Start-up on Campus – European Models for the Stimulation of Academic Spin-offs

Mirjam Novakovic and Dorothea Sturn


Abstract
A reliable assessment of the economic impact of academic spin-offs and of their significance for technology policy is currently impossible. However, the great international interest in these enterprises on the part of policy makers can also be explained without any spectacular growth and employment effects. Academic spin-offs should primarily be seen from the point of view of technology transfer and of research co-operation between science and industry. On the basis of three selected European examples, this paper analyses the implementation, structure, characteristics and success factors of spin-off models. In a further step it examines the extent to which such models can be transferred to Austria with a view to launching a similar support scheme in this country.
1 Academic spin-offs: a new hope for technology policy or a negligible quantity?

When the OECD asked its member states in 1999\(^1\) whether and how they survey their public sector spin-off firms, it provided a choice of five different definitions. The highly divergent replies showed that there is no uniform concept of this type of enterprise to date: in some countries the term covers all enterprises set up by university graduates, others take the company's object as a starting point, defining spin-offs as new enterprises which commercialise know-how that was developed at a university or a research institution, or as enterprises in which universities or research institutions are directly involved. Therefore the results of national studies, of which there is a great number by now, are hardly comparable. Accordingly, the OECD recommends standardising surveys and improving the information base on the formation, development and structure of academic spin-offs. However, the following table still provides a rough overview.\(^2\)

Table 1: Spin-off surveys in OECD countries

<table>
<thead>
<tr>
<th>country</th>
<th>academic institutions surveyed</th>
<th>academic spin-offs(^3)</th>
<th>corporate spin-offs(^4)</th>
<th>number of companies formed</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td>all</td>
<td>14</td>
<td>20,000</td>
<td>250,000</td>
</tr>
<tr>
<td>Australia</td>
<td>all</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finland</td>
<td>public research institutions</td>
<td>4.5</td>
<td>3,900</td>
<td>26,000</td>
</tr>
<tr>
<td>Germany</td>
<td>universities and research institutions</td>
<td>525</td>
<td>61,000</td>
<td>510,000</td>
</tr>
<tr>
<td>UK</td>
<td>universities</td>
<td>15</td>
<td>9,000</td>
<td>161,000</td>
</tr>
<tr>
<td>Canada + USA</td>
<td>universities + research hospitals</td>
<td>281</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Austria</td>
<td>universities</td>
<td>26</td>
<td></td>
<td>22,500</td>
</tr>
</tbody>
</table>


In addition to the different definitions, there is also the problem of different samples: whereas some countries surveyed all universities and public research

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\(^1\) Cf. the project on “Benchmarking Industry-Research Relationships” run by the OECD Working Group on Innovation and Technology Policy (TIP)

\(^2\) The data was compiled by the OECD from various national sources; however, all figures refer to the annual average over a period of time in the nineties.

\(^3\) As has been mentioned, academic spin-offs are defined differently in different countries.
institutions, others only examined some of the eligible institutions. Furthermore, only extrapolations are available for some countries (e.g. Germany), while others only provide information on documented spin-offs (e.g. Finland or Austria). There is another reason for the relatively high figures for Germany: they include enterprises set up by graduates already working in industry. The German survey ATHENE (ADT 1998) defines "akademische Unternehmensgründungen" as technology-based enterprises set up by university graduates (which excludes enterprises set up by university graduates in sectors which are not technology-intensive).

Despite the difficulty of comparing the data, it is immediately obvious that the total number of academic spin-offs is very small: there is only one academic spin-off to approximately every 1,500 enterprises founded, whereas every eighth start-up is a corporate spin-off.

Further results of the OECD survey include the following:

- The number of academic spin-offs has clearly increased over the last few years, even though growth rates in some countries are stagnating again after a strong increase in the early nineties.
- While academic spin-offs tend to be small and to grow slowly, their lifespan tends to be longer than average. This is borne out by all European studies on NTBFs (New Technology Based Firms; cf. EIMS publications no. 42 and 31, the April 1998 issue of Research Policy, as well as Storey/Tether 1998 for a summary).
- Academic spin-offs tend to be concentrated in certain sectors and technologies - primarily in the life sciences (biotechnology, pharmacy, medical technology), followed by information and communication technologies, and software.
- Owing to their small number, there are no figures on the economic effects of academic spin-offs.

