

Research and Development Support and Private Entities in the Slovak Republic

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Abstract

The paper deals with issue of research and development support in the Slovak Republic. Target group of survey are private companies with a certificate of competence for the performance of research and development. Firstly, the results of the survey suggest, that among mentioned type of companies, the percentage of turnover reinvested into research and development is below 20%. Secondly, information about research and development support is brighter for smaller firms. Further, firms consider bureaucracy and complex financial rules as a serious obstacles to grant applying. Even 65% of firms with a certificate of competence for the performance of research and development do not even know that tax credit for research and development exists and only 5% of them use it. 35% of companies do not know about possibility to finance research and development activities by venture capital. In terms of starting research and development activities, companies desire direct financial support above 51% of its total cost. Analysis of association between success in grant applying and firm characteristics showed that only statistically significant variable is a legal form of company, whereas region in which the business is located, branch of business, and the size of the company are statistically insignificant variables.

Key words: research, development, innovation, subsidy, Slovakia

JEL Classification: O31, O32

1 Introduction

Innovations, as an important factor of economic growth, are not only mentioned in the theories of growth, their significance is also confirmed by the current situation in which the decisions of the government at the level of the European Union are focused on creating a knowledge-based society concentrated on innovation, science and research as the primary factors of the competitiveness of the European Union. The goal of the Innovation Strategy of Slovakia for the period of 2007-2013 was “for innovations to become one of the main tools of development of knowledge-based economy as well as ensure the high economic growth of the Slovak Republic with the aim to reach the level of the most developed economies in the European Union” (MOE, 2007). In 2006, The Ministry of Economy of the Slovak Republic performed an analysis of innovation policy, which led to the expose of several deficiencies (Prno, 2008). Poor innovativeness of companies is caused by a general lack of knowledge, human capital and lack of financial funds. Apart from the mentioned, the analysis also revealed two most significant reasons for low private investments in research and development. Companies innovate

insufficiently because they lack venture capital. The second reason is that Slovak companies actually attach only small importance to innovation.

The Law on Incentives for Research and Development provides a possibility of applying the tax credit for activities related to research and development. Even so, private entities are usually not aware of this possibility. According to the representatives of Minerva, tax allowances for research and development are a complicated tool because they are often associated with problematic classification of eligible expenses. When it comes to venture capital, the problem is that Slovak business angels are characterized by an effort to get at least 60% of innovating private entity when they invest, which acts as a disincentive for the Inventor (innovating entity), and therefore discourages it from joining with investors.

Apart from that, there is the problem with syndication in Slovakia (providing information on innovation or selling author's work), due to feeble legal certainty (Kotulič, 2006). Foreign investors in Slovakia allocated their plants focused on sale, but they do not intend to realize their research here. One of the main reasons for the lack of interest in conducting research in Slovakia is insufficient infrastructure, which would require extra investments. Despite this claim, however, it is more likely for the foreign companies to implement product innovation (Čaplánová et al., 2012). The cost of the researcher as a labor force does not form a sufficient incentive for the allocation of research and development centers in Slovakia to foreign investors. In addition, Slovakia is not perceived as a source of sufficient educational system for the needs of research and development activities and foreign direct investment is lowest within the region (Dubravská and Širá, 2014).

From the long-term perspective, there is a low quantity of scientific publications in Slovakia as well as a low number of patents that were granted by U.S. and European patent offices, and a small proportion of sophisticated products in export altogether (Baláž, 2005).

The aim of this survey is to gather information about private entities preferences toward direct and indirect state aid designated for research and development and to look upon characteristics of the firms which are crucial in terms of grant acquisition. The rest of the paper is organized as follows: second chapter describes material and method. Third part describes background information about companies and their overall outlook on issue of research and development in Slovakia. The fourth part is devoted to research and development tax credit. Fifth part of the paper deals with venture capital and sixth part with direct financial support of research and development. Seventh part of the study looks upon associations between success in term of grants acquisition and firm characteristics. Final part of the paper comprises conclusion.

