

Factors Affecting the Decision of SMEs' to Be Involved in Cluster Cooperation

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Abstract

Various research studies have already reported many benefits of cluster cooperation for small and medium-sized enterprises (SMEs), but the factors' assessment leading them to be joined in this form of business are still missing. This research contributes to fill this gap by a broader analysis accomplishment within three perspectives: the SMEs' size category, the cluster cooperation experience and the typology being related to Slovak clusters. The main aim of this study is to identify the most important reasons that drive SMEs to engagement into cluster cooperation and by means of exploratory factor analysis (EFA) to group them into main factors affecting the SMEs' decision about clustering. These outcomes are based on questionnaire survey results conducted among 1018 Slovak SMEs. We evaluated the SMEs' perception of ten identified reasons by using the Chi-square independence test and Cramer's V. The EFA results indicated two main factors. The results highlighted the importance of clustering to SMEs, policy makers and other stakeholders.

Keywords: *small and medium enterprises, cluster, factors*

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Introduction

The market pressure on SMEs is steadily growing. If SMEs want to survive, they have to respond quickly to new trends and develop the adequate skills and capabilities. SMEs play a key role in European economy (Abrham, et al., 2015)

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and have an irreplaceable role in new jobs creation and regional development in Slovakia. However, they tackle with a set of problems, which are related to their size (Rojík et al. 2016). They are often unable to capture new market opportunities; they are locked in their routines, they have problems with the achievement of economies of scale within the purchase of inputs, they struggle with the access to funding and innovation, etc. Long-term experience shows that only those SMEs can succeed in current super competitive environment, which constantly improve their products and services and actively improve their business and production processes. Conditions under which companies operate, or develop their activities, have a significant impact on their performance, competitiveness and growth potential (Fabuš, 2017). Hence, also SMEs need to be engaged in cooperation to get access to other entities' resources, capabilities, innovation, information, better means of communication, learning activities; counselling and lobbying, joint promotion and marketing (Hlušková and Šášiková, 2013). Through cooperation with other entities, SMEs can solve these problems and improve their ability to be complete. Because of this, the mostly discussed phenomenon is clustering, which as a rule leads to more efficient functioning to all subjects involved into network (Fuschi and Tvaronavičienė, 2016).

From the perspective of SMEs, clusters may become an interesting alternative to their development (Bylok, Pabian and Kuceba, 2016). They are beneficial within the process of creating the innovation and the knowledge flow, they improve SMEs' global market access, business performance, and they can increase SMEs' competitiveness. The main motivation of SMEs being engaged into cluster cooperation are the final results oriented on profits, competitiveness increasing and quality improvement, to reduce operation costs, to increase personnel qualifications, to improve technological base, to be enhanced in innovation field, to create new products and businesses, to increase sales and competitiveness, and many others (Navickas and Malakauskaite, 2009).

A series questions emerge naturally from the foregoing aspects towards reasons that affect the SMEs' engagement into clusters. This paper is focused on: Q1. Which reasons related to engagement into cluster cooperation are the most important for SMEs? Q2. Does the perception of reasons depend on the size of an enterprise? Q3. Are there differences in perception of these reasons between SMEs that have experience with cluster cooperation and those, where this experience is missing? Q4. Does the perception of reasons depend on economic sector in which SMEs operate? In this paper, we provide answers to these questions. Main contribution of this paper lies in the determination of main factors that have impact on SMEs' decision within their engagement into cluster cooperation. Paper has concentrated its analysis on a sample of SMEs in Slovakia. The uniqueness

of this paper lies in the verification of the criteria set in practice, being necessary for the successful operation of Slovak clusters along with SMEs being involved in them. It is a unique point of view for solving an issue that has a great potential for the implementation of cluster cooperation in the action of SMEs, within the real conditions in Slovak Republic. The obtained results could be especially attractive to different clusters' stakeholders and other actors at regional and national level being responsible for the promotion of cluster cooperation.

The structure of the paper is as follows: the theoretical background provides an overview of international studies dealing with the main reasons for SMEs' engagement into cluster cooperation. The main findings were used for analytical framework in this paper and based on results, the identification of ten main reasons, which are important for SMEs' engagement into cluster cooperation was provided. The identified reasons are marked and numbered from R1 to R10. In the methodology section, the paper describes used methodological approach and procedures. We describe the research sample, we set research hypotheses and explained the steps that are necessary to use the statistical tests for data evaluation. The next part of the paper is divided into two subchapters. There is the evaluation of differences and dependences in SMEs' perception of identified reasons using descriptive statistics and statistical tests. The second part consists of the results of the EFA analysis and identification of main factors, which affect the SMEs' decision about their engagement into clustering. Finally, the main findings, final assessment and implications for the future research are summarized in the last part of the paper.

