GOVERNMENT SPONSORED VENTURE CAPITAL FUNDS AND THEIR RELATION TO INNOVATIONS IN LITHUANIAN SMES

Vitalija Venckuviene[1], Vytautas Snieska[2]

[1,2]*Kaunas University of Technology, Lithuania*

crossref http://dx.doi.org/10.5755/j01.em.19.1.5802

Abstract

The research shows that the government's role in activating the venture capital market occurs through direct and indirect public policy measures. The government plays an important role in choosing the most optimal public policy measures, focusing on timely economic issues, and in encouraging private investors to invest in industrial sectors where funding shortfall is the greatest.

Studies have shown that the establishment of government sponsored venture capital funds (hereinafter GSVC funds) funds is justified by the following reasons: GSVC funds are an alternative source of capital funding for Small and Medium Sized Enterprises (hereinafter SMEs), they encourage innovation and are focused on job creation and economic growth.

The present paper deals with the government's role in fostering the government-sponsored venture capital funds particularly focusing on the impact of such funds on innovations in SMEs in Lithuania.

The research shows that it is appropriate to clarify the concept of GSVC funds, focusing on the role of supranational institutions in the establishment of these funds. Thus, GSVC funds in this paper refer to funds accumulated from private investors and public resources (government, as well as other supranational institutions such as the EU), which invest in high growth potential SMEs in their early growth and development stages in order to improve their development conditions in a particular region or country.

The scientific literature research shows that the impact of venture capital on the innovations in SMEs is measured mainly in terms of patents (Chemmanur, Loutskina, & Tian, 2012; Brander et al., 2010; Bertoni & Tykvová, 2012). Thus, it reflects only one – the technological – side of innovations. Meanwhile, considering innovations as multifaceted conception, the organizational innovations, networking, self-assessment and marketing innovations aspects should be taken into account as well.

The type of the article**:** *Research paper.*

Keywords: *Government sponsored venture capital fund, innovative Small and Medium Sized Enterprises, public policy.*

JEL Classification: *G28, G24, O32.*

1. Introduction

Abundance of literature dealing with the features of venture capital sector shows how important this sector is to the economy in terms of innovations, productivity and employment (Kortum & Lerner, 2000; del-Palacio, Zhang & Sole, 2010; Cumming, 2007; 2011). Moreover, the worldwide companies – *Apple, Cisco Systems, Genentech, Intel,* and *Yahoo* were funded by venture capitalists and became prominent in their field.

Introduce the problem. The relevance of the research is obvious due to the huge interest in scientific literature exploring the venture capital and its relation to innovations in macro and micro aspects as well as the political interest in fostering venture capital market in order to enhance innovations in SMEs. The scientific literature research shows that the impact of venture capital on the innovations in SMEs is measured in terms of patents (Chemmanur, Loutskina & Tian, 2012; Brander *et al.*, 2010; Bertoni & Tykvová, 2012). Meanwhile, studies show that there are many

dimensions of innovations including the qualitative ones. The research question arises - *how government sponsored venture capital funds (GSVC funds) are related to innovations in the Lithuanian SMEs, particularly examining the qualitative aspect of innovations.*

Develop the background. The scientific literature research shows that the activation of venture capital market has become a national priority of most world regions in order to promote the economic growth (Cumming, 2007; 2011; Cumming & Johan, 2009; Cumming & MacIntosh, 2006; Jääskeläinen, Maula, & Murray, 2007; Karsai, 2004; 2012; Snieska & Venckuviene, 2010; 2011). The scientific literature depicts that mostly the impact of venture capital on the innovativeness of portfolio companies is measured in terms of patenting activity (number of patents, patent applications) (Kortum & Lerner, 2000; Chemmanur, Loutskina, & Tian, 2012; Dubocage, Rivaud-Danset & Redi, 2012; D'adda, 2009; Baum & Silverman, 2004; Brander *et al.*, 2010a, 2010b; Caselli *et al.*, 2009; Haeussler, Harhoff & Mueller, 2009; Bertoni & Tykvová, 2012; Ughetto, 2010, VICO, 2011; Bertoni & Tykvová, 2012).

