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**TIPIFYING THE FINANCIAL POSITION OF THE HUNGARIAN  
CORPORATE SECTOR IN THE PERIOD BETWEEN 2006 AND 2015**

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**Abstract**

*When examining the number of businesses in our country, we conclude that it is undergoing continuous transformation. Over the last decade, the corporate sector has not only rejuvenated, but also its financial situation is changing. Improving the performance of the domestic corporate sector is an indispensable driving force for domestic economic growth. In my research, I was examining the financial situation of a couple of businesses operating for ten years, whether it is possible to typify these businesses based on their financial performance and classify them by statistically supported methods and, if so, how well these groups can be distinguished. 3658 members of the examined SME sector were analysed by factor and cluster analysis. The study was carried out with the processing and analysis of secondary data, the aggregate part of which is from the publicly available source of KSH's electronic form, while Opten Kft. has provided me another - most important part in June 2017.*

**Keywords:** small businesses, statistical methods, lending, liquidity, profitability

**JEL code:** G21, G31; M21, M4

## Introduction

The focus of my research is the analysis and typifying the financial situation of the Hungarian SME sector. I was trying to find out how statistical methods can be used to typify these businesses on the basis of which we can group them. Nearly 4,000 companies were selected for this study, who had annual reports between 2006 and 2015 and an analysis of financial indicators was made possible by their data.

Regarding the timeliness of the topic, it is relevant that in 2013 more than 21 million SMEs offered 88.8 million jobs in the European Union, nine out of 10 SMEs and two SMEs in three jobs. (Bán – Csernák, 2018) By examining the age of companies, experts conclude that they are getting younger, the smaller the number of employees employed by a company, the less likely it is to reach its 10th birthday.

Knowing the financial position of the domestic corporate sector can be useful to corporate sector members, creditors, and, of course, to the state itself, as well. It is not negligible that, apart from their role in employment, enterprises provide a significant income for the central budget and become more and more involved in the social financing of various community tasks.

After the material and methodology section, some of the typical data of the domestic corporate sector are presented, and then, based on literature, I describe the financing possibilities of the sector, including loans. Based on the factor and cluster analysis, liquidity and capital strength came to the centre, so the presentation of financing has been justified.

## Material and methods

The objective of the analysis is to characterize the situation of the Hungarian SME sector by means of financial indicators, on the basis of which how it is possible to classify the enterprises into different groups and then characterize these enterprise groups.

### *Material*

During the examination, the data of nearly 80,000 enterprises provided by OPTEN Ltd. was sorted by different criteria. The primary consideration was that the companies were in the final database, which had an annual report between 2006 and 2015, and the calculation of the indicators I defined was made possible by their data. A secondary analysis was prepared using the data publicly available by the CSO, followed by a special database analysis involving 3658 companies.

## ***Methods***

Analysing the financial position of businesses is important for both internal and external stakeholders, such as owners, employees, buyers and suppliers, creditors and prospective investors alike. (Marion Steven, 2008)

Opten Ltd has provided data from corporate enterprises in 2017, which produced annual reports between 2006 and 2015 and had a 10-year database with predictable criteria. In defining the scope of the specified data, the objective was to apply an objective rating system of a given financial institution. The current “Regulation No 575/2013 / EU of the European Parliament and of the Council on prudential requirements for credit institutions and investment firms” and application of Regulation (EU) No 648/2012 makes it compulsory to comply with prudential requirements. Accordingly, there is a credit institution that does not at all apply the previously used subjective qualification criteria, and exclusively objective risk criteria exist. Regarding data for 2006-2015, the data of more than 180,000 businesses were used for the analysis by Microsoft Excel and SPSS. Preliminary analysis has narrowed the scope of businesses, which is why it was not always possible to test the indicators together, and in many cases too high data significantly distorted the test values. The factor analysis was carried out with 2015 data, and then the cluster analysis was completed. Factor analysis allows you to combine two or more variables at one time by reducing the number of variables in a single factor. (Sajtos-Mitev, 2006) In my research, factor analysis was used to group the indicators used in the debtor rating primarily based on the ones that may be related to liquidity, profitability and capital position.

The cluster analysis algorithm can be hierarchical or non-hierarchical. The hierarchical algorithm searches for new clusters based on the previously created clusters, while the non-hierarchical algorithm determines all clusters at once. (Sajtos-Mitev, 2006) Hierarchical clustering can be agglomerative and divisive. The aggregation-based algorithm first looks at each element as a separate cluster and connects them to larger clusters, while at the end we get a single cluster containing all the elements. The division algorithm, on the other hand, first considers the entire data block as a single cluster and divides it into smaller clusters, while at the end all elements form a separate cluster. (Sajtos-Mitev, 2006) The clustering I made was based on the divisive method. Similarly, the methodology of hierarchic cluster analysis was applied by Bene and his colleagues in the analysis of the food sector SME sector in the north of Hungary. (Bene et al., 2013)

<b>Profitability indicators</b>
Profitability of assets (%)
Profitability of equity (%)
Profitability of ROA (%)
<b>Solvency indicators</b>
Liquidity acid test
Liquidity indicator
Liquid acid test
<b>Capital position indicators</b>
Equity / Net sales (%)
Short term indebtedness indicator (%)
Share of equity (%)

