ASSESSMENT OF REASONS FOR BEING ENGAGED IN CLUSTERS IN TERMS OF SUSTAINABLE DEVELOPMENT

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Abstract. In terms of sustainable development, various forms of partnership are an important prerequisite for the development of companies, especially small and medium-sized enterprises (SMEs). Clusters are considered to be an effective form of support and innovation development for SMEs. Thus, enterprises working as a part of clusters are more efficient, flexible and resistant to external influences than large and hierarchical organizations. Clusters often arise spontaneously through the activities of local stakeholders who want to benefit from the synergy of the factors in the region, such as the existence of suppliers and customers, skilled labour force, specific resources and infrastructure. There are more than 20 clusters operating in the Slovak Republic. The majority of cluster members are SMEs. SMEs have many specificities and their engagement with clusters is influenced by various factors. For instance, many SMEs are often not sufficiently innovative or find it difficult to implement the results of their research and development into practical and successful innovation in the market. Bearing in mind the conditions of sustainable development, the authors examined the reasons why SMEs got engaged with clusters and enhanced their further development in terms of competitiveness. Moreover, the authors placed emphasis on their ability to innovate their products, technologies and/or services. Attention was also paid to the increased number of joint projects in the field of business, new market placement options and access to new information, as well as the acquisition of new partners, and employment growth in the regions in which these enterprises operate. The purpose of the paper was to identify the most relevant reasons why SMEs got engaged with clusters in terms of sustainable development. In order to achieve this purpose, an empirical study was carried out. The results were evaluated by quantitative tools of statistics (percentage, average values, standard deviation, chi-square test and Cramér's V). The results showed that the most important reasons that made SMEs' engage with clusters were entry to new markets and getting new partners.

Keywords: small and medium-sized enterprises; development activities; clusters; cooperation; partnerships

1. Introduction

In the context of sustainable development, SMEs are considered to be the backbone of the EU economies. SMEs are mainly seen as a driving force of economic growth, increase of employment and productivity, and new jobs creation (Mynarzova et al., 2016; Lemanska-Majdzik, 2016; Caha, 2017; Orlova et al., 2018).

Empirical studies show that SMEs tend to grow faster than their larger counterparts (e.g. Fiala, Hedija, 2015)

in order to achieve minimum efficiency of scale production (Teruel-Carrizosa, 2010; Zitkiene, Dude, 2018; Benešová et al. 2018).

They, however, are associated with some disadvantages in comparison with large companies. They are mainly those related to their connection to new markets, access to the results of R&D, innovation, lower financial power, limited opportunities for recruiting and employing professionals, limited resources for promotion and advertising, limited opportunities to gain benefits from the scale of production and others (Belás et al., 2014; Krajnakova, et al., 2015; Ivanova, 2017; Vlaseckova, Mura, 2017; Prause, Atari, 2017; Fomina et al. 2018; Žižka et al., 2018; Narkunienė, Ulbinaitė, 2018).

One of the possibilities to minimize the disadvantages mentioned is to involve SMEs into various forms of network cooperation. At present, it is primarily the clusters that are considered to be one of the options for increasing business and innovation performance as well as the competitiveness of SMEs in terms of sustainable development. Efficiently working clusters represent a fast growing business also for SMEs, and create better opportunities for them to develop new sustainable business opportunities through collaboration projects. Suh&Lee (2018) claim that changes in environment make SMEs analyse, build, and reconfigure their resources and organizational capabilities in order to achieve flexibility and agility from the perspective of sustainability. Modern cluster theory provides reasons for positive externalities that may arise from the group of interaction of close businesses that operate in common and related areas of economic activities (Kosfeld, Titze, 2015). In the literature, there is a discussion regarding horizontal co-operation between small and medium-sized enterprises, whereby individual competitors are to be managed because of the increasing resources and innovations demand, leading to enhanced competitiveness through joint products development. (McAdam et al., 2014). Being involved in cluster cooperation brings to SMEs, in particular, the ability to keep competitiveness at regional, international and global levels (Morosini, 2004; Yang, Černevičiūtė, 2017; Batkovskiy et al. 2018).

