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Original Paper

Analysis of SMEs development and their innovation activities in EU countries

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ABSTRACT

Small and medium enterprises form the basis of each highly-developed economics. They create the biggest part of the number of all business enterprises. They have significant influence on offering job opportunities and creating of surplus value. Except these aspects, SMEs is also attributed to high innovation and developing potential. The ability of SMEs to innovate introduces one of the key factors. The aim of this article was to compare the number of SMEs in EU countries with respect to old and new member countries. In order to achieve the goal and analyze the data, we used the statistical methods: basic statistical characteristics, Student's t-test and one factor analysis of variance. We found that there are still significant disparities in the development of SMEs between old and new member countries. We believe that there is a similar gap in SME innovation activities as well.

KEYWORDS: SMEs, analysis of variance, t-test, development, innovations

JEL CLASSIFICATION: C00, O10, O31

INTRODUCTION

Business is the driving force of a market economy. Small and medium-sized enterprises (SMEs) are an important part of the national economy, job creation, added value or foreign trade. Newly created SMEs generate new jobs, new SMEs that are emerging as a means of commercializing new technologies or innovative ideas are often the carriers of positive structural changes in the economy, increasing its productivity and contributing to economic growth. SME development increases the intensity of competition on the market, acts against monopolistic tendencies and has the potential to reduce social and regional polarization [8]. Small and medium-sized enterprises are characterized by transparent organizational structure, enabling direct management and information flow without significant impact of negative aspects. Small and medium-sized enterprises (SMEs) have significant potential when they perform several important functions (e.g. social, economic, export-import, etc.). The

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importance of these companies is not only at national level, but at the level of transnational [7]. With the advancing process of globalization, small and medium-sized enterprises are still more confronted with international competition. On the other hand, globalization also provides SMEs with other opportunities and possibilities for doing business on foreign markets. There is even a direct link between the degree of involvement of SMEs in international relations and their performance. Businesses engaged in international relations are more competitive and more efficient than those that do not engage in international activities. The innovation activities of these enterprises represent one of the main prerequisites for their competitiveness on international markets [3]. Also important is the importance of building a brand in SMEs, which is confirmed by Graa and Andelhak [6]. The importance of SMEs can also be perceived at EU level when, for example, in a document called the European Charter for Small and Medium-Sized Enterprises, SMEs are characterized as the EU's basic economic support and as a key source of employment.

The expansion of the business and economic base and the development of the entrepreneurial business with the support of the EU and national sources of finance initiated the growth of the national economy at the level of Slovakia [5]. However, there is still a certain negative in the development of the business environment. Entrepreneurs negatively perceive, in particular, the high tax burden, the weak law enforcement, administrative burdens of business, many unnecessary environmental standards, the level of regulated prices, complicated and often changing legislation, corruption and the increase in regulatory burdens in relation to the approximation of Slovak legislation to EU law [10].

In addition to these aspects, SMEs are also attributed to the high innovation and development potential. The ability of enterprises to innovate is one of the key factors of positive structural change. The widespread use of new (progressive) knowledge in all business activities has a positive impact on the growth of labor productivity, the growth of added value of production and the increase in competitiveness (based on production quality), not only at the enterprise level but also at the national level. However, innovative business SMEs face a number of obstacles compared to large companies. For example, a shortage of educated workers, the cost of own research and development, a lack of research infrastructure, difficulties in establishing new contacts with research organizations, lack of investment capital, limited administrative capacity, and so on [8]. The government should minimize administrative barriers, which could hamper businesses in their activities [9]. The importance of innovation is also supported by Fenyvesi [4].

As SMEs are the driving force of the economy and hence significant potential, it is desirable to support them, whether financial or advisory. Veber et al. [11] states that activities aimed at supporting SMEs can be broadly divided into two basic groups: financial support and information support. Financial support and development of SMEs in Slovakia is mainly implemented through loans, micro-loans, risk capital use, the use of guarantees (for example bank loans), non-repayable financial assistance, funding of selected activities from national funds, funding of selected activities from transnational funds so on. Support, whether financial or informational, invested in the development of SMEs will return in the short term in the form of higher competitiveness and the creation of further prerequisites for economic growth.

