



## Measuring Indicators for Marketing Effectiveness in Czech Companies

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### ABSTRACT

Marketing effectiveness has been accepted as one of the most important parts in corporate performance system. It is due to dynamical changes in business environment in after-crisis times. The goal of this paper is the definition of used possible indicators in measuring marketing effectiveness. The paper presents advance in usable indicators, especially financial and non-financial metrics. Selected studies, focusing on different branches and different indicators, were analysed by the author. The author of article puts the question, which classification is the most statistical explaining the difference of stakeholders in term of evaluation their impact on business management. There were made cluster analysis for data mining including its graphic presentation through dendrogram and two-sample t-test by statistical software IBM SPSS Statistics 22 to obtain relevant answer on defined research question. Such limitation of the paper is possible to signify focusing only on domestic (Czech) industrial market.

**Keywords:** marketing effectiveness; performance; financial indicators; non-financial indicators; engineering.

**JEL Classification:** L21; L25; M21; M31.

**MSC2010:** 90B60; 91E45.

# Indicadores para medir la eficacia del marketing en las empresas checas

## RESUMEN

La eficacia de la comercialización se ha aceptado como una de las partes más importantes del sistema del funcionamiento corporativo. Es debido a los cambios dinámicos en el ambiente de negocio en tiempos después de la crisis. El objetivo de este artículo es la definición de indicadores posibles usados en la medición de eficacia del marketing. El artículo presenta avance en indicadores usables, especialmente métricas financieras y no financieras. Los estudios seleccionados, centrándose en diversas ramas y diversos indicadores, fueron analizados por el autor. El autor del artículo pone la pregunta: ¿cuál es la clasificación más estadística que explica la diferencia de las partes interesadas en función de la evaluación de su impacto en gestión empresarial? Se realizaron análisis cluster para minería de datos, incluyendo su presentación gráfica a través de dendograma y t-test para dos muestras usando el software estadístico IBM SPSS Statistics 22 para obtener respuesta pertinente a la pregunta definida en la investigación. Tal limitación del artículo es posible significar centrarse solamente en el mercado industrial doméstico (checo).

**Palabras clave:** efectividad del marketing; desempeño; indicadores financieros; indicadores no financieros; ingeniería.

**Clasificación JEL:** L21; L25; M21; M31.

**MSC2010:** 90B60; 91E45.



## INTRODUCTION

The opening of national markets and the subsequent globalization or the movement of manufacturing to cheaper locations impacts corporate strategies, which achieve and maintain global competitiveness. Therefore, there are created new form of competitiveness as well as new companies. That encourage both of rapid growth and bigger involvement of domestic and foreign companies in all global activities. In times of economic crisis, companies often deal with identifying own efficiency and effectiveness, for which were used internal audits.

The current highly competitive environment wields permanent pressure on companies which are in turn forced to monitor and adapt to important trends and changes in order to retain their planned positions on target markets. For Czech companies, marketing management becomes an area, in which they can still seek to improve even after more than twenty years of operation in a market economy. A constant improvement of competitiveness, through which the company owns relevant competences determining its position in the market can be found, poses a challenge to Czech companies of all sizes and areas of business (Pollard, Šimberová, 2008; Tomek, Vávrová 2011; Kolečák, Kolečáková, 2012; Ehrenberger, Koudelková, Strielkowski, 2015).

Industrial production has long tradition in Czech Republic. The most significant part of manufacturing industry occupies engineering, which create important part of Czech production not only for export market.

Engineering as part of dynamic industry plays the key role in transforming Europe into knowledge economy (Šimberová, 2010). That means that should be expected expansion of engineering production. In Czech Republic has become one of the key engineering fields automotive. Automotive production as one of key parts of industry is located across Czech Republic since 19th century, and today it is important part of Czech production.

Performance measurement should be integrated with the overall strategy of the business and should include comprehensive criteria (i.e., both financial and non-financial indicators) that an organization can establish within its programs, investments, and acquisitions for reaching the desired results. These criteria can help organizations identify performance problems, address root causes, drive improvement activities, and bridge the gap between short-term market or stakeholder expectations and the long-term business or organizational goals/objectives. In addition, performance measurements must be prioritized and focused so that only the strategic terms of the KPIs for the business are measured (Lima, Costa, Angelis, 2009; Wu, 2012).

It seems that the fundamental mistake, made by companies, is the usage of inappropriate or wrong classified indicators. From the point of the view of principle of the used indicators, companies focus on comparing reached results from the previous periods. Consequently, the

comparison of values from different periods in which there were various conditions for own production.

