Academic Spin-off Ventures and Corporate Spin-off Firms at the High-Tech Industries

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ABSTRACT
In the 80s and 90s, the accelerated development of technology caused several changes in most of sciences, even in the field of business formations. The classical value chain transformed, the university science centres obtained a bigger focus and the role of research organisations is getting more and more important. New business form emerged and became popular: the academic spin-off firm. However, the spin-off companies are well-known and widely used ventures in the corporate business for a long time, especially at technology-oriented industries. For the time being, there are plenty of literatures and completed survey available regarding both academic and corporate spin-off. Some of them are engaged to reveal the critical success factors of spin-off companies and several models were created. The hypothetical question of this study whether common success factors are existing for both type of spin-off even if they are established in quite different environments. Using the relevant international literature and available public data of academic and corporate spin-off firms, six aspects were investigated: Raison d’etre, management, investment, networking, location and relation to intellectual property. As a result of this study, common success factors of spin-off companies having different origins could be identified.

INTRODUCTION
In the second half of twentieth century, the innovation, the new technologies and the scientific research and development became as important factor in the economy as never happened in the past. Both business sector and the non-profit society realized that gaining support for R&D departments and training more and more scientists are essential. Several new research organisations were created, universities enlarged their research abilities and the companies started to pour money into new research projects and established special departments. Such kind of environment fostered new venture forms which are more capable to utilize the cutting-edge technologies, to convert the scientific results into market success. Spin-off firms became well-known phenomenon both in academic life and in the world of corporates. However, the reasons for founding spin-offs, ways of their management and lifecycles show differences.

In 1980, in the USA the Bayh-Dole law gave a permission for governmental funded research organizations to patent their scientific results and technologies which invented and created by using public money (Búzás, 2004). This was an important milestone, since then the number of created spin-offs is multiplied. Massachusetts Institute of Technology is a pioneering organization in this endeavour. It spun off averagely 25 companies each year in the 1980s. In 1996 the equity on sales of spin-off companies spun off from United States universities totaled 25.3 million USD. (Bray, 2000)

The evolution of academic spin-offs took place due to the need for a transformation process. The result of academic research, the evolved knowledge cannot easily put onto the market because its complexity would be an obstacle to be instantly useful for industry. Therefore a
special process is needed which called knowledge transfer or technology transfer. The technology based spin-off firms can proceed this transformation through which the scientific knowledge is being converted into technological knowledge (Autio, 1997). Academic spin-off companies can be classified according to their role played in the knowledge transfer. Some firms are really dedicated to help with bringing scientific result to the market. Another ones are established to improve exploitation of certain technologies or knowledge were already applied to industry but used only to less extent. At last, but not at least, some academic spin-off firms act as real intermediary between industry and universities to identify the market needs and to match possible academic-evolved solutions (Fontes, 2005).

There are more approaches how to define the spin-off companies. Niosi(2003) collected the most widespreaded definitions: based on the Statistics Canada (2003, p.38), a spin-off can be defined as a company which founded for the following purposes: „Type 1: to license the institution’s technology; Type 2: to fund research to at the institution in order to develop technology that will be licensed by the company; Type 3: to provide a service that was originally offered through an institution’s department or unit.” Cooper’s simple approach (2001) is that spin-off firms are specialized to commercialize the technology which owned by the universities or university researchers. Another definition is stressing that university spin-offs have to be characterized by three criteria: 1, company founders have to be university-origined or related; 2, the company has to be based on ideas or technology evolved in university; 3, the knowledge transfer has to happen through direct link between spin-offs and universities, avoiding another intermediary (McQueen, 1982).

As regards the corporate spinning-off, this is a well-known phenomenon for decades. Svenska Kullagerfabriken spun-off from Volvo in the 1920s is known as a prototype of them (Búzás, 2004), (Törö, 2006).

The literature generally determine the corporate spin-off as a divestiture of a parent firm. Woo (1992) worked out a classification for divestitures providing three sorts of them: 1, the sell-off which „occurs when the divested assets are purchased and become a part of another firm” (Rosenfeld, 1984, p.1437); 2, the leveraged buyout, when a part of the company or a part of assets of company are bought out by investors wich generally include the former management; 3, this is the spin-off when the parent company transfers a certain part of its assets or a whole unit to its own stakeholders creating a brand-new legal entity.

