



**SZENT ISTVÁN UNIVERSITY**

**PHD SCHOOL OF MANAGEMENT AND BUSINESS  
ADMINISTRATION**

***THESES OF THE DOCTORAL (PhD) DISSERTATION***

**Holló Ervin**

Gödöllő  
2017



**SZENT ISTVÁN UNIVERSITY**

**PHD SCHOOL OF MANAGEMENT AND BUSINESS  
ADMINISTRATION**

**R&D&I AND ITS FINANCING POSSIBILITIES  
IN THE SME SECTOR**

***THESES OF THE DOCTORAL (PhD) DISSERTATION***

**Holló Ervin**

Gödöllő  
2017

**Name of the  
PhD school:** **PhD School of Management and Business  
Administration**

**Scientific branch:** **Management and Business Administration**

**Head:** **Dr. József Lehota  
Professor  
DSC of HAS  
SZIE, Faculty of Economics and Social Sciences  
Institute for Management**

**Supervisor:** **Dr. István Szűcs  
Professor Emeritus, DSC of HAS  
SZIE, Faculty of Economics and Social Sciences  
Institute for Economics and Methodology**

.....  
Signature of Head of PhD School

.....  
Signature of Supervisor

## TABLE OF CONTENTS

|   |    |
|---|----|
| 1. THE BACKGROUND AND OBJECTIVES OF THE WORK.....   | 4  |
| 1.1. The Relevance and Importance of the Topic .....  | 4  |
| 1.2. Objectives of the Research .....   | 5  |
| 1.3. Hypotheses of the Research .....   | 6  |
| 2. MATERIAL AND METHOD .....  | 7  |
| 2.1. The Procedure of the Research.....   | 7  |
| 2.2. Database and Methodology of the Secondary and Primary Research .   | 8  |
| 2.3. Statistical Methods Used in the Research .....   | 10 |
| 2.4. Qualitative Method (In-depth Interview) .....  | 12 |
| 3. RESULTS.....   | 13 |
| 3.1. Presentation of the Participants in the Questionnaire.....   | 13 |
| 3.2. Presentation of the Most Important Results .....   | 13 |
| 3.3. Principal Component Analysis.....  | 16 |
| 3.4. Kruskal – Wallis Test for the Comparison of the Value of Investments<br>Planned for Three Years and the Innovation Types ..... | 18 |
| 3.5. The main conclusions drawn from the questionnaire survey .....   | 20 |
| 3.6. The Presentation and the Evaluation of the In-Depth Interviews .....   | 21 |
| 3.7. Conclusion Based on the In-Depth Interviews.....   | 22 |
| 3.8. Analysis of the Acceptance or Rejection of the Hypotheses .....  | 24 |
| 4. NEW AND NOVEL SCIENTIFIC RESULTS.....  | 25 |
| 5. CONCLUSIONS, SUGGESTIONS.....  | 26 |
| 6. PUBLICATION LIST RELATED TO THE TOPIC .....  | 28 |

## **1. THE BACKGROUND AND OBJECTIVES OF THE WORK**

The majority of businesses in Hungary are micro-, small- and medium-sized enterprises. The SME sector plays a decisive economic role in the country's income generation, foreign capital management, investments, job creation and employment. SMEs are the main drivers of the economy, smaller and more flexible companies have an increasingly better chance to become suppliers.

The significant growth in the number and economic weight of micro-, small- and medium-sized enterprises has, in effect, been the result of several factors. These are the fundamental factors: the changes in the conditions of economic activity, the progressively developing organizational and legal system of the market economy, the collapse of the corporate structure of the former large companies and the impact of the related employment constraints. The dynamic growth of the micro-, small- and medium-sized enterprise sector contributes substantially to the development of the organizational and ownership structure of the market economy that is typical of Hungary today.

The appreciation of the role of SMEs is also assisted by the processes of large companies as these companies have outsourced a significant part of their activities for cost reduction purposes. SMEs can thus gain importance, since they are flexible, and have recently emerged in the field of innovative business services.

### **1.1. The Relevance and Importance of the Topic**

SMEs produce more than half of the value added in the non-financial business economy in our country, while their ratio in employment is about 70%. The role of SMEs is decisive in the fields of real estate transactions, professional activities, as well as in construction, where more than 90% of jobs are provided by them. In terms of labour productivity, domestic SMEs are below the EU average.

Hungarian SMEs are lagging behind the EU average in important areas (entrepreneurship, skills and innovation, environment, and internationalization, etc.). The sectoral structure of SMEs reflects the dominance of the service sector.

The importance of small businesses is also taken seriously by the EU, the European Small Business Charter (EC, 2004), adopted in 2000, points out that the backbone of the economy is small businesses.

The Lisbon objective is that the European Union should become the most competitive and dynamic knowledge-based economy in the world.

The European Structural and Investment Funds will provide more than €450 billion to member states between 2014 and 2020, and this amount can be spent on job creation and investment in growth.

The majority of SMEs do not export, although improvements have been made in recent years. The weight of commodity industries (agriculture, construction) increases with the size of the organization. About half of the medium-sized enterprises are already engaged in tangible goods production.

The analysis of the activities of SMEs is also justified by our decline in competitiveness, as the difficulties caused by the 2008 crisis worsened our competitive position.

In terms of R&D and innovation our performance is unsatisfactory.

Small businesses are considered to be the driving force behind innovation, employment and social and local integration, their activities promote the dynamism of economic life. Therefore, the topic and the detailed analysis of the SME sector are relevant.

## **1.2. Objectives of the Research**

The development of SMEs, in my opinion, is the strategic goal of our country. Ways to achieve this goal need to be explored and defined.

The role of SMEs will be presented in detail, answers to problems that have arisen will be provided on the basis of scientific examinations and also a strategy that adapts to change will be presented.

The main objectives of the dissertation:

- The primary aim of the dissertation is to examine the economic and social environment of the domestic and international development of SMEs and their role in enhancing the process of economic innovation
- The second main objective is to analyse the obstacles to the effective functioning of SMEs, in addition to examining sources and the types of funding, demonstrating the possibilities for organizing cooperation.
- My third objective was to explore the direction in which the determining factors need to be changed in order to ensure the fastest possible growth rate for the SME sector.

On the basis of primary and secondary data, conclusions will be drawn on both the current state of SMEs and the main directions to be followed.

### **1.3. Hypotheses of the Research**

Having used the results and my experience of the literature review, I formulated and examined the following research hypotheses in my dissertation.

- H.1. The current high administrative burdens, excessive administration and regulation, especially the economic crisis of 2008, resulted in a major downturn in the performance of a significant part of SMEs.
- H.2. The performance of SMEs is not homogeneous and varies considerably according to their characteristics (geographic location, sector, innovative activity, company size, etc.). Depending on the size, their willingness to invest also differs.
- H.3. Lack of co-operation undermines the competitiveness of SMEs. The situation of SMEs working in clusters is more favourable in many respects (access to information, innovation opportunities, participation in tenders, etc.). In many cases, opportunities for clustering do not exist.
- H.4. The development dynamics and investment activity of SMEs are far from desirable, and new perspectives (loan programs, tendering systems, etc.) should be promoted to increase their employment role and their dynamism.

The justification of the hypotheses is based on the systematic review of the domestic and international literature and the results of the secondary research. However, the hypotheses for which I did not find references in the literature, are justified on the basis of primary research. I strive to provide methodologically sound responses to the validation or rejection of the hypotheses with the correct preparation and implementation of the research.

## 2. MATERIAL AND METHOD

The academic dictionary defines research as “solving a problem by means of hypothesis and its inductive or deductive proof.”

### 2.1. The Procedure of the Research

The research activity is a process, thus it can be physically represented (Figure 1).

