

Higher educational institutions, spin-off companies and regional economy: a Swiss case study

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Abstract

Higher educational institutions (HEI) significantly influence regional economy. In general one can distinguish between quantitative impacts, such as the flow of money and goods, and qualitative impacts – trained and skilled people, spin-off companies, the rejuvenation of economic structures, and the strengthening of a regional image. Traditionally HEI produce well trained and qualified people who are supposed to diffuse useful and up-to-date knowledge. More recently however, HEI are also urged to deliver additional services for society, such as active technology and knowledge transfer or spurring firm formation through university spin-offs. This paper first draws a rough picture on the theoretical and empirical interrelationships between firm formation and regional development as well as between HEI and spin-off companies. The second section concentrates on a case study in eastern Switzerland in which alumni were surveyed regarding their firm formation activities. The goal of this study was, on the one hand, to empirically document economic and non-economic impacts of spin-off companies; and on the other hand, analyze the strengths and

weaknesses of various HEI regarding their services and support towards spin-offs. The concluding recommendations address the interests of both public policy bodies as well as private institutions.

Key words: higher educational institutions, university spin-offs, start-up companies, regional development/economy

1. Background and Point of Departure

Higher educational institutions, start-up companies and regional development – three burning issues in current economic and political circles. Where does the interest come from? Economic and regional studies show that the economic development of areas and regions are only minimally or not at all affected by external events, such as foreign investment or the fluctuation of currency. As a result, the focus has shifted to internal, or endogenous, factors that are more or less region-specific and for the most part engender the greatest impact. These include how open companies are to innovation, how service-oriented public authorities are, as well as the provision and distribution of knowledge and skills through institutions of higher education. For example, it has become quickly apparent that external, exogenous, influences play a decisive role a company's competitiveness. In the end, we have come to the understanding that a 'healthy mix' of exogenous and endogenous development factors determines regional prosperity. Model regions, such as California's Silicon Valley, the Medical Alley of Minneapolis, the scientific and technology cluster around Cambridge, England, or the airplane technology region around Toulouse, France, did not come about solely through internal initiative, but rather through sometimes considerable public support. Their success is continually rewarded with great attentiveness on the part of the media and the sciences.

Regional studies have tried different approaches to describe and explain these concentrations of innovative activity and entrepreneurial dynamism. Especially in the 90's, concepts such as the 'learning region' (Florida 1995; Morgan 1997) as well as 'national and regional systems of innovation' (OECD 1997; Cooke et al. 1997; Asheim/Isaksen 1997) were being discussed. Between the two general lines of theoretical reasoning, there are many points of

contact and overlapping areas. However, there are still a lot of differences in how the two approaches explain regional development as an interaction between economy, territory and society. Generally, there are three areas in which a *paradigmatic change* of the main explanatory factors for regional development can be observed (Schleicher-Tappeser et al. 1998):

1. theories which shift from exogenous to endogenous explanations,
2. theories which shift from a locational focus to a focus of development,
3. theories which shift from an approach oriented towards production factors, to an interactive approach that involves institutions and regional actors.

As a result, the main perspective is changing from a property-oriented view to an emphasis on human capital and innovation. In the trail of globalization and the race for innovation, countries with few natural resources, such as Switzerland, will need to depend on the factor of 'knowledge' as the most important raw material for the competitiveness of their companies; learning and 'learnability' will become the most important requirement to gain access to this knowledge.

2. The role of higher educational institutions on regional development

Higher educational institutions can influence the development of a region in many respects. The active impulse of these institutions – in this case, understood as universities and colleges – can be both of a direct or indirect nature. Until now, the most important function of institutions of higher education has been the instruction of students and, as a result, the dissemination of important knowledge and skills in private, public, and non-profit-oriented sectors. In the past few years however, HEI have been put under the spotlight for primarily two reasons: first, increasing numbers of students have increased the burden of public funding and secondly, because of increased costs, the public hand expects a higher return on these investments. This opens up the discussion of to what extent scientific knowledge should be required to solve social and economic problems. The economy opens up another important aspect of HEI: their important influence on their location, local economy and image. The most important effects of HEI can be roughly divided into two categories:

- The financial impact of HEI on a region belongs to the *quantitative* effects: HEI create flows of money and goods between the public hand, companies and semi-public groups. As a result, they become an economic factor for the region or province, generating not only costs but considerable benefits as well.
- The non-quantifiable or *qualitative* effects of HEI arise from the economical, ecological, political and socio-cultural environment these institutions provide. These effects form an external function, that can be understood only with great effort. One form of this external function is the spin-off, or a company founded by graduates and or employees of universities and colleges that, to some degree, leaves the sphere of influence of these institutions. A study of this phenomenon will be presented in the following chapter.

