

EUROPEAN TREND CHART ON INNOVATION

Thematic Trend Report:
“Start up of Technology Based companies”

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**EUROPEAN COMMISSION, DIRECTORATE GENERAL ENTERPRISES
“INNOVATION AND SME” PROGRAMME**

The European Trend Chart on Innovation

Innovation is a priority of all Member States and of the European Commission. Throughout Europe, hundreds of policy measures and support schemes aiming at innovation have been implemented or are under preparation. The diversity of these measures and schemes reflects the diversity of the framework conditions, cultural preferences and political priorities in the Member States. The "First Action Plan for Innovation in Europe", launched by the European Commission in 1996, provided for the first time a common analytical and political framework for innovation policy in Europe.

Building upon the Action Plan, the "Trend Chart on Innovation in Europe" is a practical tool for innovation policy makers and scheme managers in Europe. Run by the "Innovation" directorate of DG Enterprises, it pursues the collection, regular updating and analysis of information on innovation policies at national and Community level, with a focus on innovation finance; setting up and development of innovative businesses; the protection of intellectual property rights and the transfer of technology between research and industry.

The Trend Chart serves the "open policy co-ordination approach" laid down by the Lisbon Council in March 2000. It supports policy makers and scheme managers in Europe with summarised information and statistics on innovation policies, performances and trends in the European Union. It is also a European forum for benchmarking and the exchange of "good practices" in the area of innovation policy.

The "Trend Chart" products

The Trend Chart on Innovation has been running since January 2000. It tracks innovation policy developments in all EU Member States, plus Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Iceland, Israel, Latvia, Liechtenstein, Lithuania, Norway, Poland, Romania, Slovak Republic and Slovenia. The Trend Chart web site (www.cordis.lu/trendchart) will provide access to the following services and publications as they become available:

- a database of policy measures across Europe;
- a "who is who?" of agencies and government departments involved in innovation;
- a series of country reports;
- a series of six-monthly trend reports;
- a number of benchmarking reports on specific themes;
- statistical reports such as the European Innovation Scoreboard;
- the six-monthly newsletters of the Trend Chart;
- the annual reports of the Trend Chart;
- and other publications.

The present report was prepared by Jacques Bonnin from Inbis, Ltd. based on information gathered by a network of correspondents co-ordinated by Paul Cunningham from PREST (University of Manchester). The information contained in this report has not been validated in detail by the Member States or by the European Commission.

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1. Executive Summary

Start up of technology based companies has seen a dramatic change, both in terms of numbers and in terms of interest from national policy makers.

In particular, the number of start-ups backed by Venture Capital has doubled between 1998 and 1999. This phenomenon has led in turn to a change in culture with potential entrepreneurs, especially in the science and technology area, leading to an apparent self-sustaining process of business creation.

This has occurred at the time where public policy makers had taken a renewed interest at the national level in the creation of high technology start-ups. Where structures designed for fostering exploitation of research (such as science parks, seed venture funds) had been previously largely the realm of regional/local policy makers, national policy has taken the relay with new sets of measures very often co-ordinated at the national level, but to be implemented at the regional/local level.

This new set of measures includes in particular: provision of early stage finance, provision of consultancy services, (non financial) intermediation service, active promotion of university spin-offs, development of high technology incubators offering the whole range of services needed by a fledging company.

In all this activity, the forty or so measures identified allow the identification of a number of trends with regards to national public policies attempting to blend the necessity to carry out a policy at the national level with the local/regional specificity.

It appears, however, that a large set of measures are, as discussed above, decided or implemented at a regional level. This is even more valid for countries with a federal constitution/administration (Germany, Austria, Spain, Italy). No information on what is actually carried out at a local/national level removes the possibility of effectively comparing policies and results.

Despite this restriction, the data collected has allowed the following trends to be identified:

- A quasi-general move to develop **technology specialised incubators** involving public/private partnership. Incubators provide, in theory, at the local/regional level all the services required by start-ups (in particular including through one way or another the provision of finance). A further survey in these new structures would be useful to assess early results and to map their different characteristics/functions through different Member States as well as to give a first indication of the economic justification for such policies.
- A **new way of policy making at the national level** (in particular through competitions to select the best actions to support the creation of spin-offs/technology firms) which leaves more room for private/local or regional initiative in shaping support measures. More detailed information on the results of these competitions would allow a systematic comparison, exchange of experience between Member States in this area and possible guidelines for Member States which have not yet undertaken such initiatives.

- **Soft** (intermediation) **measures** to support entrepreneurs and start-ups through encouraging networking with a wide array of actors at the local/regional level. A systematic identification of these measures would provide a solid basis for exchange of experience between actors involved in such measures.

A question that the data collected also raises is the adaptation of structural programming to the development of measures at a time when policy making in the area is subject to very rapid changes. In particular, it is noticeable that the latest trends reported above have not reached cohesion countries where innovation policy is very much funded through the use of structural funds.

2. Introduction

The starting up of technology-based companies has seen a dramatic change, both in terms of numbers and in terms of interest from policy makers over the last few years.

If one had to choose which factor has been the most important in the recent flurry of technology start-ups, one would probably quote the unprecedented increase in finance available to technology start-ups (at least in the Information Technology and Biotechnology fields).

No recent comprehensive figures are available for the EU in terms of the creation of high technology start-ups. If we use the European Venture Capital Association's (EVCA) figures as a proxy, we get a vivid image of the trends in this area. The number of high tech investments has grown from about 3000 in 1998 to nearly 5000 in 1999 (from 39% to 44% in percentage of total investments), while the number of seed and start-up investments rose from 2300 to 4200 (from 30% to 37% as a percentage of number of investments). This points to a doubling in high tech start-ups involving Venture Capital.

A virtuous circle seems to have been set up. Financing has become more available to more start-ups. This, together with the good health of financial markets, has led in turn to a number of entrepreneurial success stories that prompted more entrepreneurs to start their businesses which found an even better echo with investors, etc.

This situation has been matched by a new interest from national policy makers for the start-up of new technology firms. While support to innovation in SMEs used to be spread equally over all SMEs, it is only recently that important public measures (at least at the national level) have been specifically targeted to the creation of new technology firms, in particular in the areas of Information Technology and Biotechnology.

Up to quite recently, one of the most visible attempts to foster the development of links between University and Industry and the start-up of new technology firms had been through the development, on a local level, of Science Parks and Business Incubator Centres. This trend, which lasted throughout the eighties and early nineties, led to the creation of around 200 Science Parks in Europe. This movement has revealed its limitations, however, with the realisation that a wider array of policies had to be developed if one wanted to encourage the creation and growth of technology firms.

One can argue that this state of affairs comes from the realisation by EU Member States that national economies can only create jobs and wealth if they produce more technologically innovative products than their competitors. Statistics¹ show that the world-wide share in high technology sectors of the four main EU countries (France, Germany, Italy and UK) declined from 19 to 9% during the period 1992-1996.

Another indication of this apparent lack of interest in this issue is that the Green Paper on Innovation² dated 1995 did not really deal with the question of academic spin-offs and the creation of new technology based firms. The subsequent action plan³ (published in March 1997) only mentioned one action in that area.

¹ OECD data Quoted in the European Innovation Scoreboard for the Knowledge Economy

² EC Green Paper on Innovation -1995

³The First action Plan for Innovation in Europe - 1997

This renewed interest in the creation and growth of high technology firms stemming out of European research more or less coincided with the debate that was launched at a European level on the issue of creation of “Innovation, Creation of new businesses and Jobs”. The debate, which started in 1997, allowed an assessment of the relationship between the creation and development of innovative companies and employment. It highlighted the gap between the situations in the United States and Europe in terms of creation of innovative companies and employment. The measures recommended within the framework of this exercise follow three main complementary axes:

- access to skills (technical as well as managerial)
- access to adapted sources of finance (pre-seed and seed in particular)
- the creation of an environment conducive to innovation (including the development of an entrepreneurial mentality and an improvement of the fiscal and regulatory situation for new firms).

This is a witness to the wide variety of areas which influence the start-up of new technology firms and the difficulty of isolating those which are specifically dedicated to this objective. It is no surprise, therefore, if most of the measures that appear under this theme are either technology incubators or can also be found under the innovation finance category.

Taking stock of this situation, policy makers of Member States, in particular those where the phenomenon was not very well advanced, responded with more measures designed to increase the amount of money for seed and early stage capital and reinforce the support available to new potential entrepreneurs. During the Lisbon Summit (March 2000) the necessity to have a strategy to prepare the transition to the knowledge based economy has been recognised and a number of steps in that direction have been taken. In particular, the importance of the creation of high-technology start-ups was recognised by the Union together with the necessary measures to support this move.

Some issues can be raised, not totally dissimilar to the ones that were raised when most European countries were searching for ways to develop a Venture Capital industry. Among them:

- How to make sure the European Union does not fall (or remain) behind its main competitors?
- How to benchmark activities in this area (including with respect to EU’s competitors)?
- How to support the movement in those Member States where it is the most active and start it where it still needs to happen?
- How to ensure the best co-ordination between public support measures and private ones (with the objective of not discouraging private initiative in this area)?
- How to assess the efficiency of the most recent measures to support the creation of new technology based firms, in particular incubators?

3. Analysis of current policies

3.1. Analytical Framework

The national correspondents have collected about 60 public measures that have been gathered under the creation of Technology Firms in this edition of the trend chart. One has chosen to categorise these measures according to the following typology.

- Promotion of R&D in companies
- Financial measures
- Provision of pre-seed (or early stage) financing by public organisations
- Provision of free consultancy services
- Intermediation services
- Promotion of university spin-offs
- Incubators

It is rare, however, for one measure to present one type of support mode. Most of them present a bundle of support actions, very often including both provision of early stage finance and management consulting.

We can also notice that measures can either be:

- Of a horizontal nature, promoting a limited set of the aspects above across a Member State.
- Of a more local, vertical nature. These are generally measures to promote technology incubators. They put together all horizontal measures to specifically support one target group.

