

## THE IMPORTANCE OF INFORMATION DATABASE IN COSTS EVALUATION

### VÝZNAM INFORMAČNÍ DATABÁZE PŘI HODNOCENÍ NÁKLADŮ

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#### **Abstract:**

*The current situation in activities of enterprises in the changing competitive environment requires maximum effort towards achieving stated objectives. Businesses focus the activities to maintain or improve their market position. Exploration and evaluation of economic results allows to forecast the future direction of the company with the subsequent possibility to define influencing factors and to compare these values with other companies operating in the same industry. The aim of this paper is to highlight the significance of evaluating databases in the company system and to summarize the results of the analysis of selected economic indicators of manufacturing enterprises and their comparison in the time order with the indicating the selected indicator - the total cost. By random sampling of 32 manufacturing enterprises in various industries across Slovakia with different size and legal form of the company, we examined the statistical significance of the total cost in the period 2008 - 2011.*

#### **Key words:**

*Enterprise, database, in-depth analysis, economic indicators, costs*

#### **Abstrakt:**

*Súčasná situácia v činnosti podnikov v meniacom sa konkurenčnom prostredí vyžaduje maximálne vynaložené úsilie smerujúce k dosiahnutiu stanovených cieľov. Podnikateľské subjekty orientujú svoju činnosť k zachovaniu alebo zlepšeniu trhovej pozície. Skúmanie a hodnotenie výsledkov hospodárenia umožňuje prognózovať budúci smer podniku s následnou možnosťou vymedzenia pôsobiacich faktorov a porovnávať ich s podnikmi pôsobiacimi v rovnakom odvetví. Cieľom príspevku je poukázať na významnosť spracovania databáz v podnikovom systéme a sumarizovať výsledky analýzy vybraných ekonomických ukazovateľov výrobných podnikov, ich komparáciu v čase s určením poradia rokov vybraného ukazovateľa – celkových nákladov. Náhodným výberom 32 výrobných podnikov pôsobiacich v rôznych odvetviach priemyslu na celom území Slovenska s rôznou veľkosťou a právnou formou podnikania sme skúmali štatistickú významnosť celkových nákladov v období rokov 2008 – 2011.*

#### **Klíčová slova:**

*Podnik, databáza, hĺbkové analýzy, ekonomické ukazovatele, náklady*

**JEL Classification:** D23, D24

## 1 Introduction

Promotion and development of international trade continuously creates a number of opportunities not only in EU member states, but also in Slovakia, as we are transit country from south to north and from west to east. Enterprises through their activities contribute significantly to the development and implementation of the overall policy of the Union. Orientation of enterprises is becoming the most important trend and creates the preconditions for achieving an efficient use of resources.

The concept of enterprise is defined as a basic business entity in a market economy, which enters into interactions with its environment, as a result of its business activities, products and services. Commercial Code defines the term "enterprise" as a set of tangible and intangible assets and personal business. Causality between the company and its wider environment is seen as a company's ability to produce goods or provide services and then offer them not only in domestic but also in international markets [3],[6]. Organizations today are globally managed and characterized by a joint integration and usage of corporate know-how. The use of scientific knowledge can bring us benefits, if the top management implements knowledge management into their business [7],[8]. Implementation of knowledge management brings many benefits. Enterprises should therefore not only satisfy with the quality, but should constantly monitor the qualitative development of knowledge, which are essential for the creation of their overall competitive advantage [5],[10].

Business efficiency and competitive production is mainly influenced by production activities. Production including the preparation process decides about production costs, quality and production scale. The conversion of production factors into products consists of many processes characteristic of material, energy, labor and financial cost. The result is a product of the production process – product in a tangible form. The product meets the need of consumers - potential customer. Its core is its baseline - an essential utility effect while providing benefits. The share of each asset on total assets is defined as equity structure. Capital structure is defined as the proportion of equity and loan capital, long-term and short-term capital in the total capital of the company [2],[3]. The optimal capital structure exists when the ratio of loan capital to the equity ratio and short-term and long-term capital represents the lowest overall cost of capital. Crucial role in the business economy play the costs [9]. Costs compared with the returns are the basis for management decisions, not only in deciding on production, but also about the factors to ensure production. The total costs are obtained by the sum of variable and fixed costs. Total cost function copies the total variable costs. Monitoring and evaluation of the total cost play from the view of decision-making significant role in context of the development of other cost categories [4].