Therefore, cluster initiatives and their implementation have become one of the key directions in economic support to SMEs in regions. However, the implementation of innovation activities by SMEs and the search for suitable forms of cooperation, such as the establishment of clusters in terms of economic development in Slovakia, are facing several problems. They include a lack of information about the significance of clustering among SMEs, limited financial and human resources, lack of trust to other cluster members, and lack of motivation for clustering, etc. Therefore, a comprehensive analysis of issues, such as innovative experience implementation, adequate forms of cooperation and especially innovative cluster creation is necessary. The findings from such analyses should be made available to cluster policy makers and experts in order to develop initiatives and strategies that would support SMEs in facing global challenges.

The purpose of this paper is to identify the most relevant reasons of SMEs to get engaged with clusters in terms of sustainable development. To achieve this purpose, questionnaire survey data were used. The Pearson chi-square test was employed as a statistical method to find whether there is a significant relationship between the size of enterprises and the significance of selected reasons. Next, Cramér's V was used to identify the strengths of association.

2. Literature review

The cluster concept was initiated and popularized by Michael Porter (1990). He explained that clusters have long been part of the economic landscape, with geographic concentrations of trades and companies in particular industries dating back for centuries (Porter, 2000). According to Porter (2000), a cluster is a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities. This definition and set of features of the term was elaborated in works of many other authors. Foghani et al. (2017) state that cluster is utilized to show the geographical and a sectoral focus of firms which produce and sell a range of related or complementary goods and services, and normally experience the same challenges as well as opportunities. A cluster forms an ideal platform for knowledge sharing so it ensures trust and cooperation that facilitates collective learning, synergies and smooth exchange of

knowledge (Gunawan et al., 2016). Clusters have, as a rule, a positive impact on their development, in particular, how to increase turnover savings, reduce costs, increase competitiveness, streamline the transfer of information or technologies, increase government investment, and so on. (Czechinvest, 2017). At the same time, the goal of an innovative cluster can be to gain innovation and investment into modern technologies and machinery equipment, regional innovation centre building, and innovative infrastructure development for entrepreneurs in terms of environmental impact and energy sources saving (Malakauskaite, Navickas, 2011; Kordos, Karbach, 2014; Navickas, Navikaitė, 2015; Mishenin et, 2018; Rogalev et al., 2018).

Most definitions of clusters include geographical proximity, relationship among cluster's stakeholders, social ties among cluster's stakeholders, synergy effects and benefits from cluster as a whole and also for its stakeholders and others (Porter, 1990, 1998; Dudian, 2011; Ramojus, 2016). Bylok et al (2016) provide four types of clusters' definitions:

- 1st – cluster as an agglomeration (concentration) of mutually tied enterprises on a specific territory that are a capable of synergetic processes where an important role is played by administration and local and regional authorities;
- 2nd – clusters as an industrial complex, namely the concentration of co-dependent enterprises on a specific area that operate in the same or related industrial sectors or services by which the mutual ties strive towards the improvement of competitiveness,
- 3rd – cluster as a hub of knowledge in which cooperation takes place between the research units and the enterprises with the aim of creation new knowledge and innovative solutions,
- 4th – cluster as a social network based on social relations, trust and social ties, sharing resources that facilitate cooperation and the creation of innovations.

The source of clusters' competitive advantage can be analysed by Porter's diamond model focused on particular microeconomic indicators of competitive advantage. However, the competitive advantage relies not only on individual elements of Porter's model or individual companies, but also on the coherence of the so-called "diamond". The Diamond of Competitive Advantage puts into context factors that affect the competitiveness of entities (nations, regions, sectors, clusters) (Porter, 1990). Important elements of input factors are human resources, raw materials, knowledge, capital and infrastructure, while specialized resources can vary depending on industry. Demand conditions create prerequisites for a competitive advantage in case of customer pressure to implement innovative activities. Related and supportive industries are an important part of the diamond, representing the ability for local companies to deliver cost-effective inputs and to participate in companies 'innovation processes' (SIEA, 2015). Government can influence all parts of the "diamond" by creating an appropriate competitive environment, as well as supporting the companies in their efforts to achieve growth and competitiveness enhancement. The role of government and local authorities at national or regional level should be to support the development of clusters as well as to increase their overall competitiveness (Czechinvest, 2017).