One could also think of a wide number of actions which are not dealt with here, but which have been evoked during the “Innovation, Creation of new businesses and Jobs” debate, for example:

- Measures intended to promote an entrepreneurial culture with scientific personnel and researchers
- Measures aiming to simplify the creation of a business (administrative simplification)
- Measures designed to change the status of public researchers to enable them to carry out business activities together with research activities
- Measures regarding the use of public research establishment equipment.
- Measures tending to facilitate the acquisition/use of IPR by researchers/businesses for business purposes

These measures are important for facilitating technology start-ups and spin-offs. Loose references appear to them in the French 1999 Innovation Act or in the BMBF programme EXIST. It is felt, however, that not enough of these measures have been presented in this report to justify further analysis.

An important feature of this new set of public actions is that measures do not necessarily come under a single model at the national level. This is a new concept where it is not necessarily a

single model which is promoted, but the public action attempts to stimulate imagination in setting up and developing new concepts.

Another feature with measures coming under this heading is their duality: a large number of measures which were not directly targeted at NTBFs were in fact used by them.

3.1.1. Direct funding of R&D in companies

In this type of measure, funds are directly or indirectly (grants, loans, tax relief, equity, etc.) provided by government or government controlled agencies to companies in order to finance R&D and innovation projects which are considered too risky to be financed on a purely commercial basis. Most of these measures are of a generic nature and are not specifically targeted at start-ups, even if they can be used by them. They are not therefore discussed in this report.

3.1.2. Innovation Finance

Measures intended to improve the financing of innovative firms such as the development of a Venture Capital industry, or such as increasing the interest of the banking system for start-up firms, can obviously have a direct or indirect impact on new technology firms. A lot of these measures have in addition a specific facet which is dealing with start-up firms. It is unlikely, however, that professional sources of finance are interested in budding companies, unless they can present all the characteristics of a world-beater at a very early stage.

3.1.3. Early stage Finance

Obtaining finance, whether as loan or as equity, is one of the main problems for the creation of new technology based firms. The reasons for this state of affairs are well documented:

- Lack of collateral
- Intangible assets
- Lack of track record
- Product uncertainty
- Market uncertainty
- Etc..

In addition, the amounts involved at this stage (€ 50000 to 200000) are very often too low for professionals to be interested as they would not be able to offset their management costs.

Clearly, innovative companies are of no real interest to professional risk investors before they have built up a credible business plan and have something tangible to sell on the market.

They are of no interest to most banks before receiving their first orders, and a well charted cash flow provision for the next years.

Public intervention in this domain aims to foster through direct or indirect measures the financing of these firms to the point that they can be of interest to professional financiers/investors even beyond measures destined to develop a performing financial industry. The costs they have to cover are typically:

- the development of a prototype that can be sold on the market,
- the development of a business plan,
- the protection of their IPR.

Typically this, pre seed, money would cover the topics mentioned above, as well as, in a number of instances, the costs of living of the entrepreneur. They are very often provided through a fund linked to an incubator. An important issue is to ensure efficiency of this support. The preferred route in a number of Member States is now through public/private partnerships and the active involvement of experienced businessmen.

3.1.4. Provision of consultancy services

New entrepreneurs are most in need of consultancy when they create their company. They have a very wide range of problems to deal with and very limited resources. They sometimes have very little experience themselves and are not able at that stage to hire the necessary competence while having very little money to buy outside consultancy services. Making consultancy and services available to start-ups is therefore a major field for public intervention.

3.1.5. Intermediation services

One can argue that the recognition of intermediation as a tool to support innovation is relatively new. It is based on the assumption that “tacit knowledge” is probably one of the most efficient ingredients in innovation and entrepreneurship in a knowledge-based economy⁴.

Intermediation processes do not provide consultancy or advice as such, but ensure that young entrepreneurs are effectively introduced in the relevant circles where they can find partners for developing their companies; this is most often financial circles, but can also be potential technology partners, other entrepreneurs, researchers, etc.

3.1.6. Promotion of university spin-offs.

Measures under this heading have a large degree of congruency with measures discussed in the Analytical Report on Technology Transfer.

This is a specific case where the creators of the new company bring know-how and sometimes IPR from a research centre to create a new company. A wide array of measures can be implemented to encourage this type of business creation (favourable terms for IPR, possibility to use the research centre’s equipment with favourable conditions, etc.). Measures, including regulatory, can be taken at national level for the promotion of spin-off firms from Universities or Research Centres, etc.

Such measures are characterised by the fact that they are normally specifically targeted to current researchers or employees in Universities or research centres with the objective of helping them to set up and develop their own company.

Alternatively they aim to find individuals or start-ups, outside the research organisation to take the idea forward on a commercial basis.

⁴ See for example the document prepared for the European Commission “Towards European Innovation and Diffusion Policy for the Knowledge-Driven Economy – Paul David 2000

3.1.7. Incubators

The notion of incubators is not really new. Business Innovation Centres have been in operation since the late '80s. Up to now, however, they were mainly concerned with the issue of regional and economic development. Incubators specifically preoccupied with the issue of new technology start-ups, technology exploitation and transfer are, in Europe, a relatively new phenomenon.

Incubators are by definition local, they are very often associated with a Science Park or a research centre. They are designed to provide, locally, all the services that a fledging enterprise needs (and which are provided under specific labels): physical hosting, consultancy services, strategic, professional (and sometimes management) support, intermediation, finance (in particular early stage), sometimes scientific equipment, etc. They also implement and co-ordinate at this level the policies initiated at the national and/or regional levels.

3.2. Summary of National Correspondents' Reports

3.2.1. Direct funding of R&D in Companies

Those measures which cover the last stage in RTD are the most relevant, including product development and marketing costs. A limited number of RTD promotion measures actually do that. Examples are FUTOUR (DE_20) which provides up to € 750000 in subsidy and equity to carry R&D projects to the market place. Similar measures have also been highlighted within the Analytical Report on Innovation Finance.

3.2.2. Innovation Finance

A large number of measures to support Innovation Finance have a specific bias towards start-up companies. Some of them are specifically designed for new technology companies like the Austrian Seed Financing Programme (AT_3), University Holding companies (Sweden), Campus Companies (UK, Ireland).

A number of general financial measures, not specifically designed for technology start-ups also present a component for technology start-ups (some tens of thousands of Euros). Others provide equity money up to the stage where professionals will be interested to invest (that is € 750000). Examples of such schemes are the Young Entrepreneur Programme (AT_13), the Investment Capital for Small and Medium size companies of the BTU (DE_12); the mutual guarantee scheme of the PEDIP scheme (PT3_3/3) also aims to make it easier for a new company to find finance.

3.2.3. Early Stage Finance

Specialised measures provide small scale funding, generally on a grant basis, for developing the product and the business concept by the entrepreneur. They normally do not fund R&D. This funding is typically linked to an incubator. Similarly funds can be directly administered by city councils for the same purpose (NO_19).

Horizontal measures include the Austrian Seed Financing Programme (AT_3), which is typical of a measure providing “pocket money” (15 000 Euros) and advisory services to the entrepreneurs. Similar measures include TECMA (AT_16), which provides funding for IPR protection, FIRST “Spin-off / Training and Impulse for Scientific and Technological Research” (BE_37), which funds the salary and the training of a researcher and the Walloon Region’s support to isolated inventors (BE_48). The German multimedia contest (DE_22) provides up to € 10000 to potential entrepreneurs in the multimedia sector for developing a business plan.

3.2.4. Consultancy services

Most of the measures for start-ups (in particular technology) include consultancy services.

This has been the remit for a long time of the French Innovation agency (ANVAR) which has been providing technology start-ups with a whole range of innovation support services (FR_1)

This is also the theme of a number of specialised measures such as TULI (FI_6), the agreement between Sviluppo Italia and MURST (IT_26). Some elements of FIRST (see above) also fall into that category.

Alongside these measures which are mostly demand stimulation based is the Danish « Approved technological Service institutes » (DK_8), whereby 14 approved technological institutes are funded to support companies in their innovation process.

The Internet also offers the possibility to deliver these services on-line. One example is the German On-line Academy for start-ups (DE_38)

3.2.5. Intermediation

A good example is the Technologiemarketing Austria (AT_16) which, in addition to funding, also provides an introduction to industrial partners and advisory services.

Typical Intermediation activities are carried out by Business Angel Networks (see DE_50 under this section), which facilitate relationships between new entrepreneurs and investors. A similar measure, at institutional level, is the British initiative to institutionalise a liaison at ministerial and official level (UK_2) with the aim of improving mutual understanding between financiers and SMEs.

A large number of the incubators also perform this function by loosely facilitating contacts between entrepreneurs and other relevant actors (professionals, other entrepreneurs, financiers, investors, consultants, etc.). One can also mention in this section the INSTI Inventors club (DE_47) which offers a platform for information exchange between inventors and entrepreneurs.

In the same area, one can quote the Investment forum organised by NUTEK (SE_8). Although they are not reported by national correspondents, a number of similar events are being held, similar structures are created with or without public support, in all Member States, very often on the model of the “CONNECT” scheme developed by the University of California in San Diego. They all tend to create a network of investors and service providers around potential entrepreneurs. This is also the theme of a large number of structures such as “First Tuesday” aiming to facilitate the contact and interaction between investors and technology entrepreneurs.

Another means of encouraging the development of formal and informal relationships between firms (whether customers or competitors), research centres and specialised providers is the creation of clusters. An example of such a voluntary policy is the Flemish government systematic cluster approach (BE_24).

3.2.6. Promotion of University Spin-offs

The most comprehensive action presented, at least in its concept, is certainly EXIST (DE_21). This action offers to help regional actors to finance a whole series of measure aiming to promote the creation of businesses by students and researchers (Promotion of entrepreneurship, exploitation of research results, ...).

Such measures can help to finance the salary of the entrepreneur/researcher during the time he/she is working on the constitution of his/her business (FIRST spin-off BE_37, Grants for entrepreneurs NO_24).

The Science and Technology Based Innovation (FORNY, NO_11) also provides general support to researchers and university employees to develop business ideas.

Other measures are not specifically for researchers but are designed to promote University/Companies links and the exploitation of research results for the creation of new technology firms. One can quote in particular TULI (FI_6) or HERO-BC (UK_22).

