ANALYSIS OF INNOVATION PROCESSES IN SLOVAKIA 2006 - 2008

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Abstract

The Community Innovation Survey (CIS) 2008 is a survey of innovation activities of enterprises in the EU Member States. The survey collects the information about the product and process innovation as well as organisational and marketing innovation and other key variables during the three-year period from 2006 to 2008 inclusive. The aim of this paper is to analyse innovation processes in Slovakia according to various factors; for example by region, sector, size of enterprise, productivity of labour and so on. Various statistical methods (e.g. contingency tables, logistic regression) are explored for this purpose. The basic results are: (1) the ratio of enterprises with technological and non-technological innovation activities were 33.6% of all enterprises, (2) rate of innovation activity vary depending on analysing factors.

Key words: The Community Innovation Survey (CIS) 2008, Innovation, Slovak Republic, Statistical methods, Logistic regression.

JEL Code: C10, D22, O31

Introduction

The value of innovation for all EU countries, and for Slovakia too, was pertinently formulated in prologue of communication from the European Commission to the European Parliament and its committees in October 2010 (European Commission, 2010, p. 1): *"At a time of public budget constraints, major demographic changes and increasing global competition, Europe's competitiveness, our capacity to create millions of new jobs to replace those lost in the crisis and, overall, our future standard of living depends on our ability to drive innovation in products, services, business and social processes and models. This is why innovation has been placed at the heart of the Europe 2020 strategy. Innovation is also our best means of successfully tackling major societal challenges, such as climate change, energy and resource scarcity, health and ageing, which are becoming more urgent by the day."*

The founder of modern theory of innovation was Joseph A. Schumpeter[1] (1934). He identified innovation as the critical dimension of economic change. He argued that economic change revolves around innovation, entrepreneurial activities and market power. He pointed out first, that the role of innovator is vitally important for economy.

Following Schumpeter, contributors to the scholarly literature on innovation typically distinguish between *invention*, an idea made manifest, and *innovation*, ideas applied successfully in practice (e.g. Braunerhjelm & Svensson, 2010). In economics the change must increase value, customer value, or producer value. The goal of innovation is positive change, to make someone or something better. Innovation and the introduction of it that leads to increased productivity is a fundamental source of increasing wealth in an economy.

Peter F. Drucker[2] (1993, p. 7) asserted *"Innovation and entrepreneurship are purposeful tasks that can and should be organized."* He proposed (2003) seven sources of innovative opportunity. Four exist within a company or industry (1. unexpected events, 2. incongruities between the expected and the actual, 3. new process requirements, 4. unanticipated changes in industry or market structure) and three exist outside a company in its social and intellectual environment (5. demographic changes, 6. changes in perception, mood, or meaning, 7. new knowledge).

Functional sources of innovation investigated Eric von Hippel (1988). He proposed and tested implication of replacing manufacturer-as-innovator assumption with a view of the innovation process as predictably distributed across users, manufacturers, suppliers, and others. He presented in series of studies that the sources of innovation vary greatly and reasons for such differences varied from industry to industry.

Historically, most scholars and managers equated innovation primarily with the development of new products and new technologies. But increasingly, innovation is seen as applying to the development of new service offerings, business models, pricing plans and routes to market, as well as new management practices.

Based on theory of innovation, the third Oslo Manual (OECD, 2005, p. 46) defines innovation as "*the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organisation or external relations."* Of notes, an innovation does not

[1] Joseph A. Schumpeter (1883 - 1950), Moravian-born American economist and sociologist known for his theories of capitalist development and business cycles. He wrote basic ideas about innovation in book *Theorie der wirtschaftlichen Entwicklung*, 1911.

