



Theses of doctoral (PhD) dissertation

**INVESTIGATION OF MICRO, SMALL AND MEDIUM-SIZED
ENTERPRISES IN DOMESTIC AND INTERNATIONAL COMPARISON,
ESPECIALLY IN THE CONSTRUCTION INDUSTRY**

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1. BACKGROUND AND THE OBJECTIVES OF THE STUDY

1.1 *The significance and the timeliness of the research topic*

The role of the small and medium sized enterprises is outstandingly important in the market economy. The impact of the SMEs on the European economy is unquestionable, since this sector provides more than 90 % of the workplaces in the member states of the EU (European Parliament, 2021). The building industrial sector plays a significant role in the income generation of the member states, in the flow of foreign capital, and also in the investments and in workplace creation. The enterprises contribute with their everyday activities to the operation and growth of the welfare society. The value of the economic role of the SMEs increased during the past 30 years, primarily because the large companies outsourced a significant part of their activities along the value chains. The world realised fast that the development of the SME sector is indispensable, and therefore - after Japan and the USA – the EU also took steps to develop the SME sector. The European Union paid outstanding attention to strengthening the entrepreneur capabilities of the SMEs and to their supporting framework system already since the 2000s.

The role of the SMEs is very important from the aspect of both the promotion of economic growth and workplace creation, as well as from the aspect of the development of the society (Csath, 2015). The number of the SMEs in the European Union represents close to 99 % of all the enterprises, therefore, naturally, there is a close correlation between the number of the SMEs and the number of the workplaces that involves two-thirds of all the employees within the private sector (Eurostat Yearbook, 2010). The importance of the building industrial SMEs is unquestionable within the European Union. The building industrial sector produces close to 10 % of the GDP (Losoncz, 2019) and close to 42.9 million employees are directly or indirectly depend on the building industrial sector (IW, 2020). Several reports prepared by the European Union concludes that the performance of the building industrial sector determines to a great extent the development of the entire economy” (Commission, 2012; Commission, 2015a).

1.2 *Objectives*

Targets connected to the secondary research:

C1: Processing the literature, with paying special attention to the researches that were carried out in respect of the international databases and the results of these researches. During this, I introduced the development of the economy of the building industrial sector and the specialities that were experienced in the countries that have different economic development histories.

C2: The overall target of my research is to create cluster groups based on the macroeconomic indices of the member states, which facilitate the mapping of the correlations between the European building industrial enterprises and the macroeconomic indices of the member states.

C3: I set as one of the main targets of my research study to examine the impact of the annual changing of the macroeconomic indices of the countries on the sales revenue of the European building industrial small and medium sized enterprises, and on the changing of the number of these enterprises.

Targets connected the empirical research:

C4: It was my target to examine the European Union subsidies from the aspect of the impact of the subsidies that may be called down from the European Union convergence funds, and how their usefulness is judged from the aspect of the lives of the enterprises.

C5: The purpose of my research was to receive a general picture on the vulnerabilities of the sector by comparing the operation environment, characteristics of the small and medium sized enterprises of two countries that have different economic backgrounds, in the period that was burdened with the coronavirus caused crisis.

2. SUBSTANCE AND METHOD

2.1 *Process and methodology of the secondary research*

There were two main group of questions in the focus of my research. In the case of one of them I looked for the answer to the question what impacts of the macroeconomic indices of the cluster groups formed from the European member states have on the sales revenue of the micro, small and medium sized enterprises, It is another question within this group of questions, what impact 1 unit increase of the sales revenue of the building industrial micro, small and medium enterprises has on the macroeconomic indices of the given cluster groups. The other group of questions deals with the attitude of the SME sector, with the economic and financial changes that took place upon the effect of the 2020 crisis, and the assessment of the competitiveness and growth of the SME sector.

I carried out my examinations in respect of the member states of the European Union. I excluded from the research two countries. One excluded country is the United Kingdom, since starting with January 1, 2020, it is already not the member of the European Union. In addition to this, Croatia was also left out, because the available data were deficient.

Collecting the data of the member countries, and conducting the examinations were made more difficult by the fact that EUROSTAT does not publish data about each member state. During the research, the examined topics got narrowed down both as regards time, and space, therefore, my doctor dissertation is also structured accordingly. First, I examine the European countries, then the Hungarian building industrial small and medium sized enterprise sector. The time horizon of the examinations is also narrowed down in a similar way. During defining the clusters of the countries, I took into consideration 19 years as the time horizon of the examination, while in the case of examining the building industrial SMEs this period was restricted to 10 years, because the available data are deficient. There were data published for examining the sales revenue of the building industrial SMEs starting with 2010 on the website of EUROSTAT.

The sources of the data needed for the secondary research were the Statistical Office of the European Union, the EUROSTAT, and the statistical database of the World Bank. I captured the data involving the European building industrial SMEs from the database that is available on the website of EUROSTAT. The organisation regularly published the number of European building industrial SMEs according to their sizes, and their sales revenue, broken down by the countries. Thanks to the above, I was able to examine the relationships of the micro enterprises in connection with the macroeconomic data of the member states of the European Union. It became

obvious already at the starting of the research that the databases of the EUROSTAT, and of the World Bank are deficient in many cases. While the website of the EUROSTAT is narrow in respect of statistical reports that involve the SME sector, the statistical data of the World Bank are available only until 2018. Therefore, I captured into my database that served as the basis of the research the data from the data that were published by these two mentioned organisations.

Certain macroeconomic data of the member states – GDP, inflation, savings – I found without any deficiency on the statistical website of the World Bank concerning the period of 2000–2018. The unemployment rate, the savings, and the EU subsidies I captured from the interface of the EUROSTAT (ESA 2010). The two statistical organisations publish the data in different currencies. Those data blocks that were defined in dollars I converted to EUR at the exchange rate that was published by the World Bank. The database of the Hungarian secondary resources was provided by the Central Statistical Office (KSH) of Hungary.

2.2 *Process and methodology of the primary research*

During the period of May-September 2020, I carried out an online questionnaire-based survey with the participation of 775 persons within the group of persons, who were employed within the SME sector in Germany and Hungary. The questionnaire-based survey is such a quantitative research method, with the aid of which it is possible to carry out a standard data collection with the aid of a formal questionnaire. I used for capturing the data with the aid of the questionnaire-based survey the questionnaire application that is available on an already widely used and well proven website. It was a condition to being included in the sample that the person filling in the questionnaire had to be actively employed.