According to the authors Zahay and Griffin (2010) there is a main problem that companies do not measure their own performance on the customer level. Enterprises operating in industrial markets are much more sensitive to sales volume than it is for businesses in the consumer markets. This has an impact on a misunderstanding of the results obtained from previous successful marketing programs.

As a result of the markets globalization and identifying new opportunities lead to blurring of boundaries of each sector. Individual areas (e.g., computer and consumer electronics) come together in way that traditional manufacturers of these categories focus on producing new products like MP3 players, plasma TVs and camcorders (Kotler, Keller, 2012).

Main aim of the paper is to answer research question (see chapter 2): Which groups of indicators are used in most cases in engineering companies in Czech Republic?

## **1. THEORETICAL BACKGROUND**

The industrial market has become now much more complex process, which introduces requirements for further use of the tool. In connection with the ongoing economic crisis, there are new opportunities for corporate innovation, which are important to be measured (Drugă, 2009; Svobodová, Koudelková, 2011). Modern businesses are dependent on the control of intangible assets such as brand, intellectual property, human capital or market relationships (Ambler, 2002). In order to marketers of these abstracted elements to determine whether they are effective or not, must be able to convert the results into financial terms (Kotler, Keller, 2006).

Measuring the performance of customers is usually depended on the area of corporate activity, especially in industry. Barwise and Farley (2004) state that companies, which use or plan to use indicators for measuring, tend to use more diverse measures.

Performance measurement can be defined as a system by which a company monitors its daily operations and evaluates whether it is attaining its objectives (Lebas, 1995; Lima, Costa, Angelis, 2009). A series of indicators that properly reflects company performance objectives should be set up to fully utilize the function of performance measurement. These indicators can be quantifiable or unquantifiable.

Performance measurement is an important tool for sustainable management. Well-defined indicators can potentially support the identification of current and desired performance and provide us with information on the progress of individual performances. In addition, it can be a link between strategy and management, thereby promoting the establishment and

implementation of initiatives related to the improvement company (Maria, 2009; Muchiri et al., 2010; Hornungová, 2014b).

Performance measurement support corporate day-to-day activities to reach strategic goals. However, it is necessary to derive used indicators in right ways in engineering companies. In those companies, there are not usually requirements to measure performance and effectiveness in other way than in financial figures. All used indicators could be contained in system of key performance indicators (KPI). This system become strategic tool to measure accurate performance, find appropriate results and interpret them (Zaherawati et al., 2011; Kerzner, 2011).

These indicators are focused on corporate areas, which need to be monitor and measure. Individual indicators could have different information and could be divided into (Hornungová, 2014a; Parmenter, 2010):

- Key Result Indicators – contents information about reached results and if company goes to right way;
- Result Indicators – notifies what was done;
- Performance Indicators – announces what have to do;
- Key Performance Indicators – describes what is necessary to do to increase performance and improving results.

As the author Marinič (2008) and Parmenter (2010) mentioned, once defined the correct key indicators that reflect goals of the company (those that can be measured), it is possible to use these performance indicators as tools for performance measurement. It depends on the perspective how entities inside and outside the company approach to performance process, and why they monitor own performance. Measurements can be divided according to the type of key indicators and results. The measurable key indicators should be divided according to their essence into several groups (Smith, 2008; Zaherawati et al., 2011; Samsonowa, Buxman, Gerteis, 2009).

Marketing activities could be defined from different perspectives. Siu (2002) and Mohamad, Ramayah and Puspowarsito (2011) describe marketing activities as set of areas in which company have to interested in because of the effective satisfying customers' needs. Own realization marketing activities has become wide area – from point of view of marketing mix there are different approaches how to fulfil individual requirements. Whole marketing mix helps to manage knowledge and supports corporate processes (Webb, et al., 2011).

Individual marketing activities are blending together and influencing the others. They cannot be classified in only one group. On marketing activities is possible to see from different perspectives. Among the most important aspects, which could be applied in company, is

possible add: (1) marketing activities from point of view of time, (2) marketing activities from point of view of marketing mix, and (3) marketing activities from point of view of the market. Success of individual marketing activities could be validated as effectiveness of realized marketing activities. A suitable approach focuses on those activities which have a direct impact on customers, primarily on the product and forms of marketing communication. However, the whole process of marketing effectiveness needs to undergo a process of continuous improvement, especially in economic and financial crisis. Manufacturers that want to achieve with your own marketing audit, which identifies the major shortcomings of the current approach to measuring effectiveness (Christian, 1959).