2 Material and Methode

Target group of this survey was private companies with a certificate of competence for the performance of research and development. Also, all potential applicants within the Agency for Research and Development (from Slovak APPV – Agentúra pre Vedu a Výskum) and the Agency of Operational Program Research and Development (from Slovak OPVV – Operačný Program Výskum a Vývoj) have been asked to answer questionnaire. We focused on companies

with a certificate of competence for the performance of research and development because we assumed that these have serious experiences with research and development and its funding possibilities.

In total 210 questionnaires have been distributed with response rate 36%. A questionnaire has been distributed via email, consisted of 29 questions and is available upon request.

3 Background Information

Among all companies, 32% have been joint stock companies and 68% have been limited liability companies. Figure 1 depicts the distribution of respondents by size and region in which they are situated.

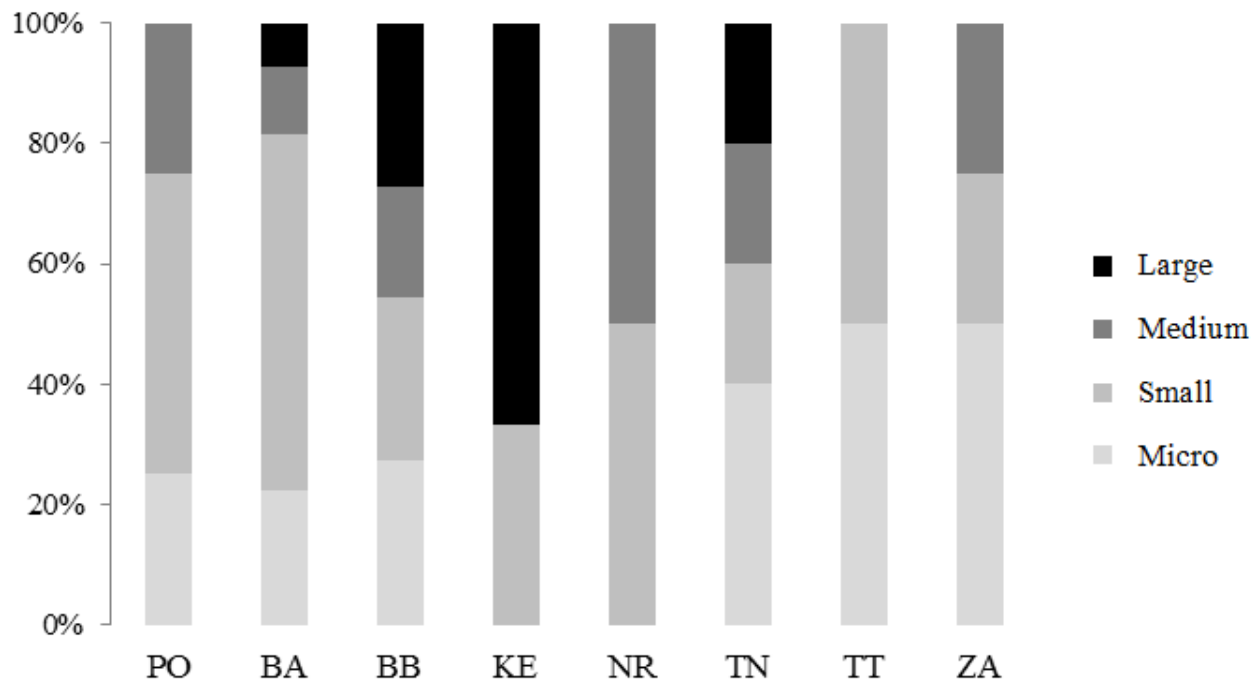


Fig. 1 Distribution of firms by size and region

3.1 Percentage of turnover invested into research and development

Table 1 shows percentage of turnover reinvested into research and development. Average turnover invested into research and development is about 27,4 %. One can conclude that percentage of turnover invested into research and development is basically low.

