VENTURE CAPITAL IN HUNGARIAN ACADEMIC SPIN-OFFS

Becsky-Nagy Patrícia [1]
Faculty of Applied Economics and Rural Development of the University in Debrecen, Hungary

Abstract: *As part of a research about Hungarian academic start-ups, I made a survey examining part of the answers of a long questionnaire created for the whole research filled in by academic spin-offs of most important Hungarian universities.*
The study is structured as follows. First I will present the most important operational information on university spin-off companies taking part in the research. Then I will give an insight to the details of financing spin-offs, thoroughly analyzing the institutional and the non-institutional venture capital and the role of funding opportunities – applications. I examine which financing sources dominate in academic spin-off companies, what are the experiences of the spin-offs in the fiel of the three financial sources mentioned before, in order to be able to answer how would what kind of changes would be needed to subserve venture capital financing Hungarian spin offs, with high growth potentional. The study ends with a summary.

JEL classification*: G24, venture capital*

1. Introduction

The goal of our research was to assess, get to know as widely as possible the pioneering national university spin-off companies. As a *first step*, based on the definitions found in the professional literature we created *our own definition*, which we used throughout the assessment. During the research we considered companies of founders who have developed technologies or created research results through their university work and utilized these within them – as spin-off companies. The determination follows the narrower interpretations. The researcher had to be a university associate in the moment of company foundation, however it was not expected from them to give up their academic careers. Moreover, we did not expect from the parent-university to have a formal connection (ownership or contractual) with the company. Concerning the immaterial means passed to the spin-off companies we also applied limitations: it had to be the passing of an intellectual property based on some kind of new technology and/or a codified knowledge. The parent institution had to be a state university.[2]

The assessments were taking place in four large university cities, in Budapest, Debrecen, Pécs and Szeged. There is no available integrated database, statistics on the national spin-off companies, which made the research difficult, therefore as a *second step we developed a database*. To identify potential university spin-off companies the researchers participating in the research used their own personal contact systems, the university technology-transfer offices, as well as internet sources. During the implementation we succeeded in identifying 80 university spin-

[1] assistant professor, Faculty of Applied Economics and Rural Development of the University in Debrecen

[2] In two cases the parent institution independently or together with the university, but it was an academic research institute.

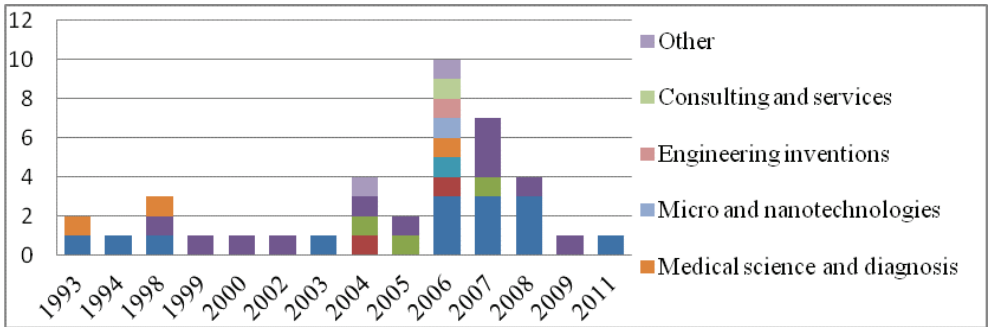
off companies, and half of them, 40 companies we successfully involved in the personal queries. According to our estimations, we succeeded in identifying half of the national university spin-off companies in line with our definition. We layered the sample based on the geographic locations of the companies' real activities, 40% of the queries are located in Budapest, while 20%-20% to the provincial cities.
During the research we implemented a questionnaire-based personal query. *The third step* examined the composed questionnaires, beside the companies' basic information (company name, headquarters, year of foundation, sector of activity, knowledge-intensive industry, information from annual reports), also the innovative activities and intellectual portfolio, the founder researcher as a person, his/her motivations, social capital, and the companies' connection and cooperation with the parent-institution. Moreover, information on the companies' functioning, growth, performance and financing were also subjects of detailed analysis. For the uppermost accuracy we tried to make the personal interviews with the founder university researchers in all cases, the queries lasted for 45-60 minutes in average. Hereinafter we will present *the main empirical results* from 38 filled questionnaires[3].