Thus, most of the research reveals only the technological dimension of innovations, ignoring the GSVC funds impact on organizational innovations, networking, self-assessment and marketing innovations. Meanwhile, considering innovations as multifaceted concept, the organizational innovations, networking, self-assessment and marketing innovations dimensions should be taken in to account.

The purpose of a study. The paper aims to explore the relation between the government sponsored venture capital funds and the innovative activities in the Lithuanian SMEs.

Methodology. *The methods employed in the article are as follows:* systematisation and logical analysis of scientific literature and the expert evaluation method.

Results. For the development of public measures it is appropriate to take into account the specificities of a country, which is defined not only by economic factors, but also by the emphasis on the political, social and cultural factors. The expert evaluation results show that venture capital impacts innovations in SMEs in respect of the technological innovations, networking and personnel management.

Practical implications. Measuring innovations in five dimensions (technological, networking, organisational, marketing and self–assessment related innovations) could be tailored in other studies.

Value/originality. The article contributes to the research scope, which aims to explore the venture capital relation to innovations. The paper is original, because it explores the GSVC funds' impact on five different qualitative dimensions of innovations.

Peculiarities of GSVC funds. The research shows that the concept of "venture capital" refers to long-term investments (both private and institutional investors) in private, young companies, with high growth potential and the expected high rate of return. Also, the term does not specify the institutional nature of venture capitalists, i.e., what source of money consist of venture capital fund (private or public, or mixed).

The analysis of the scientific literature revealed that there was no united concept in defining Government Sponsored Venture Capital Funds, the same problem for naming them. Table 1 presents the variety of names for such funds. The terms "public", "government" and "state" venture capital funds are included (see Table 1). However, recent studies (Brander *et al.*, 2010a; 2010b) employ the term of Government Sponsored Venture Capital Funds. Generally these venture capital funds are formed according to the government long-term development strategies, thus, the term "Government sponsored venture capital funds" is used in this manuscript.

Table 1. Problem of naming GSVC funds

Name	Source
Government-Sponsored Venture capital Funds	Brander *et al.* (2010a; 2010b)
Public venture capital	del-Palacio *et al.* (2010)
Publicly funded co-investment fund	Mason & Pierrakis (2009)
Publicly supported venture capital funds	Munari & Toschi (2010)
Publicly sponsored (or managed) venture capital funds	Leleux & Surlemont (2003)
State venture capital programs	Sandler (2010)
Public Venture Capital Program	Barkley *et al.* (2004)
Hybrid venture capital funds	Jääskeläinen *et al.* (2007); Reid & Nightingale, (2011)
Government co-financed 'Hybrid' Venture Capital programmes	Murray *et al.* (2012)

Source: compiled by authors.

In this paper *GSVC funds* are treated as funds generated from private and public resources (government, as well as other supranational institutions such as the EU), which invest in high growth potential SMEs in the early stage as well as growth stage, in order to improve their development conditions in a particular region or country.

The research so far shows that there is no consensus in the scientific discourse about governments' intervention in venture capital markets. Table 2 presents the two poles of arguments for the government sponsored venture capital funds. Proponents justify governments' programs due to enhancement of venture capital supply for early stage businesses, while opponents underline the negative aspects in activation of venture capital markets - "Crowding out" of private investors and generation of low returns are among the main ones (see Table 2). Many studies confirm that private venture capital funds outperform the GSVC funds when comparing the performance indicators of portfolio companies (Brander *et al.*, 2010a; Mason & Pierrakis, 2009, VICO, 2011; Bertoni & Tykvova, 2012).

Table 2. Two pole for the GSVC funds

Arguments FOR	Arguments AGAINST
• Enhancement of innovations and entrepreneurship • Financing companies which encounter the market failure • Certifies new companies	• Lack of effectiveness in allocation public resources • "crowding out" effect on private sector investors • Low capital return

Source: compiled by authors.

Nevertheless, activation of venture capital markets is just one of the ways to promote innovations and foster entrepreneurial culture. In order to implement these goals, a number of other potential direct and indirect measures can be implemented, for instance to improve the infrastructure for business, or introduce the legislative and fiscal framework.

