e^{-(0.865 - 1.551 \cdot F_1 + 2.012 \cdot F_2 + 0.0002 \cdot F_3 + 0.0002 \cdot F_4)}}, \quad (5)$$

where:

F_1	interest coverage,
F_2	overall indebtedness,
F_3	working capital,
F_4	EBIT.

As the data comes from internal company documents, there is also the potential proximity of individual data and potential interaction. This was why another test was carried out to discover potential collinearity (see Table 6). The results demonstrate that the model is acceptable and potential collinearity in the indicators was not found. The p-value was also monitored to see if the individual value parameters exceeded 0.05. This was also not found. A chi-squared test of the model achieved a value of 104.53, which is a value indicating that the zero hypothesis can be rejected. The model can be considered to be reliable.

The results show that there are four decisive indicators for the creation of value by transport companies: interest coverage, total debt, working capital and EBIT. A growth in all of these indicators leads to a growth in the company value. It shows that for the transport sector there is a decisive influence from debt and liquidity, and its influence on profit (EBIT). The creation of value by transport companies is also linked to the positive

Table 5. Transportation – characteristics of the companies' results.

Group of companies	Number	EVA average	EVA max	EVA min	ROE average	ROE max	ROE min
Creating value	612	60,493	6,098,360	0	31%	443%	0%
Destroying value	274	-296,201	-12	-11,632,284	-47%	-0.08%	-606%

Source: the authors.

Table 6. Results of the collinearity test of the model variables.

Variable	Value of the correlation coefficient	p-value
Interest coverage	1.001	0.0010
Total debt	1.018	0.0026
Working capital	1.516	0.0021
EBIT	1.512	0.0002

Source: the authors.

Table 7. Transport – Results from testing the model with input data.

	CVM values	Number of companies	% of the sample	Conformity
area of companies creating value	>0.789	565	63.8%	97.2%
area of „grey zone“ companies	between	50	5.6%	not identified
area of companies destroying value	<0.167	271	30.6%	92.3%

Source: the authors.

Table 8. The food industry – characteristics of the companies' results.

Group of companies	Number	EVA average	EVA max	EVA min	ROE average	ROE max	ROE min
Creating value	513	192,972	13,649,896	8	25%	746%	0%
Destroying value	357	–157,162	–2	–6,820,200	–31%	–0.01%	–609%

Source: the authors.

effect of financial leverage and it can be stated that a growth in financial leverage and its positive effect on profit increases a company's value. Regarding the growth of working capital and its positive influence on value, it can be stated that the growth of debt should be linked mainly to a growth in long-term debt.

The chi-squared test and the p-value were verified by the individual indicators in the model and the model can be said to be reliable. The model was then retrospectively applied to transport companies including those which were originally removed from the sample (the grey-zone companies). This provided information on the explanatory power of the model, and on the basis of this power the company could be arranged into the same group according to the EVA indicator. The results are shown in Table 7.

Despite a certain imbalance in the individual groups of companies where the value-creating enterprises predominated, the results of the conformity evaluation by the VCM and the EVA indicator are very good. Therefore, it is assumed that the model will determine the transport companies' value creation to a high degree of accuracy, particularly for value-creating companies.

2.3 The Food Industry

For this sector there were 870 companies, of which 513 (51.81% of the companies) crea-

te value and 357 (48.19% of the companies) destroy value according to the EVA indicator. For the results shown in Table 8, the same characteristics apply as for the engineering companies. Here too the number companies creating value is significantly higher, a situation which is similar to the engineering companies.

The data acquired from the food-industry sector was again used to create the following linear regression:

$$VCM(\text{food industry}) = \frac{-(2.951 - 0.233 \cdot F_1 + 5.981 \cdot F_2 + 1.247 \cdot F_3 + 0.031 \cdot F_4 + 23.19 \cdot F_5 + 0.14 \cdot F_6)}{(6)}$$

where:

F_1	current liquidity,
F_2	the share of own resources,
F_3	ROS,
F_4	asset turnover,
F_5	ROA,
F_6	net profit margin.