Effectiveness of marketing activities should be defined as return of invested funds into these activities. For evaluation there are many various methods how to measure these activities (Kotler, Keller, 2006). For the measuring there are applied several groups of marketing indicators, which help to quantify possible trend, dynamics or characteristics (Farris et al., 2010). Measuring the performance of marketing activities becomes business process that provides performance feedback on the results of realized marketing activities. Business performance becomes an important part of corporate budgeting and performance compensation and promotion (Clark, Abela, Ambler, 2006; Ginevičius, Podvezko, Ginevičius, 2013; Kožená, Chládek, 2012).

Marketing indicators (as tool how to find effectiveness) could reach the highest level of priority in whole business environment, because of creating competitive advantage. The reason should be dissatisfaction with traditional way of measuring marketing activities, connected with accounting, corporate cost-trends, or rapid progress of IT (Seggie, Cavusgil, Phelan, 2007).

Nowadays, it is possible to use many different methods as marketing indicators. These methods help track business performance through data collection from individual marketing activities, such as marketing campaigns, marketing channels or customers responsiveness (Li, 2011).

The main aim of this paper is to identify which groups of indicators companies usually use for measurement of own marketing effectiveness. Main hypothesis, derived of research question, is that engineering companies use mainly financial indicators than non-financial in measurement of marketing effectiveness. There was made premise that there is difference between group of traditional indicators (financial) and modern indicators (non-financial).

This paper strives to analyse the condition of marketing management in the Czech environment by means of an analysis and subsequent presentation of selected data obtained by primary research concerning the utilization of marketing activities, and to use the results as a basis for a professional discussion of one of the proposition in the research, i.e., that after more than twenty

years of operating in a market economy, marketing management remains an area in which Czech companies can seek improvements in order to increase their competitiveness.

The second part of the paper is statistical part. Especially, it is aimed to the cluster analysis. The main aim of the cluster analysis is to classify  $n$  objects (in this case regions), out of which each is described with  $p$  attributes (in this case indicators) into several, preferably homogeneous, groups (clusters). That is through derivation of indicators into higher grade. The highest level of the derivation (or aggregation) is so-called super-indicator (see Figure 1) which includes all performance indicators together into one final cluster (Franceschini, Galetto, Maisano, 2007).

We require the objects into the clusters to be as similar as possible, while the objects from different clusters as dissimilar as possible. The precise number of clusters is usually not known. A cluster analysis is an investigation method – it should serve as a certain guide for further data processing (Budíková, Lerch, Mikoláš, 2005).

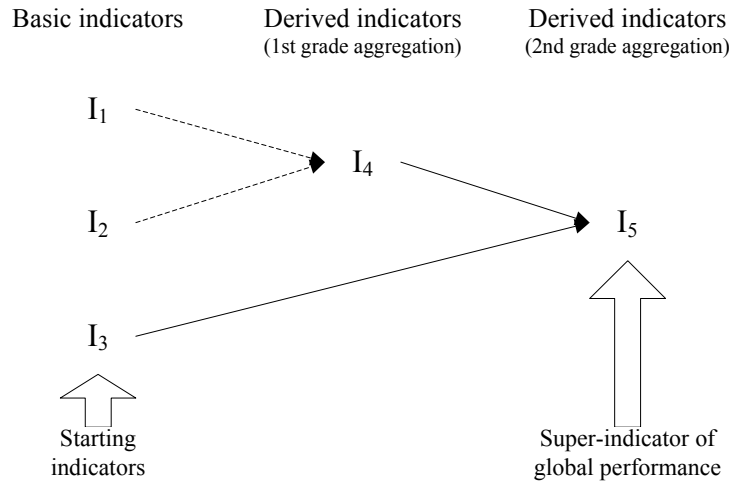


Figure 1. Concept of global performance

Source: improved according Franceschini, Galetto, Maisano, 2007.

## 2. METHODOLOGY

The first part of the paper presents main secondary information, which was processed by many scientific articles and literature. The next, and the main part of the paper, is to introduce research data that were obtained from the primary research. Whole primary research was focused on the performance evaluation of companies (in the area of marketing performance) in the Czech Republic.

In this field there were defined research questions on which questionnaire survey was designed:

- RQ 1. Do engineering companies monitor effectiveness of marketing activities?
- RQ 2. What metrics companies use to evaluate the effectiveness of marketing activities?
- RQ 3. Are used metrics accurate?

