



Results from study of the competitiveness and the interaction between Bulgarian high-tech enterprises, cluster members

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Abstract: The surveyed Bulgarian high-tech enterprises, different clusters members in Bulgaria, are interacted, while at the same time are competitors of internal and external markets. The surveyed 37 enterprises, members of 10 industrial clusters in Bulgaria, are interacted in various business activities – for example in the production of a given product type, in the case of the execution of general orders, in the implementation of common projects. They are cooperated between themselves and have a certain degree of confidence in the cluster. This in turn leads to an increase in labor productivity, as well as to enhance the competitiveness of the production produced by them.

Index Terms: competitiveness, economic interaction, Bulgarian high-tech enterprises, industrial cluster, production, confidence, cooperation

JEL: R10, O10, L60.

I. INTRODUCTION

From the literary study that has been made, there are identified several main directions of study, covering the essential aspects of the formation, structuring, functioning, development, interaction, as well as some basic characteristics of the clusters. They can be summarized as follows: • Improving opportunities for the development of innovation processes, increasing labor productivity and economic growth [1]; • Studying and analyzing the macroeconomic framework for technology development in Bulgaria [2]; • Processes and possible effects on the formation and development of regional industrial clusters in Bulgaria [4] • The operation and development of clusters of the high-tech industry [3]; • The virtual enterprise method is applied to form an innovative industrial cluster [5]; • Stimulating corporate knowledge in various forms of cooperation with the help of industrial clusters [6]; • Stimulate entrepreneurial processes and enhance the competitiveness of individual enterprises [7]; • Industrial clusters have characteristics of inter-regional and inter-cluster clusters [8].

The aim of current study is to research and analyze the competitiveness and the interaction between Bulgarian high-tech enterprises, cluster members, through “Questionnaire for preliminary research and analysis of the competitiveness of Bulgarian high-tech enterprises, members of cluster”.

The subject of the study is the theoretical formulations and mechanisms for defining the opinions of the different authors regarding the formation, functioning and development of the industrial clusters in the Bulgarian and world literature.

Object of the study are production enterprises, members of cluster.

The relevance of the study is determined by the importance of the research problem – study of the competitiveness and the interaction between Bulgarian high-tech enterprises, cluster members, through questionnaire, that is filled in from Bulgarian high-tech enterprises, Bulgarian cluster members.

II. A GENERAL CHARACTERISTIC OF THE RESPONDENTS, WHICH ARE FILLED OUT THE QUESTIONNAIRE

The surveyed enterprises are 37 in number, 10 various Bulgarian clusters members. Each enterprise is a member of only one cluster in Bulgaria. Each enterprise has completed a “Questionnaire for preliminary research and analysis of the competitiveness of Bulgarian high-tech enterprises, members of cluster”.

The “Questionnaire for preliminary research and analysis of the competitiveness of Bulgarian high-tech enterprises, members of cluster” consists of 23 questions. Some of them are open and some questions are closed. Closed questions also include issues where enterprises can point out more than one faithful answer, according to their business or their business strategy.

2.1. Relative share of enterprises in the individual clusters in Bulgaria, filled out the questionnaire

In the table 1 and figure 1 a relative share of the surveyed enterprises in the individual clusters in Bulgaria is presented.

Conclusion from Table 1 and Fig. 1.: Relative share of enterprises in the individual clusters in Bulgaria

The total surveyed enterprises, members of different clusters in Bulgaria, are 37 in number. Most of the enterprises surveyed are in Cluster "Green Transport" - 11 (30%). The least surveyed enterprises are in three clusters of 1 number – Cluster “Inuted Insurance Brokers” (3%), Cluster HITS – “Horizontally Integrated Technologies & Systems (3%), Black Sea Energy Cluster (3%), High-tech Cluster (2%).