Entrepreneurship and 'start-up companies' is a theme that has enjoyed increasing interest in politics in recent years.¹ An example in Switzerland are the activities of the Commission for Technology and Innovation (KTI), which since 1997 supports the founding of advanced technology companies through their program 'START-UP'. In addition, many already existing entrepreneurial, new initiative and technology centers in Switzerland express great interest and support for young companies. Still, neither these efforts and support networks nor the companies founded by university graduates and employees are often known to the public at large.

In Europe, start-ups have been a research theme primarily from the standpoint of business management and the national economy. Aspects of regional development arising from entrepreneurial activities as well as the social and psychological factors involved were ignored for the most part until now.

3. Higher educational institutions and start-ups

Since the beginning of the economic recession in the 90's, even Switzerland has experienced significant unemployment. With this continual economic situation, and above all structural weaknesses in the economy, the significance of entrepreneurship is being empha-

sized again. The founding of new companies is often understood as the motor for economic progress, in that they are able to create new and valuable forms of jobs. At the national level, however, the activity of new companies plays only a modest role. For example between 1996 and 1997, new firms² constituted 2.6 percent of all firms and were responsible for 7, 224 jobs, relative to existing older firms that created 14,940 jobs (BFS 1990). This rate represents only 0.5 percent of the entire labor force, which is very low relative to the rest of Europe (ENSR 1996).

Less well known is the effect of companies related to HEI on the local or regional economy. There have been several attempts to study this phenomenon, although with emphasis placed on different areas. Studies on companies founded out of HEI can be found for example in the USA (e.g. BankBoston o.J.; Brett/Gibson/Smilor 1991; Rogers/Larsen 1984; Dorfman 1983) as well as Germany (e.g. BMBF 1998a; Richert/Schiller 1994; Szyper-ski/Klandt 1981) and Sweden (Olofsson/Wahlbin 1993). Sternberg (2000) gives a current overview of the company founding situation in selected industrial countries.

In addition, there are a number of studies in various levels of detail on companies founded under academic auspices especially with respect to Technology and Science Parks (e.g. Seeger 1996, Sternberg et al. 1996, Westhead/Storey 1994, Quintas/Wield/Massey 1992, Monck et al. 1988).

The contribution of HEI to regional development is becoming more and more important within the framework of current research priorities in the EU³. Studies on the choice of location by new companies in Germany show that they tend to stay very close to where they used to spend a lot of time or where they used to live (Schmude 1996; Sternberg et al. 1996; Nerlinger/Berger 1995; Albert 1994; Audretsch/Fritsch 1994, Ickrath 1992, Picot et al. 1989). The interconnection between marketing and production of these new firms with existing businesses in the region verify the special meaning these firms have relative to the region where they are located. Moreover, it becomes apparent how these new firms in turn, pass on new impulses for the local and extended business environment and as a result, create multiplier effects. This leads to the strengthening of overall regional competitiveness.

In Switzerland, efforts of HEI or the government to foster spin-offs are still thinly spread out and very few in comparison with other countries. This initiative can be traced back to the beginning of the 90's when the economic recession and the closing of many businesses became the subject of public concern. On the other hand, the political culture or the self-image of political directives also plays an important role, providing the motive for setting up incubator facilities, technology and innovation centers, or ITI (Thierstein et al. 1999). In Europe, one detects two distinct general patterns or models for ITI (EIMS 29/1996):

- The '*continental European model*' is predominantly publicly funded and focuses on public policy objectives such as improving regional economic development and fostering innovative networks.
- The '*anglo-saxon model*' is geared more towards the creation of new technology and science based firms which in turn necessitates close cooperation with and proximity to universities and higher educational and research institutions.