Stonham (1997) specified two kinds of divestitures: One is the „sell-off” occurs as a simple selling out some assets or property to a third party and the other is the „spin-off or demerger” when a new firm is being created.

Several authors describe limited succes rate of spin-off companies with both origins (Woo, 1992 ; Clarysse, 2005) and investigate the possible succes factors, the fundamentals of better performance and the diligent strategy (Bantel, 1998).

Extant literature poorly provided comparative studies between corporate spin-offs and academic spin-off firms. In this paper I devoted to collect certain factors from both academic and corporate side which can affect the success rate of spin-off companies. I was to analyse which are the similarities and which are the fields where similarities are lacking. I focused on raison d’etre of spin-offs, management, investment/financing, networking, location and intellectual property as investigational fields.

RAISON D’ETRE

Differences can be revealed among the main raisons for „birth” of spin-off companies of business and universities.

The main question for a university having devised intellectual property is spinning it off or licensing it out. If the organisation chooses to establish a spin-off it means to take an equity in the newborn firm. Why does taking equity make sense for universities and public research
organisations? Firstly, the average value of equity is usually higher than the average yearly revenue generated by licenses. Bray and Lee (2000) presented a survey of 16 American academic spin-off companies whose equity sales were investigated. These firms were public companies. The figures were given from sold stock can be deemed as a good indicator as financial reward of taking equity in public spin-off firms. The comparison of equity sales with the traditional license fees and relating annual royalties shows that equity sales can produce 10 times more annual income than the traditional license-related revenues. Of course, so-called „jackpot-license“ is existing. The patented idea would turn into a market blockbuster and royalties can pay off quite well: for instance, Michigan State University earned 80 million USD from two well-known cytostatic drugs (cisplatin and carboplatin) were licensed by Bristol-Myers Squibb, big pharma company. Unfortunately, jackpots are not easy to find. The job of licensing managers and well-established licensing strategy is also a success factor of spin-offs, which will be detailed in this paper latter.

The second reason why reasonable for universities to remain in business that they can get more freedom to act when the situation changes: If the patented idea or technology are happened to replace with a new one, which is happening frequently nowadays, the spin-off cannot abandon the university’s property without control. In opposite case, if the spun out idea is happened to get in focus and gaining its value on the market suddenly, the university can sell it out as a „jackpot license“.

Several authors refer to the corporate spin-off as an alternative form of divestiture (Nixon, 2000). When a company considers divesting a part or unit of its organization, it has to face two main choices: spinning off or selling off. Steiner (1997) revealed four basic characteristics which determine the probability of corporate sell-off decisions. Lower market performance and consequent smaller operating margin frequently make officers decide to sell off. The appearance of distressing financial problems gets decision-makers consider to sell off certain assets. The larger the number of business units, the more eagerly corporates wish to reorganize themselves and, probably to sell off some its segment. It was also an experience if the level of ownership of managers is lower, they are more probably could be convinced to sell off assets.

Nixon et al. in 2000 accomplished a study involving 128 demergers which include 84 sell-offs and 44 spin-offs. They examined the divestitures’ market performance, financial distress, number of business segments and focus, measures of internal and external control using statistical methods. The target of that study was to analyse the choices between spin-offs and sell-offs. As a result of the analysis, it was proven that the organisations’ need for cash is a decisive factor. The more starving a company is for financial injection, the more probable to prefer selling off its assets than creating spin-off. Another results indicate that the companies having reduced number of directors on the board and being regulated by separate CEO are more likely to decide to establish spin-off firm instead of selling-off units.

