

GROWTH AND VENTURE CAPITAL INVESTMENT IN TECHNOLOGY-BASED SMALL FIRMS – THE CASE OF HUNGARY

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Abstract: *Venture capital backed enterprises represent a low proportion of companies, even of innovative ones. The research question was, whether these companies have an important role in innovation and economic growth in Hungary compared to other countries. In the first part of the article I present the theoretical background of technology-based small firms, highlighting the most important models and theories of the economic impact and the special development of innovative technology-oriented small firms. In the second part of the article I present the status of the most important indicators of innovation in connection with entrepreneurship, than I elaborate on the measures of start-ups, mainly the high-tech ones with high-growth potential. I describe the current position of venture capital industry, detailing the venture capital investments, with particular emphasis on classical venture capital investments that points out the number and the amount of venture capital investments financing early stage firms with high-growth potential. At the end I summarize the status of Hungarian technology-based small firms and their possibilities to get financial sources from venture capital investors, with regards to the status and the prospects of the JEREMIE program. In Hungary the number of internationally competitive firms, ready and willing to obtain venture capital, is much lower than in the US or Western European countries. Hungary could take advantage of its competitive edges in some special fields of innovation. The efficiency of information flow would reduce the information gap between the demand and the supply side of the venture capital market and more Hungarian firms could be internationally successful through venture capital financing. The recent years' policy and special programs like JEREMIE generated more transactions, that helped to inform the entrepreneurs about venture capital and helped to co-invest public resources with private equity more efficiently, but the global crisis had negative impact on the industry. The venture capital backed small firms are more likely to create relatively higher economic growth, but because of their low number and the inadequate number of potential companies that are ready to receive venture capital, they can hardly have a high impact on total economic growth in the short run, even with the help of the JEREMIE program.*

Keywords: technology-oriented enterprises, venture capital

JEL classification: G24, M13

Venture capital as an alternative financial source – Special development of small and innovative technology-oriented firms

Innovative technology-oriented small and medium sized enterprises represent a very low proportion of small and medium sized enterprises, but they can become the accelerator of the economy, through their high growth potential, job-creating ability and innovation activity, and they can bring technological breakthrough to the economy. Hence the technology-oriented small firms have drawn the attention of economic policy in the 70's and 80's.

Defining innovative technology-oriented enterprises has difficulties. Innovative small and medium sized enterprises, knowledge based enterprises, spin-off companies, new

technology-oriented companies are all used terms in the literature. Although these are similar phrases, all of them emphasize different characteristics of the companies. The most important features of the mentioned enterprises are summarized below.

The entrepreneur; the founder and owner of the company is usually highly qualified, but does not have entrepreneurial and business expertise. The company uses advanced or high technology, but usually focuses on developing only one product, enters into a new market, has high risk level compared to other companies, and the access of internal and external sources is limited for them. The inherent novelty raises the question, whether its market potential is high enough. On the other hand the opportunity of taking advantage of the innovation's benefits is limited in time (*Makra 2007c, Storey-Tether 1998, EC 2001*). The knowledge based companies' most important competitive edge lies in their innovation activities, the majority of their assets are intangible assets, but evaluation of intangible assets causes difficulties.

Storey and Tether (1998) grouped the definitions used in the literature and separated them into a narrower and a wider interpretation. The narrower one contains new and independent companies that create a new industry. The more general interpretation contains those companies that take significant technological risks, in order to utilize an invention or a technological innovation. The definition used by the EU describes these enterprises as new or very young companies, and their key activities are developing, marketing and using new technologies (*European Commission 2001, 11. o*).

The new technology-oriented enterprises are companies that have not reached the stage of maturity. There are two types of these enterprises which types are science-oriented and technical-oriented. The first ones develop technologies, using results of basic research, the second ones develop further the basic technologies in order to adapt them to consumer demand. (*Makra 2007c*)

The phrase spin-off is used for a special segment of the technology-oriented small firms, referring to the fact that, these enterprises utilizing and marketing research results attained at universities and research institutes, which are generally patronized by technology and knowledge transfer offices (*Buzás 2004*).