Tab. 1 Turnover reinvested into research and development

% of turnover	% of respondents
0%	8,2%
1-9%	26,5%
10-20%	26,5%
30-35%	4,1%
40-50%	20,4%
65-75%	4,1%
80-98%	10,2%

3.2 Clarity of information about research and development support on the internet

Upon 56% of all respondents, information about research and development state support provided on web pages are clear, whereas 44% think the opposite. Table 2 depicts that information is the most valuable for micro companies and big companies. Spatial distribution of firms suggests that information about research and development state support are most unclear for firms from regions of Prešov and Banská Bystrica.

Tab. 2 Clarity of information about research and development support, according to region and company size

Company size	Micro		Small		Medium		Big	
Yes	54%		65%		56%		50%	
No	46%		35%		44%		50%	
Region	PO	BA	BB	KE	NR	TN	TT	ZA
Yes	25%	56%	27%	67%	100%	100%	83%	50%
No	75%	44%	73%	33%	0%	0%	17%	50%

Interesting fact is, that the bigger firm is, less information about research and development state support is clear. To conclude, whether information about research and development support on the internet are clear we use binomic test. Hypothesis are following:

H_0 : We can state, that more than one half of firms consider information bright.

H_1 : We can not state, that more than one half of firms consider information bright.

Respective p value for binomic test is 0,1871, thus we reject the null hypothesis about clarity of information about research and development state support on the internet.

Eyeballing Table 3 is pointing out the fact, that uncertainties about grants are more frequent in companies where specialized department for project management is missing.

Tab. 3 Uncertainties and specialized department matter

Specialized department	Clear and bright conditions	
	Yes	No
Yes	18	6
No	28	10
Sum	46	16

3.3 Obstacles to applying for a grant

Respondents have been asked to express their opinion in terms of experiences with submitting an application for a direct form of support for research and development. Only one respondent has had no problems in the process of application submitting. Most frequently claimed issues with application submissions have been Bureaucracy (41,7%), Complexity of financial rules (28%), Corruption (14%). Respondents pointed out useless duplications in documentation, what should be eliminated by the electronic document feeder. Serious problems for entrepreneurs are disarranged and confusing rules for selecting the projects, frequent changes in rules and unexplained reasons of application deletion. Another deficiency is the static nature of the budget, which must be planned in advance what cause problems in the environment, where technologies are changing rapidly.

Obstacles to applying for a grant according to the region where the firm is situated are depicted in Table 4.

Tab. 4 Obstacles to grant applying – region matter

	PO	BA	BB	KE	NR	TN	TT	ZA	Sum
Corruption	14%	12%	13%	20%	0%	10%	11%	17%	13%
Bureaucracy	43%	50%	39%	40%	0%	40%	44%	33%	42%
Complex financial rules	14%	26%	30%	20%	33%	30%	44%	25%	28%
Information availability and accessibility	14%	3%	4%	0%	33%	0%	0%	8%	5%
Short time span	14%	9%	13%	20%	33%	20%	0%	17%	13%

Obstacles to applying for a grant according to company size are shown in Table 5. Here we see the same pattern as in regional analysis. The biggest problem for companies is Bureaucracy and Complex final rules. In terms of Complex final rules, the interesting fact is, that big companies have more difficulties than smaller companies.

Tab. 5 Obstacles to grant applying – size matter

	Micro	Small	Medium	Big
Corruption	10%	16%	14%	12%
Bureaucracy	44%	35%	50%	41%
Complex financial rules	29%	32%	7%	35%
Information availability and accessibility	7%	3%	7%	0%
Short time span	10%	13%	21%	12%

4 Research and Development Tax Credit

The Law on Incentives for Research and Development allows also incentives in terms of the tax credit. Yet, 66% of respondents do not know that tax credit for research and development even exists and only 5% use it. In this part of the survey, we focused on determining the effective rate of tax credit based on return on investment. Here we considered three possible outcomes of investment: up to 30%, from 31% to 60% and over 60%. Results of tax relief sensitivity are presented in Table 6.