3.2.7. Incubators

One of the ancestors and still an example for technology incubators is SPINNO (FI_1). It presents all the features of a modern incubator (involvement of the various local actors concerned, provision of expertise and training, availability of seed finance, “creative” treatment of IPR, etc.).

Most Member and Associated States, (except in cohesion countries) are in the process of launching new, specialised, technology incubators with public funding: Belgium (BE_27), Bulgaria, Cyprus (CY_9), Denmark (DK_4), Finland (FI_1), France (FR_12), Israel (IL_1), Latvia, Luxembourg (LU_4), the Netherlands (NL_15), the UK (UK_21).

One can also quote in this section the new Science Park (TechGate project, AT_24) in Vienna which aims at promoting start-ups stemming from Vienna’s universities.

The absence of the cohesion countries (Italy, Greece, Spain and Portugal) can be explained by the fact that innovation and science policies are very often funded through structural funds, the new regulation of the structural funds coming into force only in 2000. This seems to raise the issue of the reactivity of structural funds to the acceleration of new developments in this area.

In some Member States, new incubators coexist with more traditional Business and Innovation Centres (BICs) while in other countries BICs appear to have taken over the role devolved to technology incubators. As an example, BE_27 is a measure taken in Flanders to develop new technology incubators close to Universities and research centres, while Wallonia seems to prefer the involvement of more traditional, regional development led Business Innovation Centres (BE_51).

A question which transpires indirectly in the data sheet is the issue of cohabitation between private initiatives, very similar to incubators, and public incubators.

A solution which seems to have been found is the competition system by which only the best/most professional incubators are funded DE 21 (EXIST), FR_12 (Creation of regional incubator structures), UK_5 (Biotechnology Mentoring and Incubator Challenge).

The methodology governing these competitions needs to be highlighted as a new way of channelling public funds into innovation policy and to ensure its efficiency. In particular:

- the specifications are relatively non-prescriptive on how service should be organised and delivered
- the competitions call for wide partnerships between various innovation support organisations, public or private
- the initiatives and the structures created in this way are most often run by managers stemming from the private sector.

4. Conclusions

There is clearly a renewed interest for the creation of high technology start-ups, with national policy makers now involved in the definition and implementation of measures which previously used to be launched mainly at the local level.

This phenomenon takes place in a context where, although largely below the level reached in the States, start up of technology-based companies has seen a dramatic increase in numbers. This has been accompanied by a noted change in culture amongst potential entrepreneurs, especially in the science and technology area, both in terms of numbers and in terms of interest from national policy makers.

The analysis has allowed identification of a number of interesting facts and/or trends:

- A quasi-general move to support the development of **specialised technology incubators** involving public/private partnership. These incubators are different from what could be called “first generation incubators”: where the earlier type of incubator was generalist, mainly concerned with the provision of office/factory space and marginally with management support, new incubators tend to provide a comprehensive support to fledging companies (with a special emphasis on the production of finance).
- Whereas in the past, support policies used to be concentrated in the development of the supply side (creation and financing of technology transfer bodies, direct provision of finance to firms to carry out research and technological development), policy makers in the most advanced Member States are now developing an array of **soft measures**, helping young companies to build up and relate with a network of partners at the local and regional level.
- While in the past, innovation finance measures not specifically dedicated to start-ups were used by them, one can witness the development of a series of **financial measures targeted to serve the needs of start-up companies**
- Finally, a **new way of making policy**. It was noted earlier that a number of issues which used to be dealt with at the local and regional levels are now taken care of nationally. National policy makers have, however, made sure they would take into account the regional characteristics and, through the organisation of national competitions have left much more leeway than previously to the initiative of local actors public and private.
- A major issue that also comes up from the analysis is the gap between various Member states in the EU, with cohesion countries clearly lagging behind the most developed countries in the latest trends of policy development. It is quite noticeable that policy making in these countries follow the structural funds schedule. One can wonder if this schedule is still adapted when policy making follows a much swifter rhythm than it previously did.

Finally the information collection raises the following questions:

- quality and comparability of the data, which should be rectified in the future through better quality control and management in order to obtain a full set of information allowing meaningful comparisons between Member states.
- information concerning **regional initiatives** is most often missing. While in some Member States, it is possible to get a view only from a central perspective, this is much more problematic in other Member states where policy making in the area of innovation is less centralised (Germany, Italy, Spain, ...)
- it should be possible to **focus** during a period or two the data collection on topics of specific interest. Specific attention given to the points above would be useful to assess early results (and give a first indication of their economic efficiency), to map their different characteristics and functions through different Member States, to identify good practices. These results would be of interest to policy makers involved in fostering the creation of technology-based companies, whether they carry out (or consider carrying out) these types of schemes, or are not fully aware of the existence and benefits of this type of practice.

ANNEXES

5.1. Distribution of Measures Countries/Theme

	<- 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Incubator	FI1							BE27	DE23	UK21	
	BE51	IL1						DK4	NL15	DE52	NL24
Univ. Spin offs				FI6	BE37			BE27	DE21		
Consultan.	FR1					AT13	DK8	BE27	AT16	FR11	DE38
							DE22				IT26
Early Stage Financing	NO24							DE20	NL15		
	AT5				NO11			NO19	DE21	NO9	
Financial Environment	UK2										
	AT3	IL3					UK5		AT15		
Intermediat.							DK8				
	DE47	IL1					UK6		DE23		
Other Innovation Finance	UK8						UK5	DK4	DE50		
	AT5				DK2	DE12	NL23	AT12	AT7	FR13	UK31
Direct Finance To Firms	IL2								LU2		
	AT3	IL3			GR14	AT13	UK5	AT29	NL15		NL24
To Firms	AT5	IL1				DE12		DE20	AT7		ES19
	AT14					NE125		AT11			ES17
	GR2										
	NO4										
	<- 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000

5.2. Table of measures

A summary of Innovation support measures since 1990, as from the data sheets provided by National correspondents .

TREND CHART ON INNOVATION CREATION OF TECHNOLOGY FIRMS

<i>Coverage</i>	<i>Measures</i>	<i>Website</i>	<i>Date</i>	<i>Content Summary</i>	<i>Mode of operation</i>	<i>Targets</i>
Austria	AT 3 Seed Financing Programme (Venture Capital Programme)	www.innovation.co.at	1989	Provides quasi-equity, up to Euros 728,000, to technology based start-ups and new ventures promising to offer superior know-how (products, processes or services), and supports the coaching of the entrepreneurs by the investment.	Loans – Firms Financial environment	SMEs/Industrial SMEs
Austria	AT 5 BÜRGESS / Young Entrepreneurs Programme and Equity Capital guarantees	www.buerges.com/en/naviset/fford.html	1977	Supports the build up of equity capital for the foundation of new enterprises, by means of grants for interest of saved -up own capital resources, and guarantees equity holdings in SMEs for minority participation in cash and for a minimum of 10 years	Grants – firms Equity guarantee Early stage Financing	Individuals SMEs/Industrial SMEs
Austria	AT 7 Technology financing programme for SMEs- ERP	www.fgg.at/	1998	Supports the development of technology-oriented SMEs by providing risk sharing guarantees and loan guarantees to companies using also venture capital co-financing funds	Equity Guarantee Loans – firms	Venture Capital Funds, technology-orientated SMEs
Styria	AT 11 Regional Initiatives Styria	www.sfg.co.at	1997	Grants and participation for the setting up and development of SMEs. The scheme provides in particular a "silent participation" of up to 75% of eligible costs (max Euros 728,000) over 5 to 10 years.	Grants – firms Equity – firms	SMEs/Industrial SMEs
Vorarlberg	AT 12 Saving for the creation of an enterprise	www.vorarlberg.at	1997	A guarantee up to 50% of equity investment in enterprises with growth potential in international markets. Duration up to 5 years Max 1,8 Million Euros	Early stage financing Guarantee – firms	Enterprises located in Vorarlberg with innovative products and services and potential for growth
Lower Austria	AT 13 Young Entrepreneurs Programme	www.ooe.gv.at/foerderung/wirtschaft/index.htm	1995	Supports the costs of external consultancy in connection with the formation of new enterprises. The max. support up to 1,090 Euro. Supports SMEs to strengthen their equity capital base. 72,000 to 363,000 Euro participation between 10 and 20 years.	Consultancy services Equity Firms Early stage financing	Individuals SMEs/Industrial SMEs

The measures highlighted in bold have been added since the last version

<i>Coverage</i>	<i>Measures</i>	<i>Website</i>	<i>Date</i>	<i>Content Summary</i>	<i>Mode of operation</i>	<i>Targets</i>
Lower Austria	AT 14 Lower Austria participation model, business start-ups	Www.noel.gv.at/service/WST/WST2/index.htm		Financial participation and subsidies for existing companies and start-ups in Lower Austria	Equity – firms Interest subsidy – firms	Start-ups; innovative enterprises
Carinthia	AT 15 Equity Capital guarantee scheme		1998	Guarantees equity holding in SMEs for minority participation in cash and for a minimum of 10 years. Maximum guarantee offered by the Carinthian Government up to 100% .	Equity Guarantee	SMEs and investors
Austria	AT 16 Technologiemarketing Austria (TecMa)	Www.innovation.co.at	1998	TecMa locates industrial partners, provides financial assistance during the patenting phase and offers consulting services with regard to the exploration of R&D results.	Consultancy services Early stage financing	Scientists at universities and research institutions; private inventors
Vienna	AT 24 Vienna Science and Technology Park TechGate	www.magwien.gv.at	1999	Park targeted to technology-orientated industrial enterprises which work in “urban technologies of the 21st century” (mainly telecommunication, energy, transport, health or building industry), research institutions	Science and technology park	Technology-orientated industrial enterprises which work in “urban technologies of the 21st century” (mainly telecommunication, energy, transport, health or building industry), research institutions
Austria	AT 29 ERP Special Programme on Growth and Technology	Www.erp-fonds.gv.at/erp	1997	A loan granted for 5 years at 0.5% between 363.000 € and 14.5 Mio €. The borrower has to raise equity capital for at least the amount of a loan. If he fails to find an investor or raise capital at the stock exchange the loan has to be repaid at 120%.	Loan – firms	start-ups
Flanders	BE 18 University and Higher Education Institute Interfaces	Www.iwt.be	1998	Promotion of the collaboration between university and enterprises - Promotion of economic valorisation of research and the setting up of spin-off companies. Delivered by the AWI, the regional administration in charge of technology and innovation. The co-ordination between the interfaces is assigned to IWT.	University spin offs	University and high-school interface services