The economic impact of innovative, technology-oriented small firms

The empirical researches in the field of small businesses' focuses on their impact on economy, like their stimulating effect on economic growth or their ability of generating jobs. According to the recent researches the development stage of the company is the most determinant factor in creating jobs: with the development of the enterprises their role in employment also becomes more important, their net new job creating ability decreases. According to the research of *Autio and Parhankangas (1998)* about technology oriented small firms' role in employment in Finland, the technology-intensive enterprises created much more jobs than companies of traditional industries. The research of *Almus and Nerlinger (1999)* about West German enterprises led to the same results. *Storey and Tether (1998)* identified that the number of the technology oriented firms' employees is low, but the growth rate of the number of employees is high. In addition to this we have to take into consideration their indirect effects on employment and the high quality of the created jobs (*Makra 2007c*).

The special development of innovative technology-oriented small firms

The innovative technology-oriented small firms have a special evolution, their failure rate is high as a result of their high risk level, but the successful ones can reach extremely high growth rates.

The determinants of the development path of these enterprises are subjects of many theoretical and empirical researches.

According to the traditional linear innovation models about the small firms' growth (*Autio 1997*) the development of small firms is the result of a process that has many stages. The creation of idea is followed by the establishment of a company, then human and financial resources are collected for developing the prototype, and in case the idea is viable, the firm enters into the stage of rapid growth.

According to *Greiner's (1972)* organizational growth model the development of all types of the companies has five stages: growth through creativity, growth through direction, growth through delegation, growth through coordination, growth through collaboration. At the end of all evolution-revolution stages occurs a problem that has to be solved in order to get to the next stage. Therefore the growth is highly depends on the management's skills, the past of the organization and the external industrial environment. Greiner tried to develop a general model, but precisely for this generalization it became the target of many critiques, mainly because not all the firms are growth oriented, the early stage is not detailed properly, the categorization of the firms according to their size is not correct, and the development stages are predetermined. *Churchill and Lewis (1983)* modified the five stage model by taking into consideration the characteristics of small enterprises. Their model contains the possibility of ceasing activity, changing strategy and devolution. The stages of development are existence, survival, success, rising and resource maturity. Each stage is characterized by an index of size, diversity, and complexity and described by five management factors: managerial style, organizational structure, extent of formal systems, major strategic goals, and the owner's involvement in the business. The model of *Kazanjan (1988)* is specially applied for new technology enterprises based on empirical organizational life-cycle research unlike the theoretical research of Churchill and Lewis. *Kazanjan* created a four-staged life-cycle model, which contains the stages of conception and development, commercialization, growth and at the end the stability.

In the eighties and nineties the theory of innovational systems replaced the linear growth theory, which places the innovation into a system influenced by external and internal factors in an institutional approach.

The resource-based (competence-based) growth model based on *Penrose's (1959)* theory considered the growth of the company as a dynamic process that is determined by unforeseeable events. The development of the company is formed by related internal mechanisms. An organization is the sum of the internal competence and knowledge created by the firms' members. The model concentrates on the early growth of the companies, where the criterion of survival is to be able to solve the resource problems through competence building. In the later stages follows the increase of growth, decline or accumulation of resources. There are several ways of development, so a general linear growth path for all companies does not exist.

Technology-based small firms, as a target of venture capital

The global financial and economic crisis has drawn the attention to entrepreneurship as an important source of innovation and economic growth. By the process of innovation ideas are generated and commercialized. University technology transfer utilizing state-financed research is a possible form of commercializing innovations. Innovative technology-oriented small firms with high growth potential could be possible targets of venture capital, so in this way they can be a potential source of economic growth.