The main aspect was that we should be able to collect as many data as possible within the shortest time. I selected the option of online filling in of the questionnaires, because in this case there is no distortion caused by the interviewer, and the possibilities of anonymity and independent filling in increase the probability of honest responses. I did not prepare any deep interviews before the online questionnaire-based survey in respect of this topic.

The purpose of my research was to reach a target group, which in the given period had some kind of relationship with the SME sector. The group of the persons, who filled in the questionnaire is diverse as regards their employment statuses. There were even company owners among the responders.

2.3 *Statistical methods used during the analysis*

Cluster analysis

I carried out a cluster analysis in respect of the 27 member states of the European Union concerning the period of 2000-2019. Cluster analysis is a procedure, with the aid of which we are able to list data blocks into relatively homogeneous groups, that is, to classify them. My purpose was to create groups, the members of which are more similar to each other than to the members of the other groups.

For the purpose of supporting my hypothesis I tried to classify into homogeneous groups data blocks that were obtained from the macroeconomic indices. We differentiate two procedures in the case of cluster analysis: the hierarchical method and the non-hierarchical method. During my examinations, based on the method of András Jánosa (2015), I applied the hierarchical method. One of the advantages of this method is that the number of the clusters is not known in advance, however, its disadvantage is the fact that it is sensitive to the extreme values. The Ward-criterion is a method, in the case of which we try to achieve that the internal heterogeneity of all the clusters (based on the Euclidean distance) is the smallest possible projected to the entire cluster structure (Gyires, 2020).

Correlation analysis

I analysed with the aid of correlation analysis the macroeconomic indices of the member states of the European Union, and the number of enterprises operating within the building industrial SME sector and their sales revenue. The correlation answered my question asking whether there was any relationship between the quantity variables, and if yes, then in what direction and how close this relationship is. The sign of the correlation coefficient is the same with the sign of covariance and it indicates the direction of the correlation. This show whether the changing of the two variables have the same or the opposite directions.

Since the correlation indices are symmetric, the roles of the two variables may be interchanged. The closer the relationship is, the closer is the absolute value of the correlation coefficient to 1. The weaker the relationship is between the two variables, the closer is the value of the correlation coefficient to zero. If the sign of the correlation coefficient is positive, then the correlation between the two variables is direct and the points presented on the basis of the values of the variables are scattered around a straight line of positive gradient. If the sign of the correlation coefficient is negative, then the relationship between the two variables has a reversed proportionality, and the points are along a straight line that has a decreasing gradient (Reiczigel, 2005).

Relationship assessment

In the case of the questionnaire-based survey I carried out relationship examinations in respect of the received responses. In the case of this assessment method there may be three different types of relationships: association, mixed and correlation relationships. I worked with the association and the mixed relationship examinations for processing the results.

In the case of the association examination, we measure the closeness of stochastic relationship existing between two quality characteristics, with the aid of the so-called association coefficients. We speak about a mixed relationship, if the causal characteristic is quality based, while the caused characteristic is quantity based. We measure the closeness of the relationships existing between the characteristics included in the mixed relationship with the aid of the standard deviation quotient. In the case of my assessment the closeness of the relationship between the two characteristics is defined by the absolute value of the index, which is between 0 and 1, in an interval that is closed both from below and from above.

Path analysis

In the course of path analysis (Structural Equation Modelling – SEM) the changing correlations are broken down to components. On the path diagram the paths between the variables show the way the impact of the main explaining variables – in this case of the savings/person – get to the result variables, in this case to the other macroeconomic variables. Path analysis also answers how strong the partitional, total or indirect relationship that exists between the variables. Among others I was looking for the answer during my research to the question what impact the sales revenue of the building industrial enterprises have on the GDP, on inflation and on unemployment.

3. INTRODUCTION OF THE RESULTS

3.1 *Typization of the member states of the European Union on the basis of the macroeconomic indices*

I filled the database of my research with the macroeconomic indices of 27 member countries. My purpose was to create clusters with the aid of classification with the least number of cluster groups possible, in order to achieve that there will be sufficient number of samples available within the cluster groups for examining the relationships.

In the course of the examinations, I started out from the assumption that it is possible to apply distances for measuring the similarity within the database, and that there are no extreme or very different data in the case of the member countries. Prior to conducting the cluster analysis, I took out one element – Croatia – from the sample in view of the fact that the data belonging to this country were deficient on the websites of EUROSTAT and World Bank.

In the course of cluster analysis, it is a requirement that the order of magnitude of the values of the variables have to be identical, this may be achieved by standardization. For the purpose of the examination, I separately standardized for each year during the period of 2000-2019 the data of the countries in order to present the results in an as objective manner as possible.

After finalising cluster formation, I obtained six cluster groups concerning the 19-year results of the 27 countries. It was necessary to set the number of iterations to a smaller value in the course for the analysis compared to the default 10 iterations, in order to achieve that the number of samples in the groups are not too small. The 6 cluster groups created this way I named as follows:

1. Model country
2. Welfare countries
3. Converging Countries
4. Developing, but Indebted Countries
5. Crisis Countries
6. Falling behind Countries

3.2 *Introduction of the causal relationships through the SEM model within the building industry sector*

I examined the causal relationship of the SME sector and the macroeconomic indices with the aid of path analysis (SEM). The arrows indicate the causal relationship existing between 5 variables (savings, GDP, inflation, unemployment, building industrial SME).

The variable that serves as the starting out point of savings is the cause, at the end point of the arrow there are the caused variables (GDP, inflation, unemployment, sales revenue of the building industrial SMEs). The 5 manifested variables I examined are the following: savings, GDP, inflation, unemployment, sales revenue of the building industrial SMEs. In my model savings is the only variable, which is not the caused by any other variable (indicated in the model), therefore it may be considered to be an initial explaining variable, while the rest of the variables indicated in the model may be considered to be endogenous (GDP, inflation, unemployment, sales revenue of the building industrial SMEs). In the course of path analysis, the variable is broken down into correlational components. Path analysis also introduces how strong is the partitional, total or indirect relationship that is between the variables (Münnich, 2012). I was looking for the answer among others during my research to the question how the sales revenue of the building industrial enterprises influences the GDP, the inflation, and unemployment.