The aim of the contribution is to highlight the significance of availability and use of databases in the company system. We stated the hypothesis that differences between years 2008-2011 in the total cost, revenues and turnover for all companies in the sample are statistically significant, where we tested statistical significance of differences of total costs, revenues and turnover.

## 2 Methodology

### 2.1 Methods

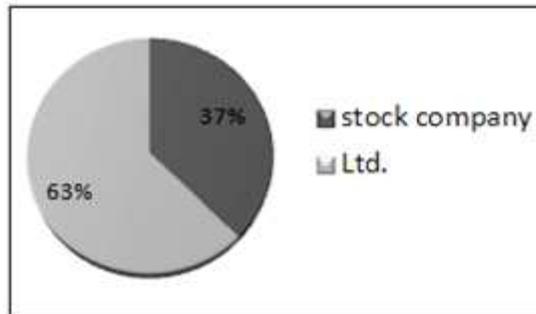
We used a general theoretical methods (abstraction, analysis, synthesis and deduction) of data processing and specific methods. As specific methods were used quantitative methods (methods of modeling, mathematical and statistical methods) systemic and comparative. Qualitative methods were applied in studying the publications studied using the methods of observation and market research aimed at examining the state of manufacturing enterprises. Quantitative methods were used to detect causal relationships between selected indicators of manufacturing companies. We used descriptive and inductive statistics, logic methods relevant for comparing relationships, chains, cause and effect between the evaluated factors.

### 2.2 Research Sample

We obtained the database of companies from the company Creditinfo Slovakia, s.r.o. Bratislava. Using a random number generator we are obtained a sample of 32 manufacturing companies operating in various industries. We used the classification according to the European Commission effective since January 2005.

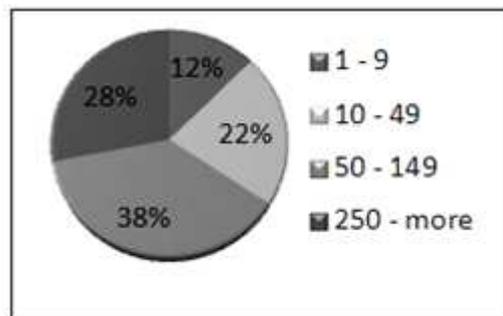
The decisive criterion of researched companies was the number of employees, namely. Figure 1 and 2 shows the basic characteristic of the research sample according to legal form (Figure 1) and number of employees (Figure 2).

Figure 1: Legal form of companies



Source: authors

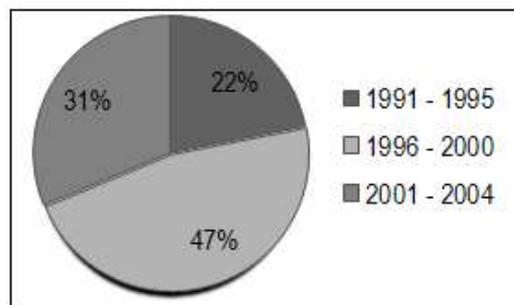
Figure 2: Number of employees



Source: authors

We divided the companies included in research sample based on their year of foundation as shown on Figure 3.

Figure 3: Research sample companies according to the year of foundation



Source: authors

The following chapter brings partial results of the provided research with discussion.

### 3 Results

Given the objective of this paper we used two sample of F - test for variance and subsequently the selection of two sample t-test for equality with the mean value, respectively with unequal variances. In the case of the alternative hypothesis, ANOVA test would not show which pairs have a statistically significant difference in the mean values. Then we made two samples F-test for variance and two samples t-test with equality for the mean value of the total costs in the period of 2008, 2009, 2010 and 2011 years.