**Table 1 The range of indicators examined in the factor analysis**

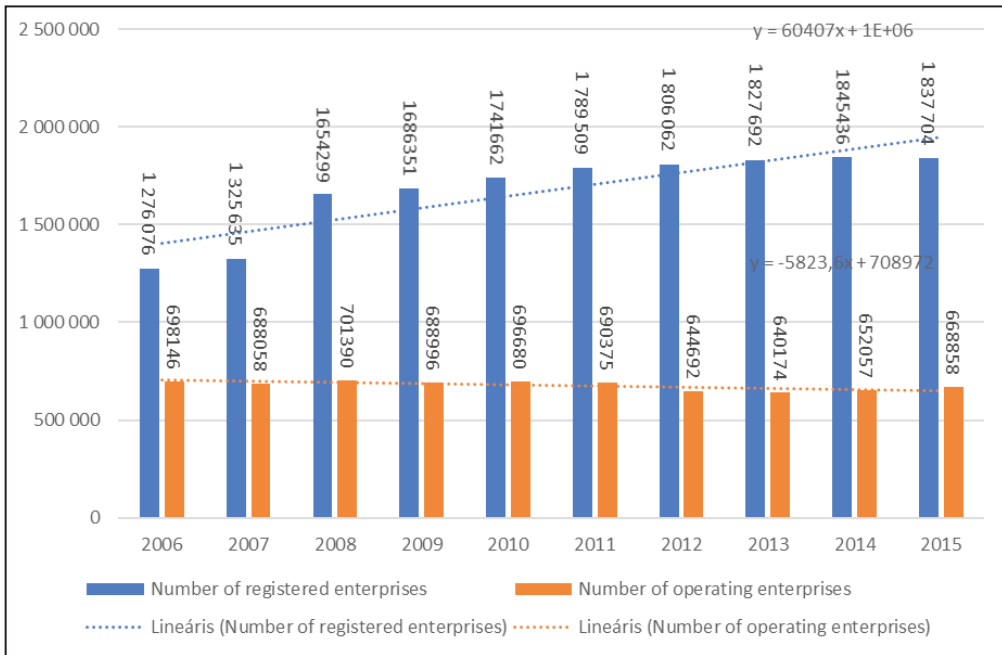
*Source: author's own editing based on the credit institutions' debtor rating policy*

## Results

In the first part of the survey, I analysed the data on the secondary data of the HCSO in order to provide an introductory picture of the whole sector. In 2016, more than 45% more companies registered than in 2006, an increase of more than half a million registered businesses. Compared to 2016, a substantial increase can be observed until 2013, and only a few percent change later indicates an increase in the number of registered businesses. „About 0.7 percent of today's businesses, some 4,000 companies were established before the change of regime, that is, only that number of companies exceeded the age of 24. But over the age of 15, it was only a quarter of today's businesses, so Hungary is characterized by a relatively young company structure. „ ([http://hvg.hu/kkv/20131125\\_A\\_magyar\\_cegek\\_meg\\_nem\\_ertek\\_el\\_a\\_tinedzs](http://hvg.hu/kkv/20131125_A_magyar_cegek_meg_nem_ertek_el_a_tinedzs))

Figure 2 shows how many of the registered businesses is the number of operating registered businesses. It is clear from the data that half of the number of registered enterprises is hardly the number of working enterprises per year, and even the ratio is rather unfavourable for the period under review. In the years prior to the crisis, 52-55% of registered businesses were viable, but with the onset of the crisis, this ratio was rapidly decreasing until 2013-2014, when it reaches a low of 35% and finally, based on the available data, in 2015 a 1% improvement can be observed for the benefit of working enterprises.

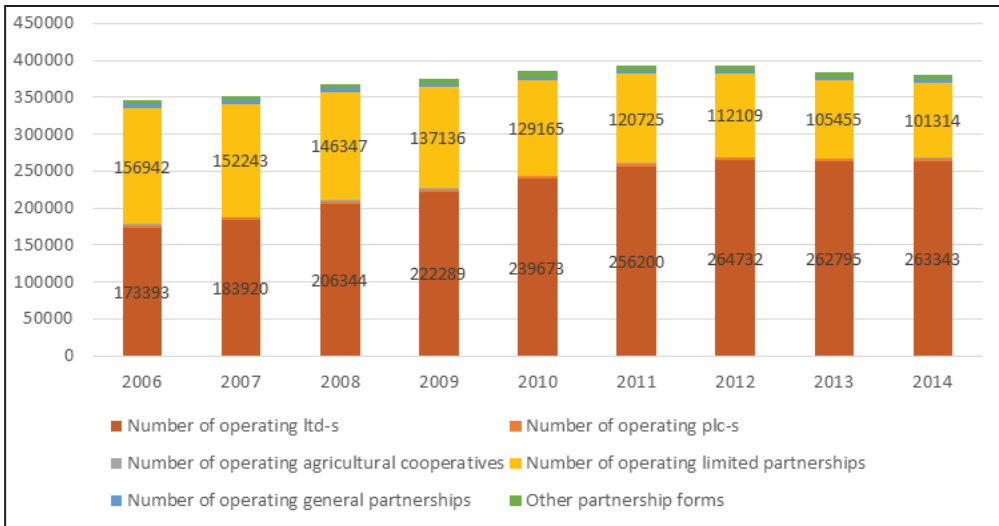
Data show that just over one third of registered businesses are viable, ongoing, i.e. paying taxes, employing people and contributing to GDP.