If we compare the university and corporate decisions upon selling-out/licensing-out some assets or intellectual property or preparing a spin-off, can be found possible similarities. To investigate the raison d’etre of spin-offs at both university and business sides, resulted the following conclusions:

University decisions on early licensing-out and corporate decisions on selling-out can be happened due to similar reasons: financial distress and low performance would be the causing factors for companies and need for cash at universities. The higher financial safety and stronger monetary fundamentals encourage founding spin-offs at both universities and firms. Since the stronger internal control (fewer directors/separate CEO) at corporates makes preference of spin-offs, it should suggest for universities and research organisations to form centralised licensor management and to engage Technology Transfer Office on behalf of better commercialisation of intellectual properties in spin-off ventures.
MANAGEMENT AND KNOWLEDGE
Several authors emphasize the importance of managerial team at the start-up companies. There is widely accepted that managerial skill of an entrepreneurial team is a decisive point for venture capitalists considering to invest or not to invest, especially in case of new academic spin-off ventures. The ability of a corporate spin-off’s management to improve the company value or sometimes to survive at all, is a critical question, too.

Clarysse and Moray (2004) deeply investigated an academic spin-off company focusing its entrepreneurial team and their managerial skill. After a long-term evaluation (20 months) they concluded important consequences which supported the results their earlier findings. They realized that the master of business idea, even the another founders, usually are not capable to charge CEO and strategic management posts. However, their initial motivation is very useful for a start-up, therefore retaining them on the board would be essential. Nevertheless, the venture capitalists are insist of having skilled management. But, if they attempt to recruit external experts, frequently had to be facing internal problems. The founders usually are not keen to accept the external members and it makes trouble for the long-term survival of the spin-off. Clarysse and Moray pointed that the optimal solution can be the permanent coaching of original –usually university scientists– founders to get entrepreneurial knowledge, supported and controlled by the investors. Later, somebody from the scientifical team will be able to gain management expertise and to get ability to manage and to lead the firm, as a CEO.

Búzás (2004) published similar findings. He described three barriers which hinder the possible „university entrepreneurs” to start and manage their own business. First, the motivation barrier has to be beaten: motivation and courage needed to start but this motivation ought to be conserved for latter days. Second, the competency barrier is a real obstacle, Aforemost mentioned venture capitalists take management skill at the highest priority. At last but not at least, the trust barrier has to be jumped: the more to be capable a management of a spin-off to learn, the easier to reward the trust of investors.

Sapienza et al. (2004) investigated 64 high-tech finnish corporate spin-off companies. The subject of the survey was to measure how knowledge-relatedness affects the post-spin-off-growth. They examined more aspects referring to the overlap between the parent firm and its spin-off: i.e. production knowledge relatedness, technological knowledge relatedness and marketing knowledge relatedness. As a result, they pointed that knowledge relatedness between parent and child shows a curvilinear relationship. If the knowledge origined from parent firm is very limited, the spin-off can have problem to accumulate and integrate skills enough which can cause smaller growth. At the other hand, if parental knowledge is too much, it might hinder the creation of own ideas and technologies, weakening the competitivness of spin-off.

The motivated scientists founded the Intermagnetics General, the spin-off of General Electric. They could refer to the accumulated knowledge of parent firm and learning the management capabilities by doing (Abetti, 2002). Gemplus, which was spun-off from Thomson recruited its management and human resource remarkably from parent company department, canalizing the skills and knowledge directly from original source (Humbert, 1997).

To compare corporate spin-offs and academic spin-offs concerning for management and its knowledge, can be detected similarities. Trainings and education of management, even if it origined form business environment, are needed expressively for both kinds of spin-off to reserve the competitivness and, if happens, to survive the debacles. Motivation of entrepreneurs is another common managerial succes factor. Motivation and education can break through the trust barrier of investors whose venture capital is the blood for spin-off companies.
INVESTMENT AND FINANCING

To examine the nature of investment and financing regarding academic and corporate spin-offs, I have found significant differences. The corporate spin-offs are usually getting financed by the parent company or related banks and investors. As regards the long-term investment in the corporate spin-offs, I found data and literature mostly focusing public companies. Older literature determine the financial result of corporate spin-offs as resulting tax benefits or simply wealth transfer. (Schipper and Smith, 1983). Recent surveys stated that investing in corporate spin-offs is a capital allocation to improve the efficiency of internal corporate capital market. Rovetta’s (2006) results warn the financial decision-makers not to invest unproportionally much capital in companies with lower growth opportunity because it can be taken negative consideration at stock markets decreasing the returns.