<i>Coverage</i>	<i>Measures</i>	<i>Website</i>	<i>Date</i>	<i>Content Summary</i>	<i>Mode of operation</i>	<i>Targets</i>
Flanders	BE 27 Incubators and Innovation Centres		1997	The Flemish government supports the establishment of innovation centres and incubators, located in research and scientific parks or in an university campus with the aim of fostering the creation of spin-off companies.	University spin-offs Incubators	
Wallonia	BE 37 FIRST " Spin-Off / Training and Impulse for Scientific and Technological Research "		1994	The Walloon Region takes in charge the salary costs of a researcher, delivers a subsidy to the research laboratory and takes in charge the costs of the necessary training for the researcher to carry out research in a spin-off company.	Early stage financing University spin-offs	<i>universities and HEI</i>
Wallonia	BE 51 Business Innovation Centres	Www.heracles.be		They provide a wide range of services for the creation and development of enterprises, including access to financing, promotion of innovation and technology transfer, spinoff projects from enterprises and laboratories.	Incubator	
Denmark	DK 2 Equity Guarantee Programme		1994	Selected venture capital companies to receive a 50% guarantee on investments made in emerging growth companies, on a case by case basis (from seed/start-up stage to a later developmental stage)	Equity guarantee	
Denmark	DK 4 Innovationsmiljøer" – Technology incubators		1997	6 technology incubators situated at universities or science/research parks to bridge research environments, innovative entrepreneurs and finance companies. They offer state-financed seed-capital, counselling and training, premises and administrative services.	Incubators Intermediation	SMEs/Industrial SMEs
Denmark	DK 8 Approved Technological Service Institutes (GTS-institutes)	Www.efs.dk	1996	Supports and promote innovation within business and industry by collecting, developing and creating new advanced knowledge and by ensuring that companies have access to advice and knowledge transfer through . 14 approved technological institutes.	Consultancy services	Large Companies/Large Industrial Companies Other Public Authorities/Organisations SMEs/Industrial SMEs

<i>Coverage</i>	<i>Measures</i>	<i>Website</i>	<i>Date</i>	<i>Content Summary</i>	<i>Mode of operation</i>	<i>Targets</i>
Finland	FI 1 SPINNO - A business incubator scheme.	Www.spinno.fi	1990	Training, a combination of government grants and other methods of support (technical, etc.), Venture capital available through SPINNO-seed Ltd, external consultants and experts on a limited basis, legal services, a support and advisory programme, accommodation in one of the science parks of the area. Up to 2 years of leave of absence can be granted to the researchers wishing to start a new company. Flexible rules for the transfer and payment of intellectual property rights.	Incubator	Graduates Other Researchers
Finland	FI 6 TULI scheme	www.tekes.fi	1993	The aim is to transfer commercially potential results of research projects towards commercialisation and new ventures. Regional TULI-projects are run by local technology transfer companies.	University Spin-offs	Managers Research Institutes Universities
France	FR 1 Support for innovation	www.anvar.fr	1979	Provision of finance and expertise (IPR - Market studies, research of partners, setting-up of European project, Acquisition or selling of technologies, setting-up of prototypes, preparation of industrial launch, preparation for the introduction to the stock market) to newly created start-ups, entrepreneurs, laboratories or SME's planning an innovative project with high technology content.	Consultancy services	Other Research Institutes SMEs/Industrial SMEs
France	FR 11 National competition for creation of new technology-based firms	www.education.gouv.fr/creation	1999	Selected projects can receive a) financial assistance for the preparation of business plan, market studies, access to external competencies, b) assistance after the creation of the company and from a financing of a part of the development from 12 to 36 months.	Consultancy services Early stage financing	Individuals

<i>Coverage</i>	<i>Measures</i>	<i>Website</i>	<i>Date</i>	<i>Content Summary</i>	<i>Mode of operation</i>	<i>Targets</i>
France	FR 12 Creation of regional incubators structures	www.education.gouv.fr/technologie/mesur/incub.htm www.education.gouv.fr/technologie/mesur/assemnat.htm	1999	The structures will have to detect and evaluate projects, support the elaboration of the project (management, organisation, juridical or commercial support, recruitment,... - information and clustering). They will receive a subvention of 50% for three years with a minimum objective of supporting 15 projects of creation of innovative firms.	Incubators	Research Institutes Universities
France	FR 13 Support for the creation of seed capital funds	www.education.gouv.fr/technologie/mesur/incub5b.htm	1999	Creation of seed capital funds on major areas of technology with a partnership of public research institutions and private investors. Development through regional incubators regional funds to invest 75% of its funds in firms linked with public research.	Equity – Investors	Research Institutes
Germany	DE 12 BTU- Investment Capital for small and medium sized companies		1995	Mobilisation of up with 6 million DM (with a co investor) to finance R&D expenditures, changes in existing technology or marketing.	Equity – firms Equity Guarantee	SMEs/Industrial SMEs
Germany New länder	DE 20 FUTOUR	www.vdivde-it.de	1997	Subsidies , venture capital, consulting and technical support towards financing and implementation of R&D projects up to the market place.. subsidies and venture capital might not exceed 750,000 Euros (up to 90% of project costs) over 10 years.	Loans – firms Equity – firms	SMEs/Industrial SMEs Young, technology-oriented very small firms (not more than 10 employees and not older than 3 years) and start-ups in the New Länder
Germany	DE 21 EXIST Existenzgründer aus Hochschulen Start-ups from colleges and universities	www.bmbf.de www.exist.de	1998	The BMBF subsidizes the winning projects for programmes helping students to set up their companies until the end of 2001 with around 45 million DM.	Early stage financing Spin-offs	Individuals Large Companies/Large Industrial Companies Research Institutes Researchers
Germany	DE 22 Multimedia Wettbewerb Multimedia Contest	www.bmwi.de/ www.gruenderwettbewerb.de/	1996	Competition to y motivate start-ups in multimedia. The best 20 ideas get DM 20,000, the other 80 concepts selected get DM 10,000. DM 40,000 per start-up may be provided for the development of business plans by professional advisers.	Consultancy services Early stage financing	Individuals SMEs/Industrial SMEs

<i>Coverage</i>	<i>Measures</i>	<i>Website</i>	<i>Date</i>	<i>Content Summary</i>	<i>Mode of operation</i>	<i>Targets</i>
Germany	DE 38 On-line Academy for New Firm Founders	www.focus.de/existenzgruendung www.focus.de/D/DB/DB39/db39.htm	2000		Consultancy services	New and recent firm founders in search of resources and assistance with their businesses
Germany	DE 47 INSTI Inventors Clubs	www.insti.de		Offer a platform for exchanging of experience and advice for inventors and young creative individuals.	Intermediation	Graduates Large Companies/Large Industrial Companies Researchers SMEs/Industrial SMEs Universities
Germany	DE 50 Business Angel Network of Germany (BAND)	www.business-angels.de	1998	Provides a platform for contacts between business angels and potential start-ups and young firms. Presentation through Internet, legal aid provided through the network.	Intermediation	Large Companies/Large Industrial Companies Other SMEs/Industrial SMEs
Germany	DE 52 BioProfile/BioProfile	www.fz-juelich.de/beo/beo.htm	1999	Competition between regions developing a regional biotechnology concept. Subsidies of up to 50% for coordination and R&D projects will be available for the realisation of the concepts in the three winning regions.	Incubators	Large Companies/Large Industrial Companies Research Institutes SMEs/Industrial SMEs
Greece	GR 2 Investment Law – Support for the creation of NTBFs		1990	Clusters grants and other support initiatives for NTBFs giving high priority to the utilisation of cutting edge technologies, " high-tech " services and the application of innovative procedures and production of innovative goods and services.	Grants – firms	Large Companies/Large Industrial Companies SMEs/Industrial SMEs
Greece	GR 14 Support of new entrepreneurs for the establishment of SMEs		1994	Support to productive SMEs in order to improve their competitiveness and access the international market, improve their financial situation and increase employment.	Grants – firms	SMEs/Industrial SMEs
Israel	IL 1 Technology incubators		1991	General assistance for entrepreneurs including assistance in obtaining financial resources and raising capital	Incubators Grants – Firms Intermediation	Individuals
Israel	IL 2 INBAL Government guaranteed research and development			Support the Research and Development Funds by purchasing 80% of the shares from any investor wishing to sell its investment.	Guarantee – equity	Individuals, SMEs/Industrial SMEs, Private investors
Israel	IL 3 YOZMA		1991	Draws foreign capital to invest in the Israeli hi-tech industry by co investing in Israel high tech industry either directly or by the creation of new VC funds.	Equity – investor Financial environment	