**Figure 1 The number of registered and operating enterprises in Hungary**

Source: author's own editing based on CSO data <http://statinfo.ksh.hu/StatinfolhaViewer.jsp>

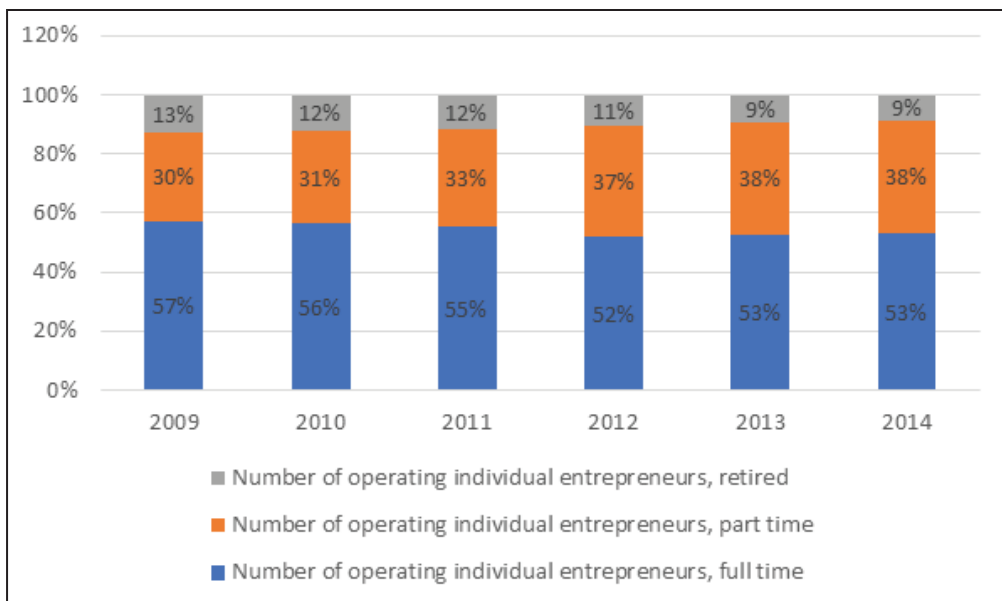
In the following figure I summarize how the number of individual proprietorships and corporate businesses in the country between 2006 and 2014 will change in the operating companies.



**Figure 2 The number of operating individual proprietorships and corporate businesses in Hungary**

Source: author's own editing based on CSO data <http://stainfo.ksh.hu/Stainfo/haViewer.jsp>

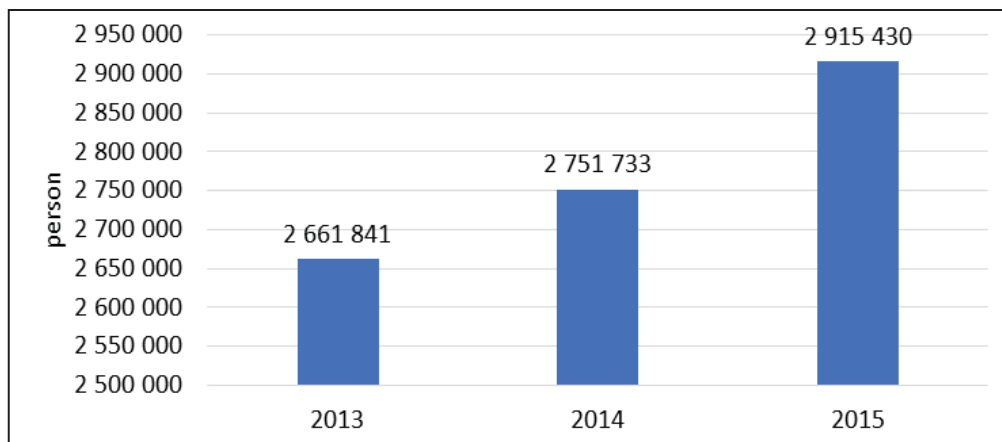
As the data show, the number of individual proprietorships is decreasing, and the role of social enterprises has increased, in 2006 more individual enterprises have been active than social enterprises, during and after the economic and financial crisis, they were decisive. In the case of corporate enterprises, associations and ltd-s were dominant in this period, but this latter form of company did not lose its popularity during the period under review, but with respect to the associations, they decreased by more than 50,000 compared to the beginning of the period. Regarding individual enterprises, the number of retired and part-time employees is dominant over the period, and in 2014 there were 272,170 individual enterprises registered. The following figure shows how the composition of individual businesses is structured, showing the percentage of the distribution data.



**Figure 3 The structure of individual businesses (proprietorships) in Hungary**

Source: author’s own editing based on CSO data <http://statinfo.ksh.hu/StatinfolhaViewer.jsp>

The smallest number of individual businesses operated in 2012, after which some growth could be discovered. In 2014, 252,187 private enterprises were registered, more than 50% of them were full-time, but in 2009 the highest rate was 57%. The proportion of enterprises with part-time employment is increasing, while retirees are less willing to maintain their business, with a share of only 9% in 2014, compared to the previous 13%. Regarding the employment role of the domestic business sector, the results are shown below.



**Figure 4 Employment in the corporate sector**

Source: author’s own editing based on CSO data <http://statinfo.ksh.hu/Statinfo/haViewer.jsp>

In terms of the employment structure, most of the micro-enterprises, including one-person enterprises, are decisive, their numbers increased by 17% compared to 2013, while the number of micro-enterprises employing 2 to 9 people did not change significantly, with only 2% in 2015 compared to 2013.