These sobering results are in contradiction to the widely circulating success story of MIT: a BankBoston study (1997) found 4,000 MIT spin-offs employing a total of 1.1 million people world-wide in 1994. If these enterprises were a country with a gross domestic product equal to their combined turnover (US$ 232

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4 i.e. spin-offs from enterprises
million), this country's economy would rank 24th in a global comparison – between South Africa and Thailand. This discrepancy is due to different factors:

- Firstly, MIT is a special case which cannot be compared to anything else, not even within the USA.
- Secondly, the study was based on a data bank of "MIT-related companies", i.e. all companies which had ever been founded by MIT graduates.

This means that considerable employment effects can be produced by just a few very large, established enterprises. Furthermore, it is to be assumed that the majority of the founders were working in other companies immediately before setting up their own.

**On the basis of the available empirical material it is impossible to make a reliable assessment of the actual economic significance of spin-offs or of their importance in the context of technology policy.** Only by means of a uniform definition and of regular, comparable surveys will it be possible to study this special type of company in more detail. However, the considerable international interest in these companies on the part of policy-makers can be explained even without spectacular growth and employment effects.

Academic spin-offs are seen as "translators and mediators between academic research and industry" (OECD 2000), or even more pointedly as "indicators of the public sector’s ability to develop commercially relevant know-how" (OECD 2000).

In other words, academic spin-offs are primarily to be seen in terms of **technology transfer and research co-operation between science and industry.** Ideally, academic spin-offs represent a form of co-operation between the academic world and the world of business, embedded in other forms of co-operation such as common research projects, joint publications, exchange of personnel, etc. Helmer et al., for example, analyse spin-off co-operation projects, i.e. close co-operation between spin-offs and their "parent" institutions, as one of the most successful regional co-operation models between economics, politics and business.

Models for the promotion of academic spin-offs are therefore primarily aimed at **intensifying and strengthening research co-operation** between science and industry. This is why great emphasis is placed on ensuring close ties between potential founders and their *alma maters.* All three models for the stimulation of
academic spin-offs presented in the next chapter include infrastructure directly on campus. In the second place, **positive structural effects** are also expected as all spin-offs are highly science and technology-intensive companies. However, no growth and employment effects can realistically be expected, especially not in the short term.
2 A comparison of three European models for the promotion of academic spin-offs: differences in development, structure and financing

2.1 The SPINNO Programme – Helsinki Technical University

Foundation: 1990, by the Ministry of Trade and Industry, the national technology agency TEKES and Otaniemi Technology Park

Structure: participating research institutions and "supporting" institutions such as financiers and service providers

Financing: public (Ministry of Trade and Industry) and private (Innopoli Oy Business Park) sources

Objective: promotion of academic spin-offs

The SPINNO programme implements a top-down initiative, with the Ministry of Trade and Industry acting as a push-factor. The Ministry plays the parts of both programme promoter and main financier. The programme now includes all key research and training institutions in the Helsinki region.

Figure 1: Top-down approach

Source: Joanneum Research
The following factors are considered to be important for the success of SPINNO:

- Its network structure, which covers a great number of research institutions and supporting organisations, in combination with an efficient operative unit (full-time manager).
- Training programmes can be tailored to the needs of individual founders (who can be accompanied for up to one year) by means of a training scheme composed of specific seminars and counselling in addition to basic modules.
- A network of industry contacts allows companies with great growth potential to find experienced experts to serve as board members.
- The organisations involved show great flexibility in providing infrastructure (e.g. laboratories) and with regard to intellectual property rights.
- A safety net for founders is provided in the shape of a leave-of-absence scheme.

2.2 Sweden: CHALMERS INNOVATION SYSTEM

Foundation: developed from different activities and organisations concentrating on the promotion of spin-offs, first Venture Cup 1998

Structure: can be described as a regional innovation centre

Financing: mainly private

Objective: promotion of academic spin-offs and of corporate spin-offs from industrial enterprises in western Sweden.

The Chalmers Innovation System is a regional network which developed from various individual initiatives with the common aim of promoting the formation of technology-based enterprises with good growth potential. Unlike the Finish model, the approach taken in implementing the Chalmers Innovation System can be described as bottom-up, the main success factor being private initiatives. The programme's core element is the Chalmers Innovation Foundation, which was in turn initiated by Chalmers Technical University, a private institution. The Chalmers Innovation Foundation offers up-and-coming technology enterprises proximity to the university, training, professional counselling and guidance,
space, services, a creative environment, international contacts, as well as a financing network for innovative projects.