- RQ 4. Are there differences in evaluation process of marketing activities between and engineering companies without foreign property share (domestic companies)?
- RQ 5. What kinds of metric's groups are most often used in engineering companies?
- RQ 6. Are there differences in measuring marketing effectiveness between and engineering companies without foreign property share (domestic companies)?
- RQ 7. Does the size of a company have an impact on the measurement of effectiveness?
- RQ 8. Are all marketing activities created and realized by foreign mother company for the whole group of companies?

For purpose of this paper there was used only one question – RQ 5. The rest of the questions helped to understand all relationships between research pillars.

The primary research was focused on engineering companies in Czech Republic. Reason for its realization was preparing dissertation during doctoral study.

The primary research was designed by questionnaire survey, focused on engineering companies in Czech Republic in 2013. Questionnaire has been compiled on the basis of achieved theoretical knowledge, defined areas of solved problem and specific objectives, so that they obtained results may contribute to the setup of KPI for the companies in selected area. The conditions for choice of companies were combination of:

- 1 geographical location (Czech Republic),
- 2 classification of economic activities according to CZ-NACE, reduced to information and communication area.
  - 28 - Manufacture of machinery and equipment
  - 29 - Manufacture of motor vehicles, trailers and semi-trailers
  - 30 - Manufacture of other transport equipment.

Results and discussion of the paper are based on the analysis of secondary sources and selected part of questionnaire survey, which are involved on measuring the performance of Czech companies.

To process the results of the questionnaire survey were used both of basic types of descriptive statistics and cluster analyse on the selected data set. The data were processed by using the statistical program IBM SPSS Statistics 22.

The basic population of engineering companies (according defined conditions) includes 7330 subjects. Calculation of sample population size is solved by formula as follow (Israel, 2012; Watson, 2001; Saunders, Lewis, Thornhill, 2009):

$$n_0 = \frac{z^2 pq}{e^2}$$

where  $n_0$  – minimal sample size

Z – reliability level (99% has value 2,5758; 95% has 1,96; 90% has 1,6449)



p – estimation of attribute rate, presented in basic population

q – (1-p)

e – required level of accuracy

If the proportion of basic population is not known, variables p and q are equal 0,5. On required level of confidence 95 % and substitution in an equation (15) result has been observed. Final sample population is 385 respondents.

$$n_0 = \frac{1,96^2 \times 0,5 \times 0,5}{0,05^2} = 384,16 \cong 385 \text{ subjects}$$

In case of small basic population (under 10 000 units) there is necessary to improve sample n<sub>0</sub> for predicative value. It is important to find minimal sample size due an equation (Saunders, Lewis, Thornhill, 2009):

$$n = \frac{n_0}{1 + \frac{(n_0 - 1)}{N}}$$

where n<sub>0</sub> – minimal sample size

n – minimal improved sample size

N – total basic population

For the purpose of this dissertation basic population was designed in 7 329 companies. Because of the condition about 10 000 units, final sample population includes 366 respondents.

$$n = \frac{385}{1 + \frac{(385 - 1)}{7329}} = 365,83 \cong 366 \text{ subjects}$$

Final sample population was divided into three groups to get representativeness of whole population. This representativeness is reached due similar percentage of individual company group – (1) size of company, (2) CZ-NACE classification.

From observed sample population were chosen companies in random way from data set. Number of returned questionnaires was 147, what means 40,16%. Table 1 shows distribution of sample population, representing group of respondents on which has been questionnaire survey focused on.

Table 1. Structure of respondents according company size

	Number of companies	Relative number in population	Theoretical frequencies (n=147)	Real frequencies
Small companies (0-49)	4656	63,52%	93	85
Medium companies (50-249)	1814	24,75%	37	42
Large companies (over 250)	860	11,73%	17	20
Total	7330	100,00%	147	147

Source: own research

The data were processed by cluster analysis method and two sample t-test such verification. These methods consist in the fact that the information contained in the multidimensional observations can be classified into several relatively homogeneous clusters (classes). Using appropriate algorithms are able to reveal the structure of the studied set of objects, and individual objects classified.