Employment categories	2013	2014	2015
1-man micro-enterprises	392 914	424 110	461 151
2-9-man micro-enterprises	173 174	170 329	170 322
small enterprises	29 197	30 372	32 013
medium sized enterprises	4 961	5 041	5 144
Non-SME organisations	5 368	5 514	5 750

**Table 2 The structure of the corporate sector by the number of employees**

Source: author’s own editing based on CSO data <http://statinfo.ksh.hu/Statinfo/haViewer.jsp>

### The relationship between corporate growth and funding

The availability of financial resources is a prerequisite for corporate growth. If an enterprise has a stable capital position, it is managed profitably, and it operates by consistently being solvent, then it can count on bank assistance. However, if there are problems in any area, the bank is less able to offer flexible funding. Below I will briefly summarize the financing options that may be the basis for the financial profitability situation of the given business. Financing is the key to providing



financial resources for short and long-term financing needs. The demand for financial resources affects the private sector as well as the business one. According to László Gyulai (2013): “Enterprise financing is in fact a much more complex concept. It includes the assessment of resource requirements, the well-established decision-making process on financing and implementation of funding decisions, and even the subsequent measurement of their impact. “

Typifying corporate resources can be carried out according to their origin, based on internal and external sources. A special case for internal resources is the reversal of after-tax profits, which is defined by the literature as self-financing. The reinvestment of after-tax profits into profit reserves shows well the owners’ future prospects for their company.

The issue of financing may also affect the relationship between buyers and suppliers in the business, what payment deadlines arise between the parties, whether buyers know how to finance suppliers or what stock management policy is needed for the company to continue fully meeting consumer needs. The company’s specific income may be either revenue from the sale or the sale of its tangible assets. The internal resources are not completely free of cost because they pose a risk to the owners similarly to a case when the bank risks own (investor) assets. Cost of ownership is called alternative profit or cost.

Foreign sources have become more and more diverse in recent times, with business-angels, venture capital companies and institutional investors appearing in addition to traditional bank loans. Banks also have a wealth of opportunities for solvent and capital-intensive businesses. As external financiers, business partners and guarantee institutions may appear. A special source of income is the European Union subsidies, which exerts its beneficial effect on the different project financing, but we can also mention the area-based subsidies that are the basis for agriculture. (Gyurcsik P. - Pataki L., 2016)

[http://www.tankonyvtar.hu/hu/tartalom/tamop412A/0007\\_d2\\_1080\\_1082\\_smeuzletifin/1\\_1\\_a\\_finanszirozas\\_lenyege\\_fontosabb\\_formai\\_SNzjx9sSaM-oQpDFp.html](http://www.tankonyvtar.hu/hu/tartalom/tamop412A/0007_d2_1080_1082_smeuzletifin/1_1_a_finanszirozas_lenyege_fontosabb_formai_SNzjx9sSaM-oQpDFp.html)

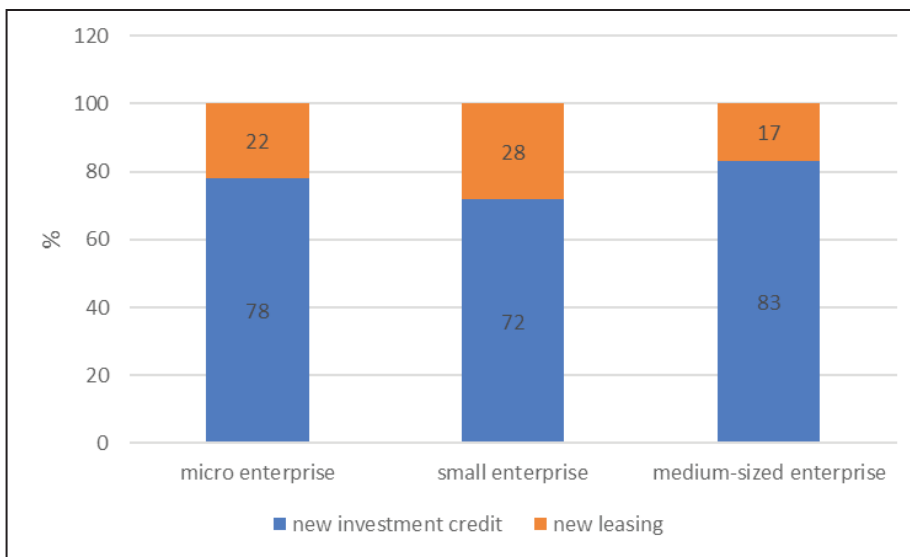
The following table summarizes the alternative options for internal and external resources.

Internal sources	External sources
Reversal of return profit (profit reserve)	Bank loans (short- and long-term loans, working capital loans, investment loans, project credits, overdrafts, white loans, Lombard loans etc.)
Sales revenue	Commercial loans Supplier loans Customer advances
Depreciation	Issuing securities
Selling of assets (tangible assets, „squeezing” of obsolete stocks)	Share financing (venture capital, business angels)
Subsidies, tax incentives	Crowd funding
	Leasing
	Factoring