**Figure 2 Network approach**

![Network approach diagram](source: Joanneum Research)

NURs = non-university research institutions (contract research institutions)

**Factors in the success of the Chalmers Innovation System:**

- Investors' network: NUTEK\(^5\) is active in the area of seed financing; CHALMERSINVEST is a venture capital company owned by Chalmers University with the special task of investing in Chalmers spin-offs from the start-up phase onwards; several regular venture capital companies are also linked to the Chalmers Innovation System.

- Competition and know-how: the Entrepreneurship Academy offers a special programme for last-year students. This training programme is based on the

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\(^5\) The Swedish National Board for Industrial and Technological Development promotes technological development and the introduction of new technologies in Sweden.
idea of hands-on learning by means of real-life examples. Only 18 applicants are selected from a total of 100.

- Space and services: Stena Centre, the founders’ park belonging to the foundation, provides all the facilities which start-up companies need in order to be able to concentrate fully on their core activities. Stena Center offers young entrepreneurs a total of 4,000 m² of newly renovated offices, laboratories and specially adapted buildings.

2.3 The spin-off & start-up programme of Lausanne Technical University (EPFL – École Polytechnique Fédérale de Lausanne)

<table>
<thead>
<tr>
<th>Foundation:</th>
<th>ongoing process since 1986</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structure:</td>
<td>ETH creates a suitable environment (facilities and programmes) for its own spin-off programme.</td>
</tr>
<tr>
<td>Financing:</td>
<td>mainly regional, through a foundation set up specifically for this purpose</td>
</tr>
<tr>
<td>Objective:</td>
<td>promotion of technology-based spin-offs</td>
</tr>
</tbody>
</table>

EPFL's spin-off programme is an independent project initiated by ETH. All the relevant facilities for a spin-off programme were created step by step.

Figure 3  Multilayered model

Source: Joanneum Research
Factors in the success of EPFL's spin-off programme

- All central features of a successful spin-off model (interface with industry, business park, seed financing company, spin-off programme including a business plan competition, Entrepreneurial Studies Chair) are located directly on the ETH Campus, providing potential candidates with an optimal environment and optimal support in preparing their new companies.

Structure: The following relevant facilities and programmes were set up between 1986 and 1999:

- CAST (1986): interface between ETHL and industry
- PSE (1994): ETH Science Park
- FIT (1995): seed financing company
- ETH spin-off & start-up programme (1997)
- SRI (1998): office for business contacts and technology transfer
- Branco Weiss (1999): Entrepreneurial Studies Chair at EPFL

2.4 Summary

The widely differing approaches to setting up and structuring the three spin-off models presented above show that there is no uniform "success model" for the implementation of such programmes. While the Finish SPINNO model is largely centrally promoted by the Ministry of Trade and Industry, the Swedish CHALMERS INNOVATION SYSTEM model is dominated by private initiatives, combining the multitude of existing individual initiatives into a regional innovation network. There is also considerable interest on the part of entrepreneurs, many of whom show great commitment in supporting their younger colleagues, be it as foundation members or as consultants. Finally, EPFL's spin-off model is based on an initiative of the Technical University, which gradually set up all the essential components of a successful programme on or near its campus, including the creation of an Entrepreneurial Studies Chair in 1999.

Even though the three models differ greatly in their structure and mode of implementation, table 2 shows that there are a number of characteristics and features which they have in common.
Table 2 Common success factors of the models studied