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TABLE 1.
RELATIVE SHARE OF ENTERPRISES IN THE INDIVIDUAL CLUSTERS IN BULGARIA

Relative share of enterprises in the individual clusters in Bulgaria		
Cluster name	Number of enterprises/ Absolute frequency	Relative share (%)
Automotive Cluster Bulgaria	4	11
Bulgarian Furniture Cluster	4	11
High-tech Cluster	1	3
Electric Vehicles Industrial Cluster (EVIC)	2	5
Cluster "INTER MODA TRADING"	5	14
Cluster "Green Transport"	11	30
Cluster "Mechatronics and Automation"	7	19
Cluster "United Insurance Brokers"	1	3
Cluster HITS – "Horizontally Integrated Technologies & Systems"	1	3
Black Sea Energy Cluster	1	3
Total	37	100

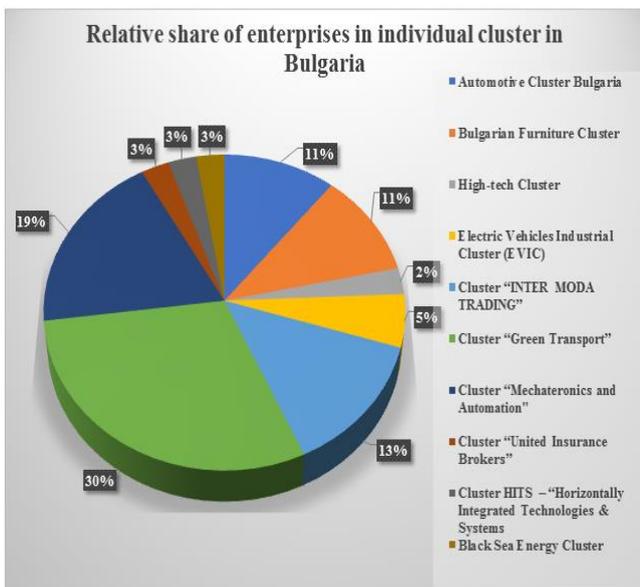


Fig. 1. Relative share of enterprises in individual clusters in Bulgaria

In the Cluster "Mechatronics and Automation" surveyed enterprises are 7 in number (19%). In Cluster "INTER MODA TRADING" surveyed enterprises are 5 (13%).

In two clusters there are the same number of enterprises that filled the questionnaires – 4: Bulgarian Furniture Cluster (11%), Automotive Cluster Bulgaria (11%).

From Electric Vehicles Industrial Cluster (EVIC) the surveyed enterprises are 2 (5%).

III. RESEARCH ON THE COMPETITIVENESS AND INTERACTION BETWEEN BULGARIAN HIGH-TECH ENTERPRISES, CLUSTER MEMBERS

3.1. Cooperation as a form of encouraging the interaction between Bulgarian high-tech enterprises, clusters members
Here are shown results from data processing for 19th question from the questionnaire.

19 question. How do you evaluate on the six-point scale of cooperation between enterprises, cluster members?

- 1 – absence;
- 2 – insignificant;
- 3 – unsatisfactory;
- 4 – satisfactory;
- 5 – moderate;
- 6 – significantly.

TABLE 2.
EVALUATION ON THE SIX-TIERED SCALE OF COOPERATION BETWEEN ENTERPRISES, CLUSTER MEMBERS

How do you evaluate on the six-point scale of cooperation between enterprises, cluster members?				
		Frequency	Percent	Valid Percent
Valid	unsatisfactory	3	8,1	8,1
	satisfactory	11	29,7	29,7
	moderate	11	29,7	29,7
	significantly	12	32,4	32,4
Total		37	100,0	100,0

Conclusion from Table 2 and fig. 2

The total number of surveyed enterprises is 37. To Evaluation on the six-tiered scale of cooperation between enterprises, cluster members, six evaluations have been made: "from 1 to 6". Evaluations "1 – absence (липса)" and "2 – insignificant (незначително)" NOT indicated by any of surveyed enterprises, cluster members in Bulgaria, i. e. any enterprise doesn't evaluate cooperation between enterprises, cluster members as missing or insignificant. For other evaluations "from 3 to 6", enterprises are responded with "YES", as for different evaluations the number of enterprises is various.

To evaluation "6 – significant (значително)", respondents are THE MOST: 12 enterprises (32,4%). For evaluation "3 – unsatisfactory (незадоволително)", responded enterprises are AT LEAST: 3 enterprises (8,1%). For evaluation "5 – moderate (умерено)", 11 enterprises (29,7%) are responded with "YES". To evaluation "4 – satisfactory (задоволително)", 11 enterprises (29,7%) are responded with "YES".