<i>Coverage</i>	<i>Measures</i>	<i>Website</i>	<i>Date</i>	<i>Content Summary</i>	<i>Mode of operation</i>	<i>Targets</i>
Italy	IT 26 Agreement Sviluppo Italia-MURST	www.igol.it/igprojects/higp_it.htm www.sviluppoitalia.it www.murst.it	2000	Supports academics to develop and marketing the results of their own research activities. Service are free for the project and start-up phases. Six months and 500 million lire (30% Murst and 70% Sviluppo Italia).	Consultancy services	Graduates ,Research Institutes, Researchers, Universities
Luxembourg	LU 2 SME Capital-Development Company (CD-PME)	www.snci.lu/CD-PME.htm	1998	Public/private joint venture (50/50) providing participating loans up to 25 - 30 million LUF and 2/3 of the total cost of the project.	Equity - Investors	SMEs/Industrial SMEs
Luxembourg	LU 4 Technoport Schlassgoart - start-up incubator	www.technoport.lu	1998	Targeted to existing and future start-up SMEs by offering its infrastructure and an efficient business environment. Companies must be a technology oriented start-up, present a realistic business plan, show synergy with the PRC Henri-Tudor.	Incubator	SMEs/Industrial SMEs
Netherlands	NL 15 Twinning Centres	www.twinning.com www.syntens.nl	1998	Provide accommodation and management support (Twinning Network) for Start up firms in the ICT sector. The Twinning Funds, respectively the Seed Fund and Growth Fund offer finance .	Equity - Firms Incubators Early stage financing	Start-up firms in the ICT sector
Netherlands	NL 23 Aunt Agatha scheme		1996	Tax exemptions on revenues (up to 2275 Euros) and deduction (up to 227500 Euros) on losses for informal investors to invest in new companies (up to eight years old) or funds investing in such companies.	Taxation – investors	Business angels, informal investors and new entrepreneurial firms
Netherlands	NL 24 Life Science Action Plan	www.syntens.nl	2000	Creation of a Platform Life Sciences Platform aiming to encourage start up and growth of Life Science firms, a seed capital fund, Incubators, Equipment fund and a Start-up participation fund.	Incubator Early Stage finance Equity firms	Public Authorities/Organisations, Research Institutes, Researchers, Universities
Norway	NO 09 Project Development Funds	www.snd.no	1999	Grants given to support researchers and innovators in developing projects and ideas into plans that can attract potential investors. ICT is given high priority.	Early Stage finance	Managers , Researchers

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<i>Coverage</i>	<i>Measures</i>	<i>Website</i>	<i>Date</i>	<i>Content Summary</i>	<i>Mode of operation</i>	<i>Targets</i>
Norway	NO 11 FORNY – Science and technology based Innovation)	www.program.forskningsradet.no/forny	1994 renewed 1999	Improves the ability to commercialise research-based business concepts. The funding is used on the commercialisation, not on the development of the product	Early Stage finance	Graduates, Researchers, Individuals, Research Institutes , Universities
Norway	NO 19 Municipal Business Development Funds		1997	Funds administered by city councils and distributed both as grants and loans to support start up of new companies, and further development of existing ones.	Early stage finance	Public Authorities/Organisations
Norway	NO 24 Grant for Entrepreneurs (Start-up Grants) .			May be used to cover living expenses, consultancy services, travel expenses, guardian schemes and other follow-up services, minor investment, market surveys and costs associated with start-up operations.	Early stage finance Grants - Firms	Entrepreneurs, particularly in the regional areas
Sweden	SE 5 Simplified registration of start-ups		2000	Common registration form.	Administrative simplification	New companies, implicitly SMEs
Spain	ES 17 Development of technical Research (PROFIT)	www.mcyt.es/	2000	Subsidies to R&D, technology centres and companies to carry out technology transfer and innovation activities	Grants – intermediaries	Large Companies/Large Industrial Companies , Public Authorities/Organisations, Research Institutes, SMEs/Industrial SMEs
Spain	ES 19 The Information society for all	www.mcyt.es/	2000	Subsidies (including equity provision in firms) to promote the use of information society in companies	Grants – firms	Individuals , Public Authorities/Organisations, Researchers, Students in upper secondary schools
UK	UK 2 Liaison at Ministerial and Official Level with Private Sector Providers of Finance			To enhance among private finance providers the understanding of the needs of innovative SMEs and how to match them. To improve the business skills of SMEs and to ease their access to appropriate finance	Financial environment	SMEs/Industrial SMEs

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<i>Coverage</i>	<i>Measures</i>	<i>Website</i>	<i>Date</i>	<i>Content Summary</i>	<i>Mode of operation</i>	<i>Targets</i>
UK	UK 5 Biotechnology Mentoring and Incubator (BMI) Challenge		1996	To stimulate the start-up of new high quality biotechnology companies which will contribute to the growth of the UK biotechnology industry. A competition to encourage intermediary organisations to support such start-ups through the provision of grants.	Grants – intermediaries Financial Environment	Large Companies/Large Industrial Companies ,Public Authorities/Organisations , Research Institutes, SMEs/Industrial SMEs, Universities
UK	UK 6 Biotechnology Finance Advisory Services		1996	To improve biotechnology SMEs' awareness of, and access to sources of finance, in order to develop the UK biotechnology sector. To identify potential sources of private sector funds or appropriate government grants in all business development phases.	Intermediation	Individuals , Large Companies/Large Industrial Companies , SMEs/Industrial SMEs
UK	UK 8 Small Firms Loan Guarantee Scheme		1981	70 % guarantees on loans from banks and other financial institutions for small businesses with viable business proposals which have tried and failed to obtain a conventional loan because of a lack of security	Loan guarantee	SMEs/Industrial SMEs
UK	UK 21 Science Enterprise Challenge	www.dti.gov.uk/COMMS/dtiexweb/pages/pg05d.htm	1999	To establish up to eight centres of enterprise in UK universities in order to foster the commercialisation of research and new ideas, stimulate scientific entrepreneurialism, and incorporate the teaching of enterprise into the science and engineering curricula.	Incubators	Universities
UK	UK 31 Corporate venturing tax relief	www.inlandrevenue.gov.uk/home.htm	2000	Relief on corporation tax payable by companies at 20% of the amount invested in specific economic activities	Taxation – investors	larger companies wishing to invest in smaller companies.

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5.3. Start up of technology based companies

Country	Summary of the country report	Reference to policy measures	Notes
Austria	A large number of measures are dedicated to providing funding for the start up of new technology firms both at the federal and regional measures. Some of them also provide consultancy service. Austria also launches itself in the building up of a major Science Park site in Vienna.		
Belgium	Specific measures in Flanders and in Wallony to develop incubators, develop the provision of advice and consultancy and encourage spin offs from universities and research centres.		
Bulgaria	In the absence of venture capital or bank loans for start-ups bank the creation of Science Parks and Incubators are the main measures considered		
Cyprus	Development of a business incubator.		
Denmark	Development of 6 technology incubators		
Estonia	N/A		
Finland	15 incubators present together with a strong Venture Capital infrastructure. Specific scheme at national level to support technology transfer.		
France	Start up of new technology firms is one of main government priorities with the provision of innovation finance. 30 incubators are being set up, together with a national contest for innovation project and regulatory measures to ease the creation of companies, in particular by researchers.		
Germany	Germany implements a large number of measures to encourage technology start-ups within a booming financial environment. Measures are not only providing finance but also foster the development of public/private partnerships, supply of consultancy services and culture change.		
Greece	Within the framework of a lack of private finance, public funds to finance creation of NTBFs have proved in sufficient. Discussion currently take place on the role of the CSFs.		
Ireland	Although venture capital in more readily available for NTBFs than before, problem remains at the seed stage, particularly at the regional level.		
Italy	Creation of a new development agency to foster the creation of high tech firms. One its first actions is a limited pilot project with MURST to foster research spin offs.		
Latvia	Creation of a Business Innovation Centre and technology park		
Lithuania	N/A		
Luxembourg	Creation of an incubator, networking of service providers and provision of development capital through a semi public organisation.		
Netherlands	Change in policy inasmuch the central government now regards the creation of new technology firms as a general policy theme. In particular technology incubators are being created. Measures to foster education on "entrepreneurship" will also be announced.		
Norway	Science Parks are playing a major role in the Norwegian scene, where they administer company creation schemes at the local level.		
Poland	No specific measures.		
Portugal	Specific measures to support the creation of innovative start-ups and creation of incubators for firms created by young researchers.		
Romania	N/A		
Slovenia	Venture Capital Fund for new technology companies considered.		
Spain	Measures to finance developments of business plans and start up funds. Specific emphasis on information and communication technologies.		
Sweden	Several on going measures managed regionally to encourage cooperation between industry and academia, to foster the exploitation of research results and "patent exploitation offices".		
UK	Long term priority (Science Parks, "Campus Companies") with new trend to develop incubators, in particular in the Biotechnology field. A number of publicly supported schemes also provide early stage funding.		

5.4. Country Reports

Austria

The importance of entrepreneurship has been recognised by Austrian policy makers under the employment aspect. Currently, three programmes at the federal level are especially designed for this purpose: The Seedfinancing Programme (AT_3) and the Technologiemarketing Austria (TecMa, AT_16), both in close co-operation, and the Young Entrepreneur's Programme (AT_12) by BÜRGES. While the Seedfinancing Programme and BÜRGES concentrate on financing, TecMa provides consultation with regard to the commercial exploitation of research results and inventions.

Moreover, financing of start-ups is closely related to other innovation financing schemes: The FFF general programme (AT_2) and the ERP, namely with the ERP SME Technology Programme (AT_8), offer favourable terms for start-ups within their programmes. Equity capital guarantees by the FGG (AT_18) and the I² programme (AT_4) are also interesting for technology-orientated start-ups. A strong start-up-aspect can also be found in the TechGate Vienna project (At 24) which (partly) aims at promoting start-ups emerging from the Vienna universities. Moreover, financing of start-ups is also an important part of initiatives at the provincial level (see AT_11, 12, 13, 14, 15)

Belgium

Increasingly, the Belgian regional authorities are developing new instruments to foster the creation of technology-based companies, very often in linkage with universities.

A first instrument to this aim is the development of incubators, established by or in the vicinity of Business Innovation Centres or universities (see BE_27, BE_51). These centres are specialised types of enterprise centres, where researchers can develop a commercial activity as a result of research, and where enterprises with an important need for applied scientific research can receive guidance or develop co-operative research projects. Their actions are oriented principally to the supply of offices and personalised services and the delivery of management advice for newly created companies. The main aim of these centres is thus explicitly to ease the creation of spin-off companies.

The second instrument is the provision of advice in all areas of business development (strategic planning, financial engineering, organisational practices, market studies, technological development, IPR, etc.). Generally speaking, the instruments mentioned in that section, delivering "soft" support and financial services to companies, are also accessible to start-ups. The organisations concerned have generally developed services adapted to the specific needs of start-ups.

A third type of support to spin-offs by regional governments is available through the public funding granted to the functioning of university interfaces, which have received the mission of promoting spin-offs, both in Flanders and Wallonia.

