

ASSOCIATION OF INNOVATIONS WITH THE ENTERPRISE GROUP MEMBERSHIP

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Abstract: *The presented contribution processes data from Community Innovation Survey (CIS) in the Czechia concerning the survey structure, which reports about enterprise innovations that could be grouped to technical (product and process) innovations and non-technical (marketing and organisational) innovations. Besides, the information about a status of an enterprise is recorded as well, dividing surveyed companies into two groups - individual enterprises or enterprises with group membership (mostly international). The statistical processing of data from two CIS periods (2010, 2012) verifies that membership in a group of enterprises has a positive influence on the amount of innovation activity. In this contribution, the authors discuss methodological aspects of the approach using statistics.*

Keywords: *innovation, association, enterprises, data processing, statistics*

JEL classification: *O3, O32, Q5*

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Introduction

Nowadays the innovation is said to be a key to increasing the economic growth, sustain competitiveness and create new jobs. There are many different definitions of “innovation”, each of them emphasising a different aspect of innovation, e.g. level, type, character (Edison, Bin Ali & Torkar, 2013; Mathiassen, & Pourkomeylian, 2003). Oslo manual (OECD/EUROSTAT, 2005) defines four basic types of innovation. Product innovation is a good or service that is new or significantly improved; process innovation represents a new or significantly improved production or delivery method. Marketing innovation stands for a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing, and organisational innovation is a new organisational method in business practices, workplace organisation or external relations. Generally, in entrepreneurship context, innovations are treated as something new with added value to company’s performance helping to increase its competitiveness on the (regional) market.

Innovations are closely related to research and development (R&D), which could be conducted internally by an enterprise itself, or externally through cooperation with universities, research institutions or laboratories. Innovations are also tied with the theories such as industry clusters, knowledge spillovers or regional innovation network system, which is stimulating for growth and innovation from an individual business perspective and a regional perspective (Pászto, Vaculík, & Švarcová, 2017; Sternberg, 2000; Cooke, 1992). According to Felder et al. (1996), R&D activities are

concentrated within the mother company, where central R&D departments develop and design new products for the whole group; and daughter companies receive the knowledge necessary for innovation through internal technology transfer. Therefore, companies that are members of large (international) groups should be more likely to introduce innovations. However, Tabas et al. (2014), argue that, in the case of Czechia, it is common practice that a mother company is drawing the resources of its daughter companies. As a consequence, daughter companies have to face the lack of resources for financing innovations.

Although Edison et al. (2013) argue that the innovations are hard to describe, evaluate, and analyse due to data insufficiency (among other factors), one of the most used methods for acquiring desired data about innovations is questionnaire survey (e.g. Kirton, 1976; Maillat, Quévit and Senn, 1993, Sternberg, 2000). Dobesova, Pászto, Macku (2017) detected similarities of innovation by a coefficient of similarity. In this paper, a questionnaire-based survey called Community Innovation Survey conducted by the European Union was used in order to assess the main objective - to compare the differences between the enterprise group membership and individual enterprises according to the amount and types of innovations.

1 Data

In this work, the two dataset from the Community Innovation Survey (CIS) were used. The first dataset was from the fifth period (2008-2010) and second data set was from the six period (2010-2012). This survey is carried out by all EU member states. CIS uses harmonised questionnaire (EUROSTAT, 2012). The dataset for Czechia referring to various innovations was taken (ČSÚ, 2013). Data for CIS 2010 were gathered in 2011 by a questionnaire sent to all enterprises with ten or more employees, stratified by size and economic activity. In total 5,151 responses, representing 21 % of the total statistical population, were received with 83% return rate of useful answers. Data for CIS 2012 were gathered in 2013. This survey had 5, 449 responses with 80% return rate (Vaculík et al., 2017).