The present business environment in which clusters operate reflects a dynamic process in which clusters have to find effective ways to achieve the long-term development. As Bembenek (2015) states, considerable challenge within this scope is the implementation of sustainable development concept assumptions. The concept of business sustainable development, including clusters, is a significant element of the EU economic policy, comprised in the priorities of the strategy "Europe 2020". This new strategy assumes, among others, that cluster members and coordinators have to show complete understanding of sustainable development concept and its practical usage to the degree that ensures to meet the requirements of market and environment. Authors focused on cluster research, elaborate their issues also in the context of sustainable development from several points of view. In literature, we can find works focused on clusters' benefit towards sustainable regional development (Knauseder, 2009, Mempel-Sniezyk, 2014), the sustainable development of clusters in the context of corporate social responsibility (Bembenek, 2015), the role of clusters in sustainable development of enterprises (Suchacek et al., 2018) and others.

In terms of sustainable development, clusters include various stakeholders, such as suppliers of specialized inputs, providers of specialized infrastructure, manufacturers of complementary products or companies related

by skills, technologies, or common inputs, governmental and other institutions, trade associations and other collective bodies involving cluster members, foreign firms, secondary schools and universities as well as SMEs.

SMEs are involved in clusters as the stakeholders that have the potential for their successful integration into productivity growth and global distribution networks (Foghani, et al., 2017; Damaskopoulos, et al., 2008). The experience from cluster cooperation indicated that SMEs start cluster cooperation as it is mutually advantageous. In SMEs, this form of cooperation is mostly implemented where businesses are bound by the creation of a competitively interesting product, its individual parts or technological chain (Hämäläinen, et al., 2011). In localities or regions where the industrial structure is organized around one or more large manufacturing companies, the most effective cluster-building practices of SMEs depend on the position of firms in supply or sales chains (Atienza, et al., 2016). In this case, enterprises cooperate to achieve one common goal, which increases their competitiveness and overall economic performance (Šúbertová, et al, 2014).

Globalization has profoundly changed the reasons why SMEs engage with clusters. Nevertheless, the impact of clusters on competition under ever-increasing globalization and the development of knowledge-based economies is getting bigger. The cluster cooperation of SMEs represents a new way of thinking about national, state and local economic interests and puts new demands on society, government and regional authority institutions to increase the competitiveness and economic performance of manufacturing enterprises (Porter, 2000).

Traditional reasons for SMEs to get engaged with clusters, such as employment growth, cost cuts, better marketing and promotional activities, entry to new markets or getting new business contacts etc. are still relevant. At the same time, new reasons for enterprises to get engaged with clusters have emerged, such as obtaining new information, implementing innovations and carrying out joint projects, etc. For example, by examining a sample of 444 SMEs involved in cluster collaboration it has been revealed that their performance within the cluster is motivated by successful deployment of dynamic organizational structures (Rice, et al., 2013; Strunz, Vojtovič, 2014).

Moreover, another study highlights that the competition among cluster enterprises can negatively affect the exchange of information, because each of one among them wants to use it separately (Sordi, 2012). And the implementation processes of advanced information and communication technologies into SMEs indicate that these technologies are getting them closer in the phases of development and training and give a stimulus to sustained and long-lasting forms of cluster cooperation development (Berranger, Meldrum, 2000).

Based on the study on reasons for the involvement of 300 SMEs in cluster cooperation, Sato (2000) proposed a successful case of SME clusters development in metallurgy industry and ironmongery. He came to the conclusion that the sub-supply chain being combined with high market diversification are the main reasons for SMEs to be involved in cluster cooperation. Similarly, the study of Atienza, et al. (2016) examining 351 SMEs also concluded that in regions where the industrial structure is organized around one or larger manufacturing companies, the best practices of SMEs depend on their status in technology and supply chain.

In the Ghanatabadi's (2005) study a cluster cooperation of SMEs is considered as one of the development strategies and at the same time as an integration tool of individual economic regions, countries and continents. This means that the SMEs development is a very necessary prerequisite for their involvement in cluster cooperation. Similarly, for SMEs benefiting from an integrated support system and a wide range of business networks, their homeland is innovation (Ceglie, Dini, 1999).

3. The Research Methodology

In the study, the most relevant reasons why SMEs engaged with clusters were identified by using the method of structured interview. The interview was performed with SMEs top managers or other people who worked on the implementation of cluster activities. The structured interview questions were obtained from a previously performed pilot project in which 27 respondents were asked to list the reasons for enterprise involvement in cluster cooperation.

Entrepreneurs selected the reasons that are relevant for small and medium-sized enterprises to cooperate in clusters. They used a 5-level scale from 0 to 5 points (0 - irrelevant, 5 - most relevant).