Table 1: Definition of the measurement units

Name of index	Definition of the measurement unit
EU budget per capita	EUR per capita
GDP proportional state debt	percentage point
GDP per capita	EUR per capita
Inflation	percentage point
Sales revenue of the building industrial SMEs	SME sales revenue per 1 inhabitant in 1000 EUR
Savings per capita	EUR per capita
Unemployment	percentage point

Source: Own edition

Results in the case of the building industrial micro enterprises:

- In the case of the **Model Country**, if the sales revenue per capita building industrial micro enterprise increases with 1 million EUR, this variable increases the unemployment rate with 0.539 percentage points. The increasing of the sales revenue of the micro enterprises negatively influences the unemployment rate.
- In the case of the **Converging Countries** the increasing of the savings also influences positively the increasing of the sales revenue of the micro enterprises.
- In the case of the **Converging, but indebted Countries**, the 1 EUR increase of the savings triggers a sales revenue increase of 0.245 EUR at the building industrial micro enterprises.
- Examining the **Crisis Countries**, it may be seen that the increasing of the savings triggers 0.01 EUR (0.235 EUR) smaller impact on the sales revenue of the micro enterprises than in the case of the converging, but indebted cluster. In the case of the crisis cluster group, it may be said that the GDP per 1000 capita increases with 2.946 EUR if the sales revenue per capita of the building industrial micro enterprises increases with 1 million EUR. A significant relationship may be also established in the case of this group as well in respect of the unemployment rate and inflation. The unemployment rate decreases with 2.768 percentage points, and the inflation decreases with 2.768 percentage points, if the sales revenue per capita of the building industrial micro enterprises increases with 1 million EUR.
- **In the case of the Falling behind Countries** the result is interesting. The increasing of the building industrial micro enterprises is responsible for the increasing of the inflation rate (39.851).

Results in the case of the building industrial small enterprises:

- In the case of the **Model Country**, if the sales revenue per capita of the building industrial small enterprise increases with 1000 EUR, this change will increase the unemployment rate with 1.283 units. The increasing of the sales revenue of the small enterprises increases the unemployment rate even more drastically than the sales revenue increase of the micro enterprises.

- In the case of the **Welfare Countries**, if the savings increase with 1 EUR, then the sales revenue of the building industrial small enterprises increases with 0.094 EUR. The increasing of the sales revenue of the building industrial enterprise increases with 1000 EUR, it has an additional impact on the unemployment rate (decreases it with 0.689 unit), or it increases the value of GDP/Capita with 6.153 EUR.
- In the case of the **Converging Countries** the increasing of the savings with 1 EU leads to the increasing of the sales revenue of the industrial small enterprises with 0.172 EUR. If the sales revenue of the building industrial small enterprise increases with 1000 EUR, then the value of the GDP/capita increases with 7.726 EUR, and it increases inflation with 3.606 units, and it decreases unemployment with -2.974 unit.
- In the case of the **Converging, but Indebted Countries** the research produced significant relationship only in one case. If the savings increased with 1 EUR, the sales revenue of the building industrial small enterprises increased with 0.107 EUR.
- In the case of the **Crisis Countries** 1 EUR increase of the savings caused the increasing of the sales revenue of the building industrial small enterprises with 0.065 EUR. Increasing the sales revenue of the small enterprises with 1 million EUR also influences these two macroeconomic indices: it causes the increasing of the inflation rate with 2.94 units, and the decreasing of the unemployment rate with -4.095 unit.
- In the case of the **Falling behind Countries**, the savings also cause the increasing of the sales revenue of the building industrial small enterprises, that is, 1 EUR savings increases with 0.112 EUR the sales revenue of the building industrial small enterprises. If the sales revenue of the building industrial small enterprise is increased with 1 million EUR, then the GDP per capita increases with GDP 6.483 EUR, while the inflation rate increases with 120.926 unit.

Results in the case of the building industrial medium sized enterprises:

- In the case of the **Model Country**, increasing the sales revenue of the building industrial medium sized enterprises with 1000 EUR per capita produces 6000 EUR increase in the GDP per capita. Therefore, in the case of the welfare countries (5.62) and in the case of the crisis countries (5.42) we may speak a five times multiplier.
- In the case of the **Converging Countries**, increasing the sales revenue of the building industrial medium enterprises with 1000 EUR per capita decreases unemployment with 0.86 percentage points.

- In the case of the building industrial medium sized enterprises of the **Crisis Countries**, if the sales revenue increases with 1000 EUR, it leads to the 1.6 % increase of inflation.

3.3 *Correlation assessment between the EU subsidies and the macroeconomic indices*

No significant relationship may be shown between the macroeconomic indices of European member states (without Croatia) and the European Union subsidies for the period of 2000-2019. The dismissing of the second hypothesis is not surprising, since the amount of the European Union subsidies compared to the annual GDP data of the member countries is between 1-4 %. Due to this, it was expectable that there is no significant relationship between the examined factors during the examined period.

3.4 *Correlation assessment projected to the macroeconomic indices of the member states and projected to the European building industrial companies*

There is a significant relationship between inflation and those small enterprises that have maximum 9 employees.

Table 2: Correlation between the sales revenue of the building industrial SMEs and the macroeconomic indices of the member states

Correlation examination		Inflation	Unemployment	State debt/GDP	GDP/capita	EU budget/capita	Savings /capita
Number of companies if the number of employees of the company is: 0-9	Pearson Correlation	-.167 **	x	0.170**	0.126*	x	0.172**
Number of companies if the number of employees of the company is: 10-19	Pearson Correlation	x	-.0296**	-.0276**	0.743**	x	0.634**
Number of companies if the number of employees of the company is: 20-49	Pearson Correlation	x	-.0296**	-.0349**	0.727**	x	0.629**
Number of companies if the number of employees of the company is: 50-249	Pearson Correlation	x	-.0240**	-.0383**	0.646**	0.129**	0.555**
Number of companies if the number of employees of the company is: 0-250	Pearson Correlation	-.0166**	x	0.137*	0.201**	x	0.236**

Source: Own edition

In the case of inflation, it is difficult to define what is the cause and what is the effect: to define whether the inflation is low because there are many companies, or there are many companies, because the inflation is low. This may be considered even as an impact that strengthen each other, or a further rippling effect.