In both cases, the exchange of knowledge and technology is the central motive. Between the two poles, however, a great number of different kinds of ITI have developed. Incubator facilities, technology and innovation centers of the first kind are found predominantly in Germany, Austria, France, Spain and Italy, while the second kind dominates in the USA as well as Great Britain, Belgium and the Netherlands. In Germany and Austria, ITI are mainly responsible for regional development and are often created by the initiative or with the cooperation of the regional or provincial government (EIMS 29/1996). Swiss ITIs belong predominantly to the continental european model, although in this case, the political support of these institutions has been relatively minimal until now (Thierstein et al. 1999).

The fact that these centers can often be found near universities and research facilities shows that these educational institutions form an important component of their conceptual underpinnings. Even though most of the close professional or also personal exchange through HEI ceases to exist, the actual functional and structural connections seem to remain. In

contrast, these ITI often show an intensive integration and diverse networking with regional partners.

In general it is recognized in theory and in practice that institutions of higher and continuing education generate decisive impulses for regional economy. In Switzerland, not much more is known other than the specific role the establishment of new firms plays, whether they are strategically-oriented or rather accidental. In the following section, two current projects, which complement each other in their goals, will show how the problem of this lack of knowledge is being addressed.

4. Spin-offs from the University of St.Gallen - the research design

The following section deals with the research design of an ongoing research project, which is financed by the University of St. Gallen, located in the eastern part of Switzerland. Our project tries to address the following issues:

- Effect of Spin-offs on the labor market
- Snowball effects through the founding of new companies and Spin-offs
- Settlement patterns, location loyalty and location image
- Establishment factors
- Role of educational institutions in the founding process
- Model for higher educational institutions as well as regional participants
- Use of research findings for more effective regional management.

The main approach to investigate these issues was a written questionnaire of primarily multiple-choice and semi-open questions. As a data base we were fortunate to use the alumni organization's database. In April of 2000, around 10'000 questionnaires were sent out to university alumni who graduated between 1965 and 1999. About 1'000 questionnaires were mailed back, which amounts to a return rate of 10 percent. Out of these 1000 responses, 430 respondents declared themselves to have established at least one or more

spin-off enterprises; 590 did not do so. Up to the publishing date of this paper, 830 questionnaires have been computed and form the sample for the following results.

5. First empirical results

The preliminary results below will concentrate on spin-off companies founded by University of St.Gallen alumni who graduated between 1965 - 1990.

Establishing a firm

The first question asked all alumni whether they had ever established a company (figure 1). Forty percent said, "Yes, I established one (or more than one) company", while 5 percent currently find themselves in the middle of this process. A quarter of the responding alumni had not yet established their own company but at least were thinking about it, while a third of all respondents had never thought about establishing a firm by themselves.