1. Theoretical Background and Literature Overview

Cluster is most commonly defined as a geographic concentration of interconnected companies, specialized distributors, service providers, and businesses in related industries and related institutions. According to Ketels (2015) clusters provide an important analytical perspective to understand and diagnose the drivers of economic performance for a particular location. The main task of a cluster is to obtain a local, regional and global synergetic effect (Masárová and Koišová, 2017; Pavelková et al., 2013). Keller et al. (2019) understood the clusters as the groups of companies, mainly SMEs, and other actors (government, research and academic community, institutions for cooperation, financial institutions) co-locating within a common geographic area, cooperating around a specialized niche, and establishing close linkage and working alliances to improve their competitiveness. According to Ketels, Lindqvist and Sölvel (2012), clusters and their

SMEs can be seen as a major backbone of European economy and hence supporting them can create the added value for people in Europe.

An essential presumption of market economy development is the existence of a business sector (Mura and Rózsa, 2013), for which the quality business environment being determined by various factors (Belas et al., 2019) is necessary. The appropriate and quality business environment creating condition for long-term sustainable developing business is the basic precondition for SMEs' development. The presence of clusters is the core element defining the quality of the micro-economic business environment (Sölvell, Ketels and Lindqvist, 2008). Companies within a cluster can operate with a higher degree of efficiency and use specialized assets of suppliers with shorter response times than working in isolation. The environment within a cluster contributes to the development of SMEs and these problems solving. As Bylok, Pabian and Kuceba (2016) stated, the environment in clusters is competitive, the cluster concept is considered as an important factor in innovation and entrepreneurship, and it constitutes an opportunity for SMEs to improve their market position. The question for SMEs, therefore, remains how efficient for their activities the *cluster's supportive environment (R1)* is.

Clusters are the fastest and the most effective solutions for implementing and deploying new technologies in businesses by being focused on research, development and innovation activities. Innovations are positive changes, which bring useful and better conditions for the business performance improvement (Okreglicka, 2016). Companies in clusters are more active in implementing innovations, so clusters are also called innovative clusters (Balog, 2016). They are global economic "hot spots" where new technologies germinate at an astounding rate and where pools of capital, expertise, and talent foster the development of new industries and new ways of doing business (Engel, 2015). In these clusters, the entrepreneurial process is a mechanism for continuous and rapid innovation, technology commercialization, business model experimentation, and new market development (Engel and Del-Palacio, 2011). Morrison and Rabellotti (2009) emphasized that the process of innovation in clusters is affected by firm's embeddedness. Eisingerich et al. (2012) have provided an evidence for the driving forces of firm innovativeness in different cluster types and found out that heterogeneity across cluster types is important. Thanks to the active participation of SMEs in clusters, they have increased access to innovation, which is a source of competitive advantage for firms, and the interest in identifying its driving forces has increased from the perspective of industrial clusters (Xie, Wu and Ma, 2016). In line with the argumentation above, we will examine reason related to the *gaining of SMEs' access to innovation (R2)*.

Tsai (2009) and Sohn et al., (2016) explained the impact of different types of partners' interactions towards identifying market opportunities, trends and

responses to market. Their studies showed that close collaboration of various partners is generally aimed at innovations that open up an entirely new market. More and Jain (2013) based on the example of automotive original equipment manufacturers showed, that these firms utilize external source of innovation and knowledge spillovers externalities within a cluster. Individually, SMEs are often unable to capture market opportunities, which require large production quantities, homogenous standards, and regular supply (Ceglie and Dini, 1999). From this point of view, it is necessary to assess the SMEs' *perception of an effective collaboration network (R3)*.

Primarily, clusters tend to help companies to compete on local and regional markets (Damaskopoulos, Gatautis and Vitkauskaitė, 2008). Hlušková and Šášíková (2013) emphasize, that cooperation in form of a cluster can reduce costs and improve chances to penetrate into new markets. Navickas and Malakauskaite (2009) concluded that the competitiveness of SME sector is closely related to the spread and extent of clustering. In relation to works of stated authors we proposed the next reason for SMEs' evaluation: *to create a position in a new market (R4)*.

Many researches point out to the benefits of extended and dynamic clustering for SMEs and provided the evidence of benefits from research, academic and business sector (Cumbers, MacKinnon and Chapman, 2003; Damaskopoulos, Gatautis and Vitkauskaitė, 2008; Ketels and Memedovic, 2008; Navickas and Malakauskaite, 2009; Sohn et al., 2016 and many others). Their studies, confirmed that clusters create for SMEs relevant and effective environment, where the interconnections among individual stakeholders bring benefits in various ways. The cluster approach to the industrial potential development will promote the increase of competitiveness due to establishing and effective dialogue not only between business structures but also with educational establishments, scientific institutions, and government bodies (Kuzmin, Stanasiuk and Vivchar, 2019). Clusters' stakeholders harbor their own perspectives, goals and understandings concerning the benefits to be derived. For example, the business community is looking for profit or competitive advantage while academic area is devoted to expanding knowledge and expertise (Madgett, Belanger and Mount, 2005). Another important element of clustering is the participation of universities, regulatory agencies, research institutes and business associations that help the industry to perform specialized tasks in the areas of research, development, education, information transfer, and technology support. Clusters thus become sector-specific organizations that not only gather the manufacturing sector but also connect it to governmental and non-governmental institutions that make up the whole area for more effective development of particular industry sectors (Svazas, Navickas and Ivanova, 2019). Clusters are also a useful category to organize public-private policy dialogue and

policy delivery to improve competitiveness (Ketels, 2015). *Access of SMEs towards stakeholders from research, academic and business sector (R5)* is another reason, SMEs should focus on, if they consider cooperating within a cluster.