The institutional venture capital and private equity investments are professionally managed capital investments into firms not listed on stock exchange, where the professional management is provided by specialized intermediaries. General partners raise funds, collect capital from individuals and institutional investors (from limited partners) to invest into portfolio companies not listed on stock exchange. These are typically hands on investment, which means that investors (general partners) play an important role personally in the management of the portfolio companies. The primary goal

of this long-term investment is to gain profits via exiting portfolio companies, selling stocks on a higher price (Prowse, 1998; Karsai, 1997; Becskyné, 2008).

The status of innovations

The Hungarian innovation system has developed progressively despite the crisis. In the Global Innovation Index (GII) Switzerland, Sweden and the United Kingdom were ranked as the first three most innovative countries. Hungary was positioned by the Global Innovation Report 2013 as an innovation learner, an efficient innovator, and is among the eighteen¹⁵ emerging, high- and middle income economies, as a high income one. These economies improve rapidly their innovation capabilities, demonstrating a 10% or even higher level of innovation compared to other countries with similar income level as a result of good policies of institutions, skilled labor force, innovation infrastructures, integration with global markets and linkages to the business community. Hungary ranked first in the world in the Audiovisual & Related services exports index, and is among the first ten in FDI net outflows (%GDP) (ranks 5th), Knowledge absorption (rank 6th), Creative goods exports (%) (ranks 7th), and as a total index of Knowledge & technology outputs it ranked 13th. The indexes also shows what has to be learned or developed in Hungary: in the Market sophistication index Hungary ranked the 87th spot, because of the low rankings of Microfinance gross loans, Investments, the Ease of protecting investors and the Market capitalization, where the country ranked around 100th (Cornell University, INSEAD, and WIPO, 2013).

In Hungary some special innovation factors are among the bests in the OECD countries, e.g. the Audiovisual & related services exports, FDI net outflows, Knowledge absorption etc., but it has to learn more in the fields of Microfinance gross loans, investments, ease of protecting investors and market capitalization. So if the financial environment were more developed, by taking advantage of their special competitive edges, there would be more innovative venture capital backed firms. The changes in financial situation concerned the parameters illustrating the management of the enterprises, influenced the competitiveness, profitability, effectiveness, etc. (Herczeg, 2009, Fenyves-Tarnóczy, 2011).

In this learning process innovation hubs would mean an important supporting role. Innovation hubs can help in creating a differentiating capabilities system that offers a sustainable competitive advantage. In innovation hubs, like Silicon Valley, hundreds of ideas are generated, and as a result of high concentration of prospering companies, more and more amounts are invested in research and development, accelerating the process of new product creation. Public and private sectors have important roles in developing an appropriate innovation ecosystem, in order to support innovations (Cornell University, INSEAD, and WIPO, 2013).

Entrepreneurship as a source of innovation

According to the survey Flash Eurobarometer Entrepreneurship in the EU and beyond published by the European Commission in 2010 87% of respondents answered, that the appropriate business idea was important, during the decision making of starting a business. 84% of the respondents answered, that it was important to have the necessary financial resources.

The survey examined the reasons for preferring self-employment. The reason “personal independence, self-fulfillment and the chance to do something of personal interest”

¹⁵The eighteen countries are: the Republic of Moldova, China, India, Uganda, Armenia, Viet Nam, Malaysia, Jordan, Mongolia, Mali, Kenya, Senegal, Hungary, Georgia, Montenegro, Costa Rica, Tajikistan and Latvia

ranged from 43-45% in Iceland and Japan, to 83% in Hungary. The “better income prospects” was the second most popular reason among Hungarian respondents, reaching the highest rate ranking from 4% in Finland to 60% in Hungary. The “freedom to choose their own place and time of work” ranged from 18%-21% in Greece and Germany to 68% mentioned in Luxemburg. In Hungary 48% of respondents chose this reason. Hungarian respondent were the most likely (26%) to say that they would prefer self-employment to be able to realize a particular business opportunity (European Commission, 2010). According to this survey, Hungarian respondent’s entrepreneurial motivations are mostly defined by the personal independence, self-fulfillment and the chance to do something of personal interest and better income prospects. The freedom to choose their own place and time of work is also an important reason to become an entrepreneur. In this interpretation, innovation is not among the motivators of most entrepreneurs, but entrepreneurs founding high-growth potential firms can create a special segment of companies.