<table>
<thead>
<tr>
<th>TARGET GROUP</th>
<th>MEASURES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SPINNO</strong></td>
<td>counselling service ✓</td>
</tr>
<tr>
<td></td>
<td>further training ✓</td>
</tr>
<tr>
<td></td>
<td>professorship, courses ✓</td>
</tr>
<tr>
<td></td>
<td>business contacts ✓</td>
</tr>
<tr>
<td></td>
<td>technology transfer (exploitation) ✓</td>
</tr>
<tr>
<td></td>
<td>infrastructure ✓</td>
</tr>
<tr>
<td></td>
<td>financing (venture capital) ✓</td>
</tr>
<tr>
<td></td>
<td>direct financial support ✓</td>
</tr>
<tr>
<td><strong>CHALMERS INNOVATION SYSTEM</strong></td>
<td>counselling service ✓</td>
</tr>
<tr>
<td></td>
<td>further training ✓</td>
</tr>
<tr>
<td></td>
<td>professorship, courses ✓</td>
</tr>
<tr>
<td></td>
<td>business contacts ✓</td>
</tr>
<tr>
<td></td>
<td>technology transfer (exploitation) ✓</td>
</tr>
<tr>
<td></td>
<td>infrastructure ✓</td>
</tr>
<tr>
<td></td>
<td>financing (venture capital) ✓</td>
</tr>
<tr>
<td></td>
<td>direct financial support ✓</td>
</tr>
<tr>
<td><strong>EPFL</strong></td>
<td>counselling service ✓</td>
</tr>
<tr>
<td></td>
<td>further training ✓</td>
</tr>
<tr>
<td></td>
<td>professorship, courses ✓</td>
</tr>
<tr>
<td></td>
<td>business contacts ✓</td>
</tr>
<tr>
<td></td>
<td>technology transfer (exploitation) ✓</td>
</tr>
<tr>
<td></td>
<td>infrastructure ✓</td>
</tr>
<tr>
<td></td>
<td>financing (venture capital) ✓</td>
</tr>
<tr>
<td></td>
<td>direct financial support ✓</td>
</tr>
</tbody>
</table>

*Source: Joanneum Research*
3 Aplus B: plans for an Austrian programme

There are current plans to implement a programme for the stimulation of academic spin-offs in Austria on the basis of existing international examples, taking into consideration the specific national background.

3.1 Limits to the transferability of international examples

Most existing models are of a size which could never be achieved in an Austrian region (with the exception of Vienna) even if all regional universities and research institutions were to co‐operate. This must be taken into consideration not only in designing specialised training and counselling modules but also in setting up financing and technology transfer/exploitation facilities, where economies of scale play a tremendous role, too.

Secondly, there are significant differences between the respective university and R&D systems. This does not necessarily refer to the conditions for applied project work at Austrian universities, which are not as limiting as is often assumed. More significant factors include

• differences in academic career structures (cf. "permanent tenure");
• differences in the size and profiles of non‐university research institutions;
• differences in universities' socio‐political missions; and finally,
• different evaluation cultures.

The last two points refer to features such as the so‐called "third (i.e. socio‐political) task" which Swedish universities assume in addition to the two traditional functions of universities, research and teaching, or the great variety of socio‐economic criteria by which universities in the Netherlands are evaluated. Generally, universities in most countries - the United Kingdom the Netherlands, Finland and Switzerland are among the trend setters here - are comprehensively evaluated in terms of research performance and external effects (including academic spin‐offs), with evaluation results influencing the public funding of these institutions. This creates a strong incentive for universities not only to initiate spin‐off models but also to ensure high quality standards in implementing them.
3.2 The starting situation

A differentiated analysis of start-up activity in Austria, in particular with regard to regional and structural effects and to the proportion of high-tech start-ups, is provided by the studies of ARCS/ZEW (1997, 1999) and Almus (2000).

- Against a background of generally moderate activity which has, however, been on the increase in recent years, 2% of all new companies can be assigned to the high-tech sector according to these studies.

- If the services sector is taken into account, too, this proportion increases significantly (7% of all new companies are technology-based service providers).

- The structural effect has slightly decreased in the last few years and mainly applies to the services sector.

- Particular weaknesses in certain technology segments (especially in the multimedia field) could be remedied to some extent in the last few years.

No surveys or statistics on the situation of academic spin-offs are currently available. However, in a recent survey of all Austrian university departments (cf. Fischer et al., 1999), more than 400 reported new company set up by university assistants in the 1995-1998 period (i.e. 26 per year, excluding professors and graduates). The majority of these departments (46) are in technical and scientific disciplines, followed by the social sciences and economics (20). In terms of business profile, ¾ of the new companies provide production-related services, 14% belong to the sector of small-scale manufacturing industry, and 12% provide other services. This corresponds to the findings of surveys of new technology-based companies in Austria, which also show the services sector to be significantly more dynamic than manufacturing industry.