If respondents should set the rate of research and development tax credit based on the expected rate of return on investment in research and development, so in case of return on investment equal to 30% subjects would prefer a tax credit of 66% of the cost. In case of return on investment of 31% to 60% subject would expect tax credit of 53% of the cost and in case of return on investment over 61% they would expect tax credit equal to 41% of the cost.

Tab. 6 Motivating rate of tax credit on the expected rate of return

Return up to 30%		Return from 31%-60%		Return over 61%	
% of tax credit	Count	% of tax credit	Count	% of tax credit	Count
5	1	10	2	0	2
10	1	15	1	10	2
20	3	20	2	15	1
30	1	30	5	20	6
40	1	40	6	25	2
50	10	50	10	30	8
60	3	70	3	40	3
65	1	75	2	50	8
70	3	80	3	60	1
75	2	100	5	70	1
90	1			100	5
100	10				
150	1				
Total: 38	65,53%	Total: 39	52,95%	Total 39	40,9%

5 Venture Capital

We also asked subjects questions concerning venture capital. Striking finding is, that 35,5% of respondents do not know about possibility to finance research and development of venture capital. Among 64,5% of respondents which know about possible use of venture capital, 25% think that venture capital is poorly developed and accessible in Slovakia. Up to 50 of respondents do not want to use venture capital as a possible source of finance for research and development mainly because of fear of loss control over business and loss of know how.

6 Direct Financial Support

In this part of the survey, we focused on determining the rate of direct financial support which would stimulate private entities to research and development. The ratio of direct financial subsidies to private sources, wherein the subject is willing to embark on research and development activities for most of the respondents is over 51%. 24% of subjects chose the amount of public sources within 71% - 80%. The ratios of direct financial subsidies to private sources, wherein the subject is willing to embark on research and development activities are presented in Figure 2.

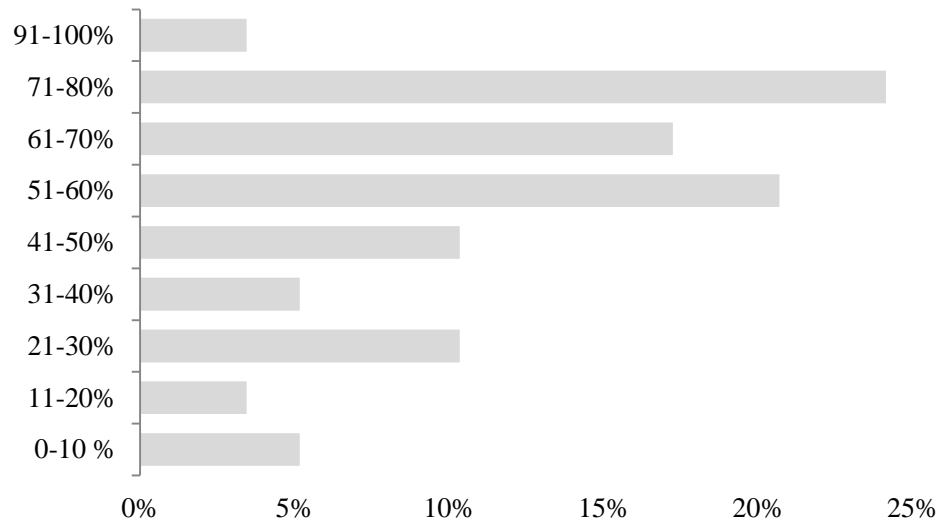


Fig. 2 The required ratio of direct financial subsidies to private sources

The rates of subsidies which are most motivating for the majority of respondents are above 61% - 70%. 30% of respondents consider for most interesting rate of public funding within 91% - 100% of subsidy, meaning that private subject is willing to finance research and development only by 10%. Most motivating rates of subsidy are presented in Figure 3.