A test was also carried out in this case to discover potential collinearity (see Table 9). The results demonstrate that the model is acceptable and potential collinearity in the indicators was not found. The p-value was also monitored to see if the individual value parameters exceeded 0.05. This was also not found. A chi-squared test of the model achieved a value of 152.77, which is a value indicating that the zero hypothesis can be

rejected. The model can be considered to be reliable.

The results show that there are six decisive indicators for the creation of value in companies from the food industry: current liquidity, share of own resources, ROS, asset turnover, ROA and net profit margin. Some of these indicators operate in a standard manner on value creation, *i.e.* it is quite logical that the creation of value (its growth) positively influences ROA (its growth) and net profit margin (its growth). The positive influence of current liquidity shows the importance of payment ability, or financial stability, in value creation, and this indicator is also reflected in the EVA indicator. Somewhat more problematic is the effect of the remaining three indicators whose growth usually means a growth in value. However, in the case of the food industry a fall in equity, a fall in ROS and a fall in asset turnover cause a growth in value, which is unusual in the interaction between ROA and net profit margin, which must, on the contrary, rise. In order to lower the share of equity, it is appropriate to include additional foreign capital (long-term is better due to liquidity), at least instead of

equity (which is reduced by, for example, the division of profit among shareholders, again with regard to liquidity). As a result, assets will not decrease, instead they will stay the same or will rise slightly, which also leads to increased ROA with the positive effect of financial leverage. With the same revenue this increase will push for a reduction in asset turnover. For the net profit margin to grow at the same time, it is necessary for profit to rise at least slightly, either through rising prices or a fall in costs relating to the product. However, if ROS has also to fall, the company will have to increase revenue outside of its operational activities, either from financial or other earnings.

It is obvious from the above that in the case of food-industry companies, it is very difficult to easily establish the conditions for creating company value. When looking at the weights of the individual indicators in the model, it is clear that the dominant indicators are the share of equity, which must fall, and the ROA, which must rise. This suggests that it is necessary to use the positive effect of financial leverage and through a growth in debt increase EBIT and net profit. With

Table 9. Results of the collinearity test of the model variables.

Variable	Value of correlation coefficient	p-value
Current liquidity	1.242	0.0016
Share of own resources	1.452	0.0002
ROS	1.147	0.0009
Asset turnover	1.009	0.0058
ROA	1.264	0.0003
Net profit margin	1.140	0.0002

Source: the authors.

Table 10. The Food Industry – Results from testing the model with input data.

	CVM values	Number of companies	% of the sample	Conformity
area of companies creating value	>0.912	348	40.0%	87.3%
area of „grey zone“ companies	between	172	19.7%	not identified
area of companies destroying value	<0.818	350	40.3%	89.5%

Source: the authors.

regard to ROS, the third strongest indicator, it is necessary to achieve higher revenue growths in areas other than sales.

The chi-squared test and the p-value were verified by the individual indicators in the model and the model can be said to be reliable. The model was then retrospectively applied to food-industry companies including those which were originally removed from the sample (the grey-zone companies). This provided information on the explanatory power of the model, and on the basis of this power the company could be arranged into the same group according to the EVA indicator. The results are shown in Table 10.

Again, despite a certain imbalance in the individual groups of companies where the value-creating enterprises predominated, the results of the conformity assessment by the VCM and the EVA indicator are very good. Therefore, it is assumed that the model will determine the food-industry companies' value creation to a high degree of accuracy. However, this level will probably be lower than for the engineering companies.

3. Discussion

The results show that in the three chosen sectors, three different VCM models were constructed which have different indicators that act differently on value growth (whilst the growth of the majority of the indicators leads to a growth in value, in some cases a decrease of the indicator leads to a growth in value). It would, therefore, appear that the construction of special VCM is models for the individual sectors is the correct course.