Organisations and financial aids targeting more specifically the creation stage are present in Flanders (VIZO - see Who is Who list) and Wallonia (support to isolated inventors, see BE_48). Besides, a main objective of the new "Technology Valley" policy in Flanders (see BE_24) is precisely the creation of spin-off companies from research activities.

One new instrument in support of spin-offs has been launched in 1999 in Wallonia, the FIRST-Spin-off scheme (see BE_37). Through this measure, the Walloon Region finances the salary of a university

researcher during two years as a support for pre-competitive research projects with an industrial finality, aiming at developing a credible valorisation plan, including a technical/commercial feasibility study of the exploitation of the research results. The idea of this scheme is to help bridge the gap between the stage of the idea for a spin-off company (the commercially exploitable research result), and the effective setting-up of a viable enterprise.

In its declaration in the summer 1999, the new Walloon Government, in collaboration with the federal authorities, proposed creating a grant for enterprise creation, to be used during the study phase of the project.

Bulgaria

Lack of venture capital and funds for start-ups as well as lack of venturing tax relief are the main problems for the start-ups of technologically based firms. Another factor with a negative impact on the start-ups is a lack of relevant legislation on high technology firms and activities.

The shortage of capital and funds is actually a problem for all firms in Bulgaria. The sample survey carried out in the first months of 2000 by the Agency for SMEs has indicated that in 54% of the interviewed 1,751 SMEs, the sources of start up capital were the personal savings of the entrepreneurs and their families, followed by savings of relatives and friends - 21% and bank loans -11%. The low share of bank loans is motivated by complicated bank procedures 23%, inability to provide collateral - 15.5%, too risky due to the unfavourable business environment - 29.1%. In 1999 the Government prepared a Strategy for the development of the high technologies in Bulgaria and drafted a Law on high technologies and high tech parks which had to be main element for the implementation of the strategy. The debates of the Law in the Parliament were delayed very much and by the end on June 2000 it was not yet passed. The government strategy defined the priority sectors in which the State has to direct its efforts for the fostering the high technologies, namely: microelectronics and micromechanics; creation of new materials, chemical substances and components; energy and energy effectiveness; electrical engineering; automation system and robotics; biotechnology, pharmaceutical and precise chemistry; gene engineering; medicine; ecology; management technologies.

The strategy emphasised the importance of high technologies not only with regard to their direct contribution to the economic growth and regional development but also with the diffusion effect to the other spheres of the economy and public life. The draft Law suggests the differentiation of high tech activities as an independent sector and proposes an alternative tax treatment. The creation of high tech parks is to be stimulated through the establishment of special legal entities applying the alleviated tax regime which have the task of ensuring an appropriate innovation environment for the tenant companies.

Start up of technologically based companies will be supported also by business incubators, technological and innovation centres which provide premises, equipment, administrative services, consultancy and information. Business incubators operate already in the towns of Russe and Gotze Delchev and the set up of one in Vidin is forthcoming. Technological centres operating according to EU standards still do not exist. In the framework of PHARE 2000, a programme supporting the creation of four technological parks in Bulgaria has been initiated. A European Innovation Centre (EIC) has been created to enable Bulgarian companies to access R&D programmes and achievements in the EU.

Cyprus

Start-up of technology-based companies

The Ministry of Commerce, Industry and Tourism will assign to a recognised consulting firm to carry out a detailed study, for the introduction of business incubators in Cyprus. Although the final form and the details pertaining to the operation and management of the incubator will be decided upon completion of the study, the basic features of the incubator, as they have emerged from the study so far carried out by the Ministry, are outlined below.

The Institution of Business Incubators

Business incubators are an institution through which the necessary support is given to new inventors in order to develop and commercialise their innovative ideas, while at the same time they help create and organise a new enterprise that will utilise the new products which will be developed.

Objective of the incubator

The initial stages of enterprises in the high-tech field involve many risks, which act as a deterrent for external investors. As a result, many excellent ideas are left unexploited. Incubators aim at helping new inventors in the early stages in order to materialise, develop and trade their innovative ideas and create new productive enterprises. Countries where companies succeed in this field, have capitalised on their success.

Supervising Authority and Management

The various managing bodies of the incubator and their responsibilities as well as the details pertaining to the incubator's operation will be defined upon the completion of the detailed study. In general, the responsibilities of the above bodies will be:

- To adopt a policy concerning the sectors where incubators will be involved
- To approve the various procedures
- To supervise incubator development and the progress of incoming enterprises
- To terminate the stay in the incubator of any enterprises which fail to fulfil their obligations.

Services provided

The incubator will offer the following basic services:

- (a) Help in determining whether the idea can be implemented from a technological and commercial point of view,
- (b) Help in designing the plan for research and development,
- (c) Secretarial and accounting support,
- (d) Scientific and consulting support,
- (e) Help in finding the appropriate financing.

The incubator will also provide access to DataBases, access to a transfer of technology network, scientific and consulting support. [CY_5]

Denmark

The Technology incubators – 'Innovationsmiljøerne' (DK 4) shall bridge the research environment, innovative entrepreneurs and financial institutions thereby creating better possibilities for starting up knowledge-based companies.

Finland

Initiatives aiming at the start-up of technology-based companies primarily relate to the venture capital industry and various incubator schemes. The Finnish venture capital industry has been relatively underdeveloped, but in the 1990s the number of venture capital companies has increased significantly, and today the Finnish Venture Capital Association consists of 30 full members and some 25 associated members (<http://www.fvca.fi>). Of the publicly funded, Sitra and Finnvera are the most significant. (<http://www.fvca.fi>)

Sitra had a significant role in the establishment of the Venture Capital Association in 1990. Sitra's own activities include technology transfer and venture capital investments in emerging and technology-based start-up companies as well as large company spin-offs. Sitra mainly invests share-capital but other equity-related or complementing forms of finance are also possible. The funds are channelled directly to the companies or through a regional network of partners, which have recently become integrated with Sitra's activities. (<http://www.sitra.fi>) Finnvera's domestic development and financing solutions are particularly geared towards SMEs and help to promote regional policy objectives also (<http://www.finnvera.fi>).

The incubator schemes have been established in close association with the regional technology parks and universities starting from the late 1980s (FI 1). In the mid-1990s, there were some 15 incubator schemes in Finland. The more significant ones include the Spinno-scheme in the Helsinki region, the technology or company centres in the larger towns of Tampere, Turku and Jyväskylä. Another scheme of relevance is the TULI scheme, which aims at transferring commercially potential results of research projects towards commercialisation, through new ventures and start-ups (FI 6). The TULI-scheme functions on a project basis, also in close association with the regional technology parks and universities. (Ahola & LaPointe 1996.)

France

In France the creation of innovative companies has long been slowed down by its education culture, which had little regard for entrepreneurship, or consideration of SMEs as a category of companies. Innovation financing was based on the later stages of the process, to the detriment of critical phases such as feasibility studies, incubation and start-up. It now one of the Government priorities.

Various type of measures have been implemented by the Government :

1. **The creation of incubators** (FR12) was launched in March 1999 through a call for proposal under the responsibility of the MEFI and the Ministry of Research. Incubators are specialised types of enterprise centres, where researchers can develop a commercial activity as a result of their research results, and where enterprises with an important need for applied scientific research can receive guidance or develop co-operative research projects. A call for projects was launched in March 1999 aiming at selecting 30 incubator structures with the target of hosting more than 900 entrepreneurs over three years. Most of the projects are large partnerships between local universities, schools, local public authorities and capital investors. **In May 2000**, 29 incubators have been created with a public support of € 23,5 million. The overall budget for the measure was supposed to be € 15,3million in 1999. For 2000, the Government decided to raise the budget by € 7,6 million.
2. **A national contest for innovation project** is also organised since 1999 (budget of € 15,3 million), by the Ministry of Research and the MEFI (FR 11). This contest is open to anyone willing to set up a innovative company in France. The success of the contest in 1999 (1900 projects were proposed) allowed the Government to raise the 2000 budget (€30 million). The 2000 call for projects received more than 1800 projects. The measure is now managed by l'Anvar at a regional level. Administrative procedures for grant payment have been changed allowing the project manager to receive 50% of the

grant immediately after having signed the contract with l'Anvar. The final results of the contest will be published in July 2000.

3. **The 1999 Innovation Act** focuses its measures on the mobility of Researchers towards the creation of firms. From July 1999 to May 2000, 39 Researchers from various public laboratories have created their company: 19 in the field of Information Technology, 17 in Life Sciences, 2 in Chemistry and one in Social and Human Sciences.

A specific actor is dedicated to the creation of enterprise : **The National Agency for the Creation of Enterprise (APCE)**¹ (see Who's Who, part 6)) created more than 20 years ago has developed three specific missions :

- Diffusion of the spirit of entrepreneurship among the general public,
- informing and assisting entrepreneurs in the creation of enterprises,
- observation and analysis of the creation of enterprise, with the objective of determining more efficient measures to facilitate the entrepreneurship.

On April, 11th 2000, the MEFI organized the **National Workshop for the creation of enterprises** with the participation of the Prime Minister who announced ten measures in favour of enterprise's creation. The main measures are :

- ***simplification of administrative procedures for the creation of enterprise*** : on the web site of the National Agency for the Creation of Enterprise, an entrepreneur pack will be set-up to give all necessary documents and pre-format forms for the creation of enterprise. The creation of enterprise on line is examined.
- ***Reduction of the cost linked to administrative procedures for the creation of enterprise*** : the fees collected for name registration, stamps and publication at the Official Journal are abolished (€ 461)
- ***The reduction of social expenses during the first year of the enterprise***
- ***The innovation financing***
- ***The tax reduction for reinvestment in newly created company***

Germany

Fostering the start-up and growth of technology-based companies has a long tradition in Germany's innovation policies. The first programmes were developed at the beginning of the eighties. Recently this area of public support has had increasing importance as a rising share of the resource of innovation policy is devoted to this kind of activity. The main activities in this field are strongly related to improving the financing options for technology-based companies, especially access to venture capital. It should be recognised that the programmes contribute to the explosion of the German venture capital market in 1997 and 1998 which continues its growth in 1999 and 2000. In addition, the number of start-ups in cutting edge technologies, telecommunication and technology-based services (e.g. software) has been increasing throughout the nineties. Reforming the legal framework (introduction of the "Neue Markt" at the Frankfurt Stock Exchange in 1997) has stimulated the provision of venture capital to technology-based start-ups and makes this option for young researchers much more attractive than it was in the eighties.