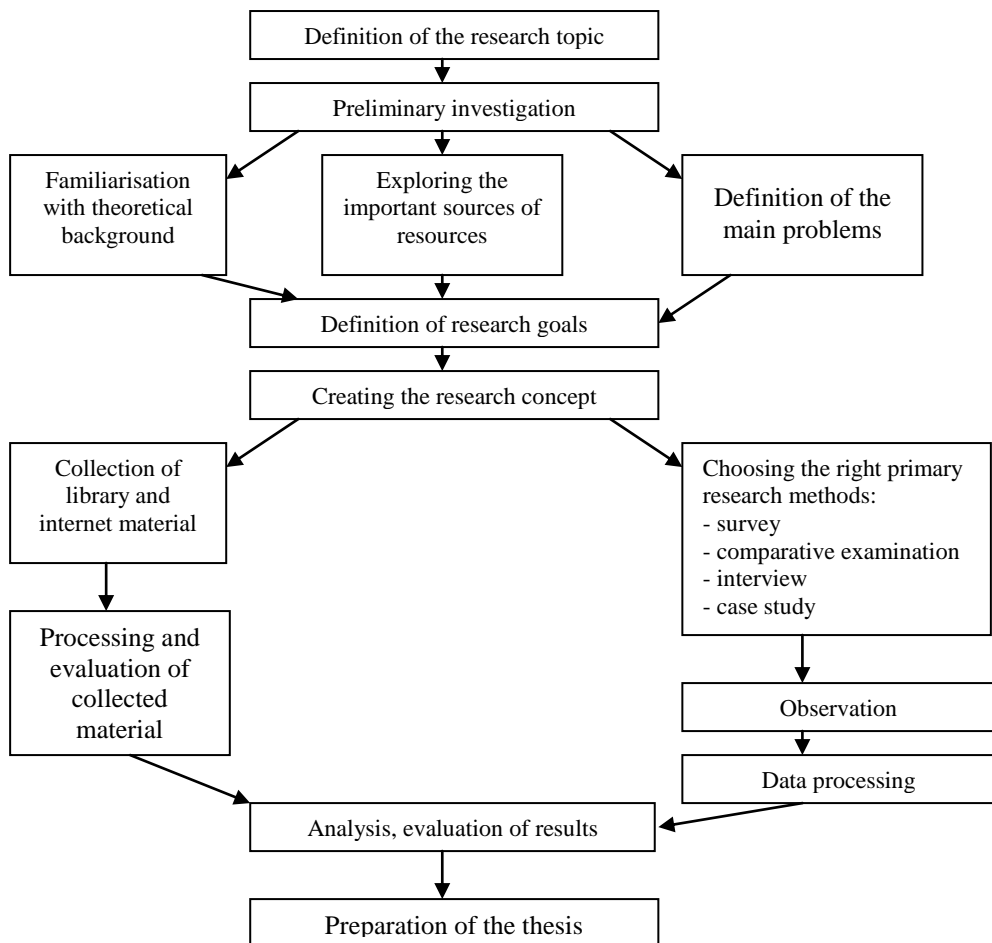


Figure 1 The Research Process

Source: Majoros, 2003



## **2.2. Database and Methodology of the Secondary and Primary Research**

During secondary research I used the data and published results of others. This also means that during the processing the already known results were evaluated and systematized. The literature review enabled me to analyse the situation, possibilities and domestic operations of SMEs in a more detailed way, compared to EU data. The main topics discussed were the following:

- the effects of the 2008 crisis and the factors that prevent effective operation,
- adaptation to external environmental factors,
- changes in competitiveness,
- opportunities for credit and financing,
- the state of investments,
- development in employment trends.

During the research HCSO publications, related STADAT databases, and EUROSTAT databases were used, the final available data were normally from 2015.

After the literature review chapter the results of the secondary research that helped to partially prove my hypotheses were highlighted.

### ***Primary Research***

The goal of my primary research was to prove whether my hypotheses were justifiable or unjustifiable, namely:

- excessive administrative burden and the economic crisis of 2008 have led to a serious decline of SMEs,
- the performance of SMEs is not homogeneous, their willingness to invest depends on their size,
- the lack of co-operation undermines the competitiveness of SMEs. Clustering must be considered.

The collection of representative data was carried out accordingly.

The questionnaire data collection was implemented between October 2016 and March 2017. During the sampling mainly North-Hungarian SMEs were surveyed. This was partly because of the easier access (acquaintance) and partly to become more familiar with the region. My previous publications are partly related to this business circle and that is why I considered the examination of SMEs in the North Hungarian region.

Pre-tested questionnaires were used during the survey. Of the **325** questionnaires sent out, **220** applicable questionnaires were returned and processed. Not all respondents answered all the questions, thus there might be minor differences in the evaluation, which means that the evaluated responses are generally less than 220.

The region is declining compared to other EU regions; the improvement of SMEs could greatly help. The secondary findings can be generalized; nonetheless, the generalization in the case of the primary research may be accepted only after weighing. The 220 samples provide sufficient information of the original population. The address list of the SMEs in North Hungary was available, which was necessary for random sampling. In the case of a homogeneous finite population, the sample elements are selected without reversing, with equal probability per each element; this is how sampling was done.

The SMEs were numbered and selected by means of drawing lots. The addresses or e-mail addresses of SMEs were at my disposal. The law of large numbers applies within the framework of mass phenomena and is subject to the condition that the random effect is not limited.

During statistical sampling the statistical methodology used to select the required sample element number was observed. The sample number is important because the accuracy of the estimation depends on the size of the element number. However, a large number of sampling is costly, so a reasonable decision must be made on the number of elements in the sample.

The degree of representation was checked. A sub-sample of the questionnaires received was formulated (50% of the questionnaires) using the Random Samples of Cases command of the SPSS program. This was repeated in ten cases and sample standard deviation remained below 5% of the averages of all variables in the questionnaire. This proves that the standard deviation of the sample for the whole sample is less than 5% (the protruding values for the whole sample are even less pronounced for the result).

The number of elements included in the sample was determined by the formula given by SZÜCS I. (2008):

$$n = \frac{t^2 \cdot s^2}{h^2}$$

n = required sample element number

s = corrected standard deviation  
t = Student's "t" distribution value  
h = error (average\*0.05)

The number of questionnaires required for the analysis was determined on the basis of this calculation thus the 220 questionnaires provides appropriate representation for the majority of the examined questions.

The data recorded in the questionnaire were evaluated with statistical calculations based on scientific methods. After entering the data, statistical processing was completed using the SPSS 20.0 program.

In a query with a Likert scale it is demonstrated that in case we can identify the type of distribution of responses to a given question based on expert information or preliminary results, then achieving a predetermined error limit at a predetermined level of confidence can be achieved with a much smaller sample than the general use.

This attests that the 220 samples provide adequate representation.

### **2.3. Statistical Methods Used in the Research**

Mathematical statistics play an important role in the methodology of research. Objective statistical methods make it possible to justify or reject research hypotheses.

The following methods have been used in this work:

- **Time series analysis**
- **Trend calculation**
- **One- and multivariate analysis**
- **Statistical distributions**
- **Mean**
- **Dispersion**

The use of multivariate analytical methods is important because they allow the exploration and explanation of the existing relationships among the subgroups of the variables. Of the multivariate analysis methods mostly **non-parametric tests** were applied during the phase of the quantitative research in this study.

The ranking-based methods proved to be the most suitable ways to test my hypotheses.

### **- Kruskal - Wallis test**

Kruskal-Wallis test was applied to test the differences between three or more independent samples in this research.

The test is used to compare the means of more than two independent samples, which basically means that it is the variance analysis of data measured on the ordinal scale.

### **- Exploratory factor analysis**

In the case of multivariate methods the interaction among all the observation variables is investigated. It is assumed that there is a close correlation between them or their particular groups because the variables belonging to the same groups depend on a common background or factor, which are called background variables.

The core of this method is to determine fictitious independent background variables instead of the interrelated original variables, which allows the use of fewer artificial coordinates to examine the the original features of the observation units.

The method provides a way to find variables which are not originally considered to be correlated.

Following the varimax rotation of the principal component analysis, the correlation coefficients expressing the relationship between the original variables and the hypothetical background variables are presented in a table.

Factor analysis is used to examine the correlation between several correlating variables.

### **- Canonic correlation**

During data analyzis we may need to divide the variable set into two parts and examine the two sets of variables. This is done by means of canonical correlation that reveals the relationships between the two sets of the variable set, explaining the set of dependent variables with the other variable set.

## **- Discrimination analysis**

There is often a situation where we want to know which group people belong to or will belong to. Discrimination analysis examines problems of how to group people based on some of their examined characteristics, to identify individual groups and to predict group memberships based on the above-mentioned test characteristics.

The task is to find the best function of separation among the non-perfectly separable elements.

## **2.4. Qualitative Method (In-depth Interview)**

In-depth interviews provide non-representative and non-statistical results with the aim of better understanding the relevant issues. Qualitative information makes it possible to understand the deeper context of the examined topics, and respondents can express their views in their own words.

The reason for choosing this method is that an individual in-depth interview is a personal, direct conversation and has many benefits (eg. respondents feel less stressed than during a group interview). The interview is conducted on the basis of a guideline, but the responses influence the formulation and order of the questions.

### **3. RESULTS**

The chapter contains the most important findings of the questionnaire and the in-depth interview.

#### **3.1. Presentation of the Participants in the Questionnaire**

Simple random statistical sampling was applied among SMEs to select respondents. The questionnaires were returned both by male and female respondents. Considering the 220 questionnaires, the proportion of male respondents was 67.29%, while that of the female respondents was 32.71%. The vast majority of respondents are either married or live in a cohabiting relationship. Most of the respondents live in North Hungary, thus it can be stated that during the sampling inhabitants of the region were involved mostly. The role of other regions from the point of view of residence is insignificant.

Two thirds of the respondents represent urban population and 61.68% of them have a college or university degree. This proves that SMEs are managed by qualified individuals. The sectoral nature of the commercial activity refers to what the business is involved in. In this respect services and agriculture dominate among the surveyed SMEs, but the role of trade and tourism is also significant.