Cluster analysis methods can be divided according to objectives that are applicable to the hierarchical and non-hierarchical. In this work we used a hierarchical method, which is based on a variety of other non-empty subsets of a set  $X$ , in which the intersection of any two subsets is either one of them, or the empty set, in which there is at least one pair of subsets whose intersection is one of them (Hebák, Hustopecký, 1987). Algorithm of method could be used to describe by those points:

1. Computing the matrix  $D$  of suitable distance measures.
2. The process begin from the decomposition of  $S(n)$ , i.e. from  $n$  clusters, where each contain one object.
3. Searching the matrix  $D$  (due to symmetry only the upper or lower triangle), and there could be find two clusters  $(C_i, C_j)$ , which distance  $D(C_i, C_j)$  is minimal.
4. Combining the two clusters into a new  $g$ -cluster. In the matrix  $D$  would be deleted the  $i$ -row and a  $j$ -column, and replace them by new row and column for the new cluster (order matrix  $D$  was reduced by one).
5. Noting the order of cycle, identification of linked objects and level for the connection.
6. If the process is not finished by merging all objects into one cluster  $S(1)$ , process continues to step 3.

### 3. RESULTS AND DISCUSSION

It is evident from analysis that companies use for own measuring performance and effectiveness in corporate marketing are a mainly financial indicators. Based on the analysis of statistical characteristics of the examined group, paper presents conclusions as approximate result, which is limited by the resulting reliability. In the results of the paper there are characteristics of research barriers and next research possibilities.

Tables 2 and 3 include fundamental data where are obvious that companies use in performance measurement system mainly:

- customers' satisfaction,
- count of complaints,
- profit per customer,
- fixed and variable costs,

- costs per order.

The number of mentioned indicators represents answers of the respondents, where they marked the most used indicators. The conclusions are given by the characteristics of the limits of research and its possible future direction. Confidence of the research was on 5 % level of margin error which represents the potential research gaps.

In questionnaire were put two questions, which were focused on usage of financial and non-financial metrics in companies. Choice of offered metrics was based on three pillars: (1) realized project in Faculty of business and management, (2) performance metrics designed by Baroudi (2010), (3) realized case study. All metrics are the most used metrics, which companies use to measure performance of own marketing activities.

From observed results by descriptive statistics there is obvious that companies use “traditional” metrics such number of complaints, customers’ satisfaction and number of customers (see Table 2). The rest of metrics are used individually due managers’ experiences in performance measurement. Non-financial metrics is possible to call as modern metrics because of the trend of focusing with marketing activities on customers.

Table 2. Basic descriptive statistics of non-financial indicators

	Customers' satisfaction	Count of customers	Customers' lifetime value	Number of customers	Market share	Number of complaints	Average waiting time	Count of new customers	Count of customers with repeated purchases	Sustainment of customers	Product audit	Productivity per employee	Knowledge and value of brand	Knowledge and value of product	Orders per customer
Mean	,65	,24	,07	,40	,37	,69	,39	,19	,25	,16	,20	,31	,18	,17	,28
Std. deviation	,480	,427	,264	,492	,486	,465	,490	,394	,435	,371	,399	,465	,389	,377	,450
Variance	,230	,183	,070	,242	,236	,216	,241	,155	,190	,138	,159	,216	,151	,142	,202
Coefficient of variance	,354	,763	1,00	,605	,638	,313	,618	,816	,760	,863	,795	,697	,839	,835	,721

Source: own research

From point of view of financial metrics, there are used mainly metrics which are focused on costs and profit levels. The most used metrics are fixed and variable costs, profit per customer, costs per order and costs per customer. In generally, financial metrics are traditional metrics because they are based on corporate financial reports.

Table 3. Basic descriptive statistics of financial indicators

	Profit per customer	Marketing costs	Fixed and variable costs	Average cost of customer retention	Costs per thousand	Costs per click	Costs per order	Return on sales	Return on investment	Return on marketing investment	Economic value added	EBITDA	Costs per customer
Mean	,79	,13	,82	,26	,04	,03	,59	,33	,20	,03	,51	,15	,57
Std. deviation	,409	,337	,389	,439	,199	,163	,494	,473	,399	,182	,502	,358	,497
Variance	,168	,113	,151	,193	,039	,027	,244	,224	,159	,033	,252	,128	,247
Coefficient of variance	,213	,869	,184	,742	,975	,900	,414	,679	,795	1,1	,494	,853	,433

Source: own research

After evaluating basic descriptive statistics of examined objects and evaluating their statistical significance was performed cluster analysis of data. The aim of the cluster analysis is a classification n objects, each of which is described p characters (in this case, due to the management company) into several homogeneous clusters. There could be required that objects within clusters were similar as most as possible, while objects from different clusters as least as possible (Budíková, Lerch, Mikoláš, 2005).