The enterprise innovations are reported in two groups of indicators: technical (product and process) innovations and non-technical (marketing and organisational) innovations. The technical innovations are reported by two product indicators concerning innovation of final products (INPDGD) or service (INPDSV). Next three technical process indicators reported about an improvement of producing (INPSPD), supplies and distribution of products (INPSLG), and change of accounting and information systems (INPSSU). The non-technical innovations are reported by four marketing indicators (new design of packaging of products - MKTDGP, advertisements - MKTPDP, licensing and franchising - MKTPDL, and product pricing - MKTPRI) and by three organisational indicators (internal business practices - ORGBUP, new internal workflow methods - ORGWKP, and external change of relationships - ORGEXR). A total number of innovation indicators was 12.

2 Methodology

This chapter describes the main methodological steps of data processing. Firstly, the share of individual enterprises with group membership in both CIS surveys are presented. Secondly, the rank and the most frequent countries according to the main headquarters seat is ordered. Finally, a detailed comparison of each type of innovation is presented and main differences in partial innovations are pointed out. All data processing was made in MS Access database by SQL queries.

2.1 Statistical evaluation of input data

Totally, 5,151 enterprises responded in CIS 2010, and totally 5,449 enterprises responded in CIS 2012. The number of responses is slightly higher in 2012. The number of enterprises answering that are members of a group of enterprises (indicator GP=Yes), were 1,880 in 2010 and 2,057 in 2012. The amount of individual enterprises is higher in both surveys (indicator GP=No). For better comparison, the share of firms (in %) in mentioned indicator GP is calculated. In both cases around 37 % (the difference is only 1.3 % between surveys, see Tab. 1) enterprises indicated a group membership.

TAB. 1: Input data and portion of the group membership enterprises in 2010 and 2012

	CIS 2010		CIS 2012	
Group membership	Number of enterprises	The portion of total count [%]	Number of enterprises	The portion of total Count [%]
Yes	1,880	36.5	2,057	37.8
No	3,271	63.5	3,392	62.2
Total number of enterprises	5,151	100	5,449	100

In the next step, list of business that belongs to a group of enterprises was created based on the country origin of their mother company (Tab. 2). In most cases for both surveys, the mother company of a group was located in Czechia (649 in 2010 and 714 in 2012). In percents, this equals approximately to 35 % of all businesses that belong to a group of enterprises for both survey periods. The second biggest number of mother companies were located in Germany (19 %), followed by Austria (6 %). In case of Germany, it is a result of the strong German-Czech economic relationship.

TAB. 2: The countries according to the main office of the enterprise group

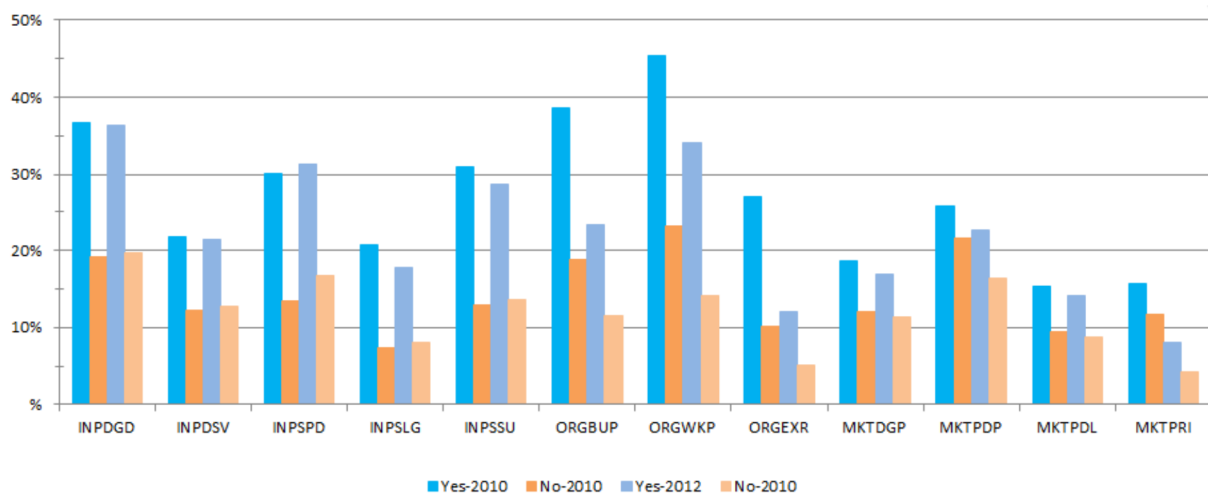
	CIS 2010			CIS 2012		
Rank	Country	Count of entr.	Portion [%]	Country	Count of entr.	Portion [%]
1	CZ	649	34.5	CZ	714	34.7
2	DE	364	19.4	DE	392	19.1
3	AT	114	6.1	AT	125	6.1
4	FR	109	5.8	US	122	5.9
5	US	104	5.5	NL	109	5.3
6	NL	85	4.5	FR	107	5.2
7	GB	58	3.1	GB	55	2.7
8	CH	49	2.6	CH	49	2.4
9	JP	44	2.3	JP	47	2.3
10	BE	40	2.1	IT	40	1.9
11	SK	31	1.6	BE	39	1.9
12	IT	29	1.5	SK	30	1.5
13	SE	25	1.3	SE	27	1.3
14	ES	19	1.0	LU	22	1.1
15	DK	14	0.7	CY	21	1.0
16	LU	14	0.7	ES	21	1.0
17	CY	13	0.7	PL	17	0.8
18	PL	13	0.7	DK	15	0.7
19	KR	12	0.6	IE	13	0.6
20	FI	11	0.6	FI	12	0.6