[2] Peter F. Drucker (1909 - 2005), Austrian-born writer, management consultant, and self-described "social ecologist". He has had a distinguished career as a teacher - professor of management in US.

need to be a world first or even to have been developed by the firm. The Oslo Manual states that: "*The minimum requirement for an innovation is that the product, process, marketing method or organisational method must be new (or significantly improved) to the firm. This includes products, processes and methods that firms are the first to develop and those that have been adopted from other firms or organisations.*"

1 Methodology

1.1 Problem background

Innovation is a complicated process of applying new ideas for gainful purpose. The types, quality and quantity of innovation in organizations depend on both its internal and external environment. Changes in the external environment give impetus to organizations to innovate. Innovative concepts and products of organizations in turn diffuse into the external environment. The interplay between the two environments has produced a body of knowledge both in economics and strategic management. The external environment can be subdivided into sectors such as politics, economics, society, technology, nature. The internal environment is typically described by its organizational structure, resources, climate and culture (Tang, 1998).

Based on CIS data, we can identify only some of external and internal factors of innovation[3]. It is possible to analyze, if the innovative activities depend on such external factors as for example: size of the enterprise, branches of economic activity, region, and also some internal factors, such as legal form or type of the ownership.

Based on the innovation theory and different case studies about innovations compiled in different countries in the world and in the EU, we state several hypotheses about internal and external factors (determinants) of innovative processes in Slovakia.

- **H1:** Enterprises with some innovation activity show significantly higher productivity (factor PP08). (*Note:* Productivity (PP08) was measured as the ratio between total turnover for given annual period and number of employees in the enterprise.)
- **H2:** There is a higher probability that the big enterprise innovates in comparison to the other size categories (factor: size).
- **H3:** Probability of innovation is different depending on the branch of economic activity (factor: sector).

[3] That is why the additional selective inquiries focused on other areas are carried out in the EU countries frequently (R&D investments, organizational innovations etc.).

- **H4:** Probability of innovation is different depending on the geographical placement of the enterprise (factor: region).
- **H5:** Probability of innovation is different depending on legal form of the enterprise (factor: legal form).
- **H6:** Probability of innovation depends on type of enterprise ownership (factor: ownership).
- **H7:** Probability of innovation is higher once the enterprise belongs to certain group (factor: group).

With application of the different statistical methods on CIS 2008 data, we tried to verify the hypothesis and the results are presented in this article. First we used simple frequency and contingency tables that enabled us to compute the probabilities and conditional probabilities for innovation activities of the Slovak enterprises based on individual factors. However, such tables did not provide the evaluation of reviewed differences with statistical significance. Therefore we further applied the model of logistic regression, that enabled us to quantify the impact of all factors (input variables) on the dependent (target) binary variable INOV2 at once. Logistic regression quantifies the impact of individual factors and tests their significance. All statistical computations were performed in the SAS Enterprise Guide 4.2 system and some additionally also in the MS Excel 2007.

1.2 Definition of innovation in CIS 2008

Since 2008, definition of innovation activities for CIS was extended with non-technological innovations according to the revised Oslo manual (3rd edition from 2005). *An innovation is the introduction of a new or significantly improved product, process, organisational method, or marketing method by enterprise.*

This definition of innovation covered 14 variables (questions) in Slovak CIS 2008 questionnaire *Inov 1-99*. If the enterprise answered "yes = 1" at least one time in these 14 questions, then the enterprise had have innovation activity. We created the new derived binary variable for innovation, namely INOV2 (1 – event (innovation "yes"), 0 – non-event (innovation "no")). Enterprises that have had any kind of innovation activity (14 variables):

- introduced new or significantly improved products (2 variables),
- introduced new or significantly improved process (3 variables),
- ongoing or abandoned innovation activities for product and process (2 variables),
- implemented new organisational method (3 variables),
- implemented new marketing concept or strategy (4 variables).

The technological innovations (T) cover first 7 variables and the non-technological innovations (NT) cover last 7 variables.

1.3 The methodology of the statistical survey on innovation in Slovakia

The methodology of the statistical survey on innovation in Slovakia was harmonized with the Fourth Community Innovation Survey (CIS 2008 or CIS 8) of the EU member states. The innovation survey was carried out in 3 239 reporting units (Slovak enterprises). The sample corresponds to the 26.6% of the target population. The response rate was 70.9% counted from filled in questionnaires. The data CIS 2008 contains 2 296 statistical units. The presented results are weighted figures, grossed-up for the whole target population of 11 761 Slovak enterprises. The weighting factors were based on shares between the numbers of enterprises in the realised sample and total number of enterprises in each stratum of the frame population.