In spite of corporate ones, the academic spin-off ventures are usually financed or expected to be financed by venture capitalists. The relationship between venture capitalists and academic spin-offs is widely and accurately investigated. This article does not target to collect and analyse this huge field, but I would like to emphasize some important and commonly appeared characteristics which can deeply influence the success of an academic spin-off company.

Lerner (2005) collected some typical features of investors’ behaviour:

- Venture capitalists very soundly checking and assessing the business plan before investment decision. Some of them are fond of saying, that business plan is curriculum vitae and proof of suitability of a start-up company.
- The investors insist of financing the company milestones by milestones stressing the management for strict planning and being „motivated”.
- Lot of reports and contractually laid financial requirements constrain the management to keep the right way.

Literature sources emphasize that the extent of management is also an important aspect for venture capital providers. Usually, more than 3-5 officers on the board are not afforded because of danger of tensions between managers and shareholders (Clarysse and Moray, 2004).

Venture capitalists prefer founders, which actively taking a part in business, holding stock than universities’s big shares in order to keep the level of motivation which is principle of success.

NETWORKING AND RELATEDNESS

Scholars of entrepreneurial literature underline the role of networking as a success factor of entrepreneurship. But, for spin-offs, can be identified particulars in networking, especially for academic ones moreover there are corresponding findings for both academic and corporate spin-off ventures.

Grandi and Grimaldi (2004) examined 40 italian academic spin-offs concerning for networking habits. They found as basic success factors of spin-offs the founders’ intention to build external relationships and the frequency of these interactions. They determined formal network, as e.g. legal and financial advisors, banks, commercial and professional associations. Informal networks consist of friends, family members, former colleagues, etc. Grandi and Grimaldi concluded surprisingly that would be a real danger if a spin-off company had been completely equipped and supplied with full resources. This company would not have intention to build its network and to search for potential resources. They also emphasized the importance of university reputation and the interdisciplinarity of management. According to their remarks, the universities’ willingness to open to business life and their industrial network building strategy is a high priority.
Walter et al. (2006) also support that point of view namely the better the network capability of a spin-off firm, the better its long-term market performance. They identified four dimensions to be to focus in order to develop networking capability: relational expertise, coordination, market information and internal communication.

Woo et al. (1992) surveyed 51 US based corporate spin-off firms for 2 years after the divestiture and found them in deterioration of performance regardless they are related or unrelated to parent. Related spin-offs have strong relations with parent company, using common facilities and having several overlaps, even managerial and strategical ones, too. Unrelated spin-offs have relationship with parent company to less extent. Woo argues that elimination of organizational barriers originated from the parent and surging the autonomy of spin-off management may improve the post-spin-off performance for a longer term. However, another findings can prove the usefulness of relations between child and parent, taking into account of learning possibilities of spin-offs. The balanced knowledge relatedness shall improve the spin-off performance (Sapienza, 2004).

Some case studies pinpoint the emphasis of external network at corporate spin-offs. Gemplus made a successful business decision to contract with value-added resellers, obtaining their worldwide network, facilitating its access to cutting-edge technologies, experiences and expanded its business significantly.

The significance of relevant network in business success is indisputable for both academic and corporate spin-off companies. Additively, two particulars can be identified:

First, optimal balance between related and unrelated status for both academic and corporate spin-offs is useful, anyway, meaning either danger of completeness of spin-off supplied by university or lagging effect of too tight connection between corporate parent and child.

Second, the openness to external partners, even competitors, provides opportunity to gain access to new ideas, technologies and experiences.

LOCATION AND RESEARCH PARKS

Everywhere in the world, the real-estate dealers’ favourite saying that location is everything. It does not fully suit spin-off establishment, but several local factors provide advantage, especially for academic spin-offs.

Territorial differences can be found at more levels. At the level of continents, United States leads before European Union, even its western part, regarding the number of spin-offs. In the European Union there are region, e.g. Twente, Netherlands whose university spun out 60 spin-offs in last 7 years. Historically, the relatively higher unemployment encouraged the university stimulating self-employment. In Munich, Germany region, the local biotech cluster is being backed by old tradition and spun out more than 30 companies in the recent years. Clarysse et al. in 2005 published a paper about typology of incubation strategies of research institutions in Europe (including the recent quoted regional data) identified low selective, supportive and incubator models. The incubator model, which is most specifically prepared for venture capital investment, is characterized by provision of technological space and resources for spin-off firm free of charge. Bray (2000) measured 16 university spin-offs’ equity on sales in United States and found the highest average in those regions which are better supplied by venture capital.