France, USA and Netherlands were placed between a fourth and sixth position in both years; each country being the main residence of roughly 4 to 5% of mother companies. Positions from first up to 12th are occupied by the same countries in both years, with only small differences in order after the 3rd position. Given this fact, we can deduct that the situation - country origin of mother companies of enterprises operating in Czechia - does not change dramatically over the survey periods and almost remains the same. Because of the historical bonds, it is worth mentioning the number of mother companies located in Slovakia (SK) - over 30 enterprises - which places this state at the 11th and 12th place respectively. It is also interesting that there has been a rise in business with its mother company residing on Cyprus (CY), which is known as one of the European tax havens. Whereas it was 13 enterprises in 2010, the number of business has almost doubled to 21 in 2012 (causing Cyprus to move from 17th to 15th position in ranking).

2.2 A detailed comparison of partial innovation indicators in relation to group membership

In this part, a comparison of all 12 innovation indicators is made. For each type of 12 innovations, the total count of enterprises that recorded the innovations was calculated. Again, the share of individual innovation indicators was calculated in order to comprehensively compare the results in both survey years (Tab. 3). It is obvious from the Tab. 3 that the share of innovations of all twelve indicators is higher in both surveys when the company indicates the membership in a group of enterprises. It is also evident from the Fig. 1 that in many individual innovation indicators the share of innovations is almost doubled when a company is a member of a group of enterprises (difference between being “Yes”, i.e. blue colour bars, and “No”, i.e. orange colour bars, answers in both surveys).

FIG. 2: Number of enterprises (in %) by innovation indicators in 2010 and 2012



For instance in 2010, the indicator **INPSPD** (significant improvements in the production process, products or services) reached 30.1% in group membership companies, which is almost two times more than in case of individual enterprises (13.4%). The maximal share of innovating companies with group membership in 2010 was recorded for indicator **ORGWKP** (an innovation of work organization methods, responsibility and decision-making) reaching 45.3% (in bold in Tab. 3). The same indicator was the second greatest regarding innovations share in 2012 (34.1%), after the **INPDGD** (new or significantly changed product) with 36.4%. It is evident that enterprises with group membership

require a new system of responsible employees, teamwork, decentralization (powers transferred from higher system components to lower ones) or education system more than individual enterprises.