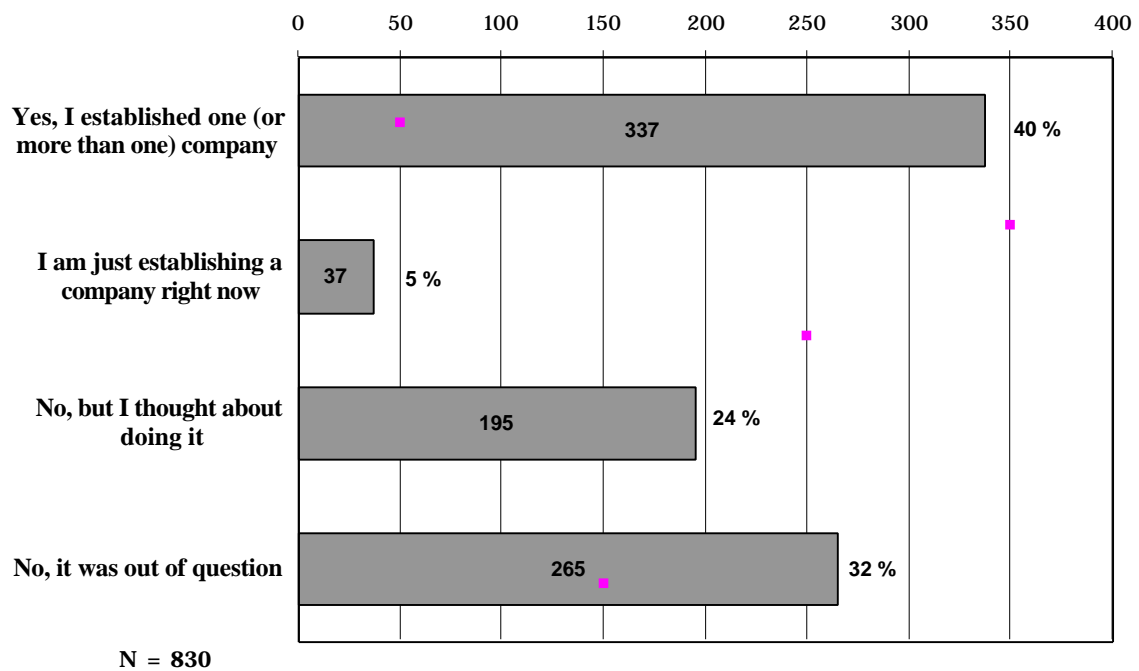


Figure 1: "Did you ever establish a company?"

Branch activity of spin-offs

Keeping in mind that the University of St.Gallen is strongly focused in business administration, economics and law, it does not seem surprising that 91 percent of all spin-offs are active within the services sector, while only 9 percent concentrate on technical domains like telecommunications technology or the development of technical software. The spin-off firms in the services sector form a wide range from legal, business and human resources consulting to software development and trade. A fourth of them are solely business consulting companies and an additional 10 percent specialize in financial services and equity financing.

Spatial distribution of spin-offs within Switzerland

The University of St.Gallen has a maximum of 25 percent of foreign students, originating from a variety of countries, but mainly from Germany and Austria. Thus it is not surprising that 78 percent of all spin-off establishments are located within Switzerland, while 11 percent are in Germany, 6 percent in the rest of Europe, and 5 percent in the rest of the world.

The spatial distribution of new establishments within Switzerland seems to follow a pattern in which most firms are located within the larger cities of the country, with a concentration in the main economic and human resources capital, the canton of Zurich. Nevertheless, the host canton of the University of St.Gallen, which bears the same name, is strongly represented as well with as many spin-off locations as Zurich. This is certainly due to the fact that many start-ups profit in the first phase – or even permanently – from the labor market reservoir of highly-qualified specialists and managers which the university represents.

Date of firm establishment

Figure 2 shows pretty clearly, that starting in the early 90's, the absolute numbers of newly established firms have increased considerably. In contrast to the 60's, 70's and 80's where far fewer than ten new companies were established per year, the frequency climbed in 1989 and 1990, experiencing a little slump until 1995 when the establishment rate grew to its peak in 1999, the last full year of our survey.

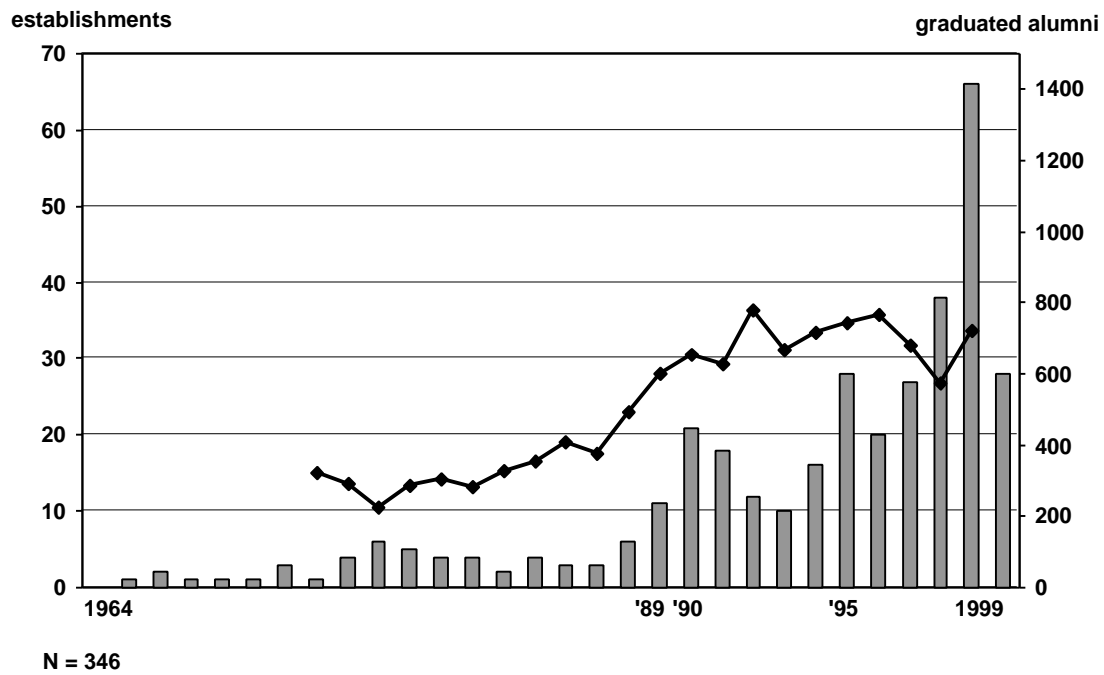


Figure 2: "When did you establish your most recent company?"