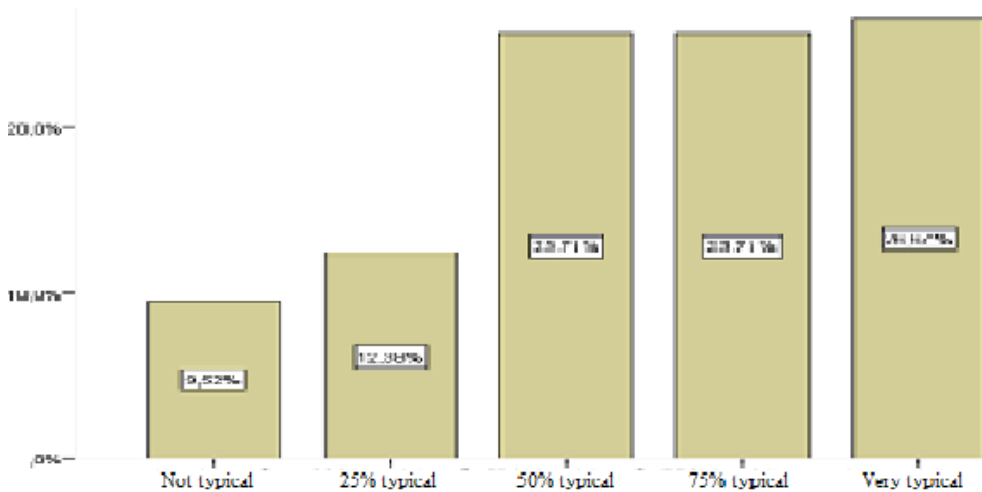
As for the number of employees micro-enterprises are on the top, and the number of large enterprises is less than 2%.

The majority of businesses have been operating for a long time, but the number of young businesses is low.

With regard to the average annual turnover, it can be stated that the businesses involved in the survey are significant enterprises since the annual average turnover is above HUF100 million in the case of 44 SMEs.

#### **3.2. Presentation of the Most Important Results**

Support for SMEs is far behind that of multinational companies. It would be important to make support and tender available for SMEs which could enable them to become suppliers of multinational companies. The idea is of major importance for the future of SMEs and to improve domestic employment (Figure 2).

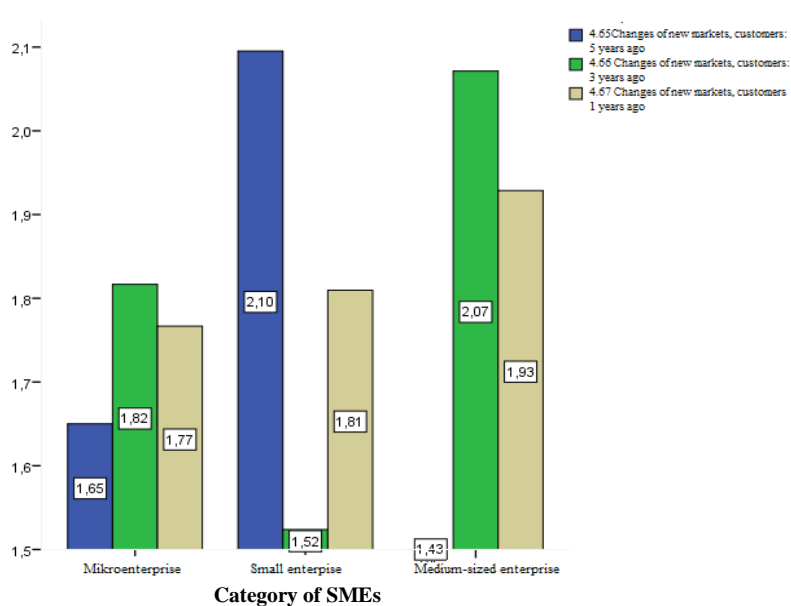


**Figure 2 The lack of support and application opportunities hinders innovation**

Source: own calculation, 2017

Of the issues relating to innovation “lower taxes”, “less bureaucracy” and “greater mutual trust” are the most significant ones based on the average values.

Changes in new markets and the number of customers show varied results in retrospect for 5-3-1 years (Figure 3).



**Figure 3 Changes of New Markets and Customers over Time**

Source: own calculation, 2017

The results of the micro and medium-sized enterprises show a growing tendency, while the trend for small businesses is descending. Undoubtedly this category was the worst hit by the crisis. The number of innovations improving company results has increased in all categories.

The number of competitive products is generally slowly increasing, but micro enterprises are the most marginal. This also proves that micro-businesses adapt well, but the price is low productivity.

Changes in innovative activity do not show great fluctuations in communication, businesses take little care in this area.

The post-crisis poor performance of enterprises was also caused by difficulties in borrowing. Micro-businesses are the first in employment, but are often not creditworthy. The end result is the refusal of credits either by the SME or the bank, which explains the 10% downturn after the crisis.

Some of the SMEs fell into the trap of foreign currency lending, which justifies the classification of borrowing as too risky and too expensive with excessive administrative burdens (Figure 4).

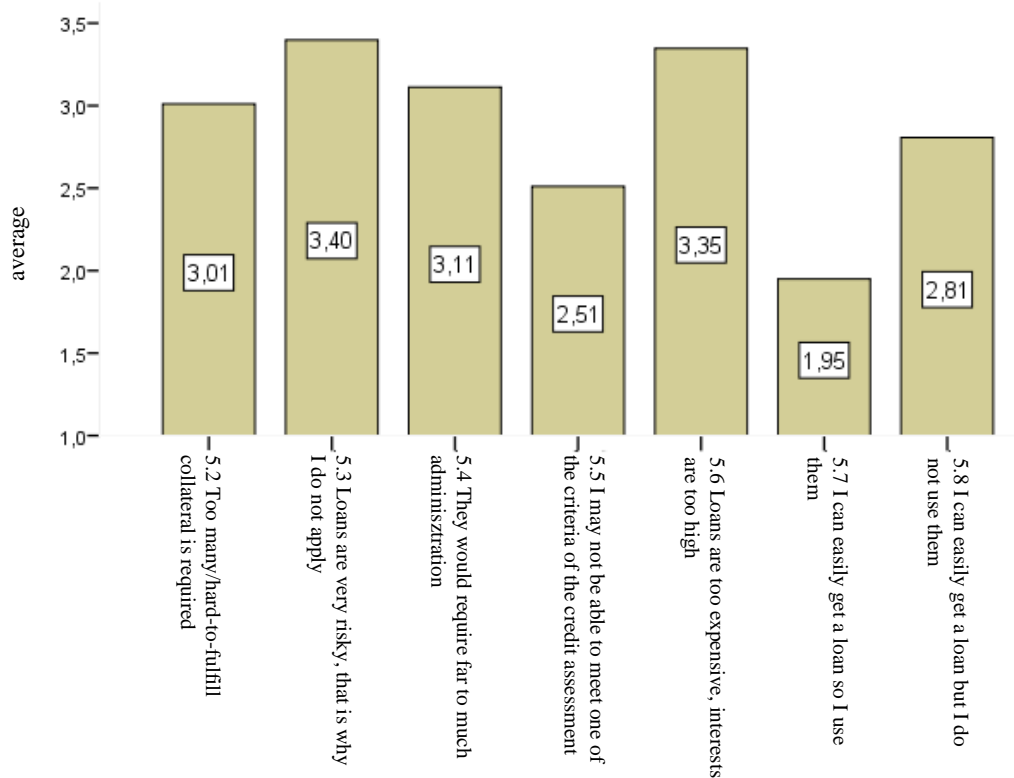


Figure 4 **External Financing Possibilities of Enterprises**

Source: own calculation, 2017



Regarding the value of investments (for three years), most respondents specified HUF 6-20 million. The insufficiency of investments is indicated by the fact that significant investments can hardly be detected (Figure 5).

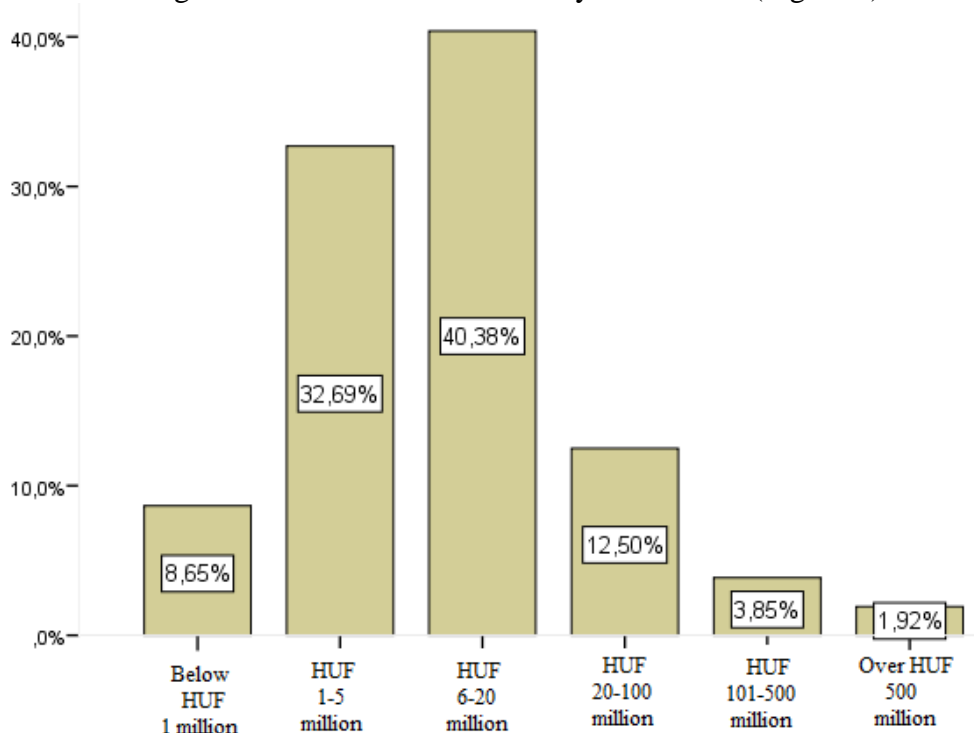


Figure 5 **The Value of Investment Planned for Three Years**  
Source: own calculation, 2017

### 3.3. Principal Component Analysis

The form of enterprise, size, the effects of the crisis, and the tools of treatment (variables) were analysed with a method reducing variables. It is advisable to look at these aspects together as this will reveal the extent to which the opinions reinforce each other and also the relationships they form.