There are several programmes for promoting start-ups of technology-based companies. The programmes differ in their focus on specific target groups. The most important programme within the promotion programmes of the BMWi is the BTU-programme (DE_12). Furthermore, the BMWi offers a special programme for technology-based start-ups in the new Länder, FUTOUR (DE_20). It offers state-subsidy,

¹ See web site www.apce.com

venture capital, consulting and technical support towards financing and implementation of R&D projects up to the saleable product, process or technological service. The expenditures have to link to the technology-oriented start-up or aim at establishing or enhancing the technological basis of start-up.

For the promotion of start-ups from universities and technical colleges the BMBF has installed a programme called EXIST. It started in 1998, (see D_21; start-ups from colleges and universities) and aims, above all, at stimulating the university spin-off and start-ups by students. This contest pointed out concepts as to how students, others involved at universities and graduates could become interested, trained and subsidised in starting up an enterprise, and accompanied into self-employment. The programme attempted to improve conditions for the foundation of new businesses and hence increase the number of start-ups originating in academic institutions. The concentration of existing resources, the creation of optimal structures and the development of innovative strategies help to motivate, train and support founders of new businesses. Therefore, colleges and universities and their partners in science, economy and politics have set up various programmes for students, employees and graduates. They aim at the creation of public private partnerships between higher education and economy. The supportive measures focus on the foundation process and accompany the newly founded businesses into growth. The aims are:

- Development of a new spirit of independence in higher education
- Promotion of the big potentials of business ideas and "Start-up personalities"
- Translation of research results into products and services
- Increase the number of technology oriented business foundations and innovative services (with positive effects on the labour market).

For certain fields of technology, there are separate promotion programmes to stimulate new firm formation. In Biotechnology, the BMBF offers the programme "BioChange" (DE_23), but start-ups are also supported within the BioProfile (DE_52) contest (but are here restricted to those located in one of the three winning regions). The BMWi launched a Multimedia contest (DE_22) in 1996 with the goal to increase the number of multimedia firms in Germany by the year 2001 by 100 %. In both programmes, start-ups are supported by direct subsidies.

Technology-based start-ups are not only supported by direct subsidies but also by consulting measures. Two examples are the Business Angles Network (DE_50) and the On-line Academy for New Firm Founders (DE_38). Here new firm founders can get advice and assistance with respect to organisational, financial and managerial questions.

Greece

Financial incentives for SMEs in general (including start-ups) are offered both by the SME Initiative (GR 3) and the law for economic development (GR2). Within the O.P. for industry EOMMEX (GR 14) had the funds to offer start up capital, which was not particularly addressed to technology-based start-ups, but was used mainly for those. The problem is that through a first-come first-served policy EOMMEX rapidly ran out of funds and for a long time potential entrepreneurs could find no support. The problem is more pronounced since the banking sector does not support start-ups, unless entrepreneurs dispose of the necessary collateral.

NTBFs and spin-offs are mentioned in various parts of the new Plan for the CSF, but a full negotiation and distribution of responsibilities and tasks remains to be settled.

Ireland

Case Studies of NTBFs

New Technology Based Firms (NTBFs) are seen to be an increasingly important component of Irish industry and a significant determinant of the future strength of the indigenous industry base.

Forfás has undertaken a study to provide case histories of such firms which have emerged from, or interact with, the National System of Innovation. The case histories are intended to demonstrate the nature and degree of that interaction in the context of the critical success factors for these firms. The study was aimed at identifying the key aspects of the innovation system on which public policy should be concentrated.

The specific terms of reference were:

“to determine the nature and extent of interaction with (including where appropriate their origin from) components of the National System of Innovation.”

Fifteen firms were selected, balanced in terms of size, range of technology areas, years trading and geographic location. The following table shows the age of the firms, their total and average employment over time.

<i>O</i> Table	1988	1990	1992	1994	1996	1998
No. of Firms in Sample	3	5	7	10	11	11
Total Employment	36	52	70	223	474	862
Average Employment per Firm	12	10	10	22	43	78

Four firms were from the software, 3 from technical support services, 2 from biotechnology and one each from the information and the electronics sectors.

The main issues arising from the interviews were:

- All the entrepreneurs were educationally qualified to at least primary degree level and many had work experience in multinational companies;
- Critical to their success was the growth in the markets served and their knowledge of the dynamics of those markets which were in the USA, the EU and Australasia;
- All the firms placed considerable importance on the technical and innovative skills produced by the education system. However, they preferred to hire commercially experienced staff rather than new graduates;
- In technological terms grant-aid for in-house R&D was considered most important. Only relatively limited contact was made with third level research and almost no use was made of other technical supports;

In the case of non-technological supports employment grants were seen as enabling more speedy and larger scale investment. Non-financial advice from Enterprise Ireland was also seen as beneficial and assistance with international marketing was availed of by some of the companies.

In terms of the wider business environment, taxation was emphasised. The 10 per cent corporation tax and employee share option plans were both seen as important. The regulatory environment was seen as neutral in its impact and venture capital was not highlighted as an issue.

The main conclusions were

Entrepreneurs Background

The study identifies the importance of experience in multinational companies and executives in these firms as a potential source of entrepreneurs.

Marketing

A knowledge and understanding of the US market should be the cornerstone of market advice and supports to NTBFs.

Key Skills

The companies stress the importance of technical and innovative skills. A continuing flow of such skills from the education system remains paramount and a review of the means by which technically qualified people acquire key business skills would seem pertinent.

R&D and Technical Support

The provision of financial support for in-house R&D for NTBFs especially in their formative years should continue.

The National Development Plan 2000-2006 provides for a great increase in public funds to support this.

The relatively low level of interaction between NTBFs and the third level research community should also be addressed by the very substantial allocations in the National Plan to support research both in the third level colleges directly and through the Technology Foresight Fund.

External Finance

The reading of the individual case studies conveys the view that venture capital is now much more readily available to new technology-based firms than heretofore – although other studies indicate that problems remain at the 'seed' stage, particularly at regional level.

Italy

SVILUPPO ITALIA

Sviluppo Italia is a new National Development Agency, founded by the Italian Government by legislative decree on Jan 9th 1999 and its aim is the development of the country, with particular reference to Southern Italy and other depressed areas as designated under the EU regulations. The following are the areas of activity of the company:

- promotion of productive activities and occupational initiatives
- new entrepreneurships
- attraction of investment
- development of requests for innovation
- development of local enterprise systems
- supporting central and local public administration

In this context, Sviluppo Italia is elaborating an Operational Programme on Innovation in order to favour new hi-tech investment, in particular in the South. In the future, the Government will set up of new incentives based on fiscal benefits for the investments in research and introduction of new instruments to support of the venture capital for new hi-tech enterprises, spin-off of young researchers, programmes of training and research.

AGREEMENT BETWEEN MURST AND SVILUPPO ITALIA TO SET UP NTBC

The agreement between MURST and Sviluppo Italia to set up new technology based firms through research spin-off came into force in February 2000.

It is an experimental programme involving the research areas of the University Federico II, Napoli, Sannio (Benevento), Lecce and Catania.

The project proposes free services for the project and start-up phases. It will last six months and provides funding for 500 million lire (30% Murst and 70% Sviluppo Italia).

Latvia

In 1993, as a trial for the development of innovation and technology oriented SME's support structures, the Latvian Technological Centre (LTC) was established. LTC operates as a classic technology or business and innovation centre. By its legal status LTC is non-profit limited liability (Ltd) company initiated and financed by the public organisations - ministries and municipalities.

Since 1997, LTC is the contractor of the EC project in the framework of the INCO-COPERNICUS programme. The goal of this project was to create the innovation support and information unit IRC-LATVIA (Innovation Relay Centre) in Latvia.

Since January 1999, LTC has also served as a National Contact Point and the representative in the EC Programme Committee for the horizontal programme "Promotion of Innovation and Encouragement of Participation of Small and Medium-Sized Enterprises" in the FP5.

LTC has provided support to 31 SME's in Latvia (complete list is available on www.innovation.lv/ltc/LTC_firms_eng.htm).

As part of the strategy to improve and stimulate business activity, measures have been worked out to attract investments, encourage the development of SMEs, promote export activity and create identical business development opportunities in regions, etc. One of the priorities announced by the government is to support the development of SME's since these businesses, in particular, with their mobility and flexibility support stable functioning of the market, increase competition and, thus, ensure lower price levels and the ability to compete in the international markets. In addition, the Latvian government believes the development of SME's to be of considerable social importance since it results in an increase of the group of employers and thus creates new jobs and promotes formation of the middle class, which stabilises society.

To foster SME's development, the strategy envisages concrete activities, such as the creation of an SME's support infrastructure, development of legislation favourable to the functioning of SME's, encourage the viability of these enterprises and growth of their competitiveness. The number of operating companies in Latvia was decreasing during the last years. For this reason, at the present stage of development of market economics in Latvia it is especially important to promote the growth of SME's and involve them in economic circulation.

Number of operating companies in Latvia

	01.03.1997	01.03.1998
Limited liability companies	37,676	34,042
Individual companies	15,366	13,956
Joint stock companies	1,322	1,441
Other	3,674	3,205
TOTAL	58,038	52,644

In 1996, the first Technology Park in Latvia was founded. The Latvian Technology Park was established by the Riga Technical University as a non-profit limited liability (Ltd.) company. The aim of the LTP is the promotion and commercialisation of science through modern technologies, by developing and supporting SMEs.

The founders and members of LTP are Riga Technical University, Riga City Council, State companies Latvian Development Agency and Latvian Privatisation Agency, as well as Chamber of Trade and Industry of Latvia and several private companies. LTP is supported by the Ministry of Education and Science, the Ministry of Economy and the Ministry of Environment and Regional Development of Latvia.