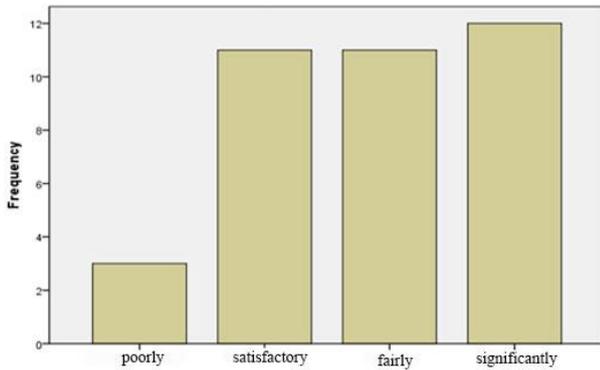


Fig. 2. Evaluation on the six-tiered scale of cooperation between enterprises, cluster members

3.2. Mutual confidence as a tool for encouraging the interaction between Bulgarian high-tech enterprises, cluster members

Here are shown results from data processing for 20th question from the questionnaire.

20 question. How do you evaluate on six-point scale the mutual confidence between enterprises, cluster members?

- 1 – absence;
- 2 – insignificant;
- 3 – unsatisfactory;
- 4 – satisfactory;
- 5 – moderate;
- 6 – significantly.

TABLE 3.

EVALUATION ON THE SIX-TIERED SCALE OF MUTUAL CONFIDENCE BETWEEN ENTERPRISES, CLUSTER MEMBERS

How do you evaluate on six-point scale the mutual confidence between enterprises, cluster members?				
		Frequency	Percent	Valid Percent
Valid	insignificant	1	2,7	2,7
	satisfactory	10	27,0	27,0
	moderate	12	32,4	32,4
	significantly	14	37,8	37,8
	Total	37	100,0	100,0

Conclusion from table 3 u fig 3:

The total number of surveyed enterprises is 37. To Evaluation on the six-tiered scale of mutual confidence between enterprises, cluster members, six evaluations have been made: “from 1 to 6“. Evaluations “1 – absence (липса)“ and “3 – unsatisfactory (незадоволително)“ NOT indicated by any of surveyed enterprises, cluster members in Bulgaria, i. e. any enterprise doesn’t evaluate mutual confidence between enterprises, cluster members as missing or insignificant. For other evaluations “from 3 to 6“, enterprises are responded with “YES”, as for different evaluations the number of enterprises is various.

To evaluation “6 – significantly (значително)“, respondents are THE MOST: 14 enterprises (37,8%). For evaluation “2 – insignificant (незначително)“, responded enterprises are AT LEAST: 1 enterprise (2,7%). For

evaluation “5 – moderate (умерено)“, 12 enterprises (32,4%) are responded with “YES“. To evaluation “4 – satisfactory (задоволително)“, 10 enterprises (27%) are responded with “YES”.

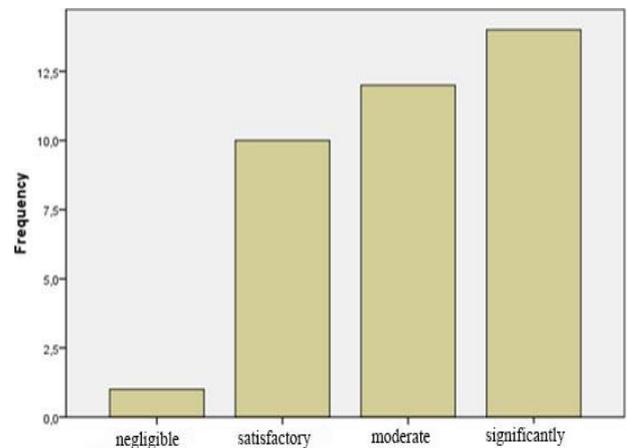


Fig. 3. Evaluation on the six-tiered scale of mutual confidence between enterprises, cluster members

3.3. Bulgarian clusters who have benefited from European and Operational Programs

Here are shown results from data processing for 22th question from the questionnaire. The study concerns the 2007-2013 programming period.