**Table 3 Summary of corporate financing sources**

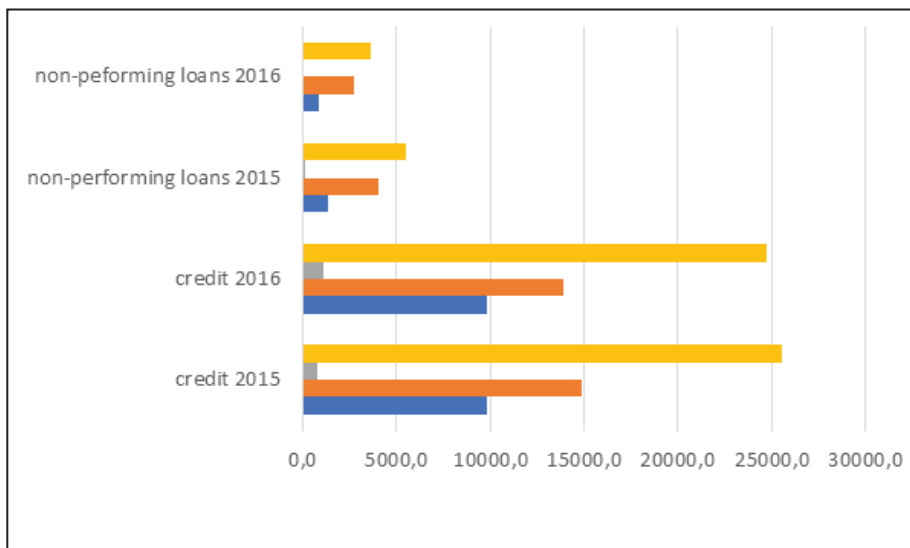
*Source: author's own editing based on Marion Steven (2008) and Andreas Mitschele (2014)*

Since my analysis is linked to lending based on an objective criterion of a credit institution, relevant secondary data are presented in this study. The figure below shows the share of the SME sector in accordance with the credit target. Investment loans were dominant, the amount of funds used by micro enterprises amounted to HUF 299.5 billion, while small enterprises reached HUF 106.9 billion and medium-sized enterprises contracted to HUF 67.9 billion. Of the HUF-based loans, agriculture, manufacturing and trade were the main beneficiaries of the loans, while foreign currency loans were used by transport, real estate and manufacturing industries. Regarding the regional distribution of loans, both the HUF and the foreign currency loans were the most favoured by Pest county enterprises where 24% of all forint loans came in together with 56% of all foreign currency sources.



**Figure 5** The share of the SME sector in accordance with the credit target

Source: <https://www.mnb.hu/sajtoszoba/sajtokozlomenyek/2016-evi-sajto-kozlomenyek/2017-marcius-31-en-zarul-a-novekedesi-hitelprogram>, *Communique on loans granted under the third stage of the Growth Loan Programme*, 4 April 2017



**Figure 6** Changes of credit repayment capability of the corporate sector

Source: author's own editing based on the data of <https://www.mnb.hu/felugyelet/idosorok/i-penz-es-hitelpiaci-szervezetek>

More than 55% of the outstanding loan portfolio affects micro, small and medium-sized enterprises. However, it is clear from the figure that the proportion of non-performing loans is much greater in micro, small and medium enterprises than in the large corporate segment. Without funding there is no growth, no expanding employment. Enterprises that see potential breakthroughs in investment and innovation still see a problem in the changes of cost factors. The R & D & I activities of the companies have increased in Hungary in recent years, one of the drivers of which is the European Union's subsidy policy, while on the other hand, for corporate and local business tax, it can be considered as a tax base reduction item and tax benefits are available. In many cases grants can only be used by larger enterprises, but taxable and tax incentives are also available to smaller companies. (Széles, 2016)

### **Typifying businesses based on indicators**

In the following examination, I was looking for answers to the question of whether companies could be sorted into groups and what kind of traits they have based on the indicators. In this test database, all business data are included for which the index could be calculated for 10 years. The relationship between the logically related indicators used is also demonstrated by the SPSS programme, which has enabled three groups (factor) to be created, resulting in the profitable, liquid and capital-intensive entrepreneurial group separately. A rotated component matrix was used to justify this statement. According to Varga-Szilágyi (2011): „The interpretation of factors is influenced by the rotation process used in the analysis. Therefore, we are investigating what conclusions can be drawn from the correlations of factors and variables and the data structure. „

Rotated component matrix			
Name of indicator	Factors		
	1	2	3
Profitability of assets (%)	,913	,166	-,021
Profitability of equity (%)	,880	-,008	-,302
Profitability of ROA (%)	-,544	-,039	,115
Liquidity acid test	,024	,889	,076
Liquidity indicator	-,082	,852	,198
Liquid acid test	,196	,615	,056
Equity / Net sales (%)	-,033	-,076	,875
Short term indebtedness indicator (%)	,134	-,408	-,754
Share of equity (%)	-,076	,500	,722

**Table 4 Rotated component matrix**

*Source: author's own editing based on the data of Opten Kft.*

According to Lehotá factor analysis is used to »reduce« the number of observed variables. (<http://www.tankonyvtar.hu/hu/tartalom/tkt/marketingkutatas/adatok.html>)

During the factor analysis, three well-defined index groups were statistically verifiable, namely the factors of profitability, liquidity and capital intensity, with 3-3 indicators per group.

The process of factor analysis

Definition of the research problem: Characterization of the examined enterprises by means of calculated indicators. The number of pre-selected indicators is nine. The objective of the factor analysis is to reduce the many variables to obtain a more manageable test dimension. Based on the 9 indicators, 3 factors were ultimately generated statistically. Based on a set of indicators, business behaviour can be characterized by liquidity and capital intensity.

The Kaiser-Meyer-Olkin (KMO) indicator was used to check the analytical conditions.