Statistical unit was the enterprise. The set of reporting units was created from the official statistical business register by combination on an exhaustive survey and a stratified sample survey in particular branches of economic activity. Enterprises with 10 and more employees were included into the survey. The breakdown of enterprises by size class is in the following table (Tab. 1).

Tab. 1: Size of enterprises in survey CIS 2008

Size of enterprises	**Numbers of employees**	**Frequency in sample**	**Percent in sample**	**Frequency in population**	**Percent in population**
small enterprises	10 - 49	1139	49.61%	9404	79.96%
medium enterprises	50 - 249	738	32.14%	1887	16.04%
large enterprises	250 and more	419	18.25%	470	4.00%
Total		**2296**	**100.00%**	**11761**	**100.00%**

Source: Innovation activity of enterprises in the SR 2006-2008, p. 6 and own calculations

According to the Eurostat methodology the survey covered all enterprises with main economic activity in the branches of industry, construction and services by the table (Tab. 2).

The sample was created by using a simple random selection in each stratum defined by size class according to the number of employees and economic activity. The regional allocation of units in the sample was also taken into consideration when sampling that allowed presentation of results in regional view. Data are presented in the table for four regions of NUTS 2 classification (Tab. 3).

Tab. 2: NACE[4] - branches of economic activity of survey enterprises

Sections of NACE Rev. 2 classification	NACE Rev.2	NACE coding	Frequency in sample	Percent in sample	Freq. in population	Perc. in population
mining and quarrying	05 - 09	**B**	47	2.05%	62	0.53%
manufacturing	10 - 33	**C**	824	35.89%	4662	39.64%
electricity, gas, steam and air conditioning supply	35	**D**	103	4.49%	148	1.26%
water supply; sewerage, waste management and remediation activities	36 - 39	**E**	78	3.40%	165	1.40%
construction	41 - 43	**F**	424	18.47%	2087	17.75%
wholesale trade, except of motor vehicles and motorcycles	46	**G**	421	18.34%	2724	23.16%
transportation and storage	49 - 53	**H**	150	6.53%	801	6.81%
publishing activities	58	**J**	98	4.27%	479	4.07%
telecommunications	61					
computer programming, consultancy and related activities	62					
information services activities	63					
financial and insurance activities	64 - 66	**K**	78	3.40%	164	1.39%
architectural and engineering activities; technical testing and analysis	71	**M**	73	3.18%	469	3.99%
scientific research and development	72					
Total			**2296**	**100.00%**	**11761**	**100.00%**

Source: Innovation activity of enterprises in the SR 2006-2008, p. 6 and own calculations

Tab. 3: Slovak regions by NUTS 2 classification

Code	Slovak regions by NUTS 2	Slovak districts	Frequency in sample	Percent in sample	Freq. in population	Perc. in population
SK01	Region of Bratislava	1-Bratislava	409	17.81%	2449	20.82%
SK02	West of Slovakia	2-Trnava 3-Trenčín 4-Nitra	878	38.24%	4106	34.91%
SK03	Middle of Slovakia	5-Žilina 6-B. Bystrica	558	24.30%	2701	22.97%
SK04	East of Slovakia	7-Prešov 8-Košice	451	19.64%	2505	21.30%
	Total		**2296**	**100.00%**	**11761**	**100.00%**

Source: Innovation activity of enterprises in the SR 2006-2008, p. 7 and own calculations

[4] **NACE** - *Nomenclature statistique des Activités économiques de la Communauté Européenne* (Statistical Classification of Economic Activities in the European Community).