2. The Hungarian university spin-off companies' activities

The Figure 1 shows the number of Hungarian spin-off companies participating in the assessment by the year of foundation and knowledge-intensive activity sectors. As indicated on the diagram, more than half of the companies participating in our research were founded between 2006 and 2008, right before the outburst of the global economic crisis, mainly in the field of information communication technologies and biotechnology. Until 2003 university spin-off companies were founded solely in the fields of biotechnology and pharmaceutical industry, medical science and diagnosis, as well as information communication technologies. From 2004 the range of new companies got more colorful by chemical industry, consulting and services, engineering inventions, micro and nanotechnologies, other natural sciences, as well as electronics.
We can see reduction of the number of company startups, which can be partially explained by the crisis, which have started in 2008 and escalated in 2009, which influenced the financing of universities on one hand, and on the other led to the drying out of the funding sources that were abundantly available in the period of 2004-2007, after the enforcement of the act on research and development and innovation.
The 59,5% of the questioned companies develop products based on new technology and sell them to business consumers and 51,4% provide innovative services for business consumers, therefore more than a half of the companies apply the B2B (business to business) business model. Compared to the previous a lot less 27% and 24,3% from the same activities sell directly to the consumers in other words they apply the B2C (business to consumer) model. Only 13,5% of the companies sell new (basic) technologies. (Figure 2)

[3] Two companies were excluded from the sample since they did not comply with our definition.

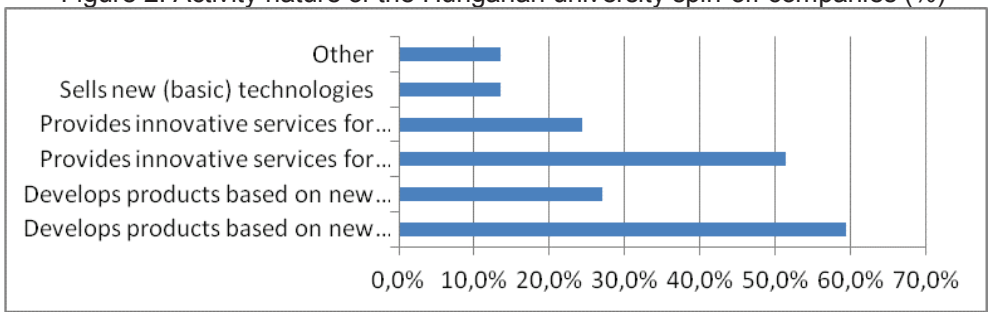
Figure 1: The number of Hungarian university spin-off companies by knowledge-intensive activity sectors and the year of foundation in 2012 (pc)



Source: own compilation

The 59,5% of the questioned companies develop products based on new technology and sell them to business consumers and 51,4% provide innovative services for business consumers, therefore more than a half of the companies apply the B2B (business to business) business model. Compared to the previous a lot less 27% and 24,3% from the same activities sell directly to the consumers in other words they apply the B2C (business to consumer) model. Only 13,5% of the companies sell new (basic) technologies. (Figure 2)

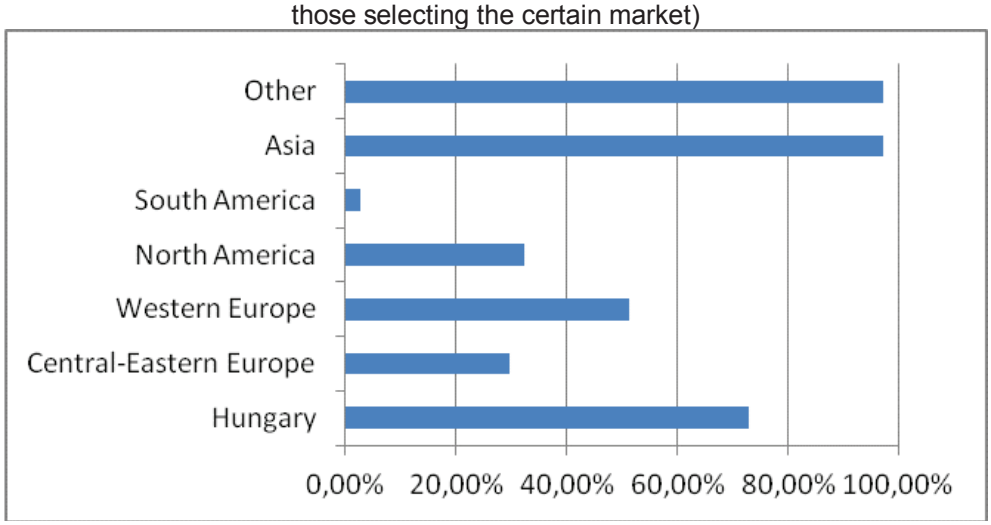
Figure 2: Activity nature of the Hungarian university spin-off companies (%)



Source: own compilation
Comment: multiple answers allowed

The main markets of the companies based on the current or planned revenue are shown on the Figure 3 97,3% of the respondents ticked Asia, 73% Hungary, 30-50% European countries, but North America counts or could count as a market only for one third of the companies. The Northern European countries, Africa, Australia, etc. were in the other category, and it was ticked by almost all respondents just like Asia.