It is assumed that the government's involvement in intensifying venture capital market could bring the benefits under such conditions:

- When the aim of the GSVC funds is to target companies characterized as SMEs with considerable growth potential and a strong technology base;
- When there are limitations in financing business from traditional financial resources, and there are complicated economic conditions in a particular region.
- When GSVC funds administering authority have the capacity as well as appropriate financial and human resources.
- When running governance system is effective, transparent and accountable and ensures the efficient allocation of public financial resources.

GSVC funds and innovations in enterprises. There are twofold approaches in estimating the impact of GSVC funds on innovations. First one - macro economical approach - considering the industry level data (patenting and productivity) which might be affected by venture capital investments (Kortum & Lerner, 2000; Ughetto, 2010; Ueda & Hirukawa, 2006). The second one - the innovations at companies level approach - measuring the changes of performance indicators (number of employers, patents) after receiving venture capital money (Caselli *et al.*, 2009; D'adda, 2009; Brander *et al.*, 2010a, 2010b).

The research in the scope of innovations in enterprises allows to introduce the *concept of an innovative company*, which is understood as an organization that is open to changes, continuously generating new products and / or introducing new technologies, and / or evolving organization a structure and is capable to respond quickly to market changes and adapt to a new competitive conditions, motivating its employees to create and critically evaluate and solve problems as well as being engaged in permanent process of self-assessment. In line with this concept of innovative company, the five dimensions of innovations are extracted as follows:

1. Technological innovations is company's ability to develop new (or improved) products as well as improvements of manufacturing processes in order to minimize production costs and achieve company's productivity growth.
2. Networking related innovations refer to ability to cooperate with various institutions, as well as involvement in a variety of structures (clusters, science and technology parks, associations), including participation in international projects in order to strengthen the company's innovations ability.
3. Personnel management related innovations refer to recruitment of skilled personnel and their motivation to create and be a part of effective innovations' chain as well.
4. Marketing innovations cover a new and / or improved ways of organizing public relations campaigns, customers search and choosing new distribution channels, product commercialization, brand development and other.
5. Self-assessment related innovations are the company's internal efforts to maintain and improve the innovative capacity, for instance observation and evaluation of on-going internal and external situation (financial and technological audits) and pursue to improvement the current performance (quality system implementation, process automation).

The research so far isolates the innovative activities of the firm related to self-assessment aspect. Self-assessment in this paper is the permanent process of companies' evaluation encompassing analysis in various aspects (financial, economic, technological) analysis, implementing quality systems in order to maximize the company's value and others.

Innovative business concept refers to ability under current conditions (at companies and industry level) to improve enterprise performance (productivity, exports), financial (profit, turnover) and the company's professional performance (including an effective human resource management system).

2. Methodology

It is assumed in this paper that venture capitalists through the involvement in the portfolio companies' board have impact on strategic goals and in this way affect the formulation and implementation of strategies in terms of companies' technological innovations, personnel management, networking, marketing and self-assessment innovation dimensions (see Figure 1).

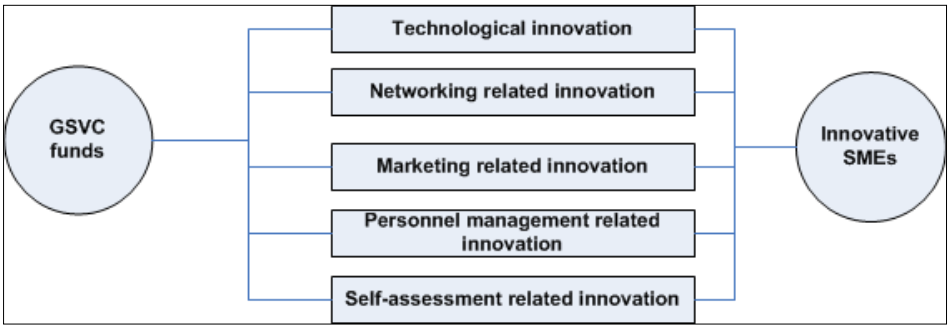

Figure 1. Relation of GSVC funds and innovative SMEs

In estimating the impact of GSVC funds on innovations the qualitative approach for the analysis was chosen in order to better reveal the multidimensionality of innovations concept. This decision was made due to the lack of quantitative data about the venture capital markets performance, and in order to reveal the deeper insight on relation of venture capitalist and the investee company.