“The KMO value assesses the ability to factor analysis on a scale from 0 to 1 on a subjective scale. The higher the KMO value, the more accurate the data for the factor analysis. It is not worth calculating with the KMO below 0.5, as the variables are independent, the multicollinearity is weak.” (Varga-Szilágyi, 2011)

Based on the analysis it was found that the examined indicators are not independent of each other, the strength of the relationship is higher than the intermediate level, so the factor analysis can be performed.

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,632
Bartlett's Test of Sphericity	Approx. Chi-Square	117468,103
	df	45
	Sig.	,000

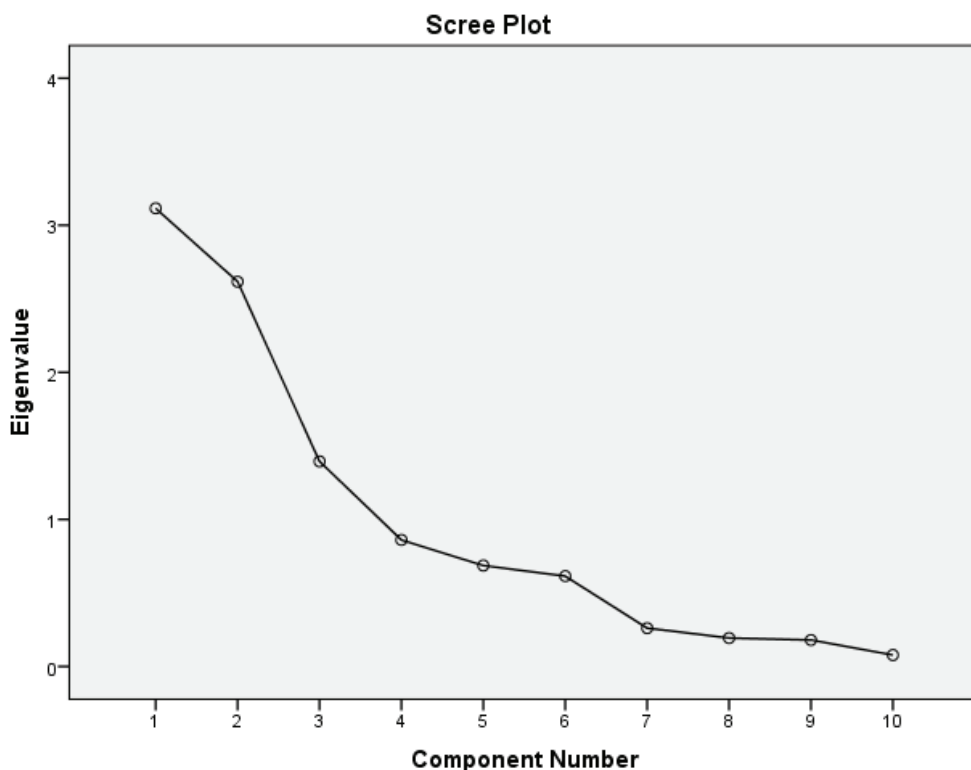
Deciding on the number of factors: By using the SPSS program, the values of the indicators are placed in decreasing order to separate the factors, bearing in mind that the value of the adjacent correlation coefficient will be higher in absolute than the correlation coefficient in the preceding column.

Rotation of factors: The components were rotated using a Varimax method. This method is generally accepted for data purification.

Interpretation of the results: Three factors can be distinguished as a result of the investigation: factor 1 is profitability, 2 is factor of liquidity, 3 is the factor of capital intensity.

The number of factors was determined on the basis of the "variance ratio method". "The minimum acceptable variance is 60%, but some disciplines or scientists require 80-90%. But in practice and in economics, there is a rare degree of variance that is so high that we consider 60%. "(Varga-Szilágyi, 2011)

Another method is the Scree test, the result of which is shown in the figure below.



**Figure 7 The Scree test**

*Source: author's own editing*

Scree Plot is a two-dimensional diagram showing the eigenvalues on the y axis and the number of factors on the x axis. (Varga-Szilágyi, 2011)

### **Analysing businesses with cluster analysis**

“Cluster analysis is one of the multivariate methods that serve to explore structures and structures between respondents” (Simon J.)

The definition of objects and determining their number is based on the factor 3 separated by the former factor analysis. In the course of cluster analysis, the criteria were analysed with the same weight, which is why these data showed a balanced picture during the factor analysis. Handling the problem of outliers was a serious problem with this significant number of items.

Among clustering methods, hierarchical clustering methods form the second most important class. Similarly to the  $K$ -middle method, it is still widely used up