LTP possess a developed scientific potential in chemistry and biology, mechanics and engineering industry, electrical engineering, computer science, energy, electronics. There are essential developments at LTP in vibrotechnology, laser, cluster, membrane and ion plasma technologies as well as electric transport. LTP has accumulated significant experience in development and adoption of CAD, highly automated equipment, safety control system development and solving ecological problems.

Business Innovation Centre of LTP (BIC) is one of the main parts of LTP structure. BIC constantly provides manufacturers, scientific institutes, industrial enterprises and other local or international institutions with information about participation opportunities in different projects. EU data base and literature, Latvian data bases and business literature, ICECE, IASP data bases and news and international networks are available at BIC.

Process Control Training Centre (PCTC) at LTP was established as a result of co-operation with the Swedish company Reglertekniska Ingenjorsburan AB and Riga Technical University. PCTC offers training courses in process control and industrial measurements.

In the nearest future, international services, patenting and other consultations will be available in LTP. It is planned to start the LTP Spin-off programme, including the Riga Technical University, the University of Latvia, State companies Latvenergo and Riga Water. Developing the programme further, with the assistance of the Latvian Chamber of Commerce and the Latvian Development Agency, will involve the majority of the biggest Latvian companies.

	<i>Contracts with the Ministry of Education and Science (contract amounts, EUR, in thousands)</i>	<i>Taxes paid by Tenant Companies of LTP (EUR, in thousands)</i>	<i>Employees in the Tenant Companies (number of persons)</i>
996	4.67	179.6	40
997	66.7	400.6	110
998	93.5	961.3	240
999	144.1	1,234.9	260

Latvian Electronic Industry Business Innovation Centre (LEBIC) was established as an institution supporting development and technical modernisation of SME's in area of electronics and IT in Latvia.

Luxembourg

Within the framework of the increased promotion of endogenous development, measures in favour of new technological companies are at the forefront of preoccupations.

A first step has been the "Technoport Schlassgoart" pilot project for the creation of a first group of technological companies most of which operate in the data processing and communication sectors.

At the end of this exploratory phase, the model will probably be widened to other business centres incubators whose general pattern (in particular, for accommodation of manufacturing undertakings) will complement that of Technoport Schlassgoart. Requirements of regional balance will also be taken into account.

The second aspect referred to above is the networking of service providers and public advisers (financial, technological, training, logistics and management) through the Luxinnovation agency that will act as a first-stop-shop for entrepreneurs setting up technological companies.

The third preoccupation relates to the availability of development capital through participating loans of the CD-PME company.

Netherlands

The support of technology-based start-up companies has for a long time been a weak part of the Dutch policy and S&T system. It was left to the universities to deal with and, with the exception of Twente University, hardly anything was done in a systematic manner to help university start-ups other than offering them office space on university campuses. Some regional policy actors (mainly development agencies, Provinces) took up this issue in the mid-1990s and provided facilities such as offices and venture capital. But since entrepreneurship in universities was not promoted in a big way many of the Science Park type facilities attracted existing businesses more than university start-ups. Consequently the Netherlands scores modestly in its number of high-tech start-ups in comparison with other European countries.

It has only been one or two years since government has looked upon this issue as a general policy theme. The Twinning Centre initiative (see NL#15) is the first policy instrument, and the recent 'Industry Letter' (June 1999) is the first White Paper to take up the issue as one of its key points. The immediate policy aim is to co-ordinate and streamline the many small initiatives that have been launched by regions, cities and universities and develop a coherent technology based start-up policy strategy.

Plans have been put forward to expand the Twinning Centre concept to more technology areas. Most concrete example of such plans is the Life Sciences Action Plan (NL#24). The government intends to increase the number of start-ups in this area by stimulating market initiatives and bringing together relevant parties.

Quite recently (March 2000), the Minister of Economic Affairs has announced the establishment of a Techno-Starters Platform (NL#33). The Platform will act as a foundation that co-ordinates previous and new initiatives for stimulating the start-up of technology-based companies and integrates actors that (are able to) support techno-starters.

A policy issue that will become more important in institutes of higher education in the near future is the education on 'entrepreneurship'. The AWT has recommended that education should focus on stimulating talent, creativity and entrepreneurship. Measures in this area will be announced in the bill 'Entrepreneurship in a modern market economy'.

Norway

The Science Parks play an important role in encouraging the establishment of new technology-based companies, including university and college spin-offs. They are the local representatives of the FORNY-programme (NO_11,) which is intended to improve the ability to commercialise research-based business concepts or ideas conceived at universities, colleges and research institutes.

Poland

Start-up of technology based companies

Although there were no specific measures to encourage the creation of technology based companies, according to research done by the Economy Chair of Lodz University, in Poland there are about 600-700 small companies based on specialised and advanced technology. The founders of such companies are usually individual inventors and researchers from technical universities and scientific institutes who

collected a specialised knowledge and experience during their professional career and now use it in their firms.

According to the research, the above companies are active in the following sectors:

- Scientific, medical and optical instruments	27.3 %
- Biotechnology and pharmaceuticals	23.6 %
- Advanced materials	18.2 %
- Computers and telecommunications	18.0 %
- Industrial electronics	12.7 %
- Others	0.2 %

Portugal

It has been widely acknowledged that the insufficiencies in the creation and development of technology-based start-ups are due to three factors: the lack of entrepreneurship by scientists and highly skilled engineers, especially having in mind that the present academic systems dissuades entrepreneurial experiences; the small domestic market (together with an anti-nationalistic purchasing behaviour of many organisations); and the lack of venture capital.

Of course, the initiatives taken under PEDIP I and PEDIP II to launch and foster the development of venture capital companies should be welcomed, as an indirect way to promote the start-up of technology-based companies. Turning now towards the future, that is, towards POE and IOCTI, there are two measures which are expected to have a positive, though indirect, influence on the start-up of technology based companies:

- *consolidating and extending companies financing mechanisms* (measure 3.4. of POE), which will have an impact upon venture capital; and
- the creation of Centres for Economic Valorisation of Scientific Research (under IOCTI), which may give rise to new technology-based company initiatives.

More specifically addressed towards the creation and development of technology-based firms there are two actions:

- *mobilising new ideas and new entrepreneurs* (measure 2.2. of POE??), which has among its objectives the support of the creation of innovative start-ups; and
- *the creation of incubators for firms created by young researchers* pointed out in IOCTI.

Unfortunately there are no details so far on the exact shape of these initiatives. We hope to be able to provide a detailed presentation of them in the November report.

Slovenia

As of the current legal framework, no incentives were located. Yet the new “Law on support for enterprises in the development of new technologies and establishment and operation of their R&D units

in the period from 2000 to 2003” stipulates the foundation of a “risk fund for new technology oriented enterprises”.

Spain

For the first time, the Spanish innovation policy includes mechanisms to promote the start-up of technology-based firms. The **IV NP** has designed different instruments devoted to foster the emergence of new firms resulting from research centres or enterprises R&D spin-off.

One of these instruments is the partial financing of the business plan of those entrepreneurial projects derived from RTD results exploitation. This measure is included in the **PROFIT programme (ES-17)** and is specially oriented to public research centres.

This programme also foresees the application of **start-up funds** (seed capital) to help new technology-based firms (NTBFs) arisen from the initiative of other enterprises or people who intend to exploit their technical knowledge.

The **INFO XXI programme (ES-19)** also declares among its objectives the establishment of favourable conditions for the creation of firms related to the information and communication technologies.

Sweden

Since 1994/1995 the commercial exploitation of university research and inventions has been the focus for some new programmes. In 1995 seven *Technology Bridging Foundations* (Teknikbrostiftelser) located in major university cities, became operational. Together they received capital of about one billion SEK, the return on which they may use to increase commercial benefits from university research and to encourage co-operation between industry and academia.

In 1994-95 eleven *University Holding Companies* (Holdingbolag) were formed in Sweden. Their mission is to form project companies in order to exploit research from the universities and to develop services for such exploitation. They are themselves owned by the universities and are expected to become minority owners in firms created jointly with researchers and industrial actors for the exploitation of university research. In total, they have received 64 MSEK.

The Technology Bridging Foundations in Co-operation with the Holding Companies have, in turn, formed *Patent & Exploitation Offices* (Forskarpatent), which actively support researchers’ exploitation efforts. The formation of actors like the Technology Bridge Foundations and the University Holding Companies as well as the Patent & Exploitation Offices are concrete manifestations of the political system’s belief in the commercial potential of R&D and academic research.

UK

In collaboration with HM Treasury, the DTI has set a target of increasing the number of successful high growth business start-ups (defined as those which have at least 10 employees or a turnover of at least £1 million after five years) from 15,300 in 1998 to 20,000 in 2005. The creation of “spin-out” companies is also a policy priority and DTI has set a target to increase by 50% the 1997-98 number of companies spun-out by universities by 2001-02. Thus there are a number of existing measures aimed at the encouragement of researchers to start up technology-based companies. More generally, there has been a long-standing tendency for the UK to address this objective, initially through the large number of science parks created

in the 1980s and 1990s and more recently through locally based (generally on universities) initiatives for the support of “campus companies”. The current trend focuses on the creation of “incubators”, (for example, the University of Manchester’s Biotechnology Incubator). Government interest in incubators and clusters also centres on the biotechnology sector and a new phase of the Biotechnology Mentoring and Incubator Challenge (UK_05) has been launched, together with a new Biotechnology Exploitation Platform Challenge (UK_37), which builds on a pilot exercise that finished in 1998.

Multi-sectoral support for the creation of new technology based companies is also available through the Enterprise Fund, UK_24, which seeks to improve the availability of venture capital support for business start-ups. The venture capital element of the regional funds should be of particular help in filling the early stage start-up funding gap. Several other measures also provide indirect support for the creation of start-up companies, such as UK_31 (corporate venturing tax relief) and UK_35 (new R&D tax incentives for small and medium companies). Early stage seed funding is also available through the University Challenge scheme (UK_11) and through the HERO-BC scheme (UK_22).

In addition, DTI also provides financial assistance to the United Kingdom Business Incubators association.