The questionnaire was prepared based on the 5 point *Likert* scale. The questionnaires were spread among the companies which were financed by GSVC funds in Lithuania. The research was conducted in June of 2012. There were 12 companies financed by GSVC funds at that time. The target respondents of this research were chief executive mangers of the companies financed by GSVC funds. Half of possible respondents - six out of twelve – filled the questionnaires. They are experts because it is assumed that they know best the features of relationship with GSVC funds' managers. The research aimed to determine opinion about the impact of GSVC funds on innovations (according to five innovations dimensions) in their enterprises.

To assess the reliability of questionnaire the *Cronbach alpha coefficient* – α was calculated. Cronbach α value ranges from 0 to 1. The recommended critical value of *Cronbach* α in social sciences is – 0.7 (George & Mallery, 2003). The observed α is 0.713, which indicates sufficient score of reliability.

Kendall concordance coefficient (hereinafter *W*) was used to calculate compatibility of experts. *W* value ranges from 0 to 1. Zero indicates that the experts' assessments are completely incompatible. When estimating *W* the two statistical hypothesis are stated: hypothesis null (H_0): $W = 0$, there is the lack of concordance among experts; and alternative hypothesis (H_a): $W \neq 0$, the agreement among experts is concordant. H_0 is rejected if the p-value is less than critical value (0.05). The critical value of *W* in this paper is determined – 0.6, which indicates concordance among experts. Estimations were made with the help of MS SPSS 17.

When assessing the dimensions of particular innovations category the average of ratings of 3.5 and higher denotes that experts agree with the statements, and the average of ratings less than 3.5 denotes that experts do not agree with the statements.

3. Results

In this section the results of research are outlined. Assessing the impact of venture capital funds on technological innovations in enterprises, the average scores of experts' evaluation on 8 dimensions are presented in Figure 2. The calculated *W* is 0.354 (*p value* = 0.038 < 0.05), which suggests, that experts agreement is significant, although weak. Five out of eight statements related to technological innovations dimension scored on average 3.5 and up to 4.17. Thus, we find more evidence that venture capitalists impacts at least 5 aspects in technological innovations in terms of introducing new products and new technologies, managing intellectual property, automation processes and investments in R&D too.

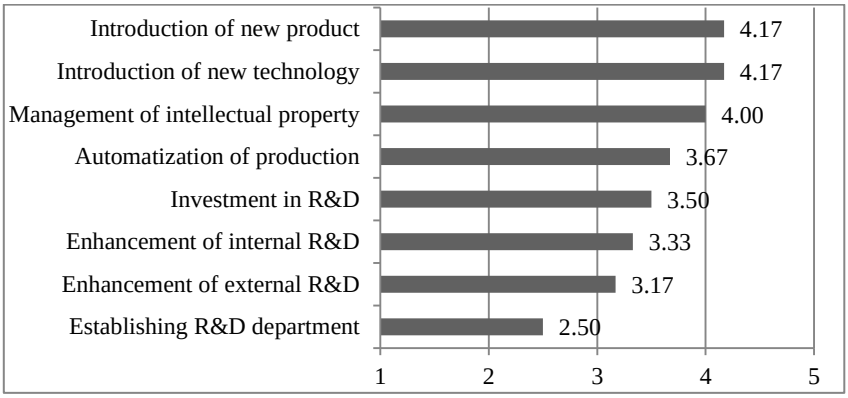

Figure 2. Average scores of experts' ratings on the technological innovations aspects

Assessing the venture capital impact on networking related innovations, the results are presented in Figure 3.

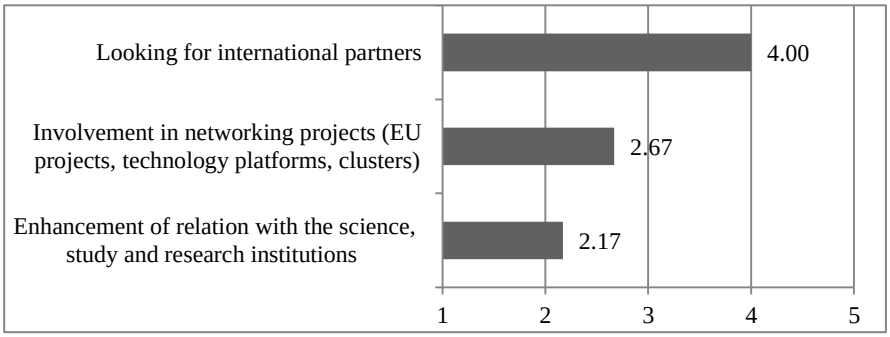

Figure 3. Average scores of experts' ratings on the networking related innovations aspects