The examined question can be classified as target 1 achievable by primary research. The total variances of the 21 variables were 21, of which 69.132% were subtracted into 7 principal component variables.

In the research the principal component weights above 0.6 were considered. The analysis is presented in Table 1, which includes the rotated principal component weights.

**Table 1: Principal Component Analysis**

**Rotated Component Matrix<sup>a</sup>**

|   | Component   |             |             |             |             |             |             |
|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
|   | 1           | 2           | 3           | 4           | 5           | 6           | 7           |
| 2.5 Classification within the SME category                                | -,004       | <b>,913</b> | ,054        | ,048        | ,009        | ,137        | -,053       |
| 2.9 Number of employees   | -,015       | <b>,939</b> | ,041        | ,006        | ,014        | ,090        | ,033        |
| 2.10 Average turnover of the past 5 years                                 | ,030        | <b>,737</b> | ,107        | ,476        | ,053        | -,139       | ,024        |
| 2.11 How long the business has been operating                             | ,019        | ,149        | ,061        | <b>,773</b> | -,050       | ,121        | ,048        |
| 2.14 Development of turnover in the past 5 years                          | ,213        | ,333        | ,015        | ,535        | ,084        | -,232       | -,358       |
| 3.1 Crisis management regulations hav a negative impact                   | ,129        | ,086        | <b>,790</b> | -,143       | ,060        | -,097       | ,181        |
| 3.2 The crisis led to market loss and a deteriorating financial situation | -,145       | ,017        | <b>,819</b> | ,088        | -,030       | ,208        | -,029       |
| 3.3 The strategic ideas had to be reconsidered because of the crisis      | ,073        | ,076        | <b>,659</b> | ,130        | ,095        | -,011       | ,208        |
| 3.4 As a result of the crisis independent sales had to be used            | -,062       | ,047        | ,175        | ,098        | ,095        | -,115       | <b>,788</b> |
| 3.5 Reduction of operating and purchasing costs                           | -,001       | -,076       | -,027       | ,038        | ,454        | -,512       | ,228        |
| 3.6 Deferrals of developments and investments                             | ,183        | -,081       | ,042        | ,035        | <b>,741</b> | -,040       | ,015        |
| 3.7 Deacrese of employees, salary   | -,122       | ,176        | ,075        | -,111       | <b>,762</b> | ,093        | ,021        |
| 3.8 Co-operation of enterprises   | ,013        | -,081       | ,387        | -,239       | -,004       | -,111       | ,584        |
| 3.9 Rescheduling Loans  | ,204        | ,291        | ,257        | -,447       | ,216        | -,500       | ,037        |
| 3.15 Significant decrease in profitability                                | ,243        | ,168        | ,164        | ,045        | ,194        | <b>,778</b> | -,092       |
| 3.16 Circular debt occurs   | ,703        | ,169        | -,139       | ,048        | ,211        | ,125        | -,162       |
| 3.17 Significant layoffs have taken place                                 | ,507        | ,244        | -,236       | -,329       | ,104        | ,351        | ,315        |
| 3.18 Decrease in the dynamics of development and investments              | <b>,834</b> | -,103       | ,004        | ,113        | -,009       | -,107       | ,024        |
| 3.19 Entrepreneurs in debt  | <b>,779</b> | ,037        | ,206        | -,283       | ,116        | -,031       | -,155       |
| 3.20 Step back from innovation  | <b>,814</b> | -,092       | ,113        | ,006        | -,019       | ,017        | -,055       |
| 3.21 Increasing administrative burdens                                    | <b>,720</b> | ,060        | -,055       | ,181        | -,166       | ,206        | ,240        |

Extraction Method: Principal Component Analysis.  
 Rotation Method: Varimax with Kaiser Normalization.  
 a. Rotation converged in 13 iterations.

Source: own calculation, 2017

The already mentioned principal component weights indicate the relationship between the principal component variables and the original variables.

Neither the size of the entrepreneurial form, nor the size of SMEs is particularly related to the effects of the crisis or how it had been dealt with. Among the size variables belonging to the second principal component, three principal components are closely related. Regarding the variable group showing close connections in the third principal component, the regulation had a negative impact parallel to the loss of markets and the deteriorating financial situation.

The variable tending towards independent sales is separated, which is in the seventh principal component with a large component weight, but this

background variable also indicates the search for entrepreneurial co-operations. In the last five years of the study after the crisis the behavior of partners is compounded by the first principal component based on the relationship between the principal components and the original variables.

The fifth principal component highlights crisis management solutions that can be followed by SME businesses, which are the postponement of developments and investments, layoffs, and wage decrease. Similarly to the seventh principal component, the fourth one is also distinctive, which closely correlates with the operation of the business, similarly to the sixth background variable, this relates to a decrease in the results of the activity.

### **3.4. Kruskal – Wallis Test for the Comparison of the Value of Investments Planned for Three Years and the Innovation Types**

In order to present the differences between the value of the planned investments in the following years and the innovation groups the Kruskal - Wallis test was applied. On the basis of significant relationship the larger planned investment can be related to more intensive innovation activity (Table 2).

**Table 2: Comparison of the Value of Investment and Innovation Types**

|  |                      | <b>Ranks</b> |           |
|--|----------------------|--------------|-----------|
| 6.8 The value of investments planned for three years |                      | N            | Mean Rank |
| 4.2 Technological innovations                        | below HUF 1 million  | 18           | 91,39     |
|  | HUF 1-5 million      | 68           | 70,82     |
|  | HUF 6-20 million     | 84           | 118,17    |
|  | HUF 21-100 million   | 26           | 135,27    |
|  | HUF 101-500 million  | 8            | 166,50    |
|  | over HUF 500 million | 4            | 125,00    |
|  | Total                | 208          |           |
| 4.3 A new organizational system is being created     | below HUF 1 million  | 18           | 61,50     |
|  | HUF 1-5 million      | 68           | 104,09    |
|  | HUF 6-20 million     | 84           | 108,64    |
|  | HUF 21-100 million   | 24           | 97,25     |
|  | HUF 101-500 million  | 6            | 159,83    |
|  | over HUF 500 million | 4            | 76,50     |
|  | Total                | 204          |           |
| 4.5 There is no specific innovation activity         | below HUF 1 million  | 18           | 104,72    |
|  | HUF 1-5 million      | 68           | 102,65    |
|  | HUF 6-20 million     | 84           | 109,86    |
|  | HUF 21-100 million   | 24           | 82,92     |
|  | HUF 101-500 million  | 6            | 71,17     |
|  | over HUF 500 million | 4            | 100,00    |
|  | Total                | 204          |           |

Source: own calculation, 2017

Significance values are presented in Table 3.

**Table 3: Significance values**

|             | <b>Test Statistics<sup>a,b</sup></b> |   |   |
|-------------|--------------------------------------|---|---|
|             | <b>4.2 Technological innovations</b> | <b>4.3 A new organizational system is being created</b> | <b>4.5 There is no specific innovation activity</b> |
| Chi-Square  | 45,770                               | 17,197  | 6,418   |
| df          | 5                                    | 5   | 5   |
| Asymp. Sig. | ,000                                 | ,004  | ,268  |

a. Kruskal Wallis Test

b. Grouping Variable: 6.8 The value of investments planned for three years

Source: own calculation, 2017

For technological and organizational innovation there is a significant difference, where there is no specific innovation activity, there is no significance.

### **3.5. The main conclusions drawn from the questionnaire survey**

- On the basis of the answers it can be stated that the crisis led to a loss of market and a deteriorating financial situation and the strategic ideas had to be altered.
- In many cases, enterprises tried to overcome the difficulties by delaying developments and investments.
- It is generally believed that the crisis management regulations had negative impacts.
- SMEs generally refrained from layoffs and wage cuts.
- The shrinking channels of sales and the declining demand for products had a negative impact.
- Profitability dropped dramatically and so did innovation.
- The administrative burdens and the overwhelming regulations had significant negative effects.
- SMEs did not become greatly indebted because of the weak borrowing opportunities.
- SMEs consider technological development and marketing important, but the importance of investment is also recognized by many.
- Marketing innovation is primarily hampered by the scarcity of financial sources.
- The situation is critical in the field of innovation, technological and organizational innovation is minimal.
- Respondents believe that the main obstacle to innovation are the current taxation regulations.
- The importance of mutual trust is recognized by many, but hardly anything is done to make real changes.
- Support for micro-enterprises is trivial, their interests are not considered when and they tenders are launched.
- Medium-sized companies are more innovative, they can produce more dynamic growth and exploit export opportunities more efficiently.
- Enterprises try to achieve fast development through state-subsidized loans or non-refundable subsidies.
- When considering investments SMEs try to avoid bank loans, their primary source is their own capital.
- The respondents acknowledge the performance-enhancing effects of investments, but few dare to invest.
- Based on the factor analysis an enterprise's material and energy management and adaptation to the financial environment are related.
- Recruiting skilled workers is becoming increasingly challenging.