2 Results of statistical analysis

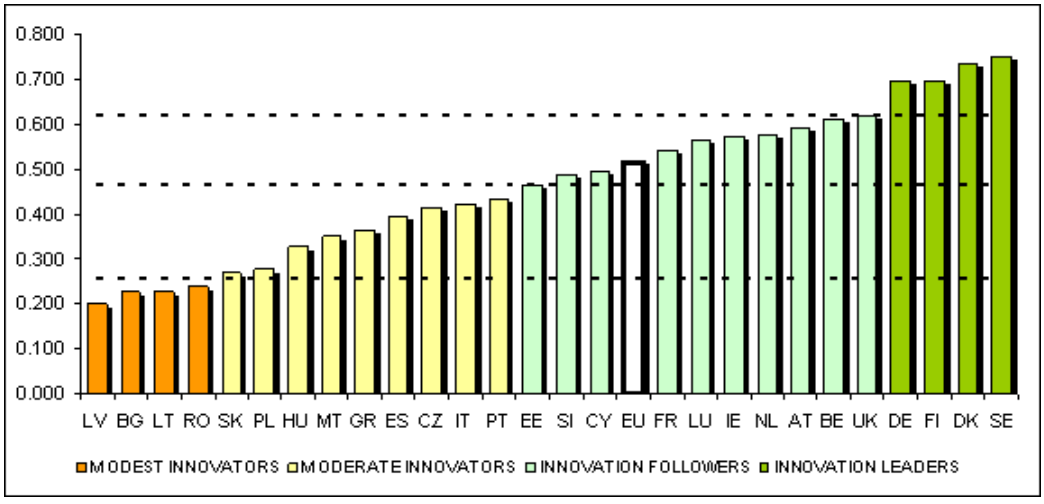
2.1 Basic results

We present the basic results of innovation activities in Slovak enterprises in the following tables (Tab. 4 - Tab. 13[5]). The proportion of Slovak enterprises which have had innovation activity from all enterprises was 33.58%. (949 enterprises in sample, 3950 in population). The proportion of Slovak enterprises which have not had innovation activity was 66.42% (1347 in sample, 7811 in population). In comparison to the CIS 2006 results, innovation activities increased by 11 percent points. (from 25.1% to 36.1%[6]).

According to CIS 2008 (Eurostat, 2011), the innovation activity in industry and services was reported by 51.6% of enterprises in the EU27 (excluding Greece) between 2006 and 2008. Of the EU27 Member States, the highest figures were recorded in Germany (79.9%) and Luxembourg (64.7%) and the lowest rates were observed in Latvia (24.3%), Poland (27.9%) and Hungary (28.9%).

Slovakia belongs to moderate innovators by Innovation Union Scoreboard 2010 (IUS, 2010). This ranking is based on average innovation performance across 24 indicators. The Member States fall into four performance groups: 1. innovation leaders, 2. innovation followers, 3. moderate innovators and 4. modest innovators (Fig. 1).

Fig. 1: EU member states' innovation performance



Source: Innovation Union Scoreboard 2010, p. 4

[5] Sources for all following tables are own calculations based on Slovak CIS 2008 microdata.
[6] Comparable stats by CIS 2006 data is figure 36.1% and no 33.58%, because the definition of innovation was modified for CIS 2008 (SOSR, 2010 and Eurostat, 2011).

In Slovakia there have been innovations mostly within those enterprises, which belonged to certain group[7] (50.46%, Tab. 5). When we look at the innovative activities by size of the company (Tab. 6), major innovations were performed by large enterprises (67.81%), then by middle enterprises (46.6%) and least by small enterprises (29.26%).

From the regional point of view (Tab. 7), major innovations were performed by entities in the Middle of Slovakia (SK03 - 41.11%), namely in district 6 - Žilina (46.21% in Tab. 8). The least innovations were present in the West of Slovakia (SK02 - 25.57%), namely in district 3 - Trenčín (22.47% in Tab. 8).