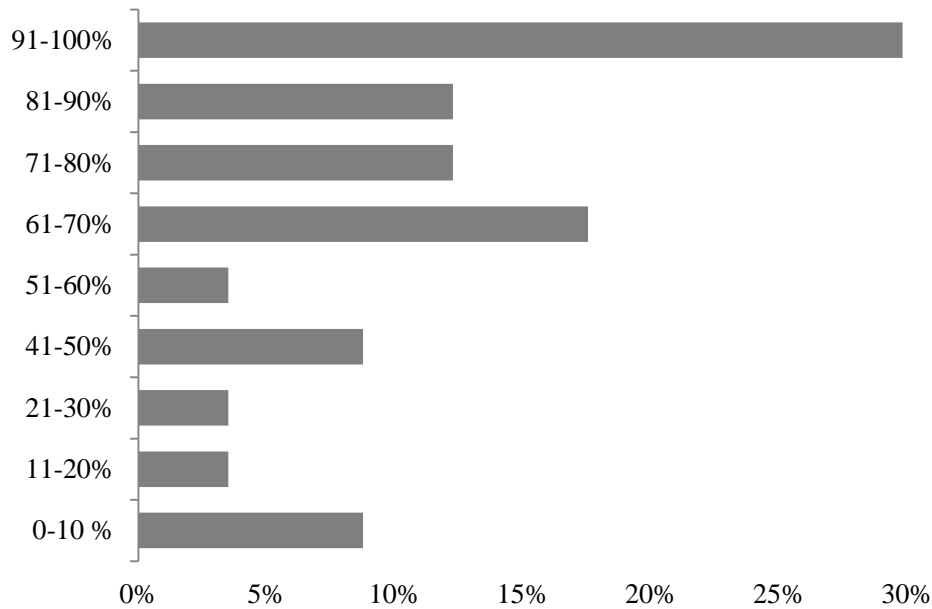


Fig. 3 Most motivating rate of subsidy

7 Associations between Success in Grant Obtaining and Firm Characteristics

Table 7 depicts the success rate of respondents in term of grant obtaining. Eleven percent of our respondents have never applied for a research and development grant. 20% of applicants have never succeeded to obtain research and development grant, 22% have success rate within 75% - 100% in grant applying, 13% of respondents have success rate within 51% - 75% and 16% have success rate within 41% - 50%.

Tab. 7 Success rate

Rate of success	Frequency
0%	20%
11- 20%	9,1%
21- 30%	10,9%
31- 40%	9,1%
41 - 50%	16,4%
51-75%	12,7%
100%	21,8%
Total	100%
Never applied	11%

In this part we focused on analysis of factors, which are behind the success of company in grant obtaining. Here we analyzed whether there is an association between nominal variables of the firm (region, branch of business, size and legal form) and success in grant applying. Here we are using Cramer's contingency coefficient, which is considered as a fair measure of association. In interpreting the Cramer's coefficient we use the range proposed by Cohen (Cohen, 1988). If the value of Cramer's contingency coefficient is less than 0.1 we speak about a trivial association, if

the values are in the range 0.1 - 0.3 we speak about a small association. Value in the range of 0.3-0.5 stands for moderate association. A value above 0.5 stands for strong association. Table 8 shows the results of association analyses.

Tab. 8 Associations between success in grant obtaining and firm characteristics

Success	Legal form	Branch of business	Region	Size
Phi-Coefficient	0.722	0.958	1.312	1.02
Contingency Coefficient	0.585	0.692	0.795	0.714
Cramer's V	0.722	0.479	0.496	0.589
$P(> X^2)$	0.0368302	0.85606	0.84232	0.18230

One can see that p-value is over 0.05 in case of Branch of business, Region and Size. Here we cannot assume statistically significant association with rate of success. On the other hand, in case of Legal form, statistical significance has been proven. Moreover, the value of Cramer's coefficient of association between the Legal form of the firm and the success of the firm in the grant application is equal to 0.722, what we interpret as a strong association.

The association is shown in spine plot, Figure 4: Success – Legal form. Spine plot represents a number of companies broken down by legal status and the success rate of applications submitted. Height of the rectangle represents the frequency of firms in a given percentages frequency span. We see that most limited companies have success rate within the range 0% - 30%, and 75% - 100%. Looking at the joint-stock companies, we see that the majority reaches success from 60% - 100% and from 40% - 50%.