The Kruskal-Wallis test calculations are detailed in the dissertation, on their basis significant improvements could be detected in the following areas:

- the number of competitive products,
  - recruiting qualified staff,
  - change of innovative activity in communication.
- Based on the canonical correlation analysis, factors that inhibit marketing innovation affect several areas of the realized marketing innovation activity.

### **3.6. The Presentation and the Evaluation of the In-Depth Interviews**

My questions were composed for the in-depth interviews on the basis of the objectives I described previously and the aim was to confirm my hypotheses supported by the questionnaire survey. These are the following:

- Excessive administration and the unfavorable environment hinder rapid growth.
- The crisis slowed down the development of SMEs.
- The performance of SMEs varies considerably depending on their situation.
- The proportion of larger SMEs is higher in commodity production.
- Lack of co-ordination worsens competitiveness.
- The results of the loan program are modest.
- The dynamism of SMEs requires new ideas.
- The performance of SMEs is not homogeneous, the crisis mainly affected micro-enterprises.
- There are no serious problems as yet concerning the workforce, but the lack of potentials for wage growth may be a problem in the future.
- There is a need for rapid improvement in innovation in order to enhance competitiveness.
- The development of innovation is primarily hampered by tax regulations.
- The lack of co-operation is extremely negative, the conditions for clustering are unfavourable.
- Investments are restrained and insufficient for development.
- The public judgment of state projects is extremely negative.

The target group of the study was the managers (owners) of SMEs in Northern Hungary. The personal in-depth interviews were conducted in 20 cases.

I must respect the respondents' request as to not disclose their names or data therefore no such information will be revealed in this work.

The in-depth interviews were conducted between October 2016 and March 2017 at the headquarters of the companies. The interviews were planned to take about one and a half hours, during which I first tried to create a friendly atmosphere only after which were the questions asked.

Interviews were recorded in my notes by respondents' consent. The questions were structured according to the topic, but they gave room for free answers and more detailed explanation of each issue.

The first part of the interview covered the general data of respondents (gender, age, residence, region, qualification), and then questions about the situation of SMEs were discussed. For the sake of better traceability the aggregated data of the interviews are also summarized in figures.

### **3.7. Conclusion Based on the In-Depth Interviews**

- 70% of the respondents were male, 30% were female. Most of them were between 26 and 40 years of age (50%), but the proportion of people aged 41-60 is also high (40%).

The managers (owners) of SMEs are qualified, 60% of them have a college or university degree. They usually live in cities (60%).

- Basically they are located in Northern Hungary (75%).
- Most of the surveyed SMEs are micro-enterprises (55%) or small businesses (35%) and only 10% are medium-sized enterprises.
- SMEs do not achieve the same performance, micro-businesses have been severely affected by the crisis, while larger businesses have been better able to adapt owing to their reserves.
- As a result of the crisis, SMEs lost markets and had to change their strategy.
- The government's crisis management was not successful; many SMEs have not yet been able to reach their pre-crisis levels in production and employment.
- There are still some reserves for the labor force, but the lack of wage growth can undermine development in the longer term. In the future new ideas will be needed to improve the dynamism of SMEs (credit, competition, support), the current ones are insufficient. Skilled workforce can still be found locally.

- In terms of innovation the country lags behind, although this would be the basis for competitiveness. SMEs do not show a unified trend, some have been able to improve their innovation activities while others deteriorated.
- In the respondents' view the most influential factor hindering innovation is local and municipal taxation. This statement is in parallel with the answers to the questionnaire. The risk of return on investment is also significant.
- Among the factors hindering marketing innovation the lack of financial sources is the most notable. The negative impact of the deficiency of information caused by the lack of communication must also be mentioned.
- The lack of co-operation is usually mentioned by the respondents, but nothing has happened in this area for a long time. Today in the world it is not the companies but the clusters are the ones that compete. Nonetheless, in this country it is difficult to discover even the germs of this phenomena.

Clusters are not a viable without knowledge-based research institutes or university campuses but such connections or the pursue for such connections is minimal. In the light of Western European and American examples, urgent changes of attitude would be needed. Usually college or university graduates participate in R&D activities but mainly in isolation and with little access to information.

- SMEs can not generally consider any major improvement; it is indicated by their modest willingness to invest. Only larger SMEs intend to invest and develop. Micro-enterprises are more likely to fight for survival and cannot consider the current environment suitable for development.

The more optimistic companies plan to invest using their own financial resources and non-repayable state support. They are reluctant to apply for loans and repayable state subsidies as a result of their negative experiences in the past. There are, of course, exceptions mainly among big companies.

- Government projects and and the role of the government are almost unanimously judged very negatively by the respondents. They disagree with the statement that government projects are "fair and impartial", what is more, many believe that they "distort competition" and are "generally incorrect". Many refer to corruption, probably based on their negative experiences.



### 3.8. Analysis of the Acceptance or Rejection of the Hypotheses

Based on the secondary and primary research, the findings of my hypotheses are described below.

#### Justification of the Hypotheses

| Hypotheses  | Justification |
|---|---------------|
| <b>H.1.</b> High administrative burdens, excessive administration and regulation, and especially the economic crisis that began in 2008, resulted in a major downturn in the performance of a significant part of SMEs.   | YES           |
| <b>H.2.</b> The performance of SMEs is not homogeneous and varies considerably according to their characteristics (geographic location, sector, innovative activity, company size, etc.). Depending on the size, their willingness to invest also differs.                                | YES           |
| <b>H.3.</b> Lack of co-operation undermines the competitiveness of SMEs. The situation of clustered SMEs in many respects (access to information, innovation opportunities, participation in tenders, etc.) is more favourable. In many cases, opportunities for clustering do not exist. | YES           |
| <b>H.4.</b> The development dynamics and investment activity of SMEs are far from desirable, and new ideas (loan programs, tendering systems, etc.) should be promoted to increase their role in employment and stimulate their dynamism.   | YES           |

#### 4. NEW AND NOVEL SCIENTIFIC RESULTS

- 1.) **The effects of the economic crisis can still be felt, and the crisis could have been better managed by the government. Domestic administrations in relation to SMEs are rather bureaucratic, the rapid changes in legislation and the vast amount of new laws give rise to legal uncertainty.**

Concerning efficient public administration, Hungary lags behind the EU average. In many cases, new regulations – in spite of good intentions – only increase the bureaucratic burden. The government's effort (e-administration, one-stop-service) is not enough. Employment decreased at SMEs and the credit difficulties adversely affected them.

- 2.) **Domestic SMEs are characterized by high labor- and low capital intensity, and their role in employment is higher than what is justifiable on the basis of their turnover, and therefore their developmental dynamics are weak. SMEs are unable to fulfill their potentials, and new ideas must be applied to dynamism them.**

With a more favorable regulatory environment and thoughtful resources the government could improve the situation. Improving productivity is indispensable, but such a measure would lead to the disappearance of some of the SMEs.

- 3.) **Innovation is negligible in Hungary though it is indispensable for competitiveness, hardly anything has been done to change it. The SMEs' potential to obtain funds is not ideal, co-operation is primitive, their productivity is low compared to EU average.**

The competitiveness of the country is constantly deteriorating. Green innovations for sustainable development are spreading, but Hungary is still behind most countries in this area. A social and economic paradigm shift could be the way out from the current situation. The trust capital in Hungary is low, clusters – because of objective and subjective reasons – are spreading slowly.

- 4.) **The willingness to invest is insufficient, the more powerful firms are interested in development, while micro-enterprises are struggling to survive.**

Low willingness to invest impedes development, and low wages can lead to labor migration.

## 5. CONCLUSIONS, SUGGESTIONS

My conclusions and suggestions are related to my specified objectives.

In the literature review I analyzed in detail the position of European and Hungarian SMEs, to which the results of the 2016 SBA (Small Business Act) analysis were used.

The development of the country is hampered by bureaucratic and overwhelming legislation. The crisis severely affected Hungarian SMEs, especially the micro-enterprises. Crisis management was not successful, SMEs still have not been able to achieve their pre-crisis performance.

Due to high labor- and low capital intensity, the dynamism of development is weak. Competitiveness is weak due to low productivity.

The cooperation among companies is at a basic level, hardly any clustering can be detected unlike in developed countries. The trust capital is low, there is little willingness to cooperate.

The competitiveness of the country is persistently worsening, investment in human resources is insufficient.