The same indicator did not appear in any of the three models created. From this it can be deduced that there does not exist a universal indicator across the sectors which would be connected with company value. On the contrary, it would appear that these indicators are designed for specific sectors. This demonstrates that value in different sectors

is formed in different places, that there exist different forces (the given weight of the relevant indicator), which operate on value creation in different sectors.

The indicators which appeared at least in two of the three models constructed were interest coverage (engineering and transport) and ROS (engineering and the food industry). While in both cases the growth in interest coverage influences the growth in value, meaning that this indicator can be considered to be an important indicator for contributing towards growth in more sectors, the situation is different for the ROS indicator. In the case of engineering, a growth in the ROS indicator leads to a growth in value, but for food-industry companies it leads to a drop in value. It would, therefore, appear that this indicator is the result of different activities or processes in both sectors. In the case of engineering companies, it seems to evaluate the ability to generate profit from the revenue of the company's production, which corresponds with the main activities of the company and the ability to generate value through the ability to create profit from production sales. For food-industry companies it would appear that the growth in value is connected more with the ability to also create revenues from activities other than selling the company's product, where it is mainly about the volume of revenue at the expense of profitability, which might be lower (lower added value meaning a lower price).

When looking at the representation of the basic groups of indicators, it is obvious that the indicators for influencing value across all sectors are profitability (indirectly in the case of transport in the EBIT indicator), activity and indebtedness. Only in the case of food-industry companies is the liquidity indicator added to these groups. In the case of companies from the transport sector, the working capital indicator is represented indirectly by liquidity.

All of the models are created mainly from ratio indicators. In this regard the transport

sector is an exception as two non-ratio indicators appear (EBIT and working capital). It would seem that the appearance of these indicators could be linked to the comparability of the companies in terms of size and with the size of the sample structure, which will need to be confirmed. However, in each case it is shown as legitimate to use absolute indicators when examining the ability to create value in a company.

4. Conclusion

The results supported our previous research (Suchánek, Štěrbá, 2017) in the sense that is appropriate to create special VCM models for value creation based on individual sectors. For the three sectors of the manufacturing industry under examination it at least confirmed that the special individual models have better explanatory power when applied to the relevant sector rather than one universal model. The models work with different numbers of indicators and with various indicators despite the fact that the groups of indicators are often the same, but the indicators in the model are arranged differently. Only in the case of the transport sector does the growth of all of the indicators positively affect value growth. For the engineering companies the drop in one, and for the food-industry companies a drop in three indicators, contributes towards value creation.

Put simply, it can be said that for all the sectors the key relationship is between indebtedness, profitability and activity, when the creation of value can be identified with the ability to create profit (whether absolutely or relatively) for the company as a whole with the sensible use of debts (with the lowest expense on interest), with the ability to increase a company's efficiency through the return on assets (whether partly or as a whole), and through reducing costs. In some cases (in particular the food industry and transport to a lesser extent), it is necessary to

also take into consideration liquidity (working capital). However, at least in the case of the food-industry companies the interdependence of value-rating indicators is untypical (see the opposite effect of ROS and ROA), and that without further analysis it is very difficult to recommend a solution to companies, which would lead to an unambiguous maximization of value.

The above-described models of modeling and its measurement are fundamentally different from the models usually used. The difference is reflected in the perception of sector diversity. Compared to the most well-known EVA model (Stern, Stewart, 1991), which is primarily intended for companies listed on the capital market and does not take into account the differences between sectors and thus between enterprises across sectors. The Czech INFA model (Neumaier, Neumairová, 2002) takes into account the Czech, and therefore European, specificity that enterprises need financing from foreign sources rather than from entering the stock exchange, but we still see here that the sectoral factor is not taken into account. Our models are unique in this. The value is assessed purely in terms of financial data, rather than the value of the company for consumers wider (Besanko *et al.*, 2012; Grennan, 2014), nor does it attempt to quantify the value for other entities, which we can call such as stakeholders (Charreaux, Desbrières, 2001).