The calculated *W* is 0.775 (*p-value* = 0.010 < 0.05), which means that there is significant strong agreement among the experts in assessing venture capital impact on networking related innovations in a portfolio company.

Experts were united in assessing the impact of venture capitalist in one aspect – looking for international partners. It is in line with the previous research results, the networking aspect as the value added of venture capital was identified in both Boué (2002) and Christensen (2006) studies.

To sum up, experts agree that venture capitalists are involved in a company in terms of "Looking for international partner".

Assessing the venture capital impact on personnel management related innovations aspects, the results are presented in Figure 4. The calculated *W* is 0.437 (*p-value* = 0.047 < 0.05), which indicates statistical significance in experts' agreement, although quite week (*W* is less than 0.6).

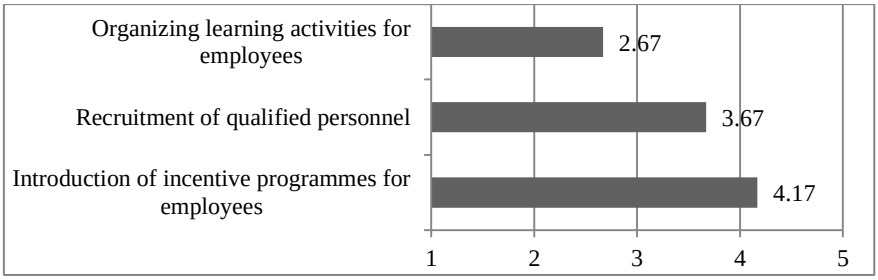

Figure 4. Average scores of experts' ratings on the personnel management related innovations aspects

Two out of three statements related to personnel management innovations were scored on average more than 3.5. Thus, we find evidences that venture capitalists influence the recruitment of qualified personnel as well as introduction of incentive programmes for employees. Thus, it is in

line with Hellman and Puri (2002) research results concerning ventures capitalists role on the human resource management in a financed company.

Assessing the venture capital impact *on marketing related innovations* the calculated *W* was obtained very small – 0.083 (*p-value* = 0.682 > 0.05) thus, H_0 is not rejected and there is no evidence about the concordance of expert opinion. It means that there is no significant agreement among the experts in evaluating the impact of venture capital on marketing related innovations.

Considering the self-assessment related innovations in portfolio companies, the significant differences among the statements was not found as well. The average score of expert evaluation were quite low. Only one statement "organization of internal and external audit" was scored on average 3.67.

To summarize the findings of expert evaluations, the three core scopes in a company are influenced by venture capitalist: the technological innovations, the networking related innovations and personnel management related innovations.

4. Discussion

The problem revealed in this paper is relevant in several aspects. First of all the scientific interest in venture capital topic is explicitly revealed, but the more narrow scope - GSVC funds and its impact on innovations is quite limited more efforts are made on the quantitative research approach. Research so far relays on patenting data as the main indicator for measuring innovations in a company. Still it is considered that the qualitative research is considered to be more subjective then quantitative one, but the decision to make qualitative research was made due to nascent and small venture capital market in Lithuania.

Meanwhile, the qualitative aspect which is revealed in the current paper provides some new issues in research on the venture capital impact on innovations. Results of expert evaluation allow confirming in considerable large proportion that venture capital impacts technological innovations in the company. Venture capital affects the networking as an expression of innovations related processes in terms of "looking for international partner". The evidences of venture capital effect on the marketing and self-assessment related innovations were not found.