In view of the number of all the small and medium-sized enterprises I established a negative significant relationship. The result is distorted by the fact that the enterprises not bigger than 9 persons in this group reach only 80 % of the weighted average of all the enterprises.

Subsequently, I examined the relationship of unemployment and the number of enterprises. Based on the results it is possible to show a significant relationship between these two indices in the case of the companies the number of employees which are between 10-250 persons. Therefore, the increasing of the number of these enterprises leads to the decreasing of unemployment.

Table 3: Correlation relationship between the sales revenue of the building industrial SMEs and the macroeconomic indices of the member states

Correlation examination		Inflation	Unemployment	State debt/GDP	GDP/capita	EU budget/capita	Savings/capita
Total sales revenue if the number of employees f the company is: 0-9	Pearson Correlation	`-.160 **	`-0.223**	x	0.866*	x	0.843**
Total sales revenue if the number of employees f the company is: 10-19	Pearson Correlation	x	`-0.352**	`-0.168**	0.914**	x	0.833**
Total sales revenue if the number of employees f the company is: 20-49	Pearson Correlation	x	`-0.325**	`-0.244**	0.894**	x	0.810**
Total sales revenue if the number of employees f the company is: 50-249	Pearson Correlation	x	`-0.301**	`-0.276**	0.828**	x	0.740**
Total sales revenue if the number of employees f the company is: 0-250	Pearson Correlation	x	`-0.294**	0.173*	0.917**	x	0.847**

Source: Own edition

Cluster analysis had shown a significant relationship between the EU subsidies and the number of those building industrial enterprises, the number of employees of which is between 50 and 249 persons. Based on the results the impact of the European Union subsidies may be measured primarily in the case of those building industrial enterprises that belong to this group. It is important to highlight that the European Union subsidies do not increase the sales revenue of the enterprises, but they have a positive impact on the foundation of companies. There is also a negative significant relationship between the sales revenue of the enterprises that employ less than nine persons and inflation. Accordingly, either sales revenue decreases because of inflation or the inflation increases because the sales revenue decreases.

Cluster analysis established a negative significant relationship between the sales revenue of the enterprises and unemployment. Based on the results it may be concluded that the decreasing of the sales revenue of the SMEs led to the increasing of unemployment.

A significant relationship could be established between the sales revenue of the building industrial SMEs (size: 0-249 persons) and the unemployment rate. Based on this it may be concluded that the increasing of the sales revenue of the building industrial enterprises led to the decreasing of unemployment. The increasing of the sales revenue of the building industrial small enterprises has the greatest impact on the unemployment rate.

3.5 *Results of the primary research*

From the 775 respondents, 562 persons do work even now in the SME sector and 213 respondents are employees of large companies. During processing the data, I did not separate the large company respondents, since I considered it to be irrelevant in companies of what size the persons filling in the questionnaire worked. The reason of this that the questions were not specific, the purpose was to obtain a general picture from the responses of the active employees. Characteristically the employees of large companies also get into contact with the SME sector, primarily as subcontractors.

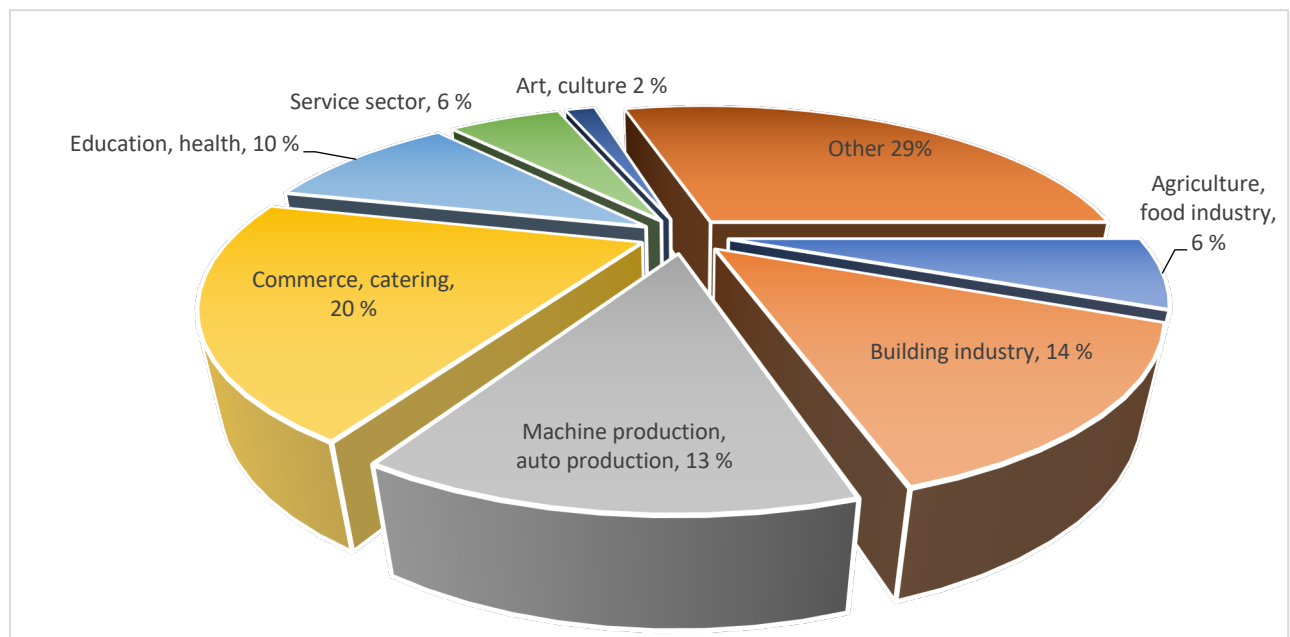


Diagram 1: Sectoral distribution of the questionnaire

Source: Own work n=775

Close to 27 % of the respondents belong to the group of people, who are employed by large companies (number of employees $250 \leq$, annual net sales revenue 50 million EUR \leq), while 73 % of the persons filling in the questionnaire may be connected to the SME sector. As regards the number of the respondents there is no big difference from the aspect of the size of the SME-sector. 77 % of the questionnaires received was filled in within Hungary, and 23 % of them was filled in within Germany. The distribution of the companies by size in the two countries was the following: The enterprises belonging to the German SME sector represented 27.22 % of all the responses belonging to the SME sector, no responses were received from the micro enterprises at all.