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6 Most European countries, including smaller ones such as the Netherlands, Sweden and Finland, have a marked culture of non-university research institutions. In addition, many of these institutions are required by the state to produce a certain number of spin-offs each year.
Table 3: Spin-offs by sectors and academic disciplines

<table>
<thead>
<tr>
<th></th>
<th>science and technology</th>
<th>social sciences</th>
<th>humanities</th>
<th>medicine</th>
<th>total</th>
<th>percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>manufacturing industry and construction</td>
<td>9.5</td>
<td>0.0</td>
<td>0.0</td>
<td>1.0</td>
<td>10.5</td>
<td>14%</td>
</tr>
<tr>
<td>production-related services, R&amp;D</td>
<td>34.5</td>
<td>19.5</td>
<td>1</td>
<td>2.5</td>
<td>57.5</td>
<td>75%</td>
</tr>
<tr>
<td>other services</td>
<td>2.0</td>
<td>0.5</td>
<td>1.0</td>
<td>5.5</td>
<td>9.0</td>
<td>12%</td>
</tr>
<tr>
<td>total</td>
<td>46.0</td>
<td>20.0</td>
<td>2.0</td>
<td>9.0</td>
<td>77.0</td>
<td>100%</td>
</tr>
<tr>
<td>percentage</td>
<td>60%</td>
<td>26%</td>
<td>3%</td>
<td>12%</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

Source: Fischer et al. 1999

Another interesting result of this study is the fact that spin-offs are regarded as a relatively unimportant form of co-operation between universities and enterprises. As the table below shows, only 14% of those surveyed name "spin-off formation of new firms" as a form of interaction with industry. "Joint supervision of PhD and master's theses", "lectures by firm members at universities", "joint research projects", "permanent mobility of university members to industry", "joint publications", and even "training of firm members" play a much more prominent role.

Table 4: Forms of co-operation between enterprises and universities

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Share of Responses in Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joint Supervision of PhDs and Masters theses</td>
<td>38</td>
</tr>
<tr>
<td>Lectures by Firm Members at Universities</td>
<td>35</td>
</tr>
<tr>
<td>Contract Research</td>
<td>32</td>
</tr>
<tr>
<td>Joint Research Projects</td>
<td>31</td>
</tr>
<tr>
<td>Permanent Mobility of University Members to Industry</td>
<td>30</td>
</tr>
<tr>
<td>Joint Publications</td>
<td>28</td>
</tr>
<tr>
<td>Training of Firm Members</td>
<td>27</td>
</tr>
<tr>
<td>Spin-off Formations of New Firms</td>
<td>14</td>
</tr>
<tr>
<td>Temporary Change of University Members to Industry</td>
<td>9</td>
</tr>
</tbody>
</table>
3.3 The design of the planned AplusB programme

AplusB is an initiative of the Austrian Federal Ministry of Transport, Innovation and Technology. The name stands for Academia Business Spin-off Start-up Programme. Similar to the German EXIST programme, AplusB is a competition for support in setting up and running spin-off centres which is open to regional initiatives.

Ideally, these initiatives are partnerships of different types of institutions (universities, research institutions, technology transfer agencies, colleges, technology centres, regional development agencies, local and regional government bodies, enterprises, etc.). The minimum number of partners is two, one of which must be a university.

The competition will provide an opportunity for initiatives to elaborate their models by creating a suitable matrix of specific measures according to local conditions. In setting up regional partnerships, account must be taken of any existing programmes or institutions which could take charge of certain measures, as well as of any possible synergy effects with existing structures. In order to ensure compliance with the objective of this support scheme, projects must fulfil certain criteria.

Principles

- The **target group** must be the academic staff of universities and research institutions, as well as graduates and PhD candidates.
- In principle, all **academic disciplines** are eligible; co-operation between technical and economic disciplines is welcomed.
- Any **available counselling, financing and technology transfer services** for founders must be utilised.
- The **focus** should be on the **early phases of the start-up process**: the central objective is to stimulate the creation of new firms and to provide support in preparing them, rather than to assist persons who have already decided that they want to set up a company. Accordingly, target groups should:
  - be interested and motivated to set up a company (**phase 1: stimulation phase**);
  - receive advice, training, financial support and assistance from the centre (**Phase 2: pre-start-up phase**), which is to be the focus of the centre's work. There are certain preconditions for being accepted as a potential founder which are to be defined by the centre itself, e.g. a viable idea, the
willingness of an academic mentor to accompany the project, a working plan and time schedule outlining the milestones of the pre-start-up phase. It is in this phase that the potential founders receive direct financial support for a maximum of 1.5 years in addition to coaching, counselling and training.);

- be integrated into a suitable support structure after the actual formation of the company; in this phase providing support is no longer the task of the centre (**phase 3: start-up phase**).

**Figure 4: Phases in the start-up process, services to be provided by AplusB**

![Figure 4: Phases in the start-up process, services to be provided by AplusB](image)

*Source: Joanneum Research*

Unlike the EXIST programme, AplusB defines a minimal set of functions which the centres must fulfil; it is up to the initiatives themselves to define and elaborate further functions and activities, of which only examples are given.