Conclusion from table 4 and fig. 4.:

The total number of surveyed enterprises is 37, which are members of 10 clusters in Bulgaria. Each enterprise is a member of only one of the surveyed Bulgarian clusters.

The Cluster, which has benefited from the MOST European or Operational Programs for the 2007-2013 programming period, is the Electric Vehicles Industrial Cluster (EVIC) 4 programs (19%).

Clusters that have benefited from AT LEAST European and Operational Programs: 1 number (5%) are the following: Automotive Cluster Bulgaria, High-Tech Cluster, Cluster “INTER MODA TRADING”.

The cluster, which has not benefited from NEITHER European or Operational Program, is Cluster “United Insurance Brokers”.

The Bulgarian Furniture Cluster and Cluster “Mechatronics and Automation” have benefited from the same number of European and Operational Programs: 3 (14%).

The Cluster “Green Transport”, Cluster “HITS – “Horizontally Integrated Technologies & Systems” and the Black Sea Energy Cluster have benefited from the same number of European and Operational Programs: 2 (10%).

3.4. Bulgarian clusters who have implemented Projects under a European or Operational Program

Here are shown results from data processing for 23th question from the questionnaire. The study concerns the 2007-2013 programming period.

TABLE 4.
RELATIVE SHARE OF CLUSTERS IN BULGARIA WHO HAVE BENEFITED FROM EUROPEAN AND OPERATIONAL PROGRAMS

Relative share of clusters in Bulgaria who have benefited from European and Operational Programs		
Cluster name	Number of enterprises/ Absolute frequency	Relative share (%)
Automotive Cluster Bulgaria	1	5
Bulgarian Furniture Cluster	3	14
High-tech Cluster	1	5
Electric Vehicles Industrial Cluster (EVIC)	4	19
Cluster "INTER MODA TRADING"	1	5
Cluster "Green Transport"	2	10
Cluster "Mechatronics and Automation"	3	14
Cluster "United Insurance Brokers"	0	0
Cluster HITS – "Horizontally Integrated Technologies & Systems"	2	10
Black Sea Energy Cluster	2	10
Total	19	100

TABLE 5.
RELATIVE SHARE OF CLUSTERS IN BULGARIA ON REALIZED PROJECTS UNDER A EUROPEAN OR OPERATIONAL PROGRAM

Relative share of clusters in Bulgaria on realized Projects under a European or Operational Program		
Cluster name	Number of enterprises/ Absolute frequency	Relative share (%)
Automotive Cluster Bulgaria	1	5
Bulgarian Furniture Cluster	3	16
High-tech Cluster	1	5
Electric Vehicles Industrial Cluster (EVIC)	5	26
Cluster "INTER MODA TRADING"	1	5
Cluster "Green Transport"	3	16
Cluster "Mechatronics and Automation"	7	37
Cluster "United Insurance Brokers"	0	0
Cluster HITS – "Horizontally Integrated Technologies & Systems"	3	16
Black Sea Energy Cluster	2	11
Total	26	100

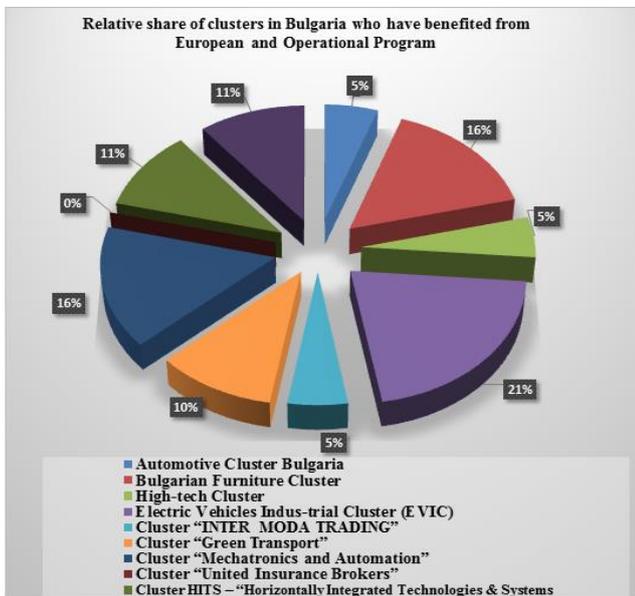


Fig. 4. Relative share of clusters in Bulgaria who have benefited from European and Operational Programs