MATERIAL AND METHODS

The aim of the thesis was to compare the number of SMEs in EU countries for the years 2010 to 2015 with respect to old and new member countries. Source data were obtained from Eurostat database (2017). Methodology division and definition of SMEs can be various in different countries. In this article we deal with definition SMEs by EU. The reason is mainly consecutive comparison. For this comparison we need uniform methodology for all countries. By mentioned definition into the category SMEs we include all enterprises, which ones have 0 to 250 employees and turnover or balance sheet total less than 50 million EUR. We can sectionalize SMEs even more in detail on micro enterprise (have less than 10 employees and turnover or balance sheet total less than 2 million EUR), small enterprise (have 10 to 49 employees and turnover or balance sheet total less than 10 million EUR) and medium-sized enterprise (have 50 to 249 employees and turnover less than 50 million EUR or balance sheet total less than 43 million EUR).

In order to achieve the goal and analyze the data, we used the statistical methods and the obtained observations were evaluated as follows:

- We have determined the basic variation-statistical characteristics by states and years.
- Comparison of observation numbers with respect to the size of MS states and years was evaluated using Student's t-test and by one and two factor analyses of variance with fixed effects.

Mathematical and statistical evaluation was carried out using the statistical package Statistix version 9.0 [12].

RESULTS AND DISCUSSION

In the European Union, SMEs represent for more than 99% of the total number of enterprises. Similarly, in the Slovak Republic. In the Eurostat databases for the Slovak Republic we can find an extremely large difference between 2008 - 2009 and 2010 - 2017 in the number of micro-enterprises. However, it has an artificial cause, since 2010 there have been some methodological and legislative changes, which subsequently affected the overall statistics. For the purposes of the analysis in this article, therefore, for all SMEs, we chose the 2010 - 2015 timeframe to make the data comparable and not to have distorted results. For the primary countries, for the purposes of our article, we considered those countries that joined the EU in the 20th century (until 1995). For new countries, we consider those who joined the EU in the 21st century (after 2004). This means that for the purposes of this article, we will consider the old member states Austria, Belgium, Germany, Denmark, Greece, Spain, Finland, France, Ireland, Italy, Luxembourg, Netherlands, Portugal, Sweden and United Kingdom. The latter country leaves the European Union in a short time, but it is still a part of the EU and so we included it, of course, in our analyzes. For the new EU member states we consider Bulgaria, Czech Republic, Cyprus, Estonia, Croatia, Hungary, Lithuania, Latvia, Malta, Poland, Romania, Slovakia and Slovenia. As the new member states are made up of many states of the former Eastern Bloc, we assumed that there will be significant differences in the development and abundance of SMEs.

Table 1 Means and standard errors of means for numbers of SMEs in 2010 - 2015 for each country and also for old and new EU countries

No	State	Abb.	\bar{y}	$s_{\bar{y}}$	No	State	Abb.	\bar{y}	$s_{\bar{y}}$
1.	Austria	AT	103532	29048	16.	Bulgaria	BG	103464	30917
2.	Belgium	BE	186190	58471	17.	Czech R.	CZ	328605	106141
3.	Germany	DE	720767	184375	18.	Cyprus	CY	15333	4702.9
4.	Denmark	DK	70436	20412	19.	Estonia	EE	19684	5790.8
5.	Greece	EL	240493	78653	20.	Croatia	HR	49894	15095
6.	Spain	ES	799788	251966	21.	Hungary	HU	173947	54857
7.	Finland	FI	75435	23061	22.	Lithuania	LT	46599	13992
8.	France	FR	938067	298674	23.	Latvia	LV	30527	9087.7
9.	Ireland	IE	14062	634.22	24.	Malta	MT	8895.1	2776.3
10.	Italy	IT	1.257E+06	398797	25.	Poland	PL	499236	159264
11.	Luxemb.	LU	9901.4	2778.6	26.	Romania	RO	143153	40537
12.	Nether.	NL	307725	98293	27.	Slovakia	SK	133472	43381
13.	Portugal	PT	266078	84872	28.	Slovenia	SI	40767	12865
14.	Sweden	SE	218238	69001					
15.	U. Kingd.	UK	582142	168791					
Tot	Old	n			Tot	New	n	122583	18275
		90	386002	47160			78		