Out of all SMEs operating in the Slovak Republic, a random sample of 317 small and medium-sized enterprises was made. However, only 250 SMEs were willing to participate in the structured interview.

The main characteristics of the sample were as follows: the size of SMEs by the number of people employed (1 to 9, 11 to 49 and 50 to 249) and by the annual turnover (not exceeding 2 million EUR, not exceeding 10 million EUR and not exceeding 50 million EUR) (Table 1).

Basically, the sample characteristics corresponded with the population characteristics (mainly with regard to the annual turnover of SMEs) which include all SMEs operating in the Slovak Republic. Anyway, the purpose of the research was not to make a statistically representative sample based on statistical units (respondents). In the structured interview, experts were interviewed. Thus, the sample representativeness is not necessary.

Table 1. Basic characteristics of the sample

Number of employees	0-9	10-49	50-249	Total
Number of respondents	90	89	71	250
Percentage (%)	36	36	28	100
Annual Turnover not exceeding	**2 mil EUR**	**10 mil EUR**	**50 mil EUR**	**Total**
Number of respondents	154	66	30	250
Percentage (%)	62	26	12	100

Source: own research

Of the total number of respondents, the largest part was comprised by enterprises employing up to 9 employees (36%), the next equally large group was represented by enterprises (35%) with a number of employees from 10 to 49 and the remaining 28% were enterprises with 50 to 249 employees. Regarding the annual turnover, 62% of enterprises were those with a turnover up to 2 million EUR. 26% of enterprises recorded an annual turnover not exceeding 10 million EUR and 12% of enterprises had an annual turnover not exceeding 50 million EUR.

To achieve the purpose of the study, the authors used empirical research methods (structured interview), statistical methods (chi-square test (χ^2) and Cramér's V) and Statistica software. A chi-square test was used to verify the null hypothesis (H0) regarding the relationship between two nominal variables. The observed counts (f_{b_n}) were compared to the expected counts (f_{e_n}).

Test statistic:

$$\chi^2 = \sum_{i=1}^{m} \sum_{i=1}^{n} \frac{\left(f_{b_n} - f_{e_n}\right)^2}{f_{e_n}} \quad (1)$$

In this paper, the test statistic $\chi 2$ was used to test the hypothesis at a level of significance of 0.05 about no association between the level of assessing the reason to enter clusters and the size category of the enterprise. The low level of p-value <0.05 meant that H0 was rejected and an alternative hypothesis H1 was accepted. High level of p-value> 0.05 meant that the H0 was not rejected. It follows that there was a relationship between the level of assessing the reason and the size of enterprises.

To measure the dependence of pairs of variables, the Cramer's V coefficient was used, which can achieve values from 0 to 1. Dependence less than 0.1 is trivial, 0.1-0.3 small, 0.3-0.5 medium and above 0.5 is great. If the value of the coefficient is closer to 1, the dependence between the two qualitative characters is stronger and vice versa (Budíková et al., 2010).

4. Results and discussion

Statistical indicators of respondents' answers on the reasons for SMEs to be involved in cluster cooperation are given in Tab. 2. According to the mean values in selected assessed reasons, the respondents marked the most relevant reasons for cluster cooperation the following items: to get new contacts (3.41±0.90%) and to enter new markets (3.38±0.99%). The least relevant reason was to increase employment (2.3±1.40).

The results of standard deviation showed, that the reasons, such as to increase the number of innovations, to enter new markets, to access new information, to get new contacts, were assessed similarly by respondents. The assessment of the remaining reasons indicated that there was observed a more significant deviation from the mean.

Table 2. Statistical characteristics of the respondents' answers by the reasons evaluated

Reason	μ (mean)	σ (standard deviation)
To increase employment	2,37	1,40
To increase the number of innovations	3.09	0.97
Common projects in business	3.12	1.08
To enter new markets	3.38	0.99
To increase competitiveness	3.09	1.14
Access to new information	3.28	0.95
To get new contacts	3.41	0.90
Cooperation to achieve cost-cuts	3.14	1.06
Better promotion and marketing	3.22	1.11

Source: own research

In the following section of the paper, the results of the relationship between the variables under review are presented, where the first one is the level of assessment of reasons by respondents and the second one is the size category of an enterprise. Due to the failure to comply with the good approximation condition (at the expected abundance, their value was not at least in 80% of cases higher than 5), respondents' answers were recalculated in case of assessing by levels of 4 and 5. Percentage of within respondents' answers for this sum within the assessment of reasons is shown in Table 3. This assessment shows that the most relevant reasons for SMEs to be engaged in cluster cooperation are: "entry to new markets" (65.20%) and "getting new contacts" (62.80%). In the category of 0-9 employees, the most relevant reason for cluster cooperation was "getting new contacts" (22.40%). In the category of 10-49 employees, the most relevant reasons recorded were "common projects in business" (22.40%) and "entry to new markets" (22.40%). In the category of 50-249 employees, the most relevant reason was "entry to new markets" (22.40%). The least relevant reason mentioned by entrepreneurs in all three categories was the option of increasing employment (see Table 3).