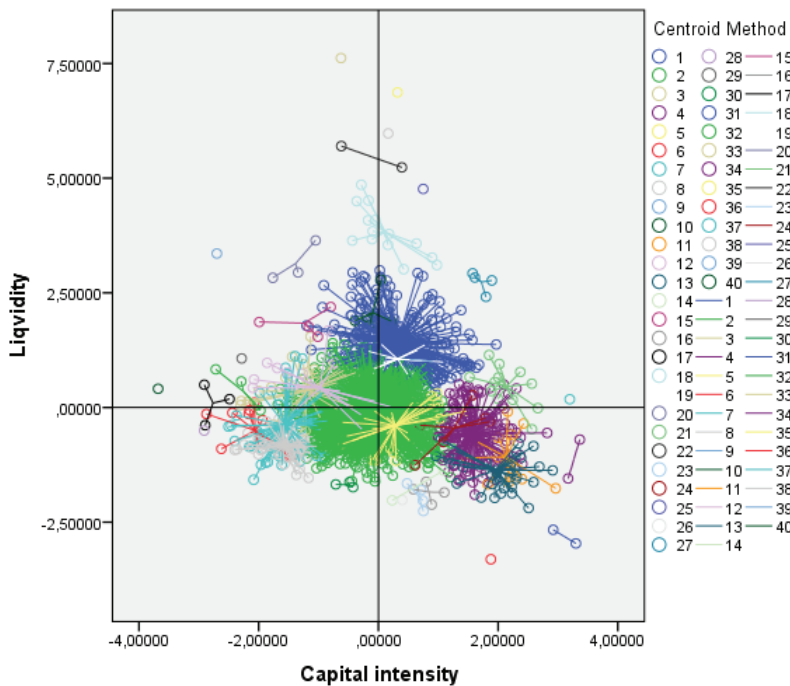
to now. There are two basic approaches to creating a hierarchical clustering: merging and splitting methods. The relationship between two clusters in the centroid (centre-based) methods is determined by computing the distance between cluster centres. (Pang-Ning Tan et al., 2011)

Hierarchical clustering is often depicted by a tree-like diagram termed as the dendrogram. (<http://www.statisticshowto.com/dendrogram/>)

Because of the large number of elements, the dendrogram display was completely incomprehensible, so it does not appear in this form.

Knowing the factors created earlier, typifying enterprises was carried out by 2015. It should be noted, however, that all these companies have shown real performance on the basis of the results obtained in the last 9 years.

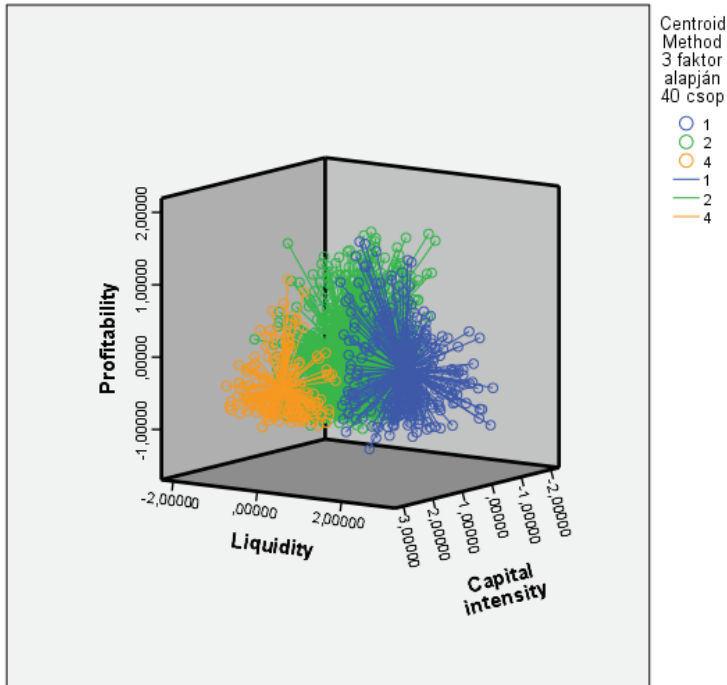
As the graph shows, it is very difficult to create and isolate substantive groups, the structure is extremely fragmented, so instead of the liquidity and capital intensity factor, a different combination has to be applied. There were a lot of small groups, some 27, and just three groups that included more than 5% of businesses, as shown in Figure 9.



**Figure 8** Groups of liquidity and capital intensity factors

*Source: author's own editing based on the data of Opten Kft.*

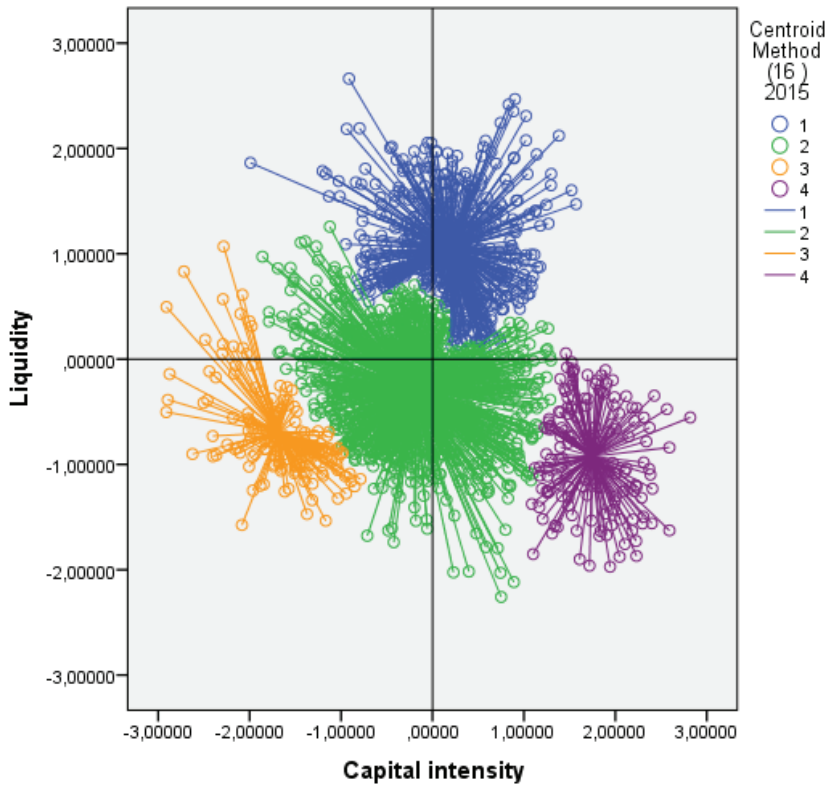




**Figure 9 Relevant groups based on profitability, liquidity and capital intensity factor**

*Source: author's own editing based on the data of Opten Kft.*

With regard to the unity of liquidity, capital intensity and profitability, it is not possible to create substantive groups, therefore, after testing several aspects, the final combination can be established after several tests, which I could best interpret in terms of liquidity and capital intensity.