One of the main limitations of the results is the short time period within which the model was created (based on one year's results). As part of further research, we would like to test the model on data over a longer period. Another limitation is that only three sectors were selected. In future, it will be necessary to create additional models for other sectors. Another definite limitation is the controversial results from the food-industry model. As part of further research, it would be advisable to use modelling and simulation to analyse the financial impact on the creation and growth of a company's value in order to

recommend a meaningful strategy to companies which would lead to the creation and growth of value.

References

Anderson, J. C., Jain, D. C., Chintagunta, P. K. (1992). Customer value assessment in business markets: A state-of-practice study. *Journal of Business-to-Business Marketing*, 1(1), pp. 3–29.

Anthony, J. H., Ramesh, K. (1992). Association between accounting performance measures and stock prices: A test of the life cycle hypothesis. *Journal of Accounting and economics*, 15(2–3), pp. 203–227.

Besanko D., Dranove D., Shanley M., Schaefer S. 2012.

Economics of Strategy (6th edn). Wiley: New York.

Besanko D., Dranove D., Shanley M., Schaefer S. 2012.

Economics of Strategy (6th edn). Wiley: New York.

Besanko, D., Dranove, D., Shanley, M., Schaefer, S. (2012). *Economics of Strategy*. 6th ed. Wiley: New York.

Charreaux, G., Desbrières, P. (2001). Corporate governance: stakeholder value versus shareholder value. *Journal of Management & Governance*, 5(2), pp. 107–128.

Department of Economic Analysis (2014). *Finacial analysis 2014, Ministry of Industry and Trade, 2015*. Retrieved from: <http://www.mpo.cz/dokument157262.html> pp. 158–161.

de Wet, J. H. (2005). EVA versus traditional accounting measures of performance as drivers of shareholder value—A comparative analysis. *Meditari Accountancy Research*, 13(2), pp. 1–16.

Esbouei, S. K., Ghadikolaei, A. S., Antucheviciene, J. (2014). Using FANP and fuzzy VIKOR for ranking manufacturing companies based on their financial performance. *Economic Computation and Economic Cybernetics Studies and Research*, 48(3), pp. 141–162.

Acknowledgement

This article is an output from the project “Management approach to reducing reverse flows in relation to customer satisfaction and continual improvement”, Czech Science Foundation no. GA 16-16260S.

Ezzamel, M., Willmott, H., Worthington, F. (2008). Manufacturing shareholder value: The role of accounting in organizational transformation. *Accounting, Organizations and Society*, 33(2), pp. 107–140.

Grennan, M. (2014). Bargaining ability and competitive advantage: empirical evidence from medical devices. *Management Science*, 60(12), pp. 3011–3025.

Hawawini, G., Subramanian, V., Verdin, P. (2003). Is performance driven by industry- or firm-specific factors? A new look at the evidence. *Strategic management journal*, 24(1), pp. 1–16.

Hendl, J. (2012): *Overview of statistical methods: data analysis and meta-analysis*. 4th ed. Praha: Portál, 53 pp.

Hosmer, E. (2000). *Applied logistic regression*. 2nd ed. New York: John Wiley, 158–203 pp.

Lee, C. M. (1996). Measuring wealth. *CA Magazine*, 129(3), pp. 32–37.

Möller, K. K., Törrönen, P. (2003). Business suppliers’ value creation potential: A capability-based analysis. *Industrial Marketing Management*, 32(2), pp. 109–118.

Neumaierová, I., Neumaier, I. (2002). *Performance and market value of the company*. 1st ed. Praha: Grada, 216 pp.

Pecáková, I. (2007). Logistic regression with a multichannel explanatory variable. *Acta Oeconomica Pragensia*, 15(1), pp. 86–96.