Link and Scott (2005) made a comprehensive study, investigating the role of so-called research parks’ initiative affection on spin-off formations. They defined the university research park as „a cluster of technology based organizations that locate on or near a university campus in order to benefit from the university’s knowledge base and ongoing research.” In this cluster, the settlers of park can benefit the association of the tenants, which could be both corporate and academic spin-off companies.
INTELLECTUAL PROPERTY
Handling of intellectual property rights (IPR) is a sensitive question for both academic and corporate spin-off ventures. While the corporate spin-off can inherit a developed patenting strategy and professional staff from its parent, this process at universities shows some lag. Vallance described (2001) the surge of changing habit of academics referring to the IPR. He revealed two problematic questions of university patenting. Some research institutes do not have clear regulation of handling IPR which would cause troubles for potential investors. Another problem that some scientists are not aware of losing their patenting opportunity if they publishate the results or ideas before filing, since publication invalidates the latter patent. Vallance argues the need for ground rules for handling of IPR at research institutions. Bray (2000) advises that the larger number of patents evolve the bigger chance to reach remarkable revenue is given for spin-offs. Statistically 3% of patented ideas will turn into success. He underlines the importance of strong patenting activity of Technology Transfer Offices and suggests staffing them with professional patent officers.

CONCLUSIONS AND LIMITATIONS
The target of this article was to make a comparison between corporate and academic spin-off companies focusing their common success factors and differences. I examined the basic reasons for creating spin-offs, the characteristics of successful management, the financing conditions and the role of location and intellectual property. I aimed to reveal which common success factors should have been taken into account by potential entrepreneurs or managers who will plan to found or control a spin-off company, coming from academic or corporate spheres.

Researching the reasons for creation spin-offs, I found well-established arguments for both academic and corporate fields. In academic point of view, the main question is: licensing out the idea or technology or transferring into a spin-off. The corporation has to decide whether to sell out the assets or to convert them into a divested firm, namely spin-off. As realised, both the universities and corporations tend to establish spin-off if they have stable financial conditions and do not starve cash. The well-established and consistent management (separate CEO or strong Technology Transfer Office) also increase the susceptibility of spinning off at both sectors.

Management is the key success factor for spin-offs. Among similarities of corporate and academic sectors, I would like to underline the importance of continuous learning and the well-balanced knowledge-relatedness to parent organizations. Another managerial common success factor was revealed as a permanent task to keep the management getting motivated. The financing of corporate spin-offs usually happens to get from parent or co-investor or they are publicly funded, but the academic spin-offs would like to attract venture capital. Briefly, I emphasized the key points of venture capitalist when they consider the investment: business plan, skilled management, milestone investments, strict contractual covenants, but the deeper analysis is not the subject of this study.

For corporate and academic spin-off companies is equally important to keep an optimal balanced relation with parent organization, using the advantages of parental resources and network but avoiding the disadvantages of too tight connection and hampering organizational barriers. In the same way, expanding the external network is useful for both. Location-wise, I would like to refer to the principal role of university research parks which forms a cluster including academic spin-offs and corporate ones, as well. This association foster mutual cooperation between the universities and industry. Actually, the intellectual property handling appears, as a problem to solve rather in academic life. Well-established patenting strategy and strict regulation are recommended for both
academic and corporate spin-off ventures to avoid the losses due to early publications and to attract more invetsments.

I have to face the limitation of the study. Empirical data were used, thus statistical data might provide additive results at certain cases to support, or to disprove, the findings. On the other hand, the examined questions can be scrutinized from several other approach, e.g. deeper financial analysis or organizational research shall be applied.

Finally, I would like to conclude some suggestions based on the results of this investigation. It seems to be well-recommended for universities to improve their education program focusing managerial expertise and entrepreneurial skills, especially in the field of biotechnology and information technology. It would be worth to consider to establish university internal venture fund to incubate the promisable start-up in-house. And I would like to repeat the importance of university research parks, clusters.

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**REFERENCES**