Source: Own processing based on Eurostat (2017)

Tab. 1 shows means and standard errors of means for the analyzed countries for the years 2010 to 2015. We have made calculations for both the old and the new EU countries. The average number of SMEs per old state was 386002 with a standard error of ± 47160 . For the new states, the average number of SMEs was 122583 with a standard error of ± 18275 . The lowest number of SMEs in the old states was 9901.4 (Luxembourg) with a standard error of ± 2778.6 . The largest number was found in the old states in Italy 1.257E + 06 with a standard error of ± 398797 . For the new states, we found the smallest value of 8895.1 (Malta) with a standard error of ± 2776.3 and a maximum of 499236 (Poland) with a standard error of ± 159264 . We believe that the number of businesses seems to be related to the geographical size of the analyzed states. The average number of SMEs in the old member countries has more than three times the number in the new member countries. As the old Member States also have a higher average population, we believe that this will be related. We have not, however, evaluated this impact. However, such a calculation also brings with it some shortcomings. Take, for example, a number of countries with a very similar population: Belgium, Greece, Portugal, Czech Republic and Hungary. Despite the similar population, it seems that the number of SMEs is more different than we would expect. For example, in Hungary, it is only 173947 and in the Czech Republic up to 328605. Another example could be Denmark, Ireland, Finland and Slovakia, which have a similar population. However, when looking at the average number of SMEs, the differences are again greater than we would expect. While in Ireland it is only 14062, in Slovakia it is up to 133472. However, we have not discussed this topic in detail.

Table 2 shows the averages and their standard errors according to the size of SMEs in the old and new EU states, indicating the significance of the differences between SME1 to SME3, as well as between old and new states. We observed the largest number of enterprises over the monitored period with SME1. The lowest number we found for SME1 in 2010. It was 714788 with a standard error of ± 166505 . The highest abundance was 758058 with a standard error of ± 174420 in 2015. For SME2, we found the smallest number of businesses in 2013. It was 48073 with a standard error of ± 13405 . The largest number was 49209 with a standard error of ± 13736 in 2015. For SME3, we found the smallest number of businesses in 2013. It was 8356.6 with a standard error of ± 2134.2 . The largest number was 8675.6 with a standard error of ± 2224.2 in 2015.

Table 2 Means and standard errors of means for number of SMEs by size, for old and new EU countries and by years