Knowledge sharing is the term used to refer to communication process that involves people-to-people communications as the conduit for sharing tacit and explicit knowledge in the form of information (McLeod, Vaughan and Edwards, 2012). Van der Zee and Vanneste (2015) highlight the fact, that knowledge sharing and access to information has positive effect on the competitiveness of a cluster. For residing SMEs to have an access to important information in clusters, the firms have to be connected locally (Zhang and Li, 2010). The close cooperation and relationship of SMEs with other cluster's stakeholders contribute to information transfer enhancement. Clusters thus provide the possibility to make the exchange of information in various ways (Novelli, Schmitz and Spencer, 2006). Internal activities carried out in clusters generate new information and can improve the SMEs' ability to exploit them. *To gain the access to new information (R6)* for SMEs can enhance the transfer of knowledge to their business activities and hence determining their survival and growth.

A lot of studies in the area of resources sharing within connection of SMEs in clusters showed how incumbent firms in clusters exploit their specific local resources in order to develop market opportunities (Hervas-Oliver and Albors, 2001; Wu et al., 2010; John and Pouder, 2006). *The common resources (R7)* as important reason for SMEs' involvement in clustering could be observed from several perspectives. John and Pouder (2006) analyzed the issues of resources in two types of clusters: technology oriented (where knowledge and research from universities and national laboratories are often essential resources that serve as the attractors and anchor in the region), and industry oriented (key resources include skilled labor, technical and scientific personnel with industry-specific knowledge). These resources provide the cluster with unique, synergetic advantages for those firms that decide to locate there. Cluster can be seen as a provider of common resources for SMEs through their participation. They provide valuable resources in terms of clustered firms' performance (Wu et al., 2010), in linkages with skilled workers, social interactions (Hervas-Oliver and Albors, 2001), knowledge, innovation, financial support and many others through which the SMEs gain a sustainable competitive advantage.

Another important part of SMEs' decision to cooperate in cluster is the access to *cooperation in the field of common educational activities (R8)*. As Porter stated (1998), many clusters include governmental and other institutions – such as universities, standards-setting agencies, think tanks, vocational training providers, and trade associations – that provide specialized training, education, information,

research, and technical support. Professional training, with knowledge diffusion, promotes the fruitful actions for local development within the context of clusters (Leite, Morales and Júnior, 2016; Morosini, 2004). Kuzmin, Stanasiuk and Vivchar (2019) expressed that the leading role in a cluster network belongs to research institutions and educational establishments, which role is to develop and invent an innovative product that meets market requirements and state economic policy priorities. Both attributes are important for SMEs, because firms belonging to an organized cluster should encourage the development of practical training-oriented programs, not only within technical aspects but also other skill and competence-based areas (Canet-Giner et al., 2020).

While previous stated reasons were focused mainly on economic, trade and innovation benefits related to cluster cooperation, another important reason, which has impact on successful cluster cooperation also for SMEs, is the *trust among clusters' stakeholders (R9)*. Lorenzen (2001) summarized in his work the different dimensions of a trust (interpersonal, inter-organizational, unilateral, mutual, unwarranted, dyadic, networked and social) and paid special attention to warranted social trust, explaining why it is a dominant coordination mechanism within clusters. Informal contacts among company employees are considered one of the major knowledge bearers among enterprises within a cluster, and these contacts represent an important diffusion channel of knowledge. The meaningful collaboration among heterogeneous stakeholders is essential for sustainability achieving, and a trust becomes a main behavioral factor to enable an effective collaboration system (Dania, Xing and Amer, 2018) and a value for cluster development (Novelli, Schmitz and Spencer, 2006).

Clustering is very important for SMEs and can positively affect their access to finance. Clusters help SMEs obtain a necessary support not only from key stakeholders (Olawale and Garve, 2010) but also from public funding (Sölvell, Ketels and Lindqvist, 2003). In early 1990s, the European Commission and various international agencies have recommended the promotion and support of SMEs through the cluster approach as a priority for all levels of governance. EU countries have transferred this priority to their national SMEs support programs and started using it. For SMEs, *the funding availability and capacity (R10)* is an important reason that affects their decision to join cluster cooperation.

2. Problem Formulation and Research Methodology

To meet the main aim of this paper, following procedure was carried out. First, we identified the most important reasons (Table 1) for SMEs' decision about engagement into cluster cooperation based on results from published scientific

research works being analyzed within the previous part of the paper and then we worked out their implementation within the conditions in Slovak Republic.

Table 1

Main Reasons for SMEs' Engagement into Cluster Cooperation

Reason	Description	Reason	Description
R1	The supportive environment for business	R6	To gain access to new information
R2	To gain access to innovation	R7	Common resources
R3	An effective network of collaboration	R8	Cooperation in the field of common educational activities
R4	Getting a position in new markets	R9	The trust among cluster's stakeholders
R5	The access to stakeholders from research, academic and business sector	R10	The funding availability and capacity

Source: Own proposition based on literature review.