Hypothesis: *The differences between years 2008 to 2011 in total costs, revenues and turnover are for all companies from the sample statistically significant.*

Table 1 represents testing of statistical differences between A – total costs, B – revenues, C – turnover in 2008.

**Table 1: Correlation matrix of selected economic indicators for the year 2008**

2008	A	B	C
A	1		
B	0,39983962	1	
C	0,39977087	0,99999976	1

Source: authors

**Table 2: Correlation matrix of selected economic indicators for the year 2009**

2009	A	B	C
A	1		
B	0,48588072	1	
C	0,48601596	0,99999981	1

Source: authors

**Table 3: Correlation matrix of selected economic indicators for the year 2010**

2010	A	B	C
A	1		
B	0,58088821	1	
C	0,58091114	0,9999998	1

Source: authors

**Table 4: Correlation matrix of selected economic indicators for the year 2011**

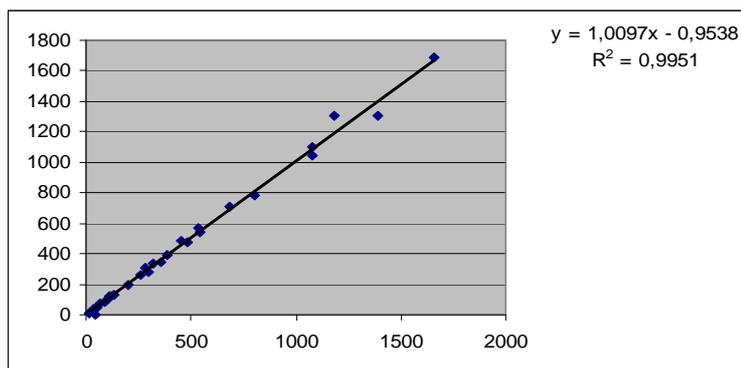
2011	B	C	D
A	1		
B	0,58088821	1	
C	0,58091114	0,9999998	1

Source: authors

By testing statistical significance of differences in all pairs of years, we found that there is no statistically significant difference between all years. We then can confirm H0 about equality of the above characteristics (variance and mean value). Then we calculated (Table 1 - 4) correlation matrixes of selected economic indicators (A, B, C) of all production companies from research sample for the period 2008 to 2011.

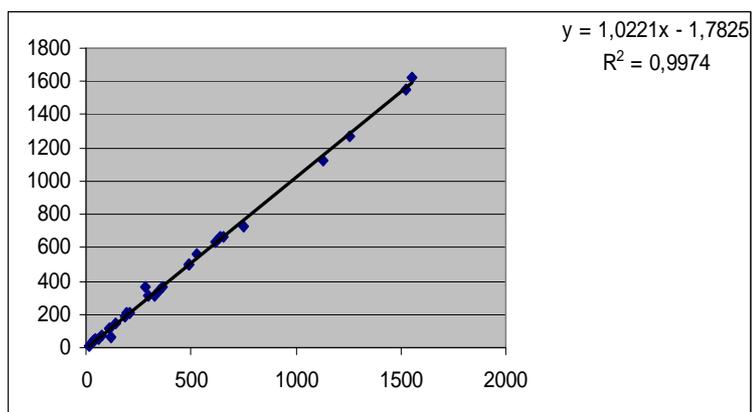
In the period 2008 - 2011 between A, B and C we monitored the correlation relationships. The correlation matrixes contain the correlation coefficients with medium correlations for relations A - B, A - C and the strong correlation of B - C. Then we have displayed those relations between A and B by regression lines. Charts 1 - 4 show the regression lines A and B in 2008 - 2011. All regression lines expressing the linear relationship have the degree of correlation  $R^2 = 1$ . This means that the total costs and revenues are in each year for all companies in the full linear dependence with a 100% compliance rate and those linear trends are also the best trends and therefore we can use them for predicting trends in next years.