3.5.1 Measures generating the growth of the SME sector

The literature considers innovation to be the primary means of increasing the competitiveness of the enterprise in the economic and financial situation of today.

Based on Diagram 2, the respondents from Hungary think that the keys to the growth of the sector are the EU sources and the state subsidies, while the respondents from Germany

considered the most important drivers to be innovation and wage policy. It is important to note, that the respondents from Germany did not consider the EU sources to be a significant factor.

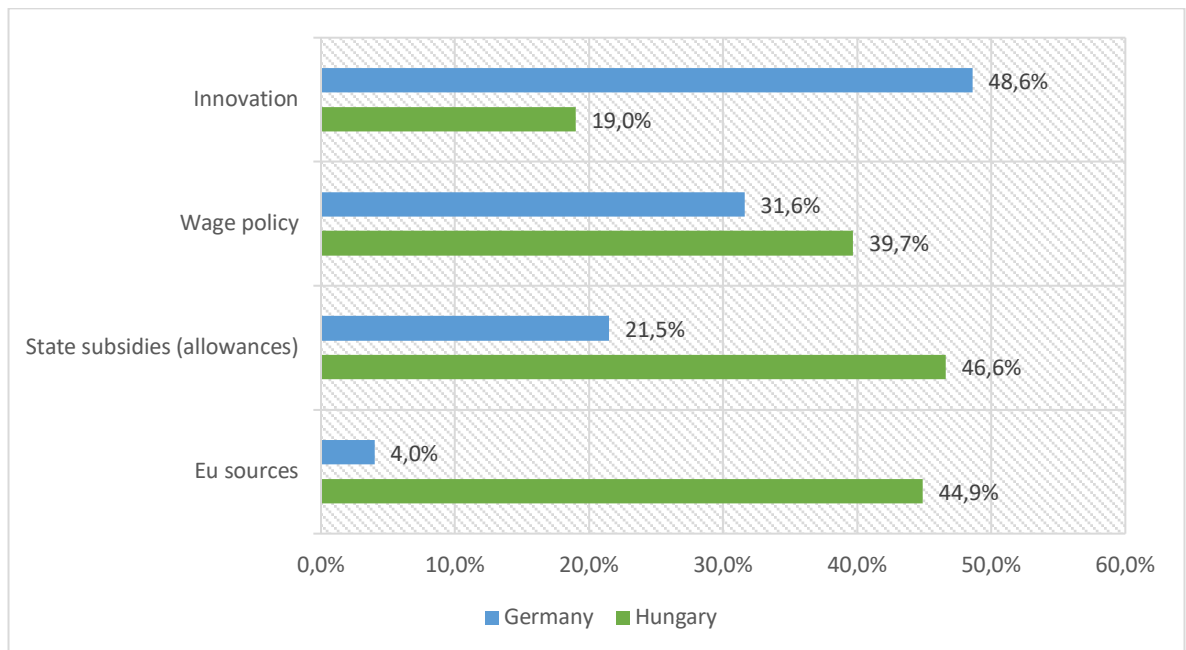


Diagram 2: Which measures had a positive impact on the SME sector recently

Source: Own edition, n=775

3.5.2 Assessment of the liquidity of the SME sector at the time of the starting of the coronavirus pandemic

In the current market situation one of the most important conditions of the stable operation of the SME sector is the following: the enterprises have to be able to solve the performance of their short-term payments. In this period the most important issue is the degree of their liquidity, and with which steps they are able to stabilize their situation.

In a well functioning economic environment, the enterprises are able to plan in advance, they clearly see the contractual portfolio of the next period and their obligations. Upon the effect of COVID-19, the external factors became uncertain in all the areas of the economy. In several sectors – e.g., in the sector of tourism and the commercial and service areas that are connected to tourism – the entire market disappeared from one day to the other, the sales revenue of the companies became practically zero. In the case of the artificially sustained companies, the fixed costs use up the reserves. In the course of my research the Hungarian and the German respondents evaluated on a 5-degree scale whether according to their opinion the SME sector has

to fight liquidity problems and if yes, according to their opinion how serious these liquidity problems are.

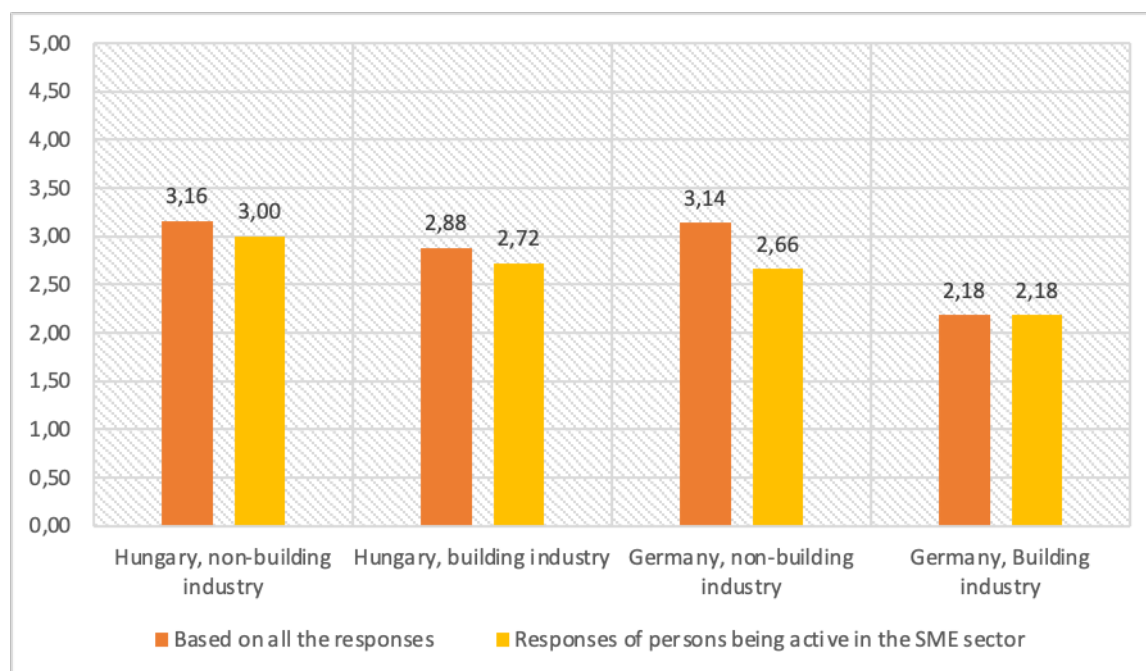


Diagram 3: The cluster classification of the 27 EU member states concerning the period of 2000-2019