Second, it has been observed how Slovak SMEs perceived stated reasons by using a Likert scale with values from 0 to 5 (0 – insignificant reason, 5 – the most important reason) from three main perspectives: (1) the size category of SMEs, (2) the experience with cluster cooperation (3) the economic branches in which Slovak clusters operate (technological and tourism).

We used and compared data of 1018 SMEs that took part within the questionnaire survey in 2017 – 2018. Our research had limitation in case of research sample due to the research goals in terms of scientific research project VEGA No. 1/0918/16 Risk management of SMEs in the context of clusters' involvement activities in the Slovak Republic. There are two types of clusters in Slovakia: technology (information and communication technology, creative industry, bio-economy, engineering, energetics, electrical engineering, construction, automotive industry) and tourism (see also Balog, 2016).

According to this typology, SMEs were assigned into the following groups within research sample (Table 2).

Table 2

Sample Structure According to Three Observed Perspectives

Cluster typology	Cluster experience	Size category			Total
		Micro	Small	Medium	
Technological	Knowledge and consideration of cluster cooperation	154	134	127	415
	Experience with cluster cooperation	23	30	19	72
Total		177	164	146	487
Tourism	Knowledge and consideration of cluster cooperation	271	206	39	516
	Experience with cluster cooperation	7	8	0	15
Total		278	214	39	531
SMEs in Total		455	378	185	1,018

Source: Own research.

The third step consisted of the assessment if there is any relation among SMEs' perception of stated reasons. We set the following hypotheses:

H1: The SMEs' perception of stated reasons depends on the size category to which SMEs belonged.

H2: The SMEs' perception of stated reasons depends on the experience of SMEs with cluster cooperation.

H3: The SMEs' perception of selected reasons depends on the economic branch in which the SMEs operate.

In order to verify the significant relationship between the respondents' answers according to those three observed perspectives, the non-parametric Chi-square independence test was used at the significance level $p = 0.05$. The test verifies the null hypothesis H_0 : There is no dependence between qualitative variables. To indicate the strength of association, the Cramer's V was used. It is a number between 0 and 1 that indicates how strongly the two categorical variables are associated.

The fourth step consisted of identifying the main factors affecting SMEs' cluster cooperation decision making by using the Exploratory Factor Analysis (EFA).

The last fifth step consisted of correlations of regression factor score with variable of cluster experience.

The calculations made within these analyses were conducted in statistical software the SPSS and the STATISTICA.

3. Findings and Results

This section discusses the results of accomplished analyses to meet the main aim of the paper. The following research was divided into two parts. In the first part, we focused on the evaluation of SMEs' perception of stated reasons (Table 1) from the three perspectives. Second part contains the results of EFA and correlation and presents main factors that are important for SMEs' decision on their engagement into cluster cooperation.

3.1. The Differences in SMEs' Perception of Stated Reasons

Within the *first perspective*, we focused on SMEs' perception of stated reasons in Table 1 according their size category (Table 3).¹

¹ The definition of SMEs according OECD: the turnover of medium-sized enterprises (50 – 249 employees) should not exceed EUR 50 million; that of small enterprises (10 – 49 employees) should not exceed EUR 10 million while that of micro firms (less than 10 employees) should not exceed EUR 2 million. Alternatively, balance sheets for medium, small and micro enterprises should not exceed EUR 43 million, EUR 10 million and EUR 2 million, respectively.

Table 3

Frequency of SMEs' Answers – Stated Reasons vs. Size Category of SMEs

Reason	Micro						Small						Medium					
	0	1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5
R1	39	46	82	81	108	99	20	41	52	79	115	71	10	31	25	36	42	41
R2	39	52	93	122	90	59	31	41	77	103	77	49	11	14	42	49	42	27
R3	21	40	86	120	115	73	23	25	73	93	106	58	6	13	35	51	39	41
R4	33	36	70	76	103	137	21	32	57	67	96	105	9	10	22	29	51	64
R5	39	71	102	125	84	34	24	61	78	94	90	31	17	30	36	51	38	13
R6	18	30	70	101	129	107	12	36	45	83	105	97	6	24	23	38	40	54
R7	15	31	73	96	125	115	14	33	43	80	104	104	3	10	25	34	53	60
R8	39	72	106	102	78	58	32	44	77	93	87	45	12	24	38	32	42	37
R9	20	40	74	114	101	106	13	37	59	84	105	80	10	29	32	49	40	25
R10	65	40	82	107	89	72	38	43	52	73	100	72	21	25	35	35	37	32

Source: Own research.

The descriptive statistics and results for the p value of Chi-square test for hypothesis H1 depicts Table 4. The most important and significant reason, considered by SMEs for their involvement into cluster, was R7 (3.38 ± 1.37 – micro enterprises, 3.43 ± 1.41 – small enterprises, 3.64 ± 1.29 – medium sized enterprises). The lowest average scale value for reasons in this perspective was for R5 (2.54 ± 1.38 – micro enterprises, 2.68 ± 1.38 – small enterprises, 2.55 ± 1.40 – medium sized enterprises). Based on the results of Chi-square test we observed the statistical dependence of SMEs' perceptions on the size category of SMEs only in case of R1 ($p = 0.04$, but the dependence according to Cramer's V is only weak). The results of our research showed, that micro-enterprises are the most vulnerable, due to the fact that they are the smallest and their ability to respond to turbulent and dynamic changes in the environment is limited and they are the most vulnerable to these changes.