**Chart 1: Regression line A and C in 2008**



Source: authors

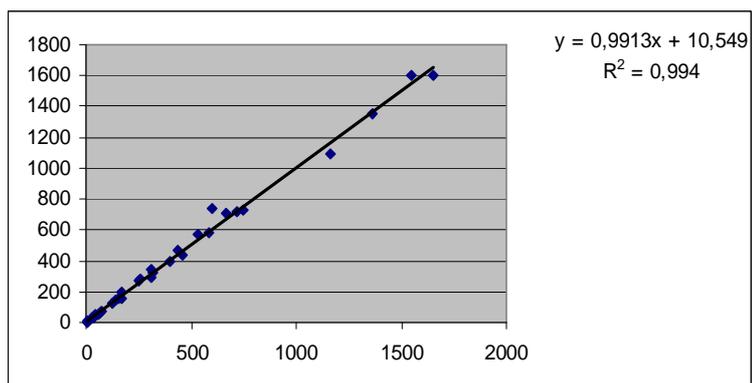
**Chart 2: Regression line A and B in 2009**



Source: authors

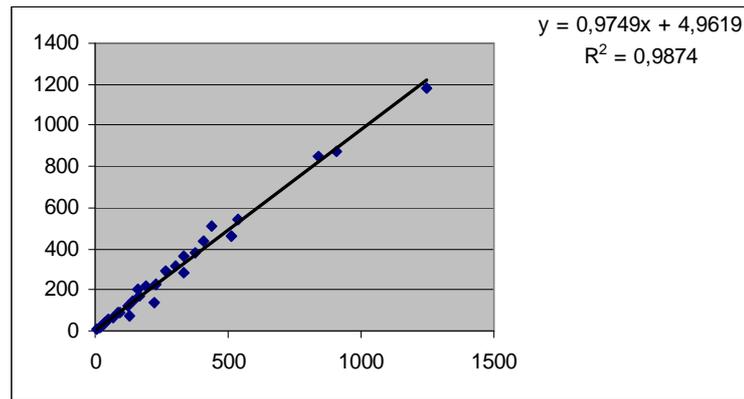
In 2008 and 2009, in both cases, there is a strong correlation between the overall costs (A) and revenues (B).

**Chart 3: Regression line A and B in 2010**



Source: authors

**Chart 4: Regression line A and B in 2011**



Source: authors

In 2010 and 2011, in both cases, there is a strong correlation between the overall costs (A) and revenues (B).

From the strong correlation and from regression lines between A and B, also between A and C in each period of time from 2008 to 2011 is clear that at the same time, when rising costs simultaneously rise B (revenues) and also turnover (C). It is a positive effect for the companies in research sample.

Following selected economic indicators, we calculated correlation matrix B – total costs (Table 5) and we determined the years order.

**Table 5: Correlation matrix B – total costs**

	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>
<b>2008</b>	1			
<b>2009</b>	0,9829525	1		
<b>2010</b>	0,9474073	0,98302502	1	
<b>2011</b>	0,9755298	0,97634555	0,94645431	1

Source: authors

Total costs in 2008 – 2011 years have strong correlation; correlation coefficient is in interval (0,8; 1). Correlation matrix B states strong correlation of each pair of years 2008 – 2009, 2008 – 2010, 2008 – 2011, 2009 – 2010, 2009 – 2011, 2010 – 2011 for all companies. Also testing of hypothesis confirmed that there is no statistically significant difference in any of the cases.

On the base of data from correlation matrix B (total costs) we calculated eigenvectors of the correlation matrix B for total costs and using calculated weights we determine the order of years.

**Table 6: Eigenvectors of correlation matrix B of the total costs**

<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>
-0,50001252	-0,42744505	0,6661287	0,351497783
-0,50466233	0,13993914	0,15318218	-0,83801442
-0,49625662	0,76005733	-0,09982482	0,40752572
-0,49903181	-0,46906352	-0,72307867	0,09002165
<b>Weights</b>			
100,5493145 %	-0,1753561966 %	0,1806205526 %	-0,5545788658 %