Kozel, Mynářová and Svobodová (2011) recommend cluster analysis for research with number of variables less than one hundred. Fundamental of cluster analysis is step-by-step merging of the nearest pairs (individual variables or groups). The process has been made until creation one group with all variables – metrics.

There are situated connections of all clusters in four steps. One of the criteria for this connection could be the furthest neighbour method, which takes maximum possible distances between individual clusters as the criterion for joining clusters. It tends to produce compact clusters.

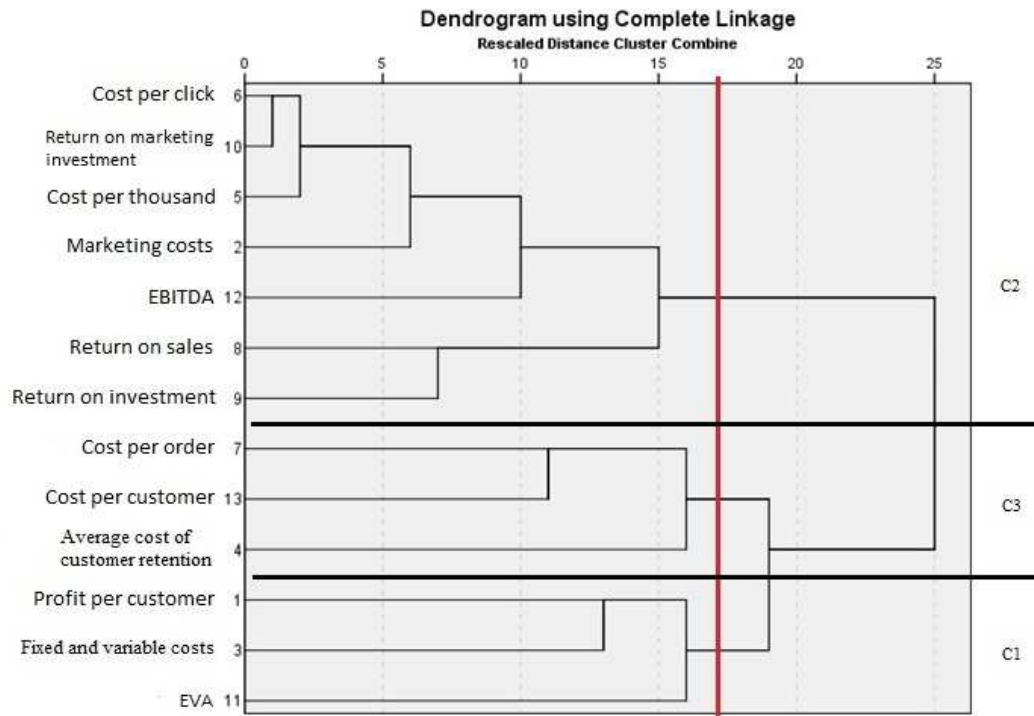


Figure 2. Dendrogram of financial indicators

Source: own research

There was put across the dendrogram cut on level 17 because this level gives accurate number of clusters. Cut on 16 gives five clusters (two include only one metric) and cut on level 19 gives only two clusters which provide too summary. These clusters give no answers on question which metrics and groups of metrics companies use to measurement.

From the obtained results could be understood as an extreme result mainly cluster C1 and C3, which include (due to their size) almost whole indicators. In terms of number of cases, cluster C2 is on the edge of acceptability (see Figure 2). This can be limited by the size and location the sample. Based on the Table 4, there are epitomized three clusters, which show the groups of indicators that include operation, marketing and customers' indicators.

Table 4. Defined clusters of financial indicators

Group abbreviation	Cluster	Indicators
C1	Operative results	Profit per customer
		Fixed and variable costs
		EVA
C2	Marketing results	Marketing costs
		Costs per thousand
		Costs per click
		Return on sales
		Return on investment
		Return on marketing investment
		EBITDA
C3	Customers costs	Costs per order
		Average cost of customer retention
		Costs per customer