Table 4

The Statistical Approach and the Relationship among SMEs' Perceptions According to Their Size Category

Reason	Micro		Small		Medium		Chi-square test p value
	MEAN	SD	MEAN	SD	MEAN	SD	
R1	3.03	1.57	3.17	1.44	3.04	1.55	0.04 (Cramer's V = 0.10)
R2	2.77	1.45	2.80	1.44	2.96	1.37	
R3	3.07	1.36	3.08	1.38	3.23	1.35	
R4	3.30	1.57	3.32	1.50	3.59	1.45	
R5	2.54	1.38	2.68	1.38	2.55	1.40	
R6	3.35	1.37	3.39	1.39	3.32	1.49	
R7	3.38	1.37	3.43	1.41	3.64	1.29	
R8	2.62	1.48	2.78	1.45	2.97	1.53	
R9	3.22	1.42	3.25	1.39	2.84	1.42	
R10	2.73	1.61	2.98	1.59	2.75	1.61	

Source: Own calculation in STATISTICA. SD – standard deviation.

The hypothesis H1 was not adopted for the rest of reasons. It means that the size category the respondents belong to, does not affect the level of selected reasons' perception.

Second observed perspective in our research was focused on SMEs' perception of stated reasons (Table 1) according their experience with cluster cooperation (Table 5).

Table 5

Frequency of SMEs' Answers – Stated Reasons vs. Experience with Clustering

Reason	Experience						Knowledge and consideration					
	0	1	2	3	4	5	0	1	2	3	4	5
R1	9	13	16	13	27	9	60	105	143	183	238	202
R2	2	7	15	27	20	16	79	100	197	247	189	119
R3	2	9	13	17	27	19	48	69	181	247	233	153
R4	2	6	13	10	18	38	61	72	136	162	232	268
R5	4	16	21	21	21	4	76	146	195	249	191	74
R6	7	13	9	22	15	21	29	77	129	200	259	237
R7	1	3	12	19	25	27	31	71	129	191	257	252
R8	0	12	14	18	19	24	83	128	207	209	188	116
R9	4	17	15	20	21	10	48	69	181	247	233	153
R10	4	7	15	18	22	21	120	101	154	197	204	155

Source: Own research.

Based on results regarding the average level of SMEs' reasons perception, we can conclude that reasons R6 (3.39 ± 1.38) and R9 (3.20 ± 1.41) are more important for SMEs that have only knowledge and consider the engagement into cluster cooperation. Based on the gained experience, the SME's ability to be orientated in a particular environment increases, and consequently the dominance of R6 decreases.

Positive lessons learned from cluster cooperation intensify a trust (R9) between cluster's stakeholders (SMEs included) unlike the SMEs, which do not know what they can expect from other participating stakeholders. The trust in a functioning system of mutual cooperation is very important for them. Due to the fact that they do not have any experience with the system of work in cluster environment, they have a higher degree of distrust than companies that have gained experience and perceive this system of work positively. In case of R8 the situation is reversed.

This reason is more important for SMEs that have experience with cluster cooperation (3.33 ± 1.39), because they can generate their strengths and weaknesses and consequently adapt the training activities.

The results of descriptive statistics and p value of Chi- square test (p value) for H2 presents Table 6.

Table 6

The Statistical Approach and the Relationship between SMEs' Perceptions of Reasons According to Experience with Clustering

Reason	Experience		Knowledge and consideration		Chi-square test p value
	MEAN	SD	MEAN	SD	
R1	2.72	1.55	3.12	1.52	0.08
R2	3.20	1.28	2.78	1.44	0.17
R3	3.32	1.37	3.08	1.36	0.22
R4	3.72	1.44	3.33	1.53	0.06
R5	2.59	1.29	2.60	1.39	0.56
R6	3.01	1.61	3.39	1.38	0.02
					(Cramer's V = 0.12)
R7	3.67	1.22	3.43	1.39	0.60
R8	3.33	1.39	2.69	1.48	0.00
					(Cramer's V = 0.15)
R9	2.77	1.43	3.20	1.41	0.04
					(Cramer's V = 0.11)
R10	3.26	1.44	2.78	1.61	0.15

Source: Own calculation in STATISTICA. SD – standard deviation.

The results have showed that hypothesis H2 was adopted in case of reason R6 ($p = 0.02$), R8 ($p = 0.00$) and R9 ($p = 0.04$). The dependence of reasons' perception on experience with cluster cooperation according to Cramer's V is weak. For the rest of the reasons the H2 was rejected. The acquired positive experience of SMEs in the framework of cluster cooperation influenced the evaluation of only R6, R 8 and R9.

The perception of ten reasons (Table 1) according to the field in which Slovak clusters operate represents the *third observed perspective* (Table 7).