Status of start-ups especially for high growth potential

The recent crisis, characterized by tighter credit restrictions, has arguably hampered new start-ups and impeded growth in existing start-ups as well as their ability to survive in tough market conditions. The significant rise in business closures, especially in case of micro and small enterprises, in recent years, bears stark witness to these difficult conditions and highlights the need for statistics on entrepreneurship that can support policy makers. Entrepreneurship at a Glance contains a wide range of internationally comparable measures of entrepreneurship designed to meet this need.

According to the survey made on behalf of the OECD (Entrepreneurship at a Glance 2013), the start-up rates still remain below pre-crisis levels in most Euro area economies, but tentative signs of stabilization are emerging. The high-growth enterprises generally represent on average only a small share of the whole enterprise population, ranging from 2% to 4% for most counties, measured on the basis of employment growth. On the basis of turnover the shares were twice as high, but both measures were still lower than in 2006 in almost all counties. The share of high-growth firms were higher in the service sector, than in manufacturing, in all counties for the measures based either on employment or on turnover. The rates of Hungary were around average (OECD, 2013).

Status of venture capital investments especially for classical ones

Initial studies found, that venture capital investors prefer financing founders with higher qualification (Macmillan-Siegel-Subbanarasimha 1985, Birley-Lelelux, 1996, Shepherd-Ettenson, Crouch, 2000). According to the empirical evidences provided by Ortin-Angel and Vendrell-Herreto (Ortin-Angel – Vendrell-Herreto, 2009) young university spin-offs attract more venture capitalists than other technological start-ups, explained mainly by the lack of managerial skills among these firms’ founders. Others found that founders of university spin-offs have higher formal education levels (Siegel-Waldman-Link, 2003), but fewer managerial skills than founders of other start-ups (Shane 2004, Vohora-Wright-Lockett, 2004).

In the majority of OECD countries, venture capital investments represent a very small percentage of GDP, e.g. often less than 0.03%. Israel and the United States have outstanding rates, 0.5% and 0.2% of GDP respectively, that indicates a mature venture capital industry in these two countries. In a parallel way the crisis has affected the venture capital industry in all OECD countries, and the level of venture capital investments was around 60% of the levels measured in 2007 in most counties, only Ireland and Luxemburg exceeded the pre-crisis level.

40% and 30% of venture capital investments in the US and in Europe were made on the field of life sciences. Investments target companies in their start-up and later-stage ventures; and only a very small number of companies are backed by venture capital (OECD, 2013).

Zhang (2008) found that university spin-offs have higher survival rate, but in terms of the amount of venture capital raised university spin-offs do not show significant differences, such as the probability of IPOs, making profit or the size of employment.

According to the size of the Hungarian venture capital and private equity industry (VC&PE industry) measured as “a percentage of the value of investments into companies headquartered in Hungary as a proportion of the country’s GDP” (Karsai, 2013, pp. 25) Hungary had a prominent rate among the EU and even among the OECD members (OECD, 2013), although for the investment/GDP the ranking of Hungary has dropped from the fifth in 2006 to the 22nd in 2010. Although the size of the venture capital and private equity market had high rankings, usually it was influenced by high value individual buyouts (Karsai, 2013).