Tab. 4: Innovation activity in Slovak enterprises

Innovation (INOV2)	Frequency	Percent
0 - no	7811	66.42%
1 - yes	3950	**33.58%**
Total	**11761**	**100.00%**

Tab. 5: Innovation activity by group of enterprises

Group (AQ7308)	Innovation (INOV2)		
	0 - no	1 - yes	Total
1-yes	49.54%	**50.46%**	100%
2-no	70.82%	29.18%	100%
Total	**66.42%**	**33.58%**	**100%**

Tab. 6: Innovation activity by size of Slovak enterprises

Size of enterprises (velkost_kat_08)	Innovation (INOV2)		
	0 - no	1 - yes	Total
1 - small	70.74%	29.26%	100%
2 - middle	53.40%	46.60%	100%
3 - large	32.19%	67.81%	100%
Total	**66.42%**	**33.58%**	**100%**

Tab. 7: Innovation activity by 4 regions

Region NUTS 2 (OBLAST)	Innovation (INOV2)		
	0 - no	1 - yes	Total
SK01	59.17%	40.83%	100%
SK02	74.43%	25.57%	100%
SK03	58.89%	**41.11%**	100%
SK04	68.49%	31.51%	100%
Total	**66.42%**	**33.58%**	**100%**

Tab. 8: Innovation activity by 8 districts

District (KRAJ96)	Innovation (INOV2)		
	0 - no	1 - yes	Total
1	59.17%	40.83%	100%
2	70.08%	29.92%	100%
3	77.53%	22.47%	100%
4	75.99%	24.01%	100%
5	63.41%	36.59%	100%
6	53.79%	**46.21%**	100%
7	70.36%	29.64%	100%
8	65.67%	34.33%	100%
Total	**66.42%**	**33.58%**	**100%**

Tab. 9: Innovation activity by branches of economic activity NACE Rev. 2

Branch (SKNACE1)	Innovation (INOV2)		
	0 - no	1 - yes	Total
B	62.90%	37.10%	100%
C	62.75%	37.25%	100%
D	66.60%	33.40%	100%
E	65.62%	34.38%	100%
F	78.16%	21.84%	100%
G	67.69%	32.31%	100%
H	73.95%	26.05%	100%
J	45.02%	**54.98%**	100%
K	48.03%	51.97%	100%
M	59.30%	40.70%	100%
Total	**66.42%**	**33.58%**	**100%**

[7] The group of enterprises consist of two or more independent legal entities in collective ownership.

By branches of economic activity (Tab. 9), there was the highest innovation activity in the sector J – Information and Communication, up to 54.98% and vice versa, there was the lowest activity in the sector F – Construction, only 21.84%.

By the type of ownership (Tab. 10), the innovations were performed mainly in those companies that were controlled by international shareholders (49.42%). Slovak enterprises with domestic Slovak ownership or with other[8] ownership have not innovated at all.

By the legal form (

Tab. **12**), the innovations were followed mostly within the joint stock companies (52.85%), whereas the limited liabilities and the companies of other legal forms have not performed any innovations.

Innovating Slovak enterprises have placed their products mostly on foreign markets (59.01%), and those that were without innovations, aimed their production mainly to domestic market (75.3%, in Tab. 11).

Tab. 10: Innovation activity by ownership

Ownership (DRVLST_4kat)	Innovation (INOV2)		
	0 - no	1 - yes	Total
1-private inland	69.62%	30.38%	100%
2-foreing	56.89%	43.11%	100%
3-international	50.58%	**49.42%**	100%
4-other	71.09%	28.91%	100%
Total	**66.42%**	**33.58%**	**100%**

Tab. 11: Innovation activity by realisation market of production

Market (AR3053)	Innovation (INOV2)		
	0 - no	1 - yes	Total
3-regional	75.30%	24.70%	100%
4-national	60.44%	39.56%	100%
5-EU countries	64.99%	35.01%	100%
6-others	40.99%	**59.01%**	100%
Total	**65.94%**	**34.06%**	**100%**
Frequency Missing = 344 (3%)			

Tab. 12: Innovation activity by legal form of enterprises

Legal form (FORMA_3kat)	Innovation (INOV2)		
	0 - no	1 - yes	Total
1-limited liability (s.r.o.)	69.08%	30.92%	100%
2-joint stock company (a.s.)	47.15%	**52.85%**	100%
3-other	70.15%	29.85%	100%
Total	**66.42%**	**33.58%**	**100%**

The proportion of enterprises, that have not innovated at all, was 66.42%. The companies that performed only one type of innovation (only technological (T) or only non-technological (NT)) amounted to 19.74% (Tab. 13). The companies that introduced both types of innovations were 13.84%.