Table 7

Frequency of SMEs' Answers – Stated Reasons vs. Cluster Typology

Reason	Tourism						Technological					
	0	1	2	3	4	5	0	1	2	3	4	5
R1	35	53	85	110	133	115	34	65	74	86	132	96
R2	65	85	107	134	87	53	16	22	105	140	122	82
R3	27	44	96	146	135	83	23	34	98	118	125	89
R4	47	64	88	87	115	130	16	14	61	85	135	176
R5	41	81	121	127	114	47	39	81	95	143	98	31
R6	17	42	73	116	152	131	19	48	65	106	122	127
R7	20	49	73	112	145	132	12	25	68	98	137	147
R8	49	71	130	136	98	47	34	69	91	91	109	93
R9	10	24	77	121	143	156	33	82	88	126	103	55
R10	73	71	94	101	118	74	51	37	75	114	108	102

Source: Own research.

The average results of SMEs' perceptions (Table 8) in case of tourism the R9 appears to be the most important reason (3.56 ± 1.27) for cluster cooperation. In case of technological SMEs, the most important reason was R4 (3.72 ± 1.32).

The results of p value of Chi square test (Table 8) for hypothesis H3 showed, that there is the dependence between respondents' perception in case of reasons: R2 ($p = 0.00$), R4 ($p = 0.00$), R8 ($p = 0.00$), R9 ($p = 0.00$) and R10 ($p = 0.00$). Access to innovation (R2) is more important for technological SMEs than for tourism SMEs, which is also related to the fact that technical enterprises need a higher degree of innovation activities for their development in terms of their further scope. R4 was again more important for technology SMEs, until technology companies operate in a dynamic environment where access to new markets plays a major role. The tourism SMEs are more tied to a certain space and the possibilities of expanding their business activities are more tied to innovative product creation. The evaluation of R8 is based on the assumption that rapid changes in the turbulent and dynamic environment of technological SMEs require a higher level of educational activities. According to Cramer's V, there is moderate dependence only in case of R9 ($V = 0.31$). We build trust for a very long time and we lose it very quickly. As long as tourism is closely linked to the location of its business, this reason is more important for tourism SMEs than for technology SMEs, which have more spatial diversity to develop their activities. The assessment of R10 depends on the location of business and the approach of state administration and regional authorities to the support for particular business sector.

The results of our research showed that for the rest of reasons, there is not statistical significance in the dependence of area in which SME operates and the stated H3 was not adopted.

Table 8

The Statistical Approach and the Relationship between SMEs' Perceptions of Reasons According to Cluster Typology

Reason	Tourism SMEs		Technological SMEs		Chi-square test p value
	MEAN	SD	MEAN	SD	
R1	3.13	1.50	3.04	1.54	0.45
R2	2.47	1.49	3.18	1.26	0.00 (Cramer's V = 0.28)
R3	3.07	1.36	3.14	1.37	0.66
R4	3.03	1.63	3.72	1.32	0.00 (Cramer's V = 0.24)
R5	2.63	1.40	2.56	1.36	0.24
R6	3.39	1.37	3.32	1.44	0.72
R7	3.34	1.42	3.57	1.32	0.07
R8	2.57	1.40	2.93	1.54	0.00 (Cramer's V = 0.18)
R9	3.56	1.27	2.72	1.43	0.00 (Cramer's V = 0.31)
R10	2.64	1.61	3.02	1.57	0.00 (Cramer's V = 0.14)

Source: Own calculation in STATISTICA. SD – standard deviation.

Finally, we can conclude, that the results obtained within this part of the paper covers answers on four stated questions from the part of Introduction. Based on the literature review we summarized ten main reasons which affect the SMEs' decision about cluster cooperation (Table 1) and they give us the answer on Q1. There is the answer on Q2 in Table 4, which summarizes the relation between the size category of SME and the perception of selected reasons. The results showed, that only in one case (R1) we can talk about the dependence between the perception of reasons and the size of an enterprise. When answering Q3, based on the results presented in Table 6, we can see the relationship between SMEs' perceptions of reasons and experience with clustering in case of R6, R8 and R9. Huge differences among SMEs' perception of selected reason we can see in case of evaluation according economic branch in which SMEs carry out their activities. Within Q4 we can conclude, that not all reasons for cooperation are perceived in the same way in two stated economic branches. The results presented in Table 8 confirmed, that differently are seen the reasons R2, R4, R8, R9 and R10

3.2. The Analysis of Main Factors Affecting SMEs Decisions on Engagement into Cluster Cooperation

An exploratory factor analysis (EFA), using maximum likelihood with a Varimax rotation was conducted to assess how to extract the factors from the ten identified reasons (Table 1) affecting SMEs' decision on their engagement into cluster cooperation.

Before conducting the analysis, the data fitting for factor analysis was checked and we excluded reasons R1, R6, R8 and R10 from further analysis. The Kaiser-Meyer-Olkin (KMO) Test for Sampling Adequacy is 0.781 so middling. The Bartlett's test is significant ($p < 0.05$) and results of Communalities (extraction) and the measure of sampling adequacy for individual variables (MSA) confirmed the suitability for EFA to be used (Table 9). The reliability coefficient alpha values for items are 0.742.