References

Barkley, D. L., DiFurio, F. & Leatherman, J. (2004). The Role of A Public Venture Capital Program in State Economic Development: The Case of Kansas Venture Capital, Inc. JRAP (2004)34:2. Retrieved from http://www.jrap-journal.org/pastvolumes/2000/v34/34-2-5.pdf

Baum, J. A. C. & Silverman, B. S. (2004). Picking winners or building them? Alliance, intellectual, and human capital as selection criteria in venture financing and performance of biotechnology startups. Journal of Business Venturing, 19(3), 411-436. http://dx.doi.org/10.1016/S0883-9026(03)00038-7

Bertoni, F. & Tykvová, T. (2012).Which form of venture capital is most supportive of innovation? ZEW Discussion Papers, No. 12-018. Retrieved from http://ftp.zew.de/pub/zew-docs/dp/dp12018.pdf.

Boué, A. R. (2002). VALUE ADDED FROM VENTURE CAPITAL INVESTORS: WHAT IS IT AND HOW DOES IT GET INTO THE VENTURE? Retrieved from: http://webs2002.uab.es/edp/workshop/cd/Proceedings/3EDPW_ABoue.pdf

Brander, J. A., Du, Q. & Hellmann, Th. (2010a). Governments as Venture Capitalists: Striking the Right Balance in Globalization of Alternative Investments, Working Papers Volume 3: The Global Economic Impact of Private Equity Report 2010, World Economic Forum, pp 25-52. Retrieved from https://members.weforum.org/pdf/FinancialInstitutions/PrivateEquity_VolIII_WorkingPapers.pdf

Brander, J.A., Du, Q. & Hellmann, Th.F. (2010b). The Effects of Government-Sponsored Venture Capital: International Evidence. NBER Working Paper No. 16521, November 2010. Retrieved from: http://www.nber.org/papers/w16521.pdf

Caselli, S., Gatti, S. & Perrini, F. (2009). Are Venture Capitalists a Catalyst for Innovation? European Financial Management, 15(1), 92-111. http://dx.doi.org/10.1111/j.1468-036X.2008.00445.x

Chemmanur, Th. J., Loutskina, E. & Tian, X. (2012), Corporate Venture Capital, Value Creation, and Innovation (October, 2012). Retrieved from http://www.krannert.purdue.edu/faculty/xu/Tian_paper_CVC_October2012.pdf

Christensen, J. L. (2006). Innovation and the contributions from venture capital. Paper for DRUID Conference "Knowledge, innovation and competitiveness: Dynamics of firms, networks, regions and institutions", Copenhagen, Denmark, June. 18-20th 2006. Retrieved from: http://www2.druid.dk/conferences/viewpaper.php?id=765&cf=8

Cumming, D. J. & MacIntosh, J. G. (2006). Crowding out private equity: Canadian evidence. Journal of Business Venturing, 21(5), 569-609. http://dx.doi.org/10.1016/j.jbusvent.2005.06.002

Cumming, D. J. (2007). Government policy towards entrepreneurial finance: Innovation investment funds. Journal of Business Venturing, 22(2), 193-235. http://dx.doi.org/10.1016/j.jbusvent.2005.12.002

Cumming, D. J. (2011). Public policy and the creation of active venture capital markets. Venture Capital: An International Journal of Entrepreneurial Finance, 13:1, 75-94. Retrieved from http://dx.doi.org/10.1080/13691066.2010.492989

D'adda, D. (2009). VC FINANCING AND PATENTING IN NEW TECHNOLOGY-BASED FIRMS: AN EMPIRICAL STUDY. The DRUID-DIME Academy Winter 2009 PhD Conference. Retrieved from http://www2.druid.dk/conferences/viewpaper.php?id=4537&cf=33

Del-Palacio, I., Zhang, X. & Sole, F. (2010). The capital gap for small technology companies: public venture capital to the rescue? Small Business Economics, 1-19.

Dubocage, E., Rivaud-Danset, D. & Rédis, J. (2012). SUCCESS OR FAILURE OF FRENCH NEW TECHNOLOGY-BASED AND VENTURE-BACKED COMPANIES: AN EMPIRICAL APPROACH. September 2012. Retrieved from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2148424

George, D. & Mallery, P. (2003). SPSS for Windows step by step: A simple guide and reference. 11.0 update (4th ed.). Boston: Allyn & Bacon.

Haeussler, C., Harhoff, D., Mueller, E. (2009). To Be Financed or Not – The Role of Patents for Venture Capital Financing, CEPR Discussion Paper No. 7115.