[8] Ownership 4 - other covers cooperative, state and municipality ownership.

Tab. 13: Technological (T) and non-technological (NT) innovations

Incidence of technological (T) and non-technological (NT) innovations	Frequency in sample	Percent in sample	Freq. in population	Perc. in population
0 - (no T and no NT)	1347	58.67%	7811	66.42%
1 - (T or NT)	462	20.12%	2321	**19.74%**
2 - (T and NT)	487	21.21%	1628	**13.84%**
Total	**2296**	**100.00%**	**11761**	**100.00%**

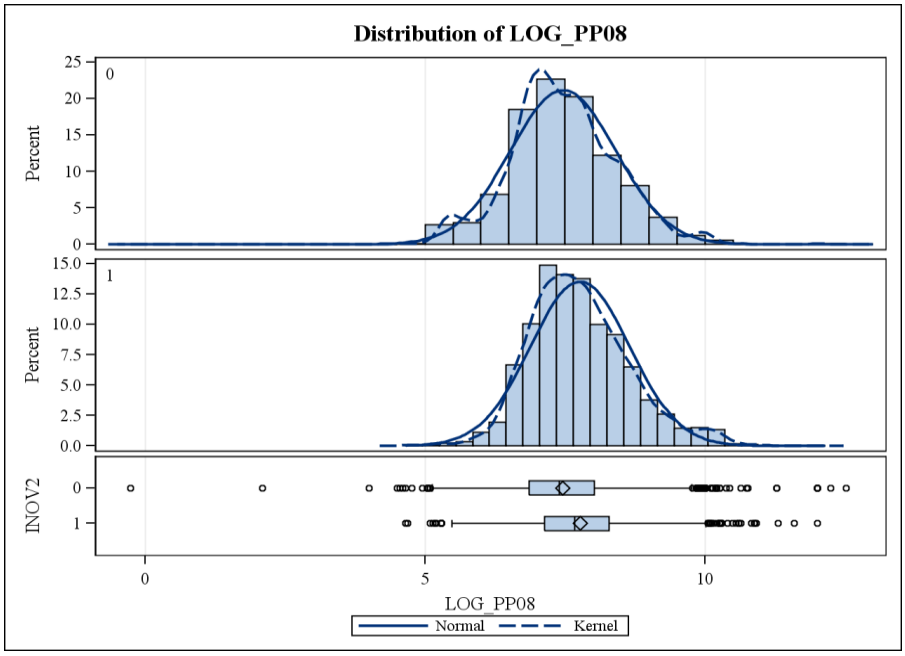
2.2 Productivity of labour by innovation activity

Theory says that entities with the innovation activity, reach the higher profit (E. von Hippel, 1988) and higher productivity than entities without innovations (see for example Braunerhjelm, 2010). Our analysis has confirmed this hypothesis in Slovakia too.

In order to use the t-test, the skewness of the analyzed variable has been adjusted by logarithmic transformation. Productivity of labour has been set as the ratio between total turnover divided by total number of employees. By this transformation, the new variable LOG_PP08 was created.

We can see on the figure (Fig. 2), that distribution of variable LOG_PP08 for enterprises with innovation activity (INOV2=1) is moved to higher values. Results of t-test validated (t-statistic = -16.81, p-value <.0001), that productivity of labour was significantly higher in enterprises with innovation activity compare enterprises without innovation.