Source: own research

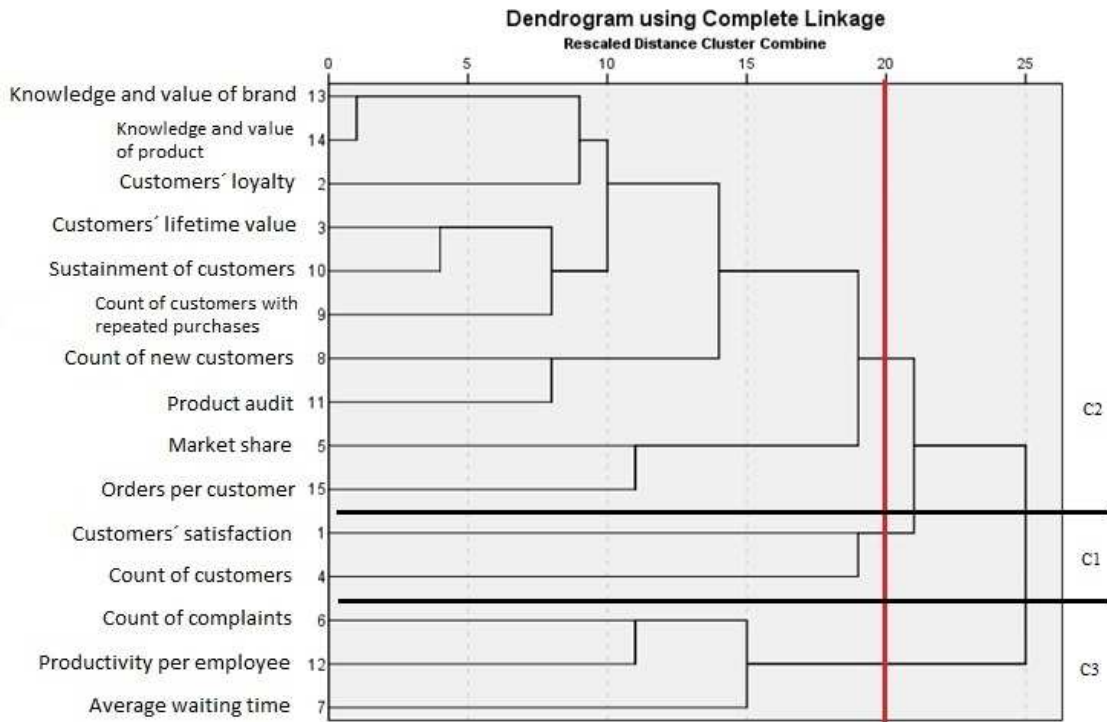


Figure 3. Dendrogram of non-financial indicators

Source: own research

In designing of dendrogram of non-financial metrics in similar way cut was made. Level of cut was on level 20. Cut under 19 provide six clusters (two include only one metric) and cut on level 21 gives only two clusters which provide too summary.

From the obtained results, which are showed in dendrogram (Figure 3) could be understood as special result mainly clusters2 and 3, which include (due to their size) almost all indicators. In terms of number of cases, cluster 1 includes especially operative indicators, used in various ways of corporate processes. Based on Table 5, there are epitomized three clusters, which show the groups of indicators that include customer satisfaction, products, and productivity indicators.

Table 5. Defined clusters of non-financial indicators

Group abbreviation	Cluster	Indicators
C1	Count of satisfied customers	Customers' satisfaction
		Count of customers
C2	Market products offer	Customers' loyalty
		Customers' lifetime value
		Market share
		Count of new customers
		Count of customers with repeated purchases
		Sustainment of customers
		Product audit
C3	Productivity	Knowledge and value of brand
		Knowledge and value of product
		Orders per customer
		Count of complaints
		Average waiting time
		Productivity per employee

Source: own research

To decide which groups of indicators is more important in company, there is necessary to prove t-test, which is focused on analysis of variance of both groups.

Two-sample t-test is used for testing measurement of the two parameters in the same sample. There is possible to compare the mean values  $\mu_1$  and  $\mu_2$ . Based on the assumption, the parameters X and Y have normal distribution  $N(\mu, \sigma^2)$  and are independent of each other. Basic requirements of two-sample t-test are normality of analysed samples, same variance and mutual independence of each parameter (Řezanková, 2010; Anděl, 2007; Kunderová, 2004). Table 6 shows descriptive statistics of each group of indicators.

Table 6. Defined clusters of indicators groups

Indicators	Mean	Standard deviation	Variance	Median
Financial indicators	,3417	,13835	,02149	,3846
Non-financial indicators	,3043	,14661	,01914	,3333

Source: own research

According requirements of two-sample t-test is necessary to verify consistency of both variances. This verification is realized by F-test:

$$F = \frac{s_1^2}{s_2^2}$$

$$s_1^2 \geq s_2^2$$

Result of F-test is  $F=1,2610$ . The value of the test criterion level of 95% is 2.53 (does not lie in the critical field). Assuming the validity of  $F = 1.2610 < F_{0, 05} (14.12) = 2.53$ , analysed variances could be considered as identical.