Figure 3: Target markets of the Hungarian university spin-off companies (% of those selecting the certain market)



Source: own compilation

3. The financing of Hungarian university spin-off companies

The Table 1 shows the percentage of the companies within the sample reporting to have been received financial support in the given phase of growth. Since the current phase of lifecycle is different among the companies, hence the company being in an early phase could not have chosen an answer of e.g. financial support for expansion, but the data in the columns can be compared with each other. Two-thirds of the companies used their own savings in the seed period, while one-third received non-refundable financial support from the state. The companies that financed their activities through involving a foreign capital or an angel investor or a close family member, also reached the high percentage of 22,2%.

In the start-up phase the non-refundable financial sources got the most scores as financing sources (41,7%), the own savings got the second place (36,1%). The sequence is very similar among other companies being *in other early stages or early expansion*, where the respondents ranked 33,3% and 19,4% the above mentioned sources. In the phase of *expansion* most of them selected the non-refundable sources, but the own savings were preceded by close family members and financing through customers. By the way, financing through customers in all phases indicated 16,7%.

In the start-up period the venture capital financing received the highest proportion, which were followed by the period of early growth and seed, but in the expansion period non of the companies received venture capital. Financing through distant family members, friends, other non-financial companies and suppliers were selected in little number, and an even smaller proportion chose the refundable state support (e.g. preferential loans), parent companies as well as short term and long term bank loans. The short term bank loans were selected in the early growing stages, while the long term bank loans in the start-up phases in 13,9% and 11,1%. The significance of university sources is similarly low, it only got over 10% in the seed phase. Overall, the Hungarian spin-off companies within the sample primarily rely on

own resources and non-refundable state funds in financing their activities, and the 3F-s' role is also significant (family, friends, fools – i.e. strangers) in the seed and start-up phases.

Table 1: Financing sources of the Hungarian spin-off companies in the various phases of their lifecycle (proportion of those indicating the given answer compared to the total number of responents, %)

Financial sources	Seed	Start-up	Other early	Expansion
Stranger individual/external capital/angel investor	22,2	13,9	2,8	2,8
Distant family members, friends	2,8	0	2,8	2,8
Close family members	22,2	11,1	5,6	16,7
Own savings	66,7	36,1	19,4	8,3
Other non-financial company	5,6	2,8	2,8	0
Venture capital company	5,6	13,9	8,3	0
Refundable state (EU) support	8,3	5,6	2,8	0
Parent company	5,6	11,1	8,3	2,8
Non-refundable support	33,3	41,7	33,3	19,4
Short term bank loan	2,8	2,8	13,9	2,8
Long term bank loan	5,6	11,1	8,3	8,3
University	11,1	8,3	8,3	2,8
Supplier	2,8	2,8	2,8	2,8
Customer	16,7	16,7	16,7	16,7

Source: own compilation
Remark: more answers were acceptable

The institutional venture capital does not mean general funding source for them, despite the fact that technology-oriented companies, in the same time spin-off companies with big expansion potential are more likely to receive venture capital than other companies.

7.1. The institutional venture capital financing of the Hungarian spin-off companies

The respondents indicated their experiences connected to venture capital financing in all different cases on a five-point scale (Table 2). Considering the average of the answers the highest value was reached by the variable indicating that the venture capital investors do not know enough about the given technology. The international competitiveness of the applied technologies do not mean problems in the aspect of

the growing of the companies as mentioned previously, but in the aspect of finding investors it doesn't. The new nature of the technology may cause this information gap, therefore the venture capital investors do not know the applied technology, but if – not only in the owners' opinion of realistically – the technology or the product is internationally competitive, there would probably be will from the venture capital investors' side to finance the company. The availability of the venture capitals for the spin-off companies could be resolved through dissolution of the informational asymmetry.