The are different reasons for this pattern. One is the increase of students enrolled at the university 'automatically' leads to more establishments, given a constant establishment rate. The numbers of graduates have been slowly increasing since the early 80's, with a leap between the 80's and 90's. There was a slump in the numbers of graduates in the middle of the 90's, but towards the end of the decade the number of spin-offs was growing faster then the number of graduates would indicate.

The second reason for the increase in the number of spin-offs in the past decade is the fact that the technological and economic environment has changed in a way that establishing a company is becoming more attractive among a certain group of younger people, in comparison with 'traditional' corporate career patterns. Parallel to the start-up-boom since the mid 90s several private and some public initiatives got off the ground in Switzerland to support start-ups. Most of them provide venture capital or business consulting for the first phases of a start-up.

A third explanation is linked with the labor market. In 1991-92 a sharp economic recession in Switzerland led – in a first phase - to more reluctance towards forming a new company.

But after a while, opportunities outran the pessimism and the establishment rate climbed again, maybe also spurred through the 'internet-hype' fanned by the media. Finally, there might well be a 'cumulative causation' phenomenon, where students become aware of fellow students who successfully form their own company, and earn money, setting a positive circle where more and more potential student 'firm-establishers' gain confidence and get together with this goal. An indicator for this hypothesis is a student initiative at the University of St.Gallen called START, which began their activities in 1998. The group's aim is to encourage the establishment of new firms through an 'information day' where young and successful companies share how they did it themselves.

The impact of the university on firm establishment

One of the aims of this study, as mentioned in chapter 4, is to develop a support scheme for students willing to form their own company. In order to do so, one has to be sure of the reasons why students establish a firm during or after their time at university. However, one can never be certain which reason is decisive for which kind of venture.

Figure 3 displays the average time span from graduation to the date of the firm establishment. The hypothesis, the shorter the time span, the stronger the influence of the alma mater on the decision to establish a firm.

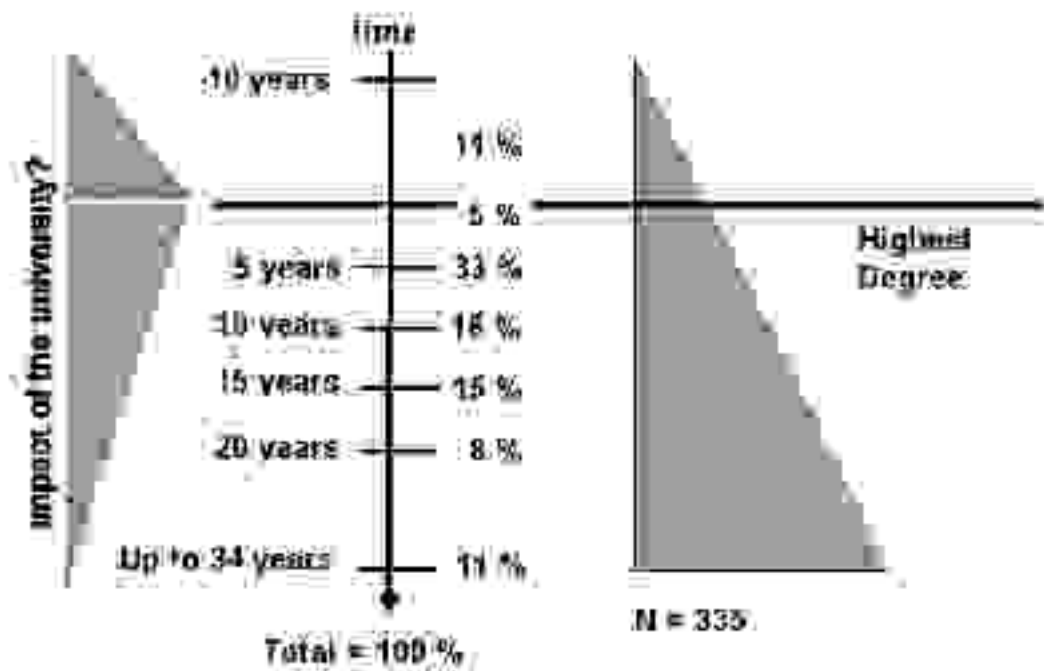


Figure 3: Time span from graduation to date of firm establishment

Figure 3 shows that 33 percent of all alumni responding to the questionnaire established their first firm five years on average after completing their highest academic degree. Another 16 percent form their own company within 10 years after graduation.