To determine t-test there were used values from Table 7. Final value of t-test was found  $t = 3.005$ . Because of the achieved value in t-test and proved comparing with critical field ( $|t| = 3.005 > t_{0,05} (26) = 2,056$ ), there was accepted hypothesis that group of financial indicators is much more important than group of non-financial indicators.

Table 7. Results of t-test

	Value	
Pairing difference	Mean	-,3740
	Standard deviation	,1509
	Mean error	,01245
t-test	-3,005	
N	146	
Signification	,003	

Source: own research

Both groups of metrics were put under normality examination by Mann-Witney test. This test compares conformity of individual medians. The power of the test is to detect departures from the hypothesized distribution that may be seriously diminished. Result of this test confirms normality of both of analysed samples – null hypothesis is accepted.

The methodological approach chosen consisted in the specification, gathering, analysis and interpretation of data to serve as a basis for the decision on the choice key indicators.

Having fulfilled the above-mentioned conditions, it is possible to proceed to the creation of a graphical output of the cluster analysis, so-called dendrogram. Dendrograms are usually used to



illustrate the results of the agglomerative hierarchic clustering procedure. A dendrogram therefore shows the individual steps of the calculation of cluster analysis. For the purpose of this paper dendrogram was created by using method of the nearest neighbour method with the Chi-squared measure. In dendrogram of financial indicators was chosen cut at a depth of seventeen, which gives a total of three clusters. Dendrogram of non-financial indicators was cut at a depth of twenty with total of three clusters (Řezanková, Húsek, Snášel, 2007).

Realized research showed that there exists large space for possible improvement and bringing opportunity for companies how to be competitive in management by companies in the Czech engineering environment.

Based on basic statistics were defined many financial indicators that have impact on performance of companies. It is possible to say, if companies want to increase their financial performance, it is appropriate to focus on these indicators. The objective of further data processing was the reduction of original broad file of indicators, namely by expert analysis, especially application of multi-dimensional statistical methods. The paper presents the results of cluster analysis.

Results of cluster analysis can be verified by using factor analysis, which looks for the hidden factors influencing the monitored variables of data file. The result of factor analysis is to replace the large number of potentially covertly correlated variables by several new (mutually uncorrelated or low correlated) factors.

#### **4. CONCLUSIONS**

The main aim of this paper is to identify which groups of indicators (financial or non-financial) companies usually use for measurement of own marketing effectiveness. There is obvious (according observed results) that engineering companies use particularly financial indicators to measurement of own marketing performance in comparison with non-financial indicators. This result is supported by realized cluster analysis on both of the groups of financial and non-financial indicators. The difference between these groups is not too significant, despite the difference of summary frequency. According two dimensional t-test there were found that average count of both of financial and non-financial indicators have changed in statistic sample. Main findings of the research include which indicators are the most frequent in measurement marketing effectiveness in Czech engineering companies. It is obvious companies focus on using of financial indicators as traditional group.

The correct choice of performance indicators is important part of the corporate strategic process, because well-defined KPIs can help the companies to plan and control their priorities. Engineering companies should focus their attention especially to profit indicators, earnings

indicators and value added indicators, based on our research. Monitoring and constantly evaluating and improving the results of these indicators, should lead to the growth of economic success that is key goal within the chosen strategy for many of them.

System of corporate performance and efficiency has included such indicators on which should each individual stakeholder group behave. These groups usually have different reasons how to become prosperous and efficient. Therefore, there is important to create long-term relationships with all stakeholders, on which significantly influence long-term business success and knowledge of their needs and wishes (Šimberová, 2008, 2010).

The definition of performance indicators is quite difficult because of complexity of measureable areas. Reached research and conclusion can help to companies focus on these indicators on the way to improving economic performance. Necessity of measurement marketing effectiveness has become quite important in engineering company. Main reason for the measurement is, that couldn't be adequate managed these activities without any monitoring of impact on the company (Halachmi, 2005).

Realised primary research has become pilot research, because it targets only on definition of indicator groups, which engineering companies use in their marketing performance measurement system. Own primary research was focused on various fields according designed research questions (different fields in engineering company). For purpose of the paper there was chosen only one field, focused on usage of metrics under examination.

Limitation of this paper is focusing only on domestic companies in defined time (second part of 2013). Therefore, it is necessary to do next researches where is possible to use knowledge not only in domestic environment, but especially in international environment to ascertain the influence of corporate performance measurement system. In case of removing these barriers, realized research could provide more accurate results.

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