Source: Own edition on the basis of own data, N= 775

The situation of the SMEs was considered to be more serious by the respondents in Hungary with 5.57 % than their counterparts in Germany. With the aid of further breaking down the SME sector and the large companies (Diagram 3) it can be seen that the building industrial sector – independently of the size of the enterprise – according to the opinion of the respondents has a milder liquidity problem than the other participants of the SME sector. The coronavirus pandemic created an extraordinary situation in the world. The economic impact of COVID-19 is not comparable to any previous economic crisis. The explosion like spreading of the coronavirus caused simultaneously the dropping of the demand (consumption, investments) and of the offer (factory shutdowns, breaking of the production chain, temporary suspension of tourism), their fast decrease.

The economic effects of the coronavirus pandemic appear in respect of the liquidity, staff number changes, wage changes and sales price factors in the most spectacular manner in the scope of the enterprises operating in Hungary or in Germany. The entrepreneur sector had to face a previously completely unknown situation, restrictions that followed the COVID-19 pandemic.

Table 2: Relationship between the size of the SME and the impact that was exerted on liquidity by the COVID-19 pandemic that appeared in 2020

		<i>The company where you work belongs under what class of companies?</i>	<i>Since when does the company operate?</i>	<i>According to your opinion does COVID19 pandemic that appeared in 2020 (coronavirus) have any influence the liquidity of the companies</i>
<i>The company where you work belongs under what enterprise category?</i>	<i>Correlation coefficient</i>	1,000	0.095	0.184
	<i>Sig. (2)</i>	.	.207	.014
	<i>Number of elements</i>	177	177	177

Source: Own edition based on own data, n=775

As regards the long-term prospects there are many uncertainties. It is difficult to judge the economic consequences of the virus due to the payment moratorium that is in effect within the European Union, which temporarily hides the actual economic damages that are caused by the virus. As a consequence of this, today it is still difficult to draw far reaching conclusions about what damages the currently established situation will have on the European enterprises in the long term. Table 2 introduces the responses that were given in respect of the period that preceded the second lock-down.

The member states of the European Union in order to mitigate the economic damages tried to keep the SME sector in life with different non-refundable state subsidies. Primarily the sole enterprises and the micro and small enterprises were able to utilise the subsidies that were distributed by the German and the Hungarian state. The questionnaire focused on the size of the companies and the liquidity problem. Based on the results of the survey, there is a significant relationship between the size of the companies and the liquidity problems, that is, the bigger a company, according to the opinion of the employees the more serious is the impact exerted on the liquidity of the companies by the COVID-19 pandemic that appeared in 2020.

3.5.3 Judgement and the significance of the EU subsidies

Based on the response that were received in response to the questionnaire it may be said that the judgement of the effect of the EU subsidies is positive on the life of the companies in Hungary. Further methodological examinations have to be carried out for proving that it has actually any demonstrable positive effect on competitiveness, efficiency or on the growth indices of the enterprise.

I compared the data received through the questionnaire from the aspect of what the opinion is of the Hungarian and German respondents in general about the European Union subsidies. The impacts could be evaluated on a scale between 1-5.

On Diagram 4 it can be seen that while the Hungarian respondents generally evaluated at 3.62 points the impact of the source on the life of an enterprise, while the German counterparts defined the positive impact of the subsidies at 3.27 points in general. Moreover, it can be also shown that those respondents have a more positive opinion on the impact of the European Union subsidy, in the case of which the employer did not win any subsidies yet. In the case of those German enterprises, which previously received from the funds that could be called down, had an opinion that was more negative with close to 0.72 points. In Hungary, those companies that won some kind of subsidy do still see more positively with 0.07 points the general impact of the subsidies on the life of the company