Five percent of spin-off firms were established directly after graduation, while a surprising 11 percent of firms were started before reaching their highest academic degree. There is at least a two-fold reason for the latter: first, the time span between the first formal education degree acquired and the highest academic degree; second, there seems to be a considerable growing number of people who first gain some business experience before returning to academia for a supplementary degree.

Firm growth

Many empirical studies state the fact that the first three to five years of a firms life is a crucial threshold for further development. Figure 4 shows the development of employment after the first five years of operation.

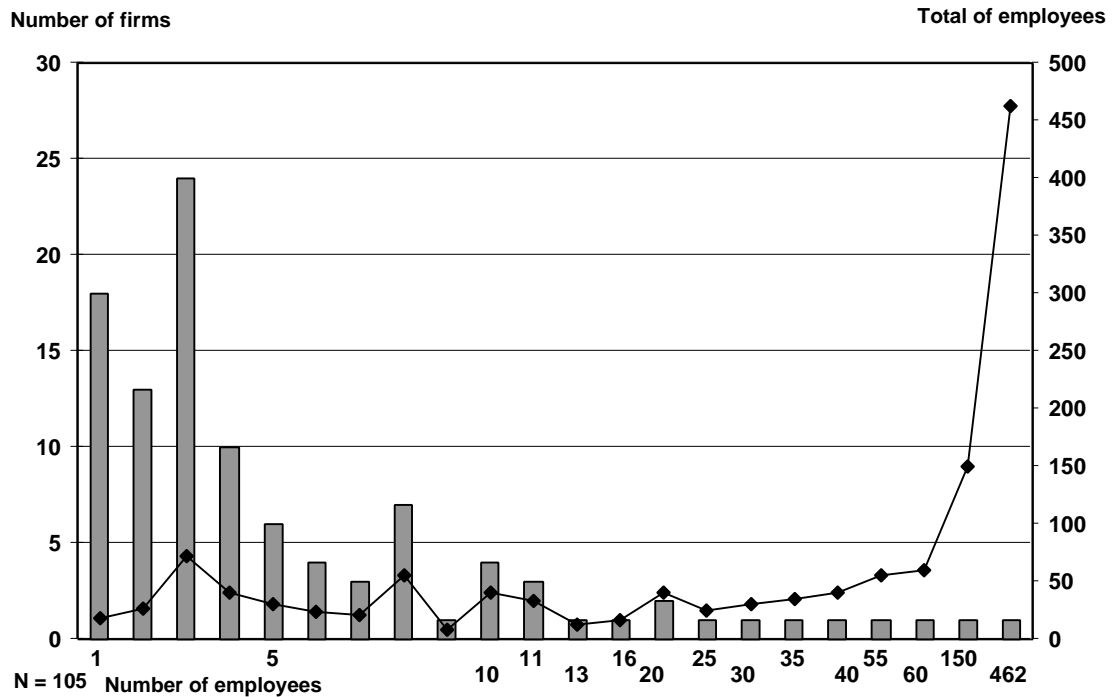


Figure 4: Employment after the first five years of operation

At first glance the message of figure 4 is clear: spin-offs from the University of St.Gallen are on average no job-creation wonder! The bulk of newly established firms have ten or less employees after their first five years in operation. Nevertheless there are some exceptions, above all, an IT-based consultant company which grew to more than 450 employees within only five years (see to the right of the horizontal axis in figure 4).

Relocation of spin-off firms

With regard to the attractiveness of locations and regions, it is of interest whether spin-off establishments stay at the location originally chosen or the firms move to other locations.

The vast majority of spin-offs did not relocate once their location had been chosen (151 out of 198 firms). Among the reasons for staying or moving, figure 5 presents the motives of those companies which chose to remain where they were. The motives that received the strongest affirmation rank in the upper half of the figure and are represented by a light bar, indicating the mean; the dark bars represent the frequency of answers per item.