Year	HistC		SME1		SME2		SME3			SME		F	SC
	State	n	\bar{y}	$s_{\bar{y}}$	\bar{y}	$s_{\bar{y}}$	\bar{y}	$s_{\bar{y}}$	N	\bar{y}	$s_{\bar{y}}$		
2010	1O	15	1.038E+06	272531	75236	22099	12504	3525.6	45	375281	113745		
	2N	13	341732	112790	17629	4286.7	3757.5	1164.9	39	121039	44530		
	Total	28	714788	166505	48490	13039	8443.1	2106.5	84	257240	65494	16.93	1:.(2,3)**
	t		2.36*	Satt	2.56		2.36*	Satt	F	3.88	FWelch	4.33*	
2011	1	15	1.042E+06	272459	76071	23060	12659	3640.0	45	377183	113935		
	2	13	344218	115987	17883	4538.3	3772.8	1163.4	39	121958	45489		
	Total	28	718468	167010	49055	13534	8533.5	2165.0	84	258686	65739	16.98	1:.(2,3)**
	t		2.36*	Satt	2.48*	Satt	2.33*	Satt	F	3.88	FWelch	4.33*	
2012	1	15	1.062E+06	278556	75150	22765	12482	3656.5	45	383152	116340		
	2	13	344940	115174	17815	4657.5	3729.0	1149.4	39	122162	45306		
	Total	28	728985	170368	48530	13369	8418.0	2166.2	84	261978	66965	16.84	1:.(2,3)**
	t		2.38*	Satt	2.47*	Satt	2.28*	Satt	F	3.91	FWelch	4.37*	
2013	1	15	1.081E+06	280091	74264	22904	12426	3596.0	45	389114	117586		
	2	13	341987	112481	17853	4750.9	3661.5	1112.7	39	121167	44461		
	Total	28	737701	171549	48073	13405	8356.6	2134.2	84	264710	67542	17.04	1:.(2,3)**
	t		2.45*	Satt	2.41*	Satt	2.33*	Satt	F	4.06*	FWelch	4.54*	
2014	1	15	1.089E+06	280876	75267	23296	12621	3669.5	45	392450	118160		
	2	13	348996	115410	17999	4839.4	3662.8	1124.1	39	123552	45544		
	Total	28	745674	172376	48678	13631	8461.8	2177.2	84	267605	67990	17.24	1:.(2,3)**
	t		2.44*	Satt	2.41*	Satt	2.33*	Satt	F	4.03*	FWelch	4.51*	
2015	1	15	1.107E+06	283931	76069	23455	13023	3736.5	45	398829	119710		
	2	13	354976	116768	18218	4938.3	3658.9	1124.5	39	125618	46163		
	Total	28	758058	174420	49209	13736	8675.6	2224.2	84	271981	68894	17.40	1:.(2,3)**
	t		2.45*	Satt	2.41*	Satt	2.40*	Satt	F	4.06*	FWelch	4.53*	

Source: Own processing based on Eurostat (2017)

From the comparison of the old and the new Member States for the sizes SME1, SME2 and SME3 we found that practically up to SME2 in 2010, the differences in numbers were statistically significant. When comparing SME1, SME2 and SME3 over the years, we have found that the number of SME1 enterprises is statistically high compared to the number of SMEs2 and SME3 in all the years under review.

The number of enterprises in the old as well as the new EU member states has risen practically with years, with the lowest value of the number of enterprises we have found in 2010. It was 257240 with a standard error of ± 65494 . The maximum number was 271981 with a standard error of ± 68894 in 2015. Using the analysis of variance, we found, that the number of enterprises in the old EU countries was statistically significantly higher than in the new countries.

From the point of view of the overall assessment and development of SMEs in Slovakia, we can say that their overall growth is only small compared to the pre-crisis period and Slovakia does not record any significant growth dynamics. There are several reasons for this, for example, deterioration of the business environment, increase of the tax burden and so on. Further development of SMEs requires a change of access in a number of areas, including a more efficient allocation of subsidy resources to support SMEs' competitiveness, growth and innovation. Help can be, for example, The National Business Center in charge of the Slovak Business Agency, whose project with an impact on individual regions is beginning to develop in Slovakia. It can also help the Center of better regulation to reduce the impact of legislation on the business environment. These solutions can bring further positive development of the number and scope of SME activity in Slovakia.

CONCLUSIONS

The position of small and medium enterprises of knowledge intensive services and their dynamics of growth in the EU economy and within the Slovak Republic can be monitored through performance indicators such as employment, number of enterprises and added value [1]. In our article, we focused mainly on the analysis of the number of enterprises in European Union in 2010 - 2015 and the comparison between old and new EU member states. The increasing number of SMEs is important for a number of reasons. One example is the fact that new SMEs generate new jobs. It is clear from the above findings that there are still significant differences between the primary and the new member countries in the area of SME development, new member countries are still lagging behind. For future investigations, it might be interesting to take into account the number of inhabitants in each country. Even more interesting would be the comparison of countries in terms of innovation activities of SMEs, since innovation is one of the most important factors of competitiveness. However, in the article, we have not explored innovative business activities, but we believe that the differences between the new and old EU states are also in this area. The new member states are composed mainly of Eastern Bloc countries that have experienced the transition from command to market economy. These effects are still perceptible and therefore the results are expected. An exception is not Slovakia, whose innovation activity and innovation performance of SMEs is on the imaginary "tail" within the EU.

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