Source: authors

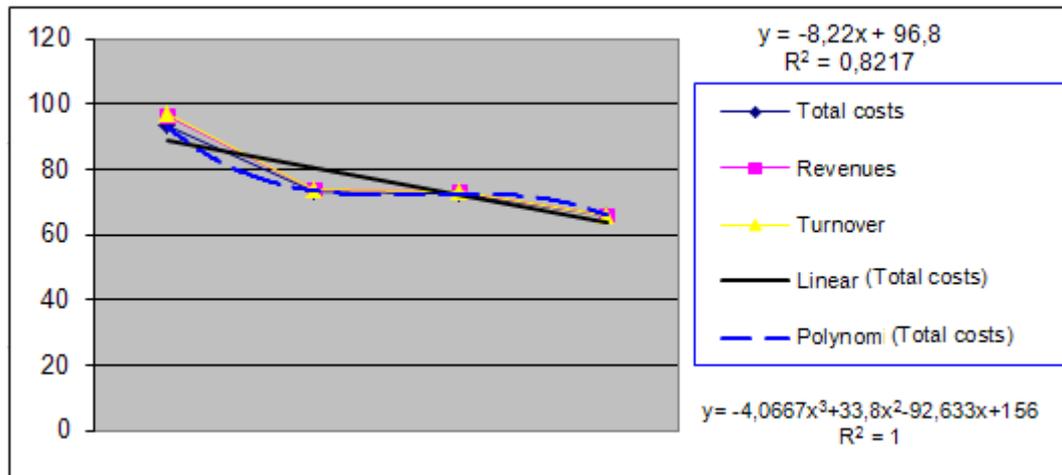
Based on our calculation we compiled a rank of the years for total costs in the following order:

1. 2008,
2. 2010,
3. 2009,
4. 2011.

Based on the calculated weight we conclude that the highest total costs were in 2008 year and the lowest total costs were in 2011 year.

From the research sample we selected one company as an example of forecasting the future costs development. Chart 5 shows the trend line and linear line of total costs.

**Chart 5: Total forecasted costs of the selected company**



Source: authors

Charts consist by polynomial functions curves of 5o with less correlation  $R^2 = 0.8217$ , the cross the values of the company in each year and are also formed by linear line with a less degree of correlation. When calculating the trend for the following years from polynomial functions of 3o  $R^2 = 1$ , we obtain unrealistically enlarged or reduced values, therefore for calculation of the trend in the coming period we use a linear line (straight line) with less, even a small degree of correlation.

#### 4 Discussion

In the article we highlighted the importance of creating and processing of databases in the company. Basic data are important for being able to make a right decision and therefore they should be a priority for each company. Comparing of the random total costs we found that the differences observed in the period 2008 - 2011 are not statistically significant. Correlation matrix indicates a strong correlation in each pair for all companies of research sample (1 to 32), which indicates a low significance of differences. Thus, we can summarize that similar as it is in the overall costs, revenues and turnovers there are no statistically significant differences between each year (2008 – 2011). In the economic point of view it means that companies might not significantly increased or decreased the volume of production, and thus the amount of revenues and total costs remained on almost identical level. For all companies from the sample in the full linear dependence with a 100% of compliance rate are linear trends also the best trends, and therefore we can use them to forecast the next years. Chart 5 shows a linear trend line and linear line of the total costs of the selected company. Consequently all companies of the research sample could be clarified. By setting a goal of our study, we wanted to highlight the significance of processing and availability of databases in the company system and also summarize the results of the selected economic indicators, their comparison in time with determining of the year order of total costs and forecast the development. We confirmed that the differences between the monitored values of selected economic indicators are not statistically significant. The correlation matrices and their results were repeatedly confirmed by the regression lines. We stated the years order in total costs on the

base of calculated weight of correlation matrix. For calculating trend for the next period of time we used linear line with less or minimum compliance rate.

Current challenges for the European market creates an opportunities for research and forecasting the future companies development in order to ensure efficiency through databases. Proper and timely preparation of the studies of the economic perspective will create new jobs and eliminates disparities between rich and poor regions respectively between the European Union member countries. Objective assessment of the conditions allows forecasting of the companies status and employment [3]. After a certain period of time and subsequent evaluation we can forecast the next period. However, the company information databases should be emphasized. If company predicts on the base of relevant, timely and fair data, it is a major underlying asset for its continued existence and operation on the market in a competitive environment.

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