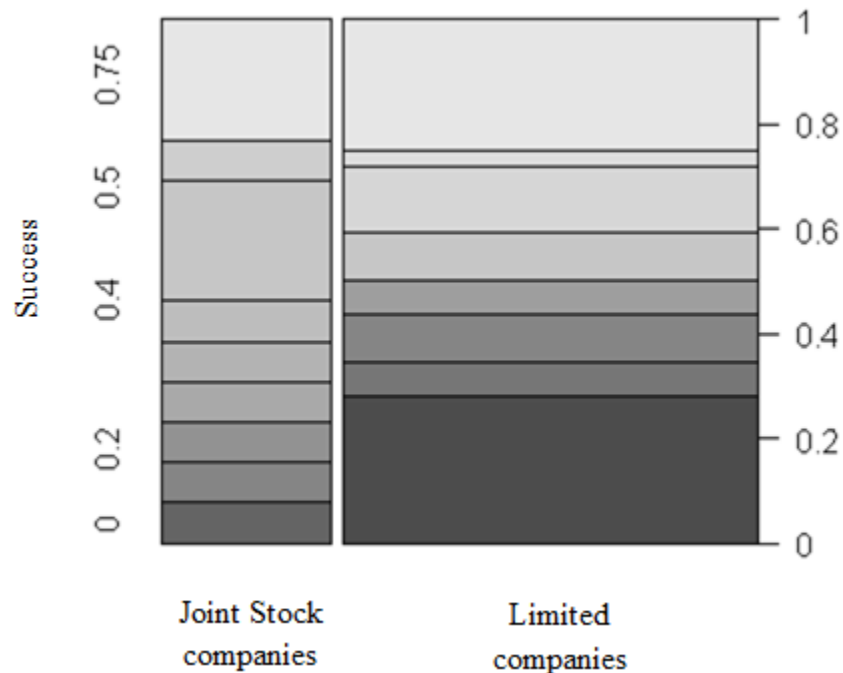


Fig. 4 Success – Legal form

8 Conclusions

The paper presents partial results of complex analysis in the field of innovation issue in Slovak republic. Results of analysis presented in this paper confirm that poor innovativeness of companies in Slovakia is caused by general lack of information, lack of confidence toward venture capital, bureaucracy and complexity of financial rules in the process of grant obtaining. Our findings are in line with studies presented in Introduction. National policies should be oriented toward creation of better environment for companies which have potential for research and development. Without doing so, Slovak republic will difficultly become part of the most competitive and knowledge-based society concentrated on innovation and science and research as the primary factors of competitiveness of the European Union. Innovation activities of European union countries are monitored by the European Commission through the Summary innovation index. Summary innovation index describes the total relative innovation performance of the countries. Based on this, the countries are divided into four groups: Innovation leaders (Denmark, Finland, Germany and Sweden), Innovation followers (Austria, Belgium, Cyprus, Estonia, France, Ireland, Luxembourg, Netherlands, Slovenia, and the United Kingdom), Moderate innovators (Czech Republic, Greece, Hungary, Italy, Malta, Poland, Portugal, Slovakia, and Spain, Lithuania, Croatia) and Modest innovators (Bulgaria, Latvia, and Romania) (European Commission, 2014). Long term growth rate in Summary innovation index of Slovak republic is 1.49%, what is below EU average which equals 1.66%. According to Innovation Union Scoreboard 2014, innovation performance of Slovakia has increased between 2006 and 2013 but declined in 2010 followed by a steep increase in 2012. This increase was due to improvements in new doctorate degrees and product or process innovators. The performance relative to the European union reached a peak in 2012 at 64% but fell to 59% in 2013. Slovak republic performs below the European union for most indicators. Relative strengths are in Sales share of new innovations, Youth with upper secondary level education and International scientific co-publications. Relative large weaknesses are in Non-EU doctorate students, License and patent revenues from abroad and Patent Cooperation Treaty, patent applications in societal challenges. (European Commission, 2014).

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