Table 3. Answers of respondents who assessed the reasons as the most relevant (in %)

Reason	0-9	10-49	50-249	Total
To increase employment	7.60%	10.80%	9.20%	27.60%
To increase the number of innovations	14.40%	16.40%	13.20%	44.00%
Common projects in business	14.40%	22.40%	13.60%	50.40%
Entry to new markets	20.40%	22.40%	22.40%	65.20%
To increase competitiveness	18.00%	15.60%	16.40%	50.00%
Access to new information	20.00%	17.20%	18.40%	55.60%
To get new contacts	22.40%	20.80%	19.60%	62.80%
Cooperation to achieve cost cuts	13.60%	21.20%	17.60%	52.40%
Better promotion and marketing	19.20%	20.00%	17.20%	56.40%

Source: own research

Table 4 shows the results of the χ2 test, by which the following hypotheses were tested:
• H0: There is no association between assessing the level of reasons to join the cluster cooperation and the size category of enterprises.
• H1: There is an association between assessing the level of reasons to join the cluster cooperation and the size category of enterprises.

Table 4. The results of chi-square test (p-value)

Reason	p-value	Cramér's V
To increase employment	0.108143	0.10563
To increase the number of innovations	0.777885	0.64001
Common projects in business	0.076355	0.08018
Entry to new markets	0.014300	0.00356
To increase competitiveness	0.188723	0.06291
Access to new information	0.069197	0.08318
To get new contacts	0.685584	0.59642
Cooperation to achieve cost cuts	0.012982	0.00582
Better promotion and marketing	0.912835	0.90923

Source: own research

As it can be seen from Table 4, the level of p-value is higher than the probability level of 0.05 in most cases of the reasons under assessment. Thus, it can be inferred that there is no association between the business size category and the level of the reasons assessed. The null hypothesis is rejected in the entry to new markets and cooperation to achieve cost cuts. The results of Cramér's V, however, showed only trivial dependence.

5. Conclusion

Several completed studies covered in the research showed the positive impact of the clusters in various ways on their stakeholders (Purwanto, et al., 2015; Bylok, 2016; Gunawan et al., 2016; Foghani et al., 2107). The analysis performed was focused on the reasons why SMEs joined existing clusters. The results of the research revealed significant estimated benefits of being a part of clusters. The key advantages, as seen by the SMEs managers, were being able to enter new markets and get new contacts. It is evident that there are also other motives for SMEs engaging with clusters, such as better promotion and marketing, access to new information, cooperation to achieve cost cuts, common projects in business and competitiveness enhancement.

Without partner cooperation and without engaging with clusters, SMEs do not possess the economic and human potential to perform similar and mutually advantageous activities in terms of sustainable development. Nevertheless, further research will require to carry out a case study and interview in SMEs working in clusters.

Undoubtedly, when working in clusters, SMEs much more improve their bottom lines. However, the results of our survey indicated that in the Slovak republic as well as other Eastern European countries there are no extensive empirical surveys and collected statistical data that clearly confirm the positive impact of cluster cooperation on the development and progress of SMEs (see also Karaev, Koh, Szamosi, 2007; Filipishyna et al., 2018).

At the same time, no study has unequivocally demonstrated that being engaged with clusters leads to improved economic performance of SMEs in terms of sustainable development. The gap in exploring this issue also lies in the fact that the conducted surveys do not focus their attention on competition issues among clusters as well as within the individual members of cluster groups. At the same time, it would be necessary to identify the intensity of competition among companies that have decided to stay out of any particular group. Up to now, disadvantages of those SMEs that are not engaged in clusters have not been identified. Because of the lack of information on the linkage between clusters and competitiveness, especially from the point of view of SMEs as the key cluster players, it is necessary to address the competitiveness issue in more depth.

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