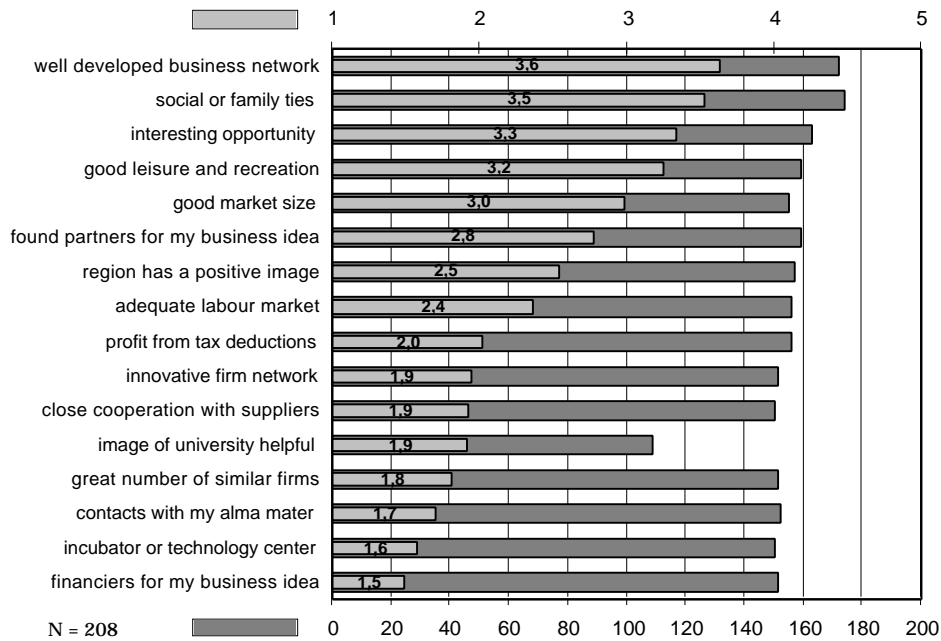


Figure 5: "I did not relocate my firm because "

The following reasons gather the most affirmation among start-up firms that did not relocate their company:

- A well-developed business network
- social or family ties
- interesting opportunities at their current location
- good leisure and recreation
- good market size for their products and services.

These positive locational factors can be summarized into two broad categories, which seem to be of mutual importance: hard and soft. Quite interesting is the fact that the item "image

of university is helpful" ranks rather low among the proposed statements. The same holds true with 'incubator/technology centers'. Perhaps not too astonishing is the last position of the location factor "financiers for my business idea". Another question of our survey reveals a potential answer: financing a start-up mainly happens with the 'help of friends or relatives'. Or in other words, in most cases seed money and working capital comes from friends, parents and spouses, and not from formal sources like banks or foundations. This hypothesis is verified through the paragraph below.

Support and firm establishment

The establishment of a new firm rarely goes without any outside or third party help. Thus we asked the alumni who established a firm to indicate which kind of help they received and from whom (figure 6).