Within the EFA we identified two components (factors) with eigenvalue over 1 criterion for 6 reasons that are significant in case of SMEs engagement into cluster cooperation, which explain 61.93% of the inherent variations. These two components were rotated. After rotation, the first component accounted for 34.81% of the variance, and the second component accounted for 27.12% of the variance. Table 9 displays the items and components loading for the rotated components, with loadings less than 0.40 omitted to improve clarity.

According to items' characteristics identified in Rotated component matrix the two components are labeled as F1 Efficiency of cooperation and F2 Business

relations. The first factor F1 pertains to the reasons in terms of getting the access to innovation, position in new markets, effective network collaboration and common resources. Second factor F2 pertains to the reasons in terms of links and trust among clusters' stakeholders. All these reasons were related to effectiveness of cluster cooperation, which each stakeholder expects.

Table 9

The Meeting of EFA Requirements and Component Loadings for the Rotated Components (N = 1018)

Item	Mean	SD	Component loading		Communality	MSA
			1	2		
R2	2.81	1.43	0.79		0.62	0.78
R4	3.36	1.53	0.77		0.60	0.81
R3	3.10	1.36	0.68		0.56	0.80
R7	3.45	1.37	0.61		0.51	0.74
R9	3.16	1.42		0.85	0.74	0.83
R5	2.60	1.38		0.81	0.69	0.71
Eigenvalues			2.64	1.10		
% of variance			43.98	17.96		
Extraction Method: Principal Component Analysis.						
Rotation Method: Varimax with Kaiser Normalization						

Note: Loading < 0.40 are omitted.

Source: Own calculation in SPSS.

The correlation of variable that presents the experience with cluster cooperation and factor score depicts Table 10. Result showed low level of variable's correlation with first factor score ($r = 0.17$) and high level of correlation for second factor score ($r = 0.97$). Business relations in cluster are correlated with cluster cooperation experiences.

The results highlighted the fact that for SMEs that have experience with cluster cooperation, the ties and trust among clusters' stakeholders are more important than for SMEs without this experience.

Table 10

Pearson's Correlation Coefficients of Individual Factor Score with Cluster Experience

		Cluster experience
F1_REGR factor score 1 for analysis 1	Pearson Correlation	0.167**
	Sig. (2-tailed)	0.000
	N	1,018
F2_REGR factor score 2 for analysis 1	Pearson Correlation	0.969**
	Sig. (2-tailed)	0.000
	N	1,018

Note: ** Correlation is significant at the 0.01 level (2-tailed).

Source: Own calculation in SPSS.

4. Discussion and Conclusions

The situation in Slovak cluster's environment is very dynamic and the number of SMEs that are connected in clusters varies. A lot of SMEs that are familiar with this type of network cooperation consider the active participation. They perceive both positive and negative effects.

The quality and supporting business environment creates the basic prerequisite for development of SMEs. The results of our research showed differences of SMEs' perception of *R1* within the dependence on the size category of SMEs ($p = 0.04$). *R1* was the most important for 211 SMEs that took part in the research, from which 46.92% belonged to micro sized enterprises, 54.50% to tourism SMEs and 95.73% to SMEs with knowledge of cluster cooperation. The differences of SMEs' perception of business environment aspect are also confirmed by work of Belas et al. (2019).

The results of European Commission (2019) showed that SMEs that were part of an enterprise group were also more likely to be engaged in innovation activities than SMEs which were independent. In our research, 135 SMEs, perceived the *R2* as the most important, of which 60.74% belonged to technological SMEs. It could be affected by fact that as Lämmer-Gamp, Meier zu Köcker and Christensen (2011) stated, that the characteristics of a cluster depend very much on the technology field the clusters are operating in. If we compared results of SMEs' perception of *R2* according to the size category of SMEs, mainly micro enterprises (43.70%) consider this reason as the most important and from the point of view of cluster experience this reason is the most important for SMEs only with their knowledge about this type of cooperation (88.15%).

Kuzmišin (2009) stated that cooperation of universities – companies – self-government triad creates prerequisite of innovation culture as a part of this, the region's activities in the direction of anchoring the region in the environment of a global knowledge society. This research extends the perspective of effective network cooperation as the reason for SMEs' engagement into cluster cooperation (*R3*). In our research the 172 SMEs perceived *R3* as the most important reason for their decision to take part in cluster cooperation, of which 42.44% belonged to microenterprises, 88.95% to enterprises with knowledge about cluster cooperation and 47.67% to technological enterprises.

Nowadays, the era of globalization imposes the requirements on ability of SMEs to improve their efficiency, productivity and flexibility in terms of market. Individual SMEs are often unable to capture market opportunities due to these requirements. Various studies showed the benefit is related to *R4* through the cluster cooperation (Damaskopoulos, Gatautis and Vitkauskaitė, 2008; Hlušková and Šášiková, 2013; Navickas and Malakauskaite, 2009). In our research, 30.06% of

SMEs perceived R4 as the most important for their engagement into cluster cooperation. From this number 44.77% belonged to micro enterprises, 87.58% to SMEs with knowledge about cluster cooperation and 57.52% to technological SMEs.