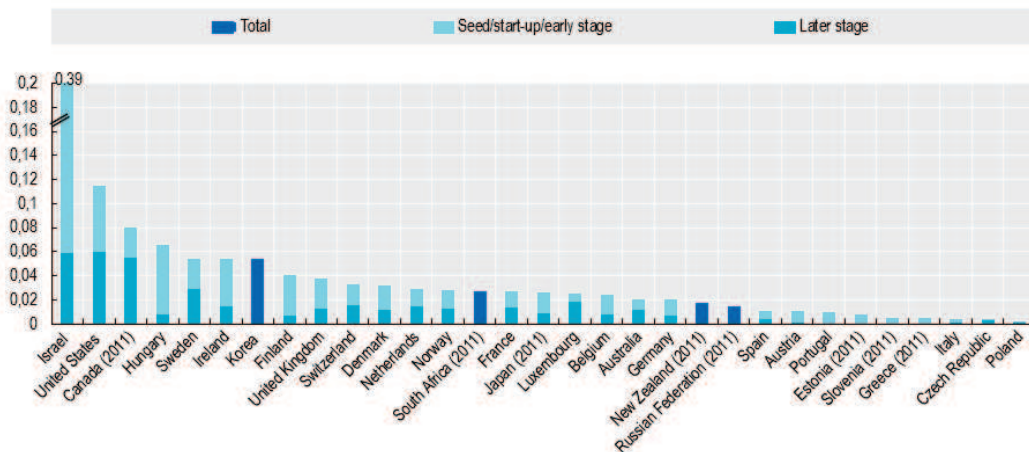


Figure 1: Venture capital investments as a percentage of GDP (US dollars current prices), Percentage, 2012

Source: Entrepreneurship at a Glance 2013 - © OECD 2013

The Hungarian classical venture capital market, financing small and medium size enterprises with a high growth potential, has usually got the lowest rankings in Europe, typically below 10% of the EU average. In the period 1989-2010 approximately half thousand investments were made in classical venture capital investments in Hungary. The number of enterprises getting venture capital during the twenty year period was only 0,2% of the double entry bookkeeping enterprises in Hungary, though in the EU 6% of the small and medium sized enterprises got venture capital investment. According to the OECD survey the number of venture capital backed company rate per 1000 enterprises was 0,02, though the OECD rate was around 0,28. These low rates are because of the relatively young venture capital market and less developed capital market. According to Hungarian researches the barriers of the classic venture capital investments are not deriving from the supply side, but the demand side (Karsai, 2013).

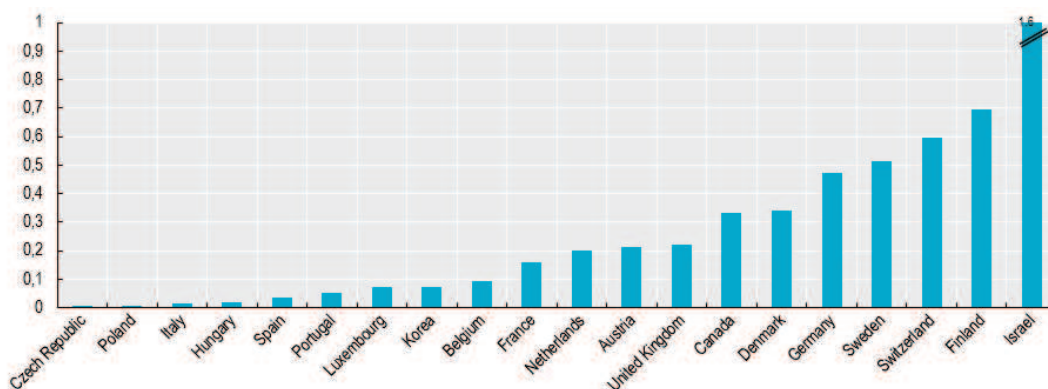


Figure 2: Venture capital backed company rate, Per 1000 enterprises, 2010
Source: Entrepreneurship at a Glance 2013 - © OECD 2013

According to a survey made in 2008 (Szerb, 2009) only 0,25% of Hungarian SMEs, are suitable for VC investments, and the potential targets of institutional and venture capital investors are around 400 to 600 firms. Before the dot.com bubble the lack of these investments were caused by low quality management. According to the recent surveys, the barriers of the investments are not only the information gap between the demand and the supply side, and the lack of the supporting organizations, but also the poor competitiveness and low level of innovations and still the low quality of the management, so the enterprises are not ready for venture capital investment (Karsai, 2013).