The venture capital investors do not like to invest small amounts, which is the second significant problem and a problem also confirmed in the international literature, is the venture capital investors moved in the direction of financing companies in later phases of growth or companies with bigger capital needs and mainly to out buying due to economics of scale reasons. The developed capital gap and informational asymmetry together result in a financing gap in the early stage (Becskyné, 2008; Freear et al., 2002; Freear et al., 1994; Freear and Sohl 2001). The financing gap could be overbridged through angel investors and through angel investors' networks. The supply of venture capital of the spin-off companies is also trammeled by the high yield expectations of the investors, which is an internationally known an characteristic of the supply's side similarly to the previously said, since usually the industry is characterized by great growth potential, aiming at international markets, promising high yield of investment when exiting (Karsai, 1997). On the demand side, namely from the companies' view the most important problems arising are the fear of freedom of decision restraint, on the other hand they do not have adequate entrepreneurial and management skills. These are general problems in other countries, too, but as long as the change in approach does not happen, the spin-off companies cannot expect to receive higher venture capital financing than before.

Table 2: The experiences of the Hungarian university spin-off companies in the field of venture capital financing

Value	Opinion
4,0	The venture capital investors do not know enough about the given technology
3,7	The venture capital investors do not like to invest small amounts
3,6	The venture capital investors have high yield expectations
3,5	The involvement of venture capital investors restricts the company leader(s)' freedom of decision during the functioning of the company
3,2	The venture capital investors averse to financing seed, start-up or early stage companies
2,9	The investment is hampered by the low quality business plan
2,8	The investment is hampered by the lack of entrepreneurial, management skills
2,7	The economic policy does not support enough the venture capital investments
2,6	There is not enough information about the venture capital investors

2,6	The possibilities of exiting of the company for the venture capital investors are bad

Source: own compilation

7.2. The informal venture capital financing of the Hungarian university spin-off companies

In the aspect of angel investors the respondents identified the biggest problem to be in the small number of angel investors and the lack of angel investor's networks in Hungary (Table 3). So the angel investors are not the solution for the financial gap formed through institutional venture capital's international tendency neither in the aspect of university spin-off companies. According to the respondents the economic policy's insufficient support for angel investor nature investments is a significant burden. Government intervention on both demand and supply side could contribute to the efficient functioning of the informal venture capital segment and to the advantages of potential possibilities, but the government must not in any way take over the role of the angel investors (Karsai, 2002), namely it can only support the functioning of the industry indirectly, by improving the investment environment on the supply side, and by creating an entrepreneurial environment stimulating innovation on the demand side (Kosztopulosz - Makra, 2004). The change of entrepreneurial attitude, the change of approach of individuals having adequate capital for informal investments, and the creation of an entrepreneurial layer with management skills could lead to results in this area.

The informative gap connected to angel investors means a similar problem to the respondents as in the case of institutional venture capital, but according to the international literature the informational asymmetry is intensified in this case, namely the companies seeking capital and the angel investors find each other even harder (Harding, 2002). Since the role of angel investors in Hungary is minimal, hence the biggest problem lies in the lack of angel investors and not in the efficiency of the industry's functioning. The second step in the segment's development is the development angel investors' network, which could play an important role in overcoming the second financing gap ensuing from the redirection of formal capitals to later phases (Aernoudt, 2005). According to Wheatherby (2007) the financial gap is getting narrower in the western countries resulting from their market reactions, since the "super angels" and their groups overbridge the problem, and on the other hand the initial capital requirements of certain technology-oriented companies, especially of internet companies significantly dropped.

Table 3: The experience of the Hungarian university spin-off companies with angel investors

Value	Opinion
4,7	There are only few angel investors in Hungary
3,6	The angel investors' networks (partner mediator organizations) are missing in Hungary
3,6	The economic policy does not support sufficiently the angel investor nature investments
3,1	The professionalism, expertise of the angel investors is insufficient
3,1	The investment is trammeled by the lack of entrepreneurial and management skills of the company leaders seeking capital
3,0	The exiting possibilities of the angel investors are limited
2,6	The angel investors do not understand our company's technology
2,6	The quality of the business plan of the company seeking capital is unacceptable
2,5	The company owner(s) do not wish to share to any extent their control over the company with an external party
2,3	There is not enough information available on the role and characteristics of the angel investors
1,9	The angel investor does not have the needed sum of capital
1,9	The angel investors' yield expectations are too high

Source: own compilation

7.3. Financing of the Hungarian university spin-off companies through application possibilities

We could already see at the selection of financing methods based on lifecycle phases that the non-refundable state funding is one of the main resources of the spin-off companies, and as I mentioned already 62% of the respondents already received state or community funding. Most of the respondents find the application procedures too bureaucratic, but they believe that these fundings helped the development of their companies. According to the respondents the delay of the call for proposals and imbursements makes the planning and functioning of the companies difficult. The difficult implementation of obligatory commitments and the too high own contribution in the aspect of companies is moderately valid. The companies find it least important that the applications redirect the company's focus from the markets and that the decision making processes are impenetrable and corrupt (Table 4).