Competitiveness may be boosted by investing into the education system, healthcare, and research. Only well trained and healthy people can achieve high performance. Trust, cooperation and clear values, which ranks on the basis of performance, are determinant factors of the improvement of competitiveness.

The improved performance of SMEs is a source of a better domestic economy. In order to achieve this, our resources must be properly utilised and the level of the applied technology must also be improved.

The willingness to invest is subdued and is typical mainly of larger businesses.

The number and qualifications of the workforce are still acceptable today, but low wages may lead to labour migration.

My research is based on literature review, questionnaire survey and in-depth interviews. Based on this it can be stated that SMEs do not provide the same performance, micro-enterprises are more vulnerable.

The crisis has led to market loss and the strategy had to be reconsidered. In the fields of innovation and R&D Hungary is doing poorly, changes must be initiated.

Many believe that the weak state of innovation is closely linked to state and local government taxation, which should be reconsidered.

It is a serious problem that the role of the state is negatively perceived by the respondents. According to them government projects are not fair and impartial and thus distorts competition.

**The strategic steps needed to improve the situation are as follows:**

- efficient and non-bureaucratic administration,
- promotion of e-public administration, one-stop service and other benefits,
- the restriction of legislation in order to eliminate legal uncertainty,
- to expand the resources and increase opportunities for innovation and research and development,
- investment in human resources,
- to expand co-operation, and create circumstances suitable for clusters,
- to improve productivity, which leads to wage increase,
- granting preferential loans and state aids,
- the stability and predictability of taxation,
- granting preferential tenders to SMEs,
- investment in high-tech industries.

## 6. PUBLICATION LIST RELATED TO THE TOPIC

### 1. Scientific publications (books, chapters)

#### In Hungarian:

- **Holló E.** – Takácsné György K. – Bujdosó Z. (2011): Innovációs projektek üzleti tervezése, innováció-finanszírozás, Ö: 104. o. 1. fejezet Tervezési alapok, stratégia 4-21. o. 2. fejezet Az üzleti tervezés-, üzleti terv 22-48.o. 4. fejezet Pályázatírás és pályázati projektek megvalósítása 57-78. o. Károly Róbert Főiskola, Gyöngyös 2011., ISBN 978-963-9941-48-9
- Király Zs. – Bujdosó Z. – **Holló E.** (2011): Innováció menedzsment, Ö: 110. o. 4. fejezet Pályázatírás és pályázati projektek megvalósítása 63-83. o. Károly Róbert Főiskola, Gyöngyös 2011., ISBN 978-963-9941-47-2
- Töröcsvári Zs. – Bíró B. – Novák T. – Bujdosó Z. – **Holló E.** (2011): Kutatás módszertan, Ö: 125. o. 4. fejezet Pályázatírás és pályázati projektek megvalósítása 75-95. o. Károly Róbert Főiskola, Gyöngyös 2011., ISBN 978-963-9941-50-2
- Téglá Zs. – Bujdosó Z. – **Holló E.** (2011): K+F+I Folyamatmenedzsment, Ö: 119.o. 4. fejezet Pályázatírás és pályázati projektek megvalósítása 70-88. o. Károly Róbert Főiskola, Gyöngyös 2011., ISBN 978-963-9941-49-6
- Szegedi L. – Bíró B.- **Holló E.** – Bujdosó Z. (2011): Spin-off vállalkozási ismeretek, Ö: 119.o. 5. fejezet Pályázatírás és pályázati projektek megvalósítása 62-81. o. Károly Róbert Főiskola, Gyöngyös 2011., ISBN 978-963-9941-51-9
- Bujdosó Z. – **Holló E.** (2011): Innovációs projektmenedzsment, Ö: 126.o. 5. fejezet Pályázatírás és pályázati projektek megvalósítása 78-98. o. Károly Róbert Főiskola, Gyöngyös 2011., ISBN 978-963-9941-46-5
- Téglá Zs. – Balázs B. – **Holló E.** (2013): Lisztharmat elleni preventív védekezés lehetőségeinek best practice megoldásai a minőségbiztosításai rendszerek célirányos fejlesztésével c. technológiai know-how, Ö: 161 o., 13-41. o., Károly Róbert Kutató-Oktató Közhasznú Nonprofit Kft., Gyöngyös, 2013. április 01., ISBN 978-963-9941-72-4
- **Holló E.** (2016): A pénzügyi tervezési alapok, IX. fejezet, Pénzügyi ismeretek példatár, Bakos-Tóth E. (szerk.) Ö: 180 o., 57-64. o., Károly Róbert Kutató-Oktató Közhasznú Nonprofit Kft., Gyöngyös, 2016. június 12. ISBN 978-963-9941-96-0

- Bakos-Tóth E. – Baranyi A. – Domán Sz. – **Holló E.** – Sidlovicsné Tóth I. – Széles Zs. – Vanó P. (2016): Innováció finanszírozás, VI. fejezet, Banki ismeretek , Baranyi A.(szerk.) Ö: 371 o., 154-182. o., Károly Róbert Kutató-Oktató Közhasznú Nonprofit Kft., Gyöngyös, 2016. július ISBN 978-963-9941-99-1

## 2. Scientific journals, scientific articles

### In foreign language:

- Takács I. – Nagy-Kovács E. – **Holló E.** – Marselek S. (2012): Model for Optimization of Biomass Utilization for Energy Production by Energetic and Economic Requirements, p. 225-235, 2-nd International Symposium “Shaping Europe 2020: socio – economic challenges” Bucharest, 16<sup>th</sup> – 17<sup>th</sup> November 2012, Review of Applied Socio-Economic Research ISSN:2247-6172,
- Téglá Zs. – Hágen I. – **Holló E.** – Takács-György K. (2012): Adoption of logistic principles in woody-biomass energy clusters, p. 236-246, 2-nd International Symposium “Shaping Europe 2020: socio – economic challenges” Bucharest, 16<sup>th</sup> – 17<sup>th</sup> November 2012 Review of Applied Socio-Economic Research ISSN:2247-6172
- Baranyi A. – Liebmann L. – **Holló E.** (2015): Opportunities and limitations in the management of alternative energy, Journal of Central European Green Innovation 3 (TI) pp. 13-34 (2015) HU ISSN 2064-3004

### In Hungarian:

- **Holló E.** (2011): Bioenergetikai Innovációs Klaszter a KR Spektrum Kft. menedzselésével. Agrarium Agrár-és Piacgazdaság 2011. január 21. évfolyam 1. szám 40. o. HU-ISSN 1215-8380
- Csapó L. A. - Györpál T. – **Holló E.** (2013): Az információgazdálkodás kihívásai a KKV szektorban, Acta Carolus Robertus folyóirat 3(2) szám,35-48.o. Károly Róbert Főiskola, Gyöngyös, 2013. augusztus, ISSN 2062-8269
- Dupcsák Zs. – Nagy-Kovács E. – **Holló E.** – Marselek S. (2015): A megújuló energiaforrások használatának megítélése kiválasztott jellemzők szerint észak-magyarországi borvidéken (Assessment of utilization of renewable energy sources according to the selected specifications in the Northern Hungarian wine regions) Journal of Central European Green Innovation 3 (1) pp. 151-170 (2015) HU ISSN 2064-3004

- Hágen I. Zs. - **Holló E.** (2017): A hazai KKV-k helyzete, versenyképesség, innováció és kontrolling tükrében CONTROLLER INFO 2017:(1) pp. 41-48. (2017) HU ISSN 20639309

### 3. Scientific conference presentations published in conference publications

#### In foreign language:

- **Holló E.** – Dinya L. – Bíró B. (2011): The Economic Importance of The Bioenergetic Innovation Kluster, Thüringisch – Ungarisches Symposium 2011, CD presented p. 33 - 38 ISBN: 978-3-932-886-28-7 Fachhochschule Jena, Germany
- **Holló E.** (2011): Biomasse, Bioenergetik - Beschäftigung, Thüringisch – Ungarisches Symposium 2011, CD presented p. 39 - 32 ISBN: 978-3-932-886-28-7 Fachhochschule Jena, Germany

#### In Hungarian:

- Dinya L. – **Holló E.** (2011): Bioenergetikai Innovációs Klaszter és fenntartható kistérség II. Környezet és Energia Konferencia. Debrecen 2011. november 25-26. Környezettudatos energiatermelés-és felhasználás, MTA DAB Megújuló Energetikai Munkabizottság, Debrecen 2011., p. 232-237., ISBN: 978-963-7064-27-2
- **Holló E.** – Dinya L. – Dupcsák Zs. (2011): A Bioenergetikai Innovációs Klaszter szerepvállalása. In: Szabó Valéria, Fazekas István (szerk.) Környezettudatos energiatermelés és -felhasználás: II. Környezet és Energia Konferencia. 395 p. Konferencia helye, ideje: Debrecen, Magyarország, 2011.11.25-2011.11.26. Debrecen: MTA DAB Megújuló Energetikai Munkabizottság, 2011.pp. 392-393. ISBN:978-963-7064-27-2
- Dupcsák Zs. – **Holló E.** – Marselek S. (2011): Az ökoenergiatermelés foglalkoztatási lehetőségei a vidéki térségekben. In: Barancsi Ágnes, Hernyák Gábor (szerk.) Magyar Tudomány Ünnepe: „Összhang - Tudomány a gazdaságban és a társadalomban": Intézeti Tudományos Diákkori Konferencia; VII. Alföldi Tudományos Tájégzdálkodási Nap. Szolnok, Magyarország, 2011.11.17 Szolnoki Főiskola Műszaki és Mezőgazdasági Fakultás, 2011. pp. 1-6. (VII. Alföldi Tudományos Tájégzdálkodási Napok) ISBN: 978-963-89339-1-1
- Ivády I. – **Holló E.** – Tóvári P. – Szabó I. – Kocsis L. – Ivády J. (2011): Zöldenergia hordozók természetes száradási és energetikai vizsgálata, Innováció a Károly Róbert Főiskolán c. konferencia, 2011. február 17. Gyöngyös, 76.-79. o. ISBN 978-963-9941-19-9