Jääskeläinen, M., Maula, M. & Murray, G. (2007). Profit distribution and compensation structures in publicly and privately funded hybrid venture capital funds. Research Policy, 36(7), 913-929. http://dx.doi.org/10.1016/j.respol.2007.02.021

Karsai, J. (2004). Can the state replace private capital investors? Public financing of venture capital in Hungary. Institute of Economics Hungarian Academy of Sciences, Discussion paper MT-DP.2004/9. Retrieved from http://www.econ.core.hu/doc/dp/dp/mtdp0409.pdf

Karsai, J. (2012). Development of the Hungarian .Venture Capital and Private Equity Industry over the Past Two Decades. Discussion papers MT-DP – 2012/1. Retrieved from http://econ.core.hu/file/download/mtdp/MTDP1201.pdf

Kortum, S. & Lerner, J. (2000). Assessing the contribution of venture capital to innovation. Rand Journal of Economics, 31(4), 674-692. http://dx.doi.org/10.2307/2696354

Leleux, B. & Surlemont, B. (2003). Public versus private venture capital: seeding or crowding out? A pan-European analysis. Journal of Business Venturing, 18(1), 81-104. http://dx.doi.org/10.1016/S0883-9026(01)00078-7

Mason, C.M. & Pierrakis, Y. (2009). VENTURE CAPITAL, THE REGIONS AND PUBLIC POLICY: THE UNITED KINGDOM SINCE THE POST-2000 TECHNOLOGY CRASH. Working Paper 09-02. Retrieved from http://www.strath.ac.uk/media/departments/huntercentre/WP_Version_VC_regions.pdf

Munari, F. & Toschi, L. (2010). ASSESSING THE IMPACT OF PUBLIC VENTURE CAPITAL PROGRAMMES IN THE UNITED KINGDOM: DO REGIONAL CHARACTERISTICS MATTER? Retrieved from http://efmaefm.org/0EFMSYMPOSIUM/Canada-2010/papers/munari%20toschi%20EFM%20conference%20final.pdf

Murray, G., Cowling, M., Weixi, L. & Kalinowska-Beszczynska, O. (2012). Government co-financed 'Hybrid' Venture Capital programmes: generalizing developed economy experience and its relevance to emerging nations. Forthcoming in Kauffman International Research and Policy Roundtable, Liverpool, 11-12 March 2012. Retrieved from http://www.kauffman.org/uploadedfiles/irpr_2012_murray.pdf

Reid, A. & Nightingale P. (Eds.) (2011). The Role of Different Funding Models in Stimulating the Creation of Innovative New Companies. What is the most appropriate model for Europe? A report to the European Research Area Board. Study funded by the European Commission, Directorate-General Research. Retrieved from http://ec.europa.eu/research/erab/pdf/erab-study-venture-capital-2011_en.pdf

Sandler, D. (2010). STATE VENTURE CAPITAL PROGRAMS. Retrieved from http://lavca.org/wp-content/uploads/2010/02/Sandler-State-Venture-Capital.pdf

Snieska, V. & Venckuviene, V. (2010). Peculiarities of venture capital in financing the early stage business in Lithuania // Business and Management 2010 : the 6th international scientific conference, May 13-14, 2010, Vilnius, Lithuania: selected papers / International North German Academy of Informatology, Stralsund, Vilnius Gediminas Technical University, Riga Technical University, Tallinn University of Technology, Brno University of Technology, Technical University-Sofia, University of Foggia. Vilnius: Technika. ISSN 2029-4441. 2010, Vol. 1, p. 207-214.

Snieska, V. & Venckuviene, V. (2011). Hybrid Venture Capital Funds in Lithuania: Motives, Factors and Present State of Development. Inzinerine Ekonomika-Engineering Economics, 22(2), 157-164.

Ughetto, E. (2010). Assessing the contribution to innovation of private equity investors: A study on European buyouts. Research Policy, 39(1), 126-140. http://dx.doi.org/10.1016/j.respol.2009.11.009

VICO (2011). Venture capital: Policy lessons from the VICO Project. Retrieved from http://www.vicoproject.org/doc/policy/VICO_FinalPolicyBrief.pdf