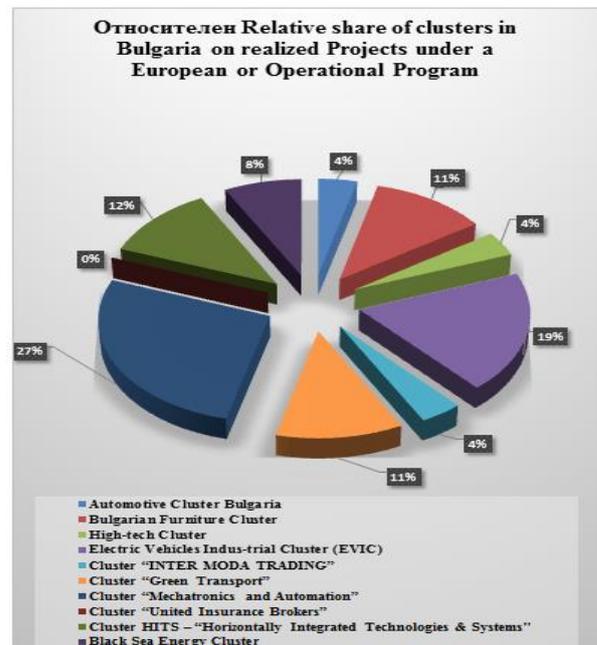


Fig. 5. Relative share of clusters in Bulgaria on realized Projects under a European or Operational Program

Conclusion from table 5 and fig. 5:



The cluster that has the most implemented Projects under a European or Operational Program for the 2007-2013 programming period is Cluster "Mechatronics and Automation": 7 (37%).

Clusters with the least developed Projects under a European and Operational Program: 1 number (5%) are the following: Automotive Cluster Bulgaria, High Technology Cluster, Cluster "INTER MODA TRADING".

The Cluster, which has NONE realized Project under a European or Operational Program, is Cluster "United Insurance Brokers".

Electric Vehicles Industrial Cluster (EVIC) has implemented Projects under a European or Operational Program: 5 (26%).

The Bulgarian Furniture Cluster, the Cluster "Green Transport" and the Cluster HITS – "Horizontally Integrated Technologies & Systems" have the same number of realized Projects under a European and Operational Program: 3 (16%).

The Black Sea Energy Cluster has implemented Projects under a European and Operational Program: 2 (11%).

IV. CONCLUSIONS

From the research on the interaction and competitiveness of Bulgarian high-tech enterprises, members of the cluster, the following **more important conclusions were made:**

1. The "Questionnaire for preliminary research and analyses of the competitiveness of Bulgarian high-tech enterprises, members of cluster" is one of the stages of the Methodology for the study for economic interaction levels in Bulgarian high-tech enterprises. This Methodology analyzes the interaction and competitiveness of enterprises, cluster members.
2. The questionnaire for collecting, systemizing and analyzing the data from the study supports the application of the expert-analytical method in the analysis of the interaction, the relations between enterprises, members of industrial clusters in Bulgaria, as well as the enhance competitiveness of the production, produced by them.
3. From the processes data from the questionnaire it is clear that the interaction and relations between enterprises, industrial cluster members in Bulgaria, are realized in the implementation of common orders, in the production of some types of products and implementation of common projects.
4. The cooperation and the mutual confidence between Bulgarian high-tech enterprises, cluster members, contribute to stimulating the interaction between them. This in turn leads to enhance the competitiveness of their production.
5. Bulgarian high-tech enterprises, cluster members, are interacted between themselves, but at the same time remain competitors on internal and external markets.
6. The enterprises that filled in the questionnaire are 37 and are members of 10 clusters in Bulgaria. Each enterprise is a member of only one cluster. The surveyed enterprises are from different industrial branches, covering about 80% of the leading branches for functioning clusters in Bulgaria. Also in these 80% is the cluster services sector – ICT sector (information and communication technologies).

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