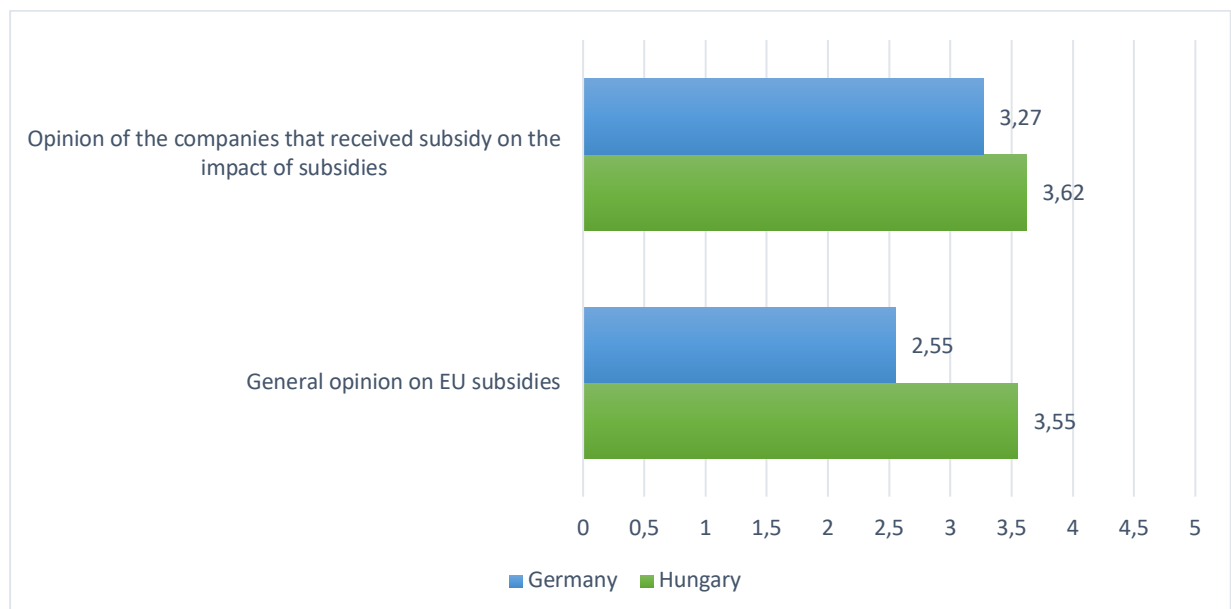


Diagram 4: Opinion on EU subsidies

Source: Own edition based on own data N= 775

On the basis of the Pearson Chi-square (Table 3) there is a significant relationship between the company size variable and the won EU subsidies variable, because $p < 0.05$. According to this the size of the enterprise influences the chance of winning EU subsidies. Therefore, the bigger an enterprise, the higher is its chance to win EU subsidies.

Table 3: Pearson Chi-square for the enterprise size and the EU subsidies won

		ENTERPRISE SIZE
EU_BÜDZSÉ	Pearson Chi-Square	.000
	df	1
	Value	26.158

Source: Own edition

Diagram 5 illustrates how the subsidies won are distributed on the basis of the sizes of the enterprises. 80.8 % of the respondents worked at companies that did not win EU subsidy yet. More than one-fifth of them, that is, 19.2 % of them already received some kind of subsidy that could be called down from the EU.

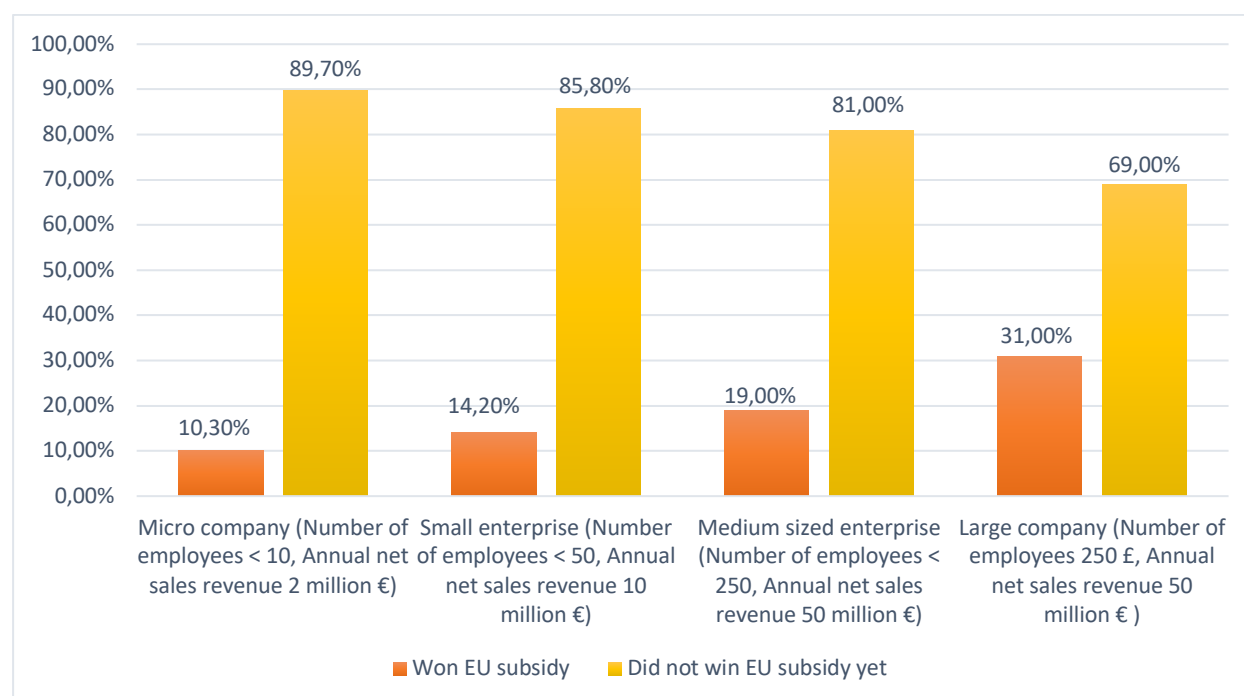


Diagram 5: Distribution of the EU subsidies won, according to the enterprise sizes

Source: Own edition

4. NOVEL SCIENTIFIC RESULTS

I summarise in the following the new and novel scientific results that were found on the basis of the research:

H1: With the aid of my research, I supported that the data blocks obtained from the main macroeconomic indices of the 27 member states of the EU (GPD/capita, savings/capita, EU-subsidies, inflation, unemployment rate, state debt/GDP) may be classified into homogeneous groups.

Prior to conducting the cluster analysis, I took out Croatia from the sample, in view of the fact that the data belonging to this country were deficient on the site of the EUROSTAT and of the World Bank. Upon finalizing the cluster creation, I got six cluster groups for the 19-year results of the 27 states. It was necessary to reduce the number of iterations than the default value of 10, in order not to have a low number of samples in the groups. I named the 6 cluster groups that were created this way, as follows:

1. *Model country*
2. *Welfare countries*
3. *Converging countries*
4. *Developing, but indebted countries*
5. *Crisis countries*
6. *Falling behind countries*

H2: No significant relationship may be shown to exist between the main macroeconomic indices of the member states of the European Union and the European Union subsidies (convergence funds).

No significant relationship may be shown to exist between the European member states (without Croatia) and the European Union subsidies in respect of the period of 2000-2019. The dismissal of the second hypothesis is not surprising, since the total of the European Union subsidies is between 1-4 % compared to the annual GDP data of the member states. Therefore, it was expectable that there is no significant relationship between the examined factors concerning the examined period.

H3: A significant relationship may be shown to be present between the main macroeconomic indices of the member states of the European Union, and the number and the sales revenue of the building industrial companies that belong to the member states.