Table 4: Experiences of Hungarian university spin-off companies with application procedures

Value	Possible answers
4,2	The application procedures are too bureaucratic
4,1	The funding through application helped the development of our company
3,9	The eventuality and delay of call of proposals make planning difficult
3,9	The delay of imbursement made the functioning and the development of our company difficult
3,0	The obligatory commitments connected to the application are hardly implementable
2,9	The required own contribution is too high
2,6	The call for proposals redirect the company's focus from the market work
2,3	The decision making concerning of applications is impenetrable and corrupt

Source: own compilation

8. Summary

Most of the Hungarian university spin-off companies included in the sample were established between 2004 and 2008. Parallel to the global economic crisis the propensity for spin-off company establishment dropped, in the past four years only two companies were established. Most of the spin-off companies are connected to biotechnology and pharmaceutical industry, as well as information communication technology among the knowledge-intensive activities. In the aspect of business activities for the companies the "business to business" model is more characteristic than the „business to consumer". The main markets if selling are the ones in Asia, but Hungary is also a significant target.

The biggest problems in the aspect of venture capital financing are the informational asymmetry and the shifting of the investors' interest on later phases in the lifecycle. The companies find it hard to give up their independence in decision making and they are not ready for venture capital involvement, which impedes the realization of venture capital investments. The biggest obstructions of angel investments are the small number of professionally prepared angel investors in Hungary and the lack of angel investors' networks, too. The biggest problems of application procedures are the overloaded bureaucracy and unpredictability.

Summarizing all, the companies see their most important financing possibilities in applications and non-refundable sources, namely they expect from the government to directly support them with "soft" money. The companies primarily expect from the government to cover their capital needs for growth, even after the state financial resources dry out. The government on the other hand could support the faster growth of spin-off companies through the stimulation of both demand and supply side of the institutional and informal venture capital industry, and that growth would also contribute to the development of the national economy.

Bibliography

Aernoudt, R. (2005) Executive Forum: Seven Ways to Stimulate Business Angels' Investments. *Venture Capital,* 4, pgs. 359–371.

Becskyné Nagy P. (2008) *A kockázati tőke hozzáadott és „elvett" értéke.* Doktori értekezés. Debreceni Egyetem Közgazdaságtudományi Doktori Iskola, Debrecen.

Freear, J., Sohl, J. E., Wetzel, W. E. (1994) Angels and Non-Angels: Are There Differences? *Journal of Business Venturing*, 9, pgs. 109–123.

Freear, J., Sohl, J. E., Wetzel, W. (2002) Angles on angels: financing technology-based ventures – a historical perspective. *Venture Capital,* 4, pgs. 275–287.

Freear, J., Sohl, J. E. (2001) The Characteristics and Value-Added Contributions of Private Investors to Entrepreneurial Software Ventures. *Journal of Entrepreneurial Finance,* 6, pgs. 84–103.

Harding, R. (2002) Plugging the knowledge gap: an international comparison of the role for policy in the venture capital market. *Venture Capital: An International journal of Entrepreneurial Finance*, 1, pgs. 59–76.

Karsai J. (1997) A kockázati tőke lehetőségei a kis- és középvállalatok finanszírozásában. *Közgazdasági Szemle*, 2, pgs. 165-174.

Karsai J. (2002) Mit keres az állam a kockázatitőke-piacon? (A kockázati tőke állami finanszírozása Magyarországon). *Közgazdasági Szemle*, 11, pgs. 928–942.

Kosztopulosz A., Makra Zs. (2004) Az üzleti angyal hálózatok szerepe az informális kockázatitőke-piac élénkítésében. Botos K. (szerk.) *Pénzügyek a globalizációban* SZTE GTK 2004. JATEPress, Szeged, pgs. 96–118.

Weatherby, L. (2007) Capital gap is shrinking. 2007. október 17.