Stern, J. M., Stewart, G. B., Chew, D. H. (1991). The EVA Financial Management System. *Journal of Applied Corporate Finance*, 8(2), pp. 32–46.

Priem RL. 2007. A consumer perspective on value creation. *Academy of Management Review* 32(1): 219–235.

em RL. 2007. A consumer perspective on value creation. *Academy of Management Review* 32(1): 219–235.

Suchánek, P., Štěřba, M. (2017). The Efficiency of the Value Creation Model in the Manufacturing Industry in the Czech Republic. *International Scientific Conference of Business Economics Management and Marketing*, 2(1), pp. 273–283.

Varaiya, N., Kerin, R. A., Weeks, D. (1987). The relationship between growth, profitability, and firm value. *Strategic Management Journal*, 8(5), pp. 487–497.

Wilson, D. T., Jantrania, S. (1994). Understanding the value of a relationship. *Asia-Australia marketing journal*, 2(1), pp. 55–66.

Yalcin, N., Bayrakdaroglu, A., Kahraman, C. (2012). Application of fuzzy multi-criteria decision making methods for financial performance evaluation of Turkish manufacturing industries. *Expert Systems with Applications*, 39(1), pp. 350–364.

Reference for Software:

Gretl. gretl.sourceforge.net [software]. November 2016.

Received: 15. 11. 2017

Reviewed: 26. 6. 2018

Accepted: 29. 6. 2018

doc. Ing. Bc. Petr Suchánek, Ph.D.

Masaryk University Brno
Faculty of Economic and Administration
Department of Corporate Economy
Lipová 41a, Brno 60200
Czech Republic
Tel.: +420 549 49 6927
E-mail: suchy@yahoo.com

Mgr. Ing. Martin Štěřba

Masaryk University Brno
Faculty of Economic and Administration
Department of Corporate Economy
Lipová 41a, Brno 60200
Czech Republic
Tel.: +420 549 49 6927
E-mail: martin.sterba@mail.muni.cz

Appendix

List of all financial indicators used in the profile analysis.

Current liquidity = current assets / short-term liabilities
Total debt = external resources / total assets
Net profit margin = net profit/ operating income + extra income
Net working equity = current assets / short-term external resources
Net working equity II = profit / operating income + extra income
Debt repayment period = external resources – reserves / profit for the accounting period + depreciation
EBIT = profit + tax payable + expense interest
EVA as a proportion of assets = EVA / total assets
Financial leverage = total assets / equity
The index of financial leverage = ROA / ROE
Self-financing coefficient= equity / total assets
Reserves coverage by working equity = net working equity / reserves
Degree of financial independence = equity / (long-term liabilities + short-term liabilities + bank loans and overdrafts)
Indebtedness ratio = equity / external resources
Cost = total cost / total revenue
NWC / long-term resources = (current assets – short-term external resources) / long-term assets
NWC / assets = (current assets – short-term external resources) / total assets
Turnover of total assets = total revenue / total assets
Turnover of long-term assets = total revenue / long-term assets
Turnover of current assets = total revenue / current assets
Turnover of receivables = total revenue / receivables
Turnover of equity = revenue / equity
Turnover of reserves= total assets / revenue
Immediate liquidity = financial assets / short-term liabilities
Share of own resources = equity / total assets
Quick liquidity = (current assets – reserves) / short-term liabilities
Operating liquidity = (depreciation + EBIT+ reserves) / (long-term liabilities + short-term liabilities – long-term financial assets)
ROA = EBIT/total assets
ROCE = EBIT / (equity + reserves + long-term liabilities + long-term bank loans)
ROE/NWC = ROE / (current assets – short-term external resources)
ROS = profit/revenue
Interest burden = (short-term + long-term) liabilities – financial assets / balance cash flow
Indebtedness CA = (short-term liabilities + long-term liabilities + bank loans and overdrafts) / total liabilities
Indebtedness E = equity / external resources

Source: The authors.