Fig. 2: Distribution of productivity of labour (LOG_PP08) by innovation activity (INOV2)



Source: t-test output from SAS Enterprise Guide 4.2

2.3 Logistic regression model: factors influencing innovation activity

Results of logistic regression are in table (Tab. 14) and chart (Fig. 3). We modelled binary target variable INOV2, namely value 1 - event (innovation "yes") depending on seven explanatory variables (inputs). Only one input is numerical (LOG_PP08) and the remainder six input variables are categorical. We use reference coding for these input categorical variables (CLASS variables). Reference category for input variables was the category with the higher conditional probability in contingency tables by factors (Tab. 5 -
Tab. **12**). Quality of logistic model was relatively satisfying (ROC index c = 0.709).

The table (Tab. 14) gives regression results for the factors that influence whether or not a Slovak firm performs innovation activities. We can see that all considered determinants (factors) were significant (all $p < .0001$). Size of Wald chi-square statistics means the importance of factor variable to target variable INOV2. The highest value reached the factor variable sector (labelled as SKNACE1, Wald Chi-Square = 275.8). The lowest value of Wald Chi-Square is 22.9 which reached variable AQ7308 (i.e. business firm belongs to group). It means that our basic hypotheses H1 – H7 were validated.

Tab. 14: Signification of variables in logistic model

Type 3 Analysis of Effects			
Effect	**DF**	**Wald Chi-Square**	**Pr > ChiSq**
Sector - SKNACE1	9	275.8	<.0001
Productivity - LOG_PP08	1	198.3	<.0001
Region - OBLAST	3	197.3	<.0001
Size - velkost_kat_08	2	120.2	<.0001
Legal form - FORMA_3kat	2	42.9	<.0001
Ownership - DRVLST_4kat	3	26.7	<.0001
Group - AQ7308	1	22.9	<.0001

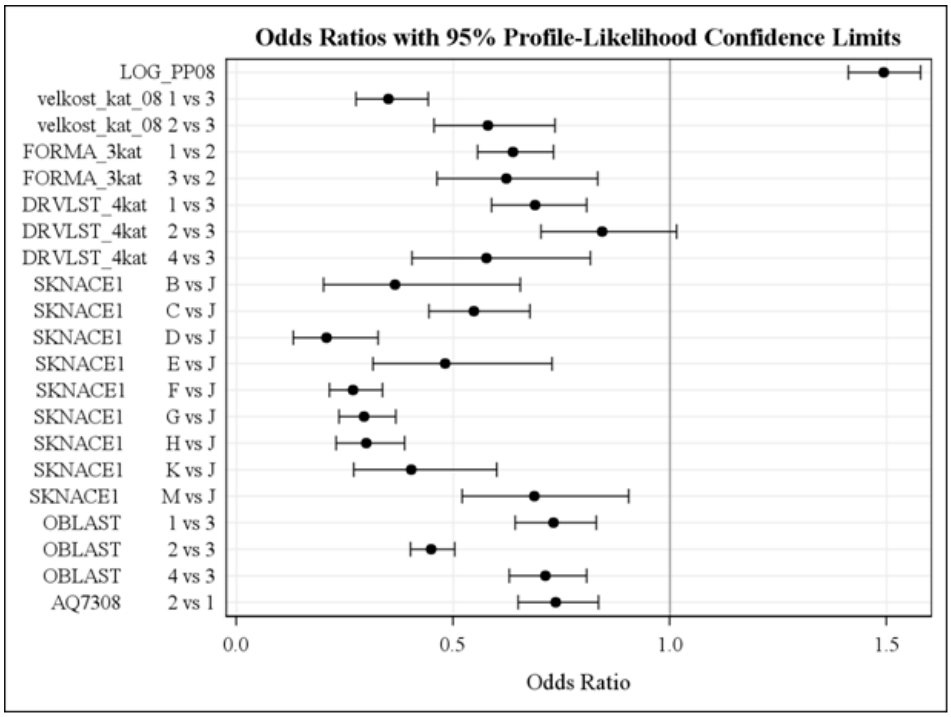
Source: LOGISTIC output from SAS Enterprise Guide 4.2

On the figure (Fig. 3) there are 95% confidence limits of the estimated odds ratios for the explanatory variables (factors). Based on those we can identify the significant and insignificant odds changes on innovation activities of the enterprises which were caused by individual factors (determinants) in comparison to their referential categories (under assumption of the stability of the other factors).