- Tóvári P. – **Holló E.** – Pallás E. – Madár V. (2011): Laboratóriumi mérőkör fejlesztés biomassza gázosíthatóságának modellezésére, különös tekintettel a lágyszárú tüzelőanyagokra „Zöldenergia termelés és hasznosítás rendszere” c. tudományos konferencia, Károly Róbert Főiskola, Gyöngyös 2011. 09.27. cd. 144-148.p. ISBN 978-963-9941-24-3
- Benedek A. – **Holló E.** – Saáry R. – Tamus A. (2012): Külső és belső kapcsolatok építésének jelentősége egy működő klaszter marketing stratégiájában. Károly Róbert Főiskola, Gyöngyös, XIII. Nemzetközi Tudományos Napok „Zöld gazdaság és versenyképesség?”1445-1541. o., Gyöngyös 2012. március 29-30. ISBN 978-963-9941-53-3
- **Holló E.** – Tóvári P. – Szabó I. – Fenyvesi L. (2012): Zöldenergia hordozók száradásának terepi és laboratóriumi vizsgálata, „Zöld társadalom, zöld gazdaság, innováció” c. III. Innovációs Konferencia, 74-78. o., Károly Róbert Főiskola Gyöngyös, 2012. június 7. ISBN 978-963-9941-58-8
- Takács I. – Nagy-Kovács E. – Marsalek S. – **Holló E.** (2012): A biomassza energiacélú felhasználásának energetikai és gazdasági kritériumai In: Pannon Egyetem Georgikon Kar (szerk.) LIV. Georgikon Napok. A mezőgazdaságtól a vidékgazda(g)ságig: 54<sup>th</sup> Georgikon Scientific Conference. Keszthely: Pannon Egyetem Georgikon Kar, 2012.10.11-2012.10.12. ISBN: 978-963-9639-48-5
- **Holló E.** – Harmatné Szekrényes M. (2012): A Bioenergetikai Innovációs Klaszter Centrum, X. ENERGOexpo Nemzetközi Energetikai Szakkiállítás és Konferencia, Klaszterek Szakmai Fóruma, Debrecen, Kölcsey Konferenciaközpont 2012. 09. 25-27., 43.o. ISBN 978-963-88526-3-2
- **Holló E.** (2013): Klaszterek, hálózatok, mint innovációs szereplők, szerk. Ferencz Árpád "Környezettudatos gazdálkodás és menedzsment": Gazdálkodás és Menedzsment Tudományos Konferencia, Kecskemét, 2013. szeptember 5. Kecskeméti Főiskola Kertészeti Főiskolai Kar 2013. II. kötet 940-944.o., I-II. kötet ISBN 978-615-5192-19-7 Ö, 1. köt.: ISBN 978-615-5192-20-3,550p.2. köt.: ISBN 978-615-5192-21-0, 553-1079 p
- Herneckzy A. – **Holló E.** (2014): A foglalkoztatáspolitikai aktuális kérdései Magyarországon Károly Róbert Főiskola, Gyöngyös, XIV. Nemzetközi Tudományos Napok „Az átalakuló, alkalmazkodó mezőgazdaság és vidék” Gyöngyös 2014. március 27-28., 92. o. ISBN 978-963-9941-75-5
- Marosi I. – Bezzeg E. – Csernák J. – **Holló E.** – Takács I. (2014): A szervezeti és szervezatközi bizalom vizsgálatának aktualitása az Észak-magyarországi régióban, XIV. Nemzetközi Tudományos



Napok „Az átalakuló, alkalmazkodó mezőgazdaság és vidék” Károly Róbert Főiskola, Gyöngyös 2014. március 27-28., 1015-1024.o. ISBN 978-963-9941-75-5

- **Holló E.** (2016): A K+F+I ellátottság színvonala és a gazdasági növekedés, kutatási prioritások, XV. Nemzetközi Tudományos Napok, Károly Róbert Főiskola Gyöngyös, 2016. március 30-31. 699-708. o. ISBN 978-963-9941-91-5
- **Holló E.** – **Marselek S.** (2016): A KKV-k helyzete, versenyképessége, szerepük és lehetőségeik, Európa: Gazdaság és kultúra (Europe: Economy and Culture) c. Nemzetközi Tudományos Konferencia, Nyugat-magyarországi Egyetem, Lámfalussy Sándor Közgazdaságtudományi Kar (NYME LKK) Sopron, 2016. november 10., 162-169. o. ISBN 978-334-298-5
- **Holló E.** – **Marselek S.** (2016): A Kkv-k helyzete, versenyképesség, innováció és foglalkoztatás. „Tudás és innováció a XXI. század gazdaságában – Válogatás a Gazdaság- és Társadalomtudományi Kar oktatóinak tanulmányaiból” című kari tanulmánykötet, Eszterházy Károly Egyetem, Tudományos tanácskozás, Magyar Tudomány Ünnepe, Eger, 2016. november 8., 1-12. p. (befogadva, megjelenés alatt)

#### 4. Other publications

- **Holló E.** – **Hágen I. Zs.** – **Nagy Zs.** (2006): Üzleti tervezés és pályázatírás – tanfolyam jegyzet, oktatási segédanyag Károly Róbert Főiskola, 2006
- **Hágen I. Zs.** – **Holló E.** – **Nagy Zs.** (2010): EU Pályázati és projektmenedzser akkreditált program tanfolyami jegyzet, KR Spektrum Kft. Gyöngyös 2010
- **Hágen I. Zs.** – **Holló E.** – **Nagy Zs.** (2011): EU Pályázati és projektmenedzser akkreditált program tanfolyami jegyzet, KR Spektrum Kft. Gyöngyös 2011
- **Holló E.** – **Harmatné Szekrényes M.** (2011): Zöldüljünk, de miből? – pályázati lehetőségek felkutatása - képzési program (16 óra) KR Spektrum Kft., Gyöngyös, 2011 (nysz. 7336-4/2010-5500)
- **Holló E.** – **Harmatné Szekrényes M.** (2011): Üzleti tervezés - képzési program (16 óra) KR Spektrum Kft., Gyöngyös, 2011 (nysz. 7336-4/2010-5500)
- **Holló E.** – **Harmatné Szekrényes M.** (2011): EU pályázati- és projektmenedzser akkreditált program (64 óra) kidolgozása. KR Spektrum Kft., Gyöngyös, 2011. Programakkreditációs lajstromszám PL-53-18 - 2011.

- **Holló E.** – Harmatné Szekrényes M. (2011): Megújuló energiaforrások felhasználásának lehetőségei (32 óra) akkreditált program kidolgozása. KR Spektrum Kft., Gyöngyös, 2011. Programakkreditációs lajstromszám PL-5153- 2011.
- Hordós – Nagy Zs. – **Holló E.** – Hágen I. Zs. – Bujdosó Z. (2013): PL-5318 EU Pályázati és projektmenedzser akkreditált program, tanfolyami jegyzet, munkafüzet KR Spektrum Kft. Gyöngyös 2013. március-április
- Ivády I. – **Holló E.** – Tóvári P. – Kocsis L. – Szabó I. – Ivády J. (2011): Zöldenergia hordozók üzemi tárolási és energetikai vizsgálata 7. Magyar Szárítási Szimpózium, Gödöllő 2011. 04. 7-8.
- **Holló E.** (2008): A bioenergia perspektívái, a helyi energiatermelés fontossága (előadás) Szerencs Város Önkormányzatának Testületi Ülése, Szerencs, 2008. 02. 21.
- **Holló E.** (2008): Gazdálkodókat érintő aktuális pályázati lehetőségek, Termelői-, gazdálkodói Fórum Károly Róbert Kutató-Oktató Kht. Károly Róbert Területi Szaktanácsadási Központ, Atkár, Tass-puszta, (2008. 04. 17.)
- **Holló E.** (2008): Pályázati lehetőségek 2008-2013 időszakban, akciótervek, operatív programok, A felnőttképzés kommunikációja – Kistérségi kerekasztal beszélgetések záró konferenciája Károly Róbert Főiskola, Gyöngyös, 2008. 06. 20.
- **Holló E.** (2009): „Nem művelt területek hasznosítási lehetőségei – a szőlővessző/venyige hasznosítása. Abasári Hegyközség Közgyűlése, Abasár, 2009.02.12.
- **Holló E.** (2009): Energetikai projektek finanszírozása, támogatási lehetőségek, Energiaracionalizálás a gyakorlatban c. konferencia Károly Róbert Főiskola, Atkár, Tass-puszta, (2009.03.19.)
- **Holló E.** (2010): „Zöldüljünk”, de miből? – avagy finanszírozási, pályázati lehetőségek a megújuló energia fejlesztésére, népszerűsítésére. „Kutatók éjszakája” Károly Róbert Főiskola, Gyöngyös, 2010. 09. 24.
- **Holló E.** (2010): A Bioenergetikai Innovációs Klaszter szerepe a megújuló energia hazai elterjedésének növelésében, Fenntartható Energiagazdálkodás c. konferencia, Heves Megyei Agrárkamara, Atkár, Tass-puszta 2010.10.14.
- **Holló E.** (2010): Pályázati lehetőségek, a megújuló energiaforrások alkalmazása a mezőgazdasági, élelmiszeripari és energiaraacionalizálási fejlesztési tervek megvalósítását érintően. „A zöldenergia-termelés nyersanyag forrásainak és használatának lehetőségei az Észak-magyarországi Régióban” című konferencia Károly Róbert Főiskola- Mátra Faaprítékot Termelő és Érékesítő

Szövetkezet – Bioenergetikai Innovációs Klaszter, Atkár Tass-puszta, 2010. 10. 26.