**Figure 10** The relevant groups received are based on liquidity and capital intensity factor

*Source: author's own editing based on the data of Opten Kft.*

1. Group 1 characteristics: high liquidity, low capital intensity. Long-term solvency is not ensured by the capital position, assets carry high losses, businesses can temporarily maintain their solvency, but at any given moment, insolvency may arise as there is no adequate capital instability. With overdrafts offered by credit institutions, rescheduling of suppliers' debts or just paying customers by date, it cannot be excluded that they sell their existing assets to maintain the company's business, which included some 469 companies.

2. Group 2 features: standard liquidity and standard capital intensity. The most ideal businesses for banks. Not only current, but long-term solvency is also ensured. Businesses are liquid and dispensable at the same time. Their performance is balanced, and their capital stability provides for the future as well. With these characteristics about 998 businesses can be characterized.
3. Group 3 features: low liquidity and weak capital intensity, bankruptcy itself, fortunately it only affects 152 businesses. The assets and liabilities of enterprises are poorly structured, the assets are not able to finance the cost of resources, ineffective management, capital debt should be reduced, indebtedness should be increased, equity capital should be increased, external capital investors and community funding can be counted as no bank loans shall be offered.
4. Group 4 features: low liquidity and high capital intensity. Businesses have developed a capital structure that may cause solvency problems, while sales revenue may not always be able to provide cash flow. Businesses strive for excessive stability, no risk, no revenue, and with these features 147 businesses can be characterized.

## **Conclusion**

For Hungary, the operation of the corporate sector and the efficiency of the operation are a key issue. Many research, analysis and analyses show that the most accessible CSO database can provide a wide variety of data on the role of the sector. Over the last decades, the operation and ownership structure of enterprises has undergone a major transformation. Prior to the privatization and reprivatisation, the state enterprises and co-operatives were followed by thousands of privately owned enterprises. In the turn of the millennium, an entrepreneurial circle was found in employment, export and taxation, most of which belonged to SMEs in addition to large corporations. Companies with domestic capital investment are often associated with multinational multinational companies that provide permanent orders to smaller and larger businesses, while requiring high-quality production and cost-effective operation. The European Union continues to support not only Hungarian enterprises, but also enterprises of other nations, pointing to the vital importance of the future operation and development of the sector. The operation of domestic enterprises is shown by the fact that 52-55% of registered enterprises were operational in the pre-crisis years, but this rate is rapidly decreasing with the onset of the crisis, until reaching a low of 35% for the 2013-2014 period, and finally, on the basis of available data, an improvement of 1% for the benefit of

working enterprises could be observed in 2015. In the coming years, encouraging entrepreneurship can be a promising expectation, showing a more realistic picture of the sector's perception and the range of measures needed for other economic operators. The company is slowly becoming more transparent due to the changes in legislation in the meantime due to forced companies or companies that have had negative results for many years now. Data show that just under one third of registered businesses are operational, i.e. they pay taxes, employ people, and contribute to GDP.

The objective of my research is to analyse the financial situation of the domestic corporate sector by means of indicators, whose fields are:

- Perform a factor analysis by selecting 9 indicators, which resulted in the creation of three factors.
- Creating a cluster analysis based on 2015 data, resulting in four well-defined enterprise groups.

For the preliminary analysis, OPTEN Kft. provided the data with the help of the SPSS programme because of the size of the database: 184.170 enterprises with 10 years of data. From this business circle, firstly, the enterprises that had data necessary for the calculation of indicators for the objective index system were selected. I have found varied values for 10 years: in 2006, about 13561 enterprises were surveyed based on these indicators, 13680 in 2008, 11147 in 2008, 12022 in 2009, 11492 in 2010, 10943 in 2011, 10518 in 2012, 9925 in 2013, 9846 in 2014 and 9671 in 2015.

Regarding the liquidity of enterprises, based on statistical data duality is typical, values are excellent on the average, but this characteristic is not detectable in half of enterprises. During the factor analysis, groups of well-defined groups of liquidity and capital intensity could be formed. Creating and examining these groups is important to find out what measures can be taken to get businesses in at least the standard category, knowing the liquidity and capital positions of businesses. 70% of the non-performing loan portfolio is related to the SME sector, while the non-performing loan portfolio is only 23%. During the factor analysis, the companies under consideration are grouped according to liquidity and capital intensity into the following categories: Group 1: high liquidity and low capital intensity; Group 2: standard liquidity and standard capital intensity; Group 3: low liquidity and weak capital intensity; Group 4: low liquidity and high capital intensity. Companies in these groups showed real activity for 10 years based on the balance sheet and profit and loss account data. The nature of the activity of businesses can also influence what financial features they are having, and this is another way of

looking at how the activity can affect the place occupied in each cluster. It cannot be clearly stated that the items of Factor 3 will soon go bankrupt because they survived the crisis, but the fact that the CRR directives mandated by credit institutions from 2013 do not help this group in lending.

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