On the basis of international experience, these minimum functions have been defined as follows:

- arranging a link to the university/research institution to ensure academic supervision of the start-up process, as well as certain flanking measures;
- ensuring the necessary material infrastructure on campus, taking into account the relatively low infrastructure requirement during the pre-start-up phase;
• providing know-how, supervision and financial support for the start-up process;
• taking measures in the areas of stimulation, awareness raising and public relations.
4 Conclusions

This paper shows that the available data base is insufficient for a reliable assessment of the economic impact of academic spin-offs and of their significance for technology policy.

However, there are many indications that hardly any growth effects and only very modest structural effects are to be expected from these companies. On the other hand, academic spin-offs can be a very lively and dynamic factor in intensifying contacts between academia and the business world. Ideally, they are embedded in other forms of cooperation and mutual support.

Even though three European support schemes for the formation of academic spin-offs show similarities in both their objectives and their range of tasks, there are significant differences in the development, structure and regional integration of these models. The Finish SPINNO model can be described as a top-down initiative by a government ministry, the Swedish Chalmers Innovation System can be described as a network of many diverse regional and national actors, and the programme of EPFL can be described as a multilayered model in which more and more components were gradually set up around the core of the model, EHT itself.

This shows that simply copying an existing successful model it is not feasible when designing a new spin-off promotion programme such as the newly developed Austrian support scheme. In addition to this, the success of such programmes also depends on the structure and characteristics of the respective national R&D system, and in particular on the incentives which it provides. One of the key principles of the new Austrian programme, AplusB, is to encourage regional partnerships between various types of institutions such as universities, research institutions, regional development agencies, technology centres, venture capital agencies, etc., which are to design their own centres according to the respective local conditions, integrating as many existing programmes as possible.

In order to provide a suitable opportunity for regional partnerships to do this, the programme is to be launched in the form of a competition.

If the success of this initiative is to be appropriately evaluated in a few years, differentiated surveys of spin-off activity in Austria will be required in addition to a sound evaluation process – and if at all possible, on the basis of internationally comparable definitions and categories.
Literature:

ADT – Arbeitsgemeinschaft Deutscher Technologie- und Gründerzentren (Hrsg.),
ATHENE Projekt: Ausgründungen technologieorientierter Unternehmen aus

Almus et al. (2000), Unternehmensgründungsgeschehen in Österreich bis 1998,
ZEW Dokumentation Nr. 00-06. Mannheim

ARCS / ZEW (1997), Regionale Aspekte von Unternehmensgründungen in
Österreich, Wien.

ARCS / ZEW (1999), Berichterstattung zum Unternehmensgründungsgeschehen

Aston Business School et al. (1996), Review of Studies on Innovative Fast
Growing SMEs, Summary Report, EIMS Publication 42, Luxembourg.

Balázs, K. (1996), Academic Entrepreneuers and their Role in Knowledge
Transfer, STEEP Discussion Paper 37, Brighton.

Department Special Report, Boston MA.

Centre for Small & Medium-Sized Enterprises, University of Warwick, UK
(1996), New Technology Base Firms (NTBFs) in Europe, EIMS Publication
31, Luxembourg.

European Commission 1996, EIMS Publication Nr.26, Good Practice in the
Transfer of University Technology to Industry, Vol.3/3.

Spillovers Within the Austrian Innovation System, (FWF-Projekt-Nr. P12742-
OEK).

Frank, H. et al. (1999), Fördernde und hemmende Faktoren im Gründungsprozess,
Strategien zur Ausschöpfung des Unternehmerpotentials in Österreich, Wien.

Neuorientierung der Gründungsforschung, in: Wirtschaftspolitische Blätter
5/97.


Sturn Dorothea, Adametz Christoph, Gruber Markus, Holzer Franz, Novakovic Mirjam, Zinöcker Klaus (1999), Start auf dem Campus: Infrastruktur für Gründungen aus Hochschulen und Forschungseinrichtungen, Joanneum Research.

**Initiatives and persons contacted:**

SPINNO: contact: Raija Tengvall, Customer Service Manager, Kuopio Technology Centre Teknia Ltd.

CHALMERS INNOVATION SYSTEM: contact: Olle Stenberg, President, Chalmers Innovation

EPFL spin-off programme: contact: Damien Tappy, project manager