- Dinya L. – **Holló E.** (2010): Pályázati, finanszírozási lehetőségek a megújuló energiagazdálkodásban – a Bioenergetikai Innovációs Klaszter szerepvállalása „Zöldülő gazdaság – foglalkoztatási lehetőségek és kihívások” c. konferencia Károly Róbert Tudományos Nap 2010, Károly Róbert Főiskola, Gyöngyös 2010. 11. 12.
- **Holló E.** (2011): A Bioenergetikai Innovációs Klaszter, IX. ENERGOexpo Nemzetközi Energetikai Szakkiállítás és Konferencia, Klasztertalálkozó/Fórum, Debrecen, 2011. 09. 27-29.
- **Holló E.** (2011): Pályázati lehetőségek a megújuló energiaforrások alkalmazására, TÉSZ-ÉSZ Szakmai Továbbképzési Konferencia Magyar Zöldség-Gyümölcs Szakmaközi Szervezet és Terméktanács, TÉSZ-ÉSZ Nonprofit Kft. Atkár, Tass-puszta, 2011. 11. 24.
- **Holló E.** (2011): A Bioenergetikai Innovációs Klaszter, „Klaszter információs nap”, NORDA Észak-magyarországi Regionális Fejlesztési Ügynökség Konferencia, Felsőtárkány, 2011. 12. 09.
- Dupcsák Zs. – Nagy-Kovács E. – **Holló E.** – Marselek S. (2012): A megújuló energiafelhasználás és fejlesztési lehetőségek elemzése Észak-magyarországi borvidékeken Közgazdasági Fórum Gyöngyös, Károly Róbert Főiskola, 2012. november 8.
- Dinya L. – **Holló E.** (2012): A Bioenergetikai Innovációs Klaszter szerepvállalása - az ÉMOP-1.2.1-11-2011-0009 projekt, „ÉMOP-1.2.1-11-2011-0009 azonosító számú projekt, „Biomassza potenciál felmérésére alkalmas távérzékelési rendszer kiépítése a Bioenergetikai Innovációs Klaszter szervezésében” Nyitókonferencia – Üzletember találkozó”, Gyöngyös, Károly Róbert Főiskola, 2012. április 26.
- **Holló E.** (2012): Pályázati lehetőségek az „energetika” területén, Energetikai Tanácsadó Nap, Gyöngyös, Károly Róbert Főiskola, 2012. november 09., 2012. november 16.
- **Holló E.** (2012): Mezőgazdasági melléktermékek energetikai hasznosításának kihívásai és innovációs lehetőségei HU-SK Envirovid projekt HUSK/1101/1.2.1/0358 „Nyitókonferencia”, Párkány, Szlovákia, 2012. november 16.
- **Holló E.** (2013): Pályázati írás és pályázati projektek megvalósítása, Pályázati író kurzus, Corvinus Egyetem, MKT Corvinus, Budapest, 2013. március 12.
- **Holló E.** (2013): Uniós forráslehetőségek, XI. Budapesti Közgazdasági Napok. A Vállalkozások Finanszírozása és Lehetőségei, MKT Corvinus (Magyar Közgazdasági Társaság) Corvinus Egyetem, Budapest, 2013. november 7-8.

- **Holló E.** (2015): A Bioenergetikai Innovációs Klaszter tagösszetételének, szolgáltatott adatainak vizsgálata. „A gazdaságelemzések módszertani lábnyoma” c. konferencia (A Magyar Tudomány Ünnepe 2015.) Szent István Egyetem Gazdaság- és Társadalomtudományi Kar, Gödöllő, 2015. november 18.

## 5. Patent/utility model protection/know-how

- Bohár G. – Gergely S. – **Holló E.** – Ivády I. – Lőrincz L. – Lukács Gy. – Nagy Zs. (2012): „Kazánrendszer bioapríték tüzeléssel” c. használati mintaoltalom,  
A Szellemi Tulajdon Nemzeti Hivatala 4493 lajstromszámon az U 14 00200 ügyszámú bejelentésre használati mintaoltalmat adott ki. A mintaoltalmi bejelentés napja és az oltalmi idő kezdete: 2012. október 24.
- Takács I. – Marselek S. – Nagy-Kovács E. – **Holló E.** (2012): „OPTILOG© Szervezeti modell az energetikai központok optimális kiszolgálására” c. know-how, TÁMOP-4.2.1-09/1-2009-0001 „Fenntarthatósági Innováció Technológiai Centrum (FITC) létrehozása és hatékony működtetése a Károly Róbert Főiskolán” c. projekt, Károly Róbert Főiskola, Gyöngyös, 2012. augusztus

## 6. Citacions

- Takács I.- Nagy-Kovács E.- **Holló E.**- Marselek S. (2012): Model for optimization of biomass utilization for energy production by energetic and economic requirements Review of Applied Socio-Economic Research 4:(2) pp. 225-235. (2012)
  - Maciejczak M et al (2013): Annuałs of the Polish Association of Agricultural and Agribusiness Economists: 243-248 (2013)
  - Gonda C. (2014): Gazdálkodás 58: 461-471 (2014)
  - Balogh P.- Bai A et al (2015): Renewable & Sustainable Energy Reviews 48: 17-26 (2015)
  - Takács-György K. et al (2015): Visegrad Journal on Bioeconomy and Sustainable Development 4: 36-41 (2015)
  - Bai A. et al (2016): Renewable Energy 85: 777-789 (2016)

- Takácsné György K. – Téglá Zs. - Hágen I. Zs. – **Holló E.** (2012): Adoption of logistic principles in woody biomass energy clusters Shaping Europe 2020: socio-economic challenges Pro Global science association 2 -nd International Symposium Bucharest 16–17<sup>th</sup> November 2012 ISSN 2247-6172 p. 1 – 7.
  - Durkó E. (2015): Gazdaságos szállítási távolság vizsgálata a tüzelőanyag árának függvényében Energia a mindennapokban verseny és konferencia szerk.: Lázár István Kiadó: Megújuló Energiapark Kutatóközpont Kft. Debrecen ISBN: 978 615-5212-33-8
  - Balogh P. Bai A et al (2015): Renewable & Sustainable Energy Reviews 48: 17-26 (2015)
  - Koncz G. (2015): Journal of Central European Green Innovation 3: 59-70 (2015)
  - B. Gyenge – Z. Zéman – S. J. Zsarnóczai (2016): Applying simulation in modelling a company's economic processes Hungarian Agricultural Engineering No. 29 / 2016 11 – 16. <http://hae-journals.org/> p. 11 – 16.
  - Kozma T. – Pónusz M. (2016): Ellátáslánc-menedzsment elmélete és gyakorlata – alapok (Alapösszefüggések a hálózati versenyelőnyök és értékláncok mentén) Károly Róbert Kutató-Oktató Közhasznú Nonprofit Kft., Gyöngyös 2016 ISBN:978-963-9941-94-6
  - Bai A. et al (2016): Renewable Energy 85: 777-789 (2016)
  - Kozma T. et al (2016): Vadyba: Journal of Management 28: 119-125 (2016)
  
- Marosi I.- Bezzeg E.- Csernák J. - **Holló E.**-Takács I (2014): A szervezeti és szervezatközi bizalom vizsgálatának aktualitása az Észak-magyarországi Régióban In: Takácsné György Katalin (szerk.)Az átalakuló, alkalmazkodó mezőgazdaság és vidék: tanulmányok: XIV. Nemzetközi Tudományos Napok: Gyöngyös, 2014. március 27-28. . 1657 p. . Gyöngyös: Károly Róbert Főiskola, 2014. pp. 1015-1024. (ISBN:978-963-9941-76-2)
  - Kertai-Kiss I. (2014): The Embedded Nature of Entrepreneurship In: Possibilities for development of business cluster network between SMEs from Visegrad countries and Serbia, University of Belgrade, 2014.