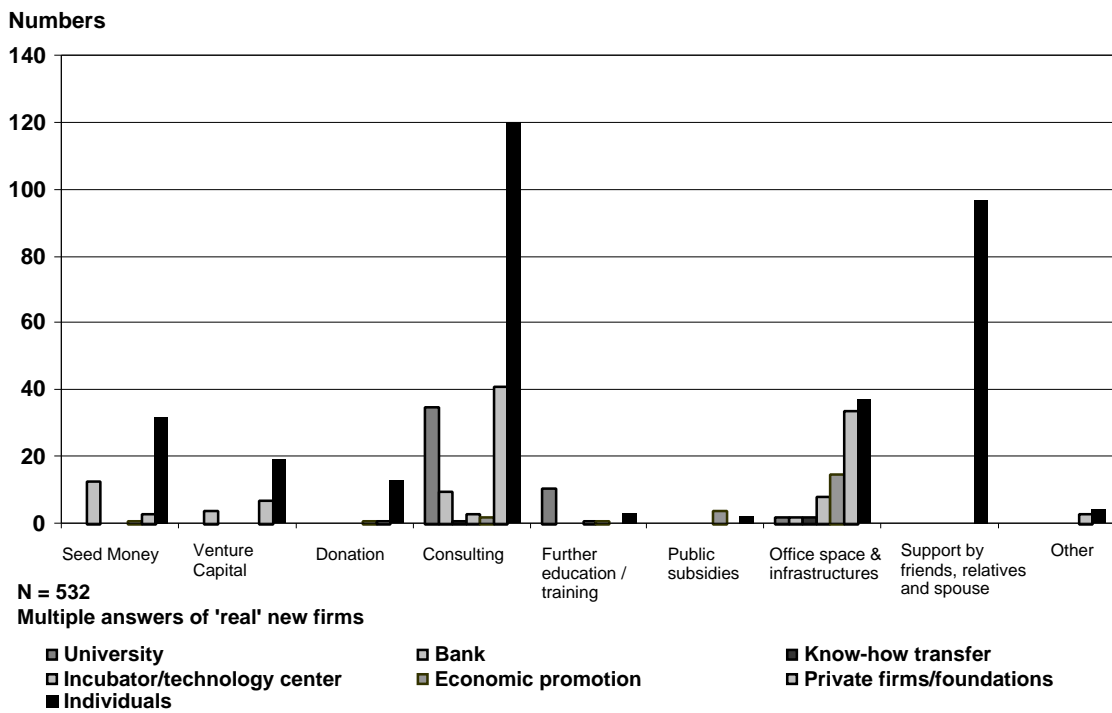


Figure 6: "Did you receive any support while you were establishing your firm?"

It is obvious that within all the categories of potential sources, the category "individuals" is always the single most important source of support or help. Looking first at 'consulting', all kinds of legal, business, organizational or other forms of consulting are needed by the founders of new companies. Office space and infrastructure ranks second, while all other sources of support are of minor importance in our survey.

As already mentioned, individuals give the main and most important push to establish a new firm. This is also indicated by the category 'support by friends, relatives and spouses' which received an overwhelming affirmation. In assessing these results, it seems very clear that in order to develop an effective and efficient scheme to enhance the number of alumni spin-offs, one has to incorporate the decisive role of friends and relatives into any promotion scheme.

6. A perspective

This paper presents some first empirical results from an ongoing research project. Because an in-depth analysis of the data is still lacking, these results cannot be fully analyzed yet. Consequently, recommendations cannot be formulated on an appropriate and solid basis.

Nevertheless, the following preliminary findings aim at spurring the intellectual process of putting together a manageable and effective support system for universities to motivate their students and graduates and to enable them to launch their own company. It is understood that this venture is not the universities' prime objective, but spin-off rates could in any case be higher than they are today.

Preliminary findings for the Swiss case

- Start-ups and spin-offs from the University of St.Gallen are primarily businesses run by individuals. The function and roles of banks, of economic development agencies, of incubator and technology centers is hardly defined; these institutions rarely grasp the opportunities that are there.

- Universities (and other higher educational institutions) should be designing efficient and effective start-up promotion schemes. These schemes should not only be oriented towards students but also towards scientific staff.
- Start-ups and spin-offs are needed along the entire chain of added value. The TMT-craze (technology, media, and telecommunications) cannot drive a region's well-being alone. Innovative products and services for every day activities also earn money and thus create jobs.

¹ In Germany, company founding aid has already found support by the public hand for many years in diverse ways. A current form of founding aid at higher educational institutions is formed by the program 'EXIST', a two-phase competition with the aim of supporting the five best regional networks that further entrepreneurial activity out of universities. In the first phase, 200 from the 326 universities in Germany took part. The five networks chosen in the second competition phase will be supported until the end of 2001 with a total of 24 million DEM (BMBF 1998b).

² "Real foundings" refer exclusively to those foundings which comprise of an acceptance of a new activity, regardless if the firms are officially listed in the register of companies or not (e.g. firms of individuals). Restricted from this category are company takeovers, fusions, split offs, or the retaking up of known activities. If all new enterprises would be taken into account, one would come up with a number of around 40,000 foundings in the period from 1996 to 1997. This represents a share of approximately 14 percent of existing companies.

³ Since 1998, a project to study the role of entrepreneurs in regional development ("Universities in regional development") has been implemented in the framework of the Targeted Socio-Economic Research Programme (TSER) at the Centre for Urban and Regional Development Studies at Newcastle upon Tyne (CURDS), in collaboration with an Australian and six other European universities.

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