The highest probability (or odds) that the enterprise in Slovakia performs some innovation is within the J sector – Information and Communication. J sector belongs to the sector knowledge-intensive high-tech services. In other sectors there is statistically significant lower probability of innovation activity. For example, if we compare the M sector – Technical

testing and analysis, scientific research and development (also the services sector), then there is 1.5-times lower odds for innovation (1/0.548 = 1.82), in C sector – manufacturing, there is 1.8-times lower odds for innovation and in D-sector – electricity, gas, steam and air conditioning supply, there is up to 4.8-times lower odds for innovation (1/0.208 = 4.81). Our hypothesis H3 was confirmed, stating that the probability of innovation activity differs from the branch activity of the enterprise (SKNACE1) and the highest is within the sector knowledge-intensive high-tech services.

Fig. 3: Point and interval estimation of odds ratios for factor (INOV2 = 1)



Source: LOGISTIC output from SAS Enterprise Guide 4.2

Factor size of the enterprise (velkost_kat_08) confirmed our hypothesis H2, that there is statistically-significant higher chance for innovations in the big enterprises in comparison to small and medium enterprises.

When it comes to factor region (OBLAST), then in comparison to the region Middle of Slovakia (reference category 3 - SK03), significantly lower chances for innovations are in all other Slovak regions, including enterprises in Bratislava (1 - SK01).

Variables with lower influence on modelled variable, but statistically significant, were also the other three examined factors. Those can be included within the internal determinants of the innovations, because they are connected to management.

Reference category for the legal form of enterprise (FORMA_3kat) was 2 = join stock company, in the limited liability and other legal forms there is a significantly lower probability for innovations than in the join-stock company (hypothesis H5)

When it comes to type of ownership (DRVLST_4kat), then as a referential variable was the category 3 = international ownership. With other types of ownership there is a significantly lower probability for innovations. With type of ownership 2 = foreign, the difference is insignificant. The hypothesis H6 was therefore validated only partially.

The last significant variable was AQ7308 – whether the enterprise was part of the group (1 = yes, 2 = no). From the graph, we can identify that the higher chance for innovations was within enterprises that belonged to some group (AQ7308 = 1), presumably those were owned by foreign investors (hypothesis H7).

Conclusion

In Slovakia, three out of 10 enterprises innovates and seven out of ten were without innovations. Ratio of the enterprises with some innovation activity (from the examined 14 types of innovation activities) in the timeframe 2006-2008 in Slovakia was 33.6%. In comparison to the average of the EU27 countries we belong to the group of moderate innovators and it will take a long time until we reach the level of countries from the group of innovation leaders.

Analysis based on logistic regression model confirmed that the probability of innovation activity in Slovak enterprises was significantly different depending on the seven examined factors. CIS 2008 data provide only some selective external and internal factors for predicting the probability of innovation activity. Those factors were used as the explanatory variables in the logistic regression model. Quality of the model was relatively satisfying (c = 0.709), but the value 1 – event (target variable INOV2) prediction was not satisfying. Sensitivity (the ability to predict an event correctly) for our model was only 29.4% and specificity (the ability to predict a non-event correctly) was up to 90.3%.

Innovations belong to main power of industrial and social development. Innovation processes create positive creative changes in society. Applied innovation processes result in higher competitive abilities of the enterprises. Higher competitiveness wins the new markets, increase employment rates and prosperity of enterprises, which triggers the increase of regional and whole-country development and prosperity. Innovations in the times of globalization and hypercompetitiveness are the only solution to the survival of the enterprise.

The financial crisis which started in 2007 has triggered a global economic downturn. This has resulted in at first falling economic growth rates followed by a real economic decline in many countries. The EU's most innovative firms may be relatively less affected by the economic crisis.

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