The venture capital backed enterprises were more competitive than others, and showed higher differences on the field of the individuality of the product, quality of technology and the continuity of innovation (Szerb, 2009).

So the innovative, technology-based small firms with individual product have high growth potential, and in this context automatically become potential targets of venture capital investors.

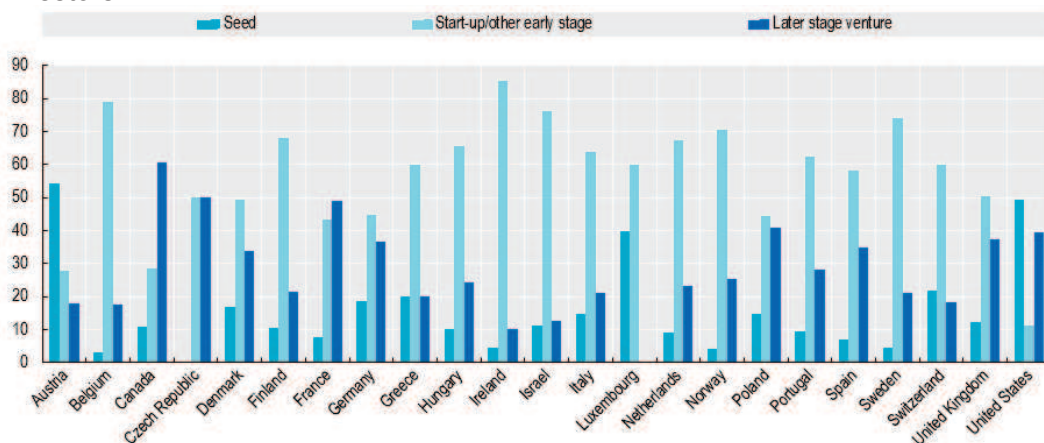


Figure 3: Venture capital backed companies by stage, Percentage, 2011
Source: Entrepreneurship at a Glance 2013 - © OECD 2013

According to a survey about Hungarian spin-off companies (Becsky-Nagy, 2013) the founders of spin-offs find that the involvement of venture capital investors restricts their freedom in decision making and it can remain an important obstacle for venture capital financing. The creation and growth of university spin-offs can be stimulated by lowering information asymmetry and facilitating contact and trust between venture capitalists and entrepreneurs, especially in cases where the lack of managerial skills of entrepreneurs

occurs. The founders generally do not have enough managerial skills and they are not able to write high quality business plan.

Conclusions

For the entrepreneurs the most important challenges of starting a business are the appropriate business idea and the necessary financial resources. The Hungarian entrepreneurs are mostly motivated by personal independence, freedom and better income prospects and not by innovation. In case of venture capital investments the entrepreneur has to give up a part of the independence and needs to cooperate with the investor to create companies with high-growth and the possibility of international business success. In Hungary the number of internationally competitive firms, ready and willing to obtain venture capital, is much lower than in the US or Western European countries. Hungary could take advantage of benefits in some special fields if innovation, as the country has the best rates in some indicators of innovation. The increased efficiency of information flow between the venture capitalists and entrepreneurs would lead to more transactions and more Hungarian firms would reach international successes. The recent years' policy and special programs like JEREMIE generated more transactions, that helped to inform the entrepreneurs about venture capital and helped to co-invest public resources with private equity more efficiently, but the global crisis had negative impact on the industry. The venture capital backed small firms are more likely to create relatively higher economic growth, but as a result of the low number of occurring and potential venture capital backed companies, they can hardly have a high impact on total economic growth, even with the help of the JEREMIE program.

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