On the basis of the examination results, this statement was only partially proven, since it is not possible to always show a significant relationship between the number of the building industrial SMEs and the macroeconomic indices.

It is possible to prove that a significant relationship exists between the building industrial micro enterprises and inflation ($p = -0.167$).

A negative significant relationship could be shown to exist between the number of building industrial enterprises that have more than 10 employees and unemployment. Based on this it may be concluded that the increasing of the number of the companies leads to the decreasing of unemployment.

It was not possible to prove any significant relationship in each case between the sales revenue of the building industrial SMEs and the macroeconomic indices. In the case of this research the following partial assumptions can be considered as having been proven:

There is a negative significant ($p = -0.160$) relationship between the building industrial micro enterprises (0-9 person) and inflation.

A significant relationship could be established between the sales revenue of the building industrial SMEs (size: 0-249 persons) and the unemployment rate. Based on this it may be said that the sales revenue increase of the building industrial enterprises led to the decreasing of unemployment. The sales revenue increase of the building industrial small enterprises has the greatest impact on the unemployment rate.

Therefore, hypothesis 3 was proven only partially. The reason of this was the smaller data set that was used during the research. In respect of this research, it is worthwhile to carry out further research with using a more detailed (monthly) time series.

H4: The Hungarian and the German SME sector considers innovation to be the primary means serving the improvement of the competitiveness of the enterprise in the current economic and financial situation.

According to the German responders, innovation is the key to improving the competitiveness of the enterprises, while the Hungarian respondents consider the impacts of EU subsidies more important under the economic and financial situation that is characteristic of our days.

Hypothesis 4 was refused in the case of the Hungarian SMEs, since the Hungarian SME sector does not consider innovation to be the primary means of improving the competitiveness of the enterprise in the current economic and financial situation. In respect of the Hungarian SMEs, it would be an additional interesting research area the examination of whether there is a significant relationship between the added value per capita of the companies and the EU subsidies, which would support the opinion of the Hungarian respondents.

H5: It is possible to show that a relationship exists between the size of the SME sector and the EU subsidies won.

It is possible to show that there is a significant relationship ($p < 0.05$) between the size of the enterprise and the EU subsidies won. According to this the size of the enterprise influences the chance of winning EU subsidies. Therefore, the bigger the size of an enterprise, the bigger is its chance to win EU subsidies.

H6: The impact of savings in the case of the building industrial SMEs is more significant in the lagging behind countries.

I consider this hypothesis to be proven, since the impact of savings on the SMEs is the most significant in the case of the cluster groups of the converging, but indebted countries (0.25), in the case of the crisis countries (0.24), and the converging countries (0.20). I consider it to be an interesting result that in all these three groups the result was the most significant in the case of the micro enterprises.

5. SUMMARY

The purpose of the research being the subject of my dissertation was to introduce the changes of the characteristics of the European building industrial SMEs in view of the EU member states' macroeconomic indices divided into different cluster groups.

In the initial phase of the research, I reviewed both the international and the Hungarian professional literature in order to get a comprehensive view of the current situation of the SMEs, and within it the literature of the building industrial sector. My research topic was extended with further examinations during the past two years, and the impacts caused by the COVID-19 pandemic also got into the focus.

I defined the annual cluster classifications at the beginning of the research from the macro-economic data sets concerning the 27 member countries of the European Union, as a result of which I formed six cluster groups. This base provided the basic element of the subsequent examination. After defining the cluster groups formed, I carried out a causal analysis with the aid of the SEM method. I considered savings as an exogenous variable, while I considered the GDP per capita, inflation, unemployment, and the sales revenue of the building industrial SMEs as endogenous variables during the research. I started out from the basic conclusion that savings exert an impact on the sales revenue of the building industrial SMEs, and savings exert a further indirect impact on the other endogenous variables through the sales revenue of the building industrial SMEs. The results of the research supported that the positive impact of the savings on the sales revenue of the building industrial micro companies is significant in the case of the underdeveloped countries.

I primarily focused on the correlation between the macro-economic indices of the European member countries and the subsidies of the European Union through secondary data analysis in my dissertation. The results of the executed correlation examination supported that it is not possible to show correlation between the macro-economic indices of the European member countries and the subsidies provided by the European Union.

I examined the number and the sales revenue of SMEs operating in the building industry in the next step of secondary research. I carried out correlation assessments, by comparing the compiled data sets, by analysing the sales revenue and the number of companies, the inflation, the unemployment rate, the state debt of the given country, the budget of the EU and the relationships of the savings of the households. I drew the conclusion that the negative trend of the sales revenue of the building industrial micro companies has a negative impact on inflation, that is, it increases inflation.

A significant relationship was apparent between the sales revenue of the building industrial SMEs (size between 0 and 249 persons) and the unemployment rate. The increasing of the sales revenue of the building industrial companies led to the decreasing of unemployment. The increasing of the sales revenue of the building industrial small enterprises has the strongest impact on the unemployment rate ($-0.350 \div -0.325$).

I assessed the situation of the Hungarian and of the German SMEs, as a part of the primary research. I divided the examined area into the following four parts during the assessment: measures that generate the growth of the SME sector, the liquidity status in the case of the SMEs, the reason d'être of the EU subsidies, the impact of the COVID 19 pandemic on the life of the enterprises. I defined the following four most general economy stimulating measures during the assessment of the „measures that generate the growth of the SME sector”: innovation, EU resources, state subsidies (allowances within the SME sector), and wage policy (contribution allowances, workplace generation allowances). As a result of the assessment, it may be concluded that respondents in Hungary consider subsidies to be the characteristic key to the growth of the sector, while respondents in Germany consider innovation and wage policy to be the most important driving force. The further results of the primary research also supported that there is a strong relationship between the size of the company and the EU subsidies won. Accordingly, the size of the enterprise influenced the chance of its winning EU subsidies. Therefore, the bigger an enterprise, the bigger is its chance to win EU subsidies.

I have no doubt that the SMEs will continue to be a research topic accompanied by significant interest in the future as well until the factors determining the success of the sector will be fully identified and the relevant relationships will be fully explored.

Under these circumstances each analysis – therefore also the ones included in this dissertation – will serve to a smaller or bigger degree the economic dialogue and the development of the SME sector.

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