Although several studies (e.g. Ketels and Memedovic, 2008; Svazas, Navickas and Ivanova, 2019) confirmed the importance of cooperation among cluster's stakeholders, the R5 is not perceived as very important in our research. It is the most important reason for engagement into cluster only for 7.66% of respondents. If we compare the results among groups of SMEs, the R5 is the most important for 11.11% of micro enterprises, 24.18% of SMEs with knowledge about clustering and 15.36% of tourism SMEs. Research of Wennberg and Lindqvist (2010) showed similar results and they argued that this could be attributed to the fact that it does not gauge the intensity and quality of research, but simply counts the presence of universities.

The new information and knowledge are crucial for SMEs' activities, their flows in clusters are relevant to the aspects of their productivity, innovation, competitive advantage, solving the unexpected situations and spreading the important ideas among their stakeholders. In our research R6 was evaluated as the most important by 258 of respondents (25.34%), of which 41.47% belonged to micro enterprises, 91.86% to SMEs with knowledge about cluster cooperation and 50.78% to tourism SMEs. This result contributes to other empirical works (Baggio, Scott and Cooper, 2010; Bhagwat and Sharma, 2007; van der Zee and Vanneste, 2015) by indicating, that this reason is more significant for SMEs that have knowledge about cooperation and consider taking part in clustering (3.39 ± 1.38), not only for SMEs that have already had activities within clusters.

One of the main reasons why the SMEs enter into the networks is the sources sharing as a starting point for limiting the barriers from the company size and subsequent expansion of the company onto the foreign markets (Mura and Rózsa, 2013). In our research R7 is the most important for 279 SMEs, of which 41.22% belonged to micro-enterprises, 90.32% to SMEs with the knowledge of cluster cooperation and 52.69% technological SMEs. Our research supports the empirical findings in other studies, which suggest the direct relationship between the participation of SMEs in clusters and the access to common resources.

As economies and states get more advanced, some clusters usually tend to including suppliers of specialized inputs, components, machinery, and services; specialized infrastructure emerges from public and private investment; and institutions providing specialized training, education, information, research, and technical support (Porter and Ketels, 2009). Investments made by these institutions such as educational programs can enhance a company's productivity (Porter, 1998), that's why the R8 is important also for SMEs due to their restrictions as an individual entity. The conducted survey among Slovak SMEs showed some

differences among their opinions about this issue. R8 is the most important only for 13.75% of respondents, of which 41.43% belonged to micro-enterprises, 82.86% to SMEs with knowledge about cluster cooperation and 66.43% to technological SMEs. The SMEs that are willing to take part in cluster cooperation, realize the importance of common educational activities for their future success. Also this reason is more important for technological SMEs due to the innovation intensity of these business entities.

The trust (*R9*) within cluster cooperation creates informal rules for cooperation (Dania, Xing and Amer, 2018; Lorenzen, 2001; Morosini, 2004). The R9 in our research was perceived as the most important reason among 20.73% of SMEs of which 50.24% belonged to micro-enterprises, 72.51% to SMEs with knowledge about cluster cooperation and 73.93% to tourism SME. Our results are supported by the research of Partalidou and Koutsou (2012) who explained why the trust is more important for smaller SMEs. According to them these entities feel that the big companies will try to satisfy their goals without taking into account the needs of the smaller ones and it seems that it is not a comfortable environment for participating in a cluster with many different types and sizes of companies.

As Olawale and Garve (2010) stated, all businesses require financial resources in order to start trading and to fund growth. The results of European Commission (2019) showed that increasing the availability of private funding for RandD in enterprise, the public support for RandD at universities and government research organizations is likely to increase the share of innovating SMEs. Thus *R10* is gaining in importance. In our research this reason is the most important for 17.09% of SME, of which 40.91% belonged to micro and the same number of medium sized enterprises, for 88.07% of SMEs with knowledge about cluster cooperation and for 57.95% of technological SMEs. In Slovakia, the technological clusters have more complicated access to funding possibilities than tourism clusters. It is affected by the fact, that tourism clusters act more like the Regional Tourism Organizations and their activities are defined by Act No. 91/2010 Law on Tourism where the financing of tourism development is incorporated. Technological clusters are supported within the Scheme de Minimis supported by the Slovak Ministry of Economy, but this support is only partial and is intended only for industrial cluster organizations.

Detailed analysis of the clusters' role for SMEs is underdeveloped and the awareness of this concept among SMEs and other stakeholders is at low level. The assessment of SMEs' perception of ten reasons, which motivate SMEs to join cluster cooperation, contributes to fill up this gap. The paper was focused on the identification of main factors that are important for SMEs' engagement into cluster cooperation. Within our research we identified two main factors: *F1* Efficiency of cooperation and *F2* business relations.

Important issue for further research in this area can be derived from the researched framework. It is necessary to know which kind of shared resources, ties among stakeholders, types of contribution to competitiveness enhancement are important for SMEs. If we want to know better the meaning of clusters for Slovak SMEs, it is necessary to focus mainly on SMEs which carry out their activities in clusters and to elaborate deeper each reason of this study and to find connections between each reason and behavior of SMEs being engaged in cluster.

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