The minimum number is 7.4% (red number) for indicator **INPSLG** (an innovation of logistics, delivery or distribution method for products, services, or inputs) for individual enterprises in 2010. It means a very low requirement of logistics improvement in such companies. At the same time, this indicator represents the one with the greatest difference between the share of innovating individual enterprises and enterprises with group membership in given year (2010).

TAB. 3: Comparison of innovation activities of individual enterprises and group membership enterprises in 2010 and 2012

		Year	2010				2012			
		Group Member	Yes		No		Yes		No	
		Type of Innovation	Total	%	Total	%	Total	%	Total	%
Technical innovations	Product	INPDGD	689	36.6	629	19.2	749	36.4	665	19.6
		INPDSV	410	21.8	397	12.1	440	21.4	435	12.8
	Process	INPSPD	566	30.1	439	13.4	644	31.3	568	16.7
		INPSLG	391	20.8	241	7.4	366	17.8	275	8.1
		INPSSU	583	31.0	423	12.9	591	28.7	464	13.7
Non-technical innovations	Organisational	ORGBUP	725	38.5	618	18.9	481	23.4	393	11.6
		ORGWKP	852	45.3	757	23.1	702	34.1	480	14.2
		ORGEXR	507	26.9	329	10.1	246	12.0	173	5.1
	Marketing	MKTDGP	352	18.7	395	12.1	348	16.9	387	11.4
		MKTPDP	484	25.7	708	21.6	467	22.7	557	16.4
		MKTPDL	288	15.3	309	9.4	289	14.0	298	8.8
		MKTPRI	294	15.6	383	11.7	167	8.1	143	4.2

Worth noting is a relatively high number of innovations in both years for the indicator **INPDGD** (new or significantly changed product). In percents, it exceeds 36 % for enterprises with group membership contrary to much lower 19% for individual enterprises. Again, this confirms that enterprise innovates more if it belongs to a group of enterprises. Despite the fact that individual enterprises make fewer innovations for this indicator than enterprises belonging to a group, among individual enterprises only, the indicator INPDGD had the most innovations in the year 2012. This indicates that individual enterprises favour innovating products over other types of innovations. The lowest share rate in 2010 among enterprises with group membership is in indicator **MKTPDL** (new product placement or sales method - franchising or distribution of licenses, direct sales, a new concept for product introduction), which is only 15.3%. In this case, we assume that marketing innovations are not dealt by enterprises themselves but rather centrally in a consortium (or mother company) respective department. However, this indicator (**MKTPDL**) has a low percentage share in case of individual companies as well (9.4%); similarly, in 2012. The lowest values in 2012 expressed the indicator **MKTPRI** (new system in product or service pricing - different prices according to demand, discount system) with 8.1% share in case of enterprises with group membership, and with

4.2% share in case of individual enterprises. Product pricing seems to have higher demands on data-analytical processes (e.g. data mining, statistical inferences, market survey), which is rather out of individual enterprises capabilities since they have limited time, expert and financial capacities.

Conclusion and discussion

This paper explores the results of Community Innovation Survey from 2010 and 2012 focusing on the enterprises group membership and the possible influence of the membership on their innovation activity. The basic statistical evaluation proved that there is an influence of group membership on the amount of innovations, in a positive manner, i.e. higher innovation activity of enterprises with group membership. Namely, the organisational innovation (where the differences are most visible) is more frequent for enterprises with group membership than for individual enterprises. The same observation could be made in all groups of innovations. It is supposed, that benefits of being a member of a bigger group of enterprises lie in the centralised innovation activities. For instance, it is more likely that marketing innovations will be governed by a mother company in order to maintain the same corporate identity (or the identity of the products). Therefore, surveyed enterprises indicated more innovations as they are driven by innovation policies defined by a mother company. This leads us to a limitation of the CIS dataset - in general, the sample of respondents (enterprises) is somehow limited and could not represent the overall status quo in a business environment in Czechia. On the other hand, there is no other dataset available with such level-of-detail. This paper represents the kick-off contribution to the topic of innovation activities related to an enterprise group membership. In future, we will examine the dataset with stress on the overall economical and geographical context.

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