



Technology incubators

Technology incubators, a variant of more traditional business incubation schemes, assist technology-oriented entrepreneurs in the start-up and early development stage of their firms by providing workspace (on preferential and flexible terms), shared facilities and a range of business support services.

Target and purpose

Technology incubators represent today an increasing share of existing business incubation programmes. In the United States, they are estimated to be one-third of overall incubators and an increasing number of universities and technology parks in the OECD area set up incubation schemes to promote technology-based entrepreneurship.

The specific target of technology incubators varies, depending on the single programmes. So, university incubators can either specifically target their own faculty and students or also reach out to people out of the university system who are nevertheless interested in the commercialisation of university research. Similarly, incubation programmes can have a narrow industry focus or can welcome firms from different industries, as long as they are technology-driven or exploit certain technologies. Generally speaking, though, three are the features that enterprises addressed by a technology incubation programme should have: *i)* they should be technology-oriented; *ii)* they should have the potential to grow in a relatively short period of time and employ skilled workers; *iii)* they should closely involve graduates, often in applied sciences, in their management.

The purpose of traditional business incubation schemes has been in the past as different as increasing firm survival rates; combating unemployment; contributing to the regeneration of distressed areas; encouraging ethnic-minority entrepreneurship, etc. Technology incubators share some of these objectives – *e.g.* improving the survival rate of new firms – but also have more specific goals such as:

- Strengthening the knowledge component of the local economy, also by engaging more closely the university system with the world of production.
- Creating an environment conducive to technology entrepreneurship; this in turn contributes to local economic competitiveness.
- Providing a nursery for the commercialisation of university research, especially when higher education institutions are directly involved in the promotion and management of the incubator.
- Fostering the development of cross-fertilising technologies such as biotechnologies, nanotechnologies, or material sciences that have several possible industrial applications and have therefore a strong impact on productivity and growth.

- Support the emergence of high potential start-ups that can achieve significant progress in employment, sales and exports within a defined period of time (e.g. 3-5 years).

Practice

The public and not-for-profit sectors predominate in the establishment and management of incubator schemes, with the private sector generally contributing through time and participation in specific activities at its own costs.

The economic characteristics of the location in which an incubator is established affect its operations and usefulness. Ideally, the area chosen should provide access for tenant firms to markets for goods and services, a degree of business expertise in the surrounding community, and financial resources of both debt and equity nature. These ideal conditions point to the importance for an incubator to develop strong linkages with the local business environment.

Indeed, incubators are not required to develop and offer internally all services that new firms need in the start-up and early development phases. Drawing on the external network of existing business development service (BDS) organisations has at least 3 positive effects: *i*) it reduces overhead costs for the public sector; *ii*) it prevents the potential displacement of existing private BDS providers; *iii*) it fosters the development of a private market for BDS organisations.

Key operational issues to consider in the management of a technology incubator include, but are not limited to:

- **Incubator management and staff:** The expertise and commitment of incubator managers is critical to success. Good managers are essential in selecting suitable tenant firms, in providing business and managerial advice to these firms, and in creating links to investors and the wider business community. When incubators make a direct investment in the hosted firm, financially skilled managers are also important. The effectiveness of management can be strengthened through networks of business incubators in which industry best-practices are disseminated.
- **Progression of tenant firms:** As a rule, incubated firms should not be allowed to overstay the agreed period of incubation so as to enable other firms to benefit from the same support. In practice, many technology and non-technology incubators find it difficult to implement a stringent exit policy because young enterprises, after the typical one or two years of the programme, are hardly ready to be fully exposed to open market conditions. In this case, an option can be to require tenant firms to leave the premises of the incubator after the agreed deadline, but still let them benefit for a longer timeframe from the subsidised services of the incubator. Another option is to use increasing rental fees over time to promote the graduation of the incubated firms.

- **Rental and other sources of income:** The previous point suggests that incubators can partly raise their own sources of income by renting out space and facilities or by selling at market prices their support services to external firms. However, this raises a tension between the role of an incubator as a financially self-sustaining venture and as a pure public policy tool.
- **Linkages with higher education institutions (HEI):** In the case of technology incubators, links with universities and research organisations are obviously of key importance. Incubator management will have to get over existing institutional constraints to the involvement of academic staff in enterprise support programmes and to tackle through the right set of incentives the classic dilemma opposing basic to applied research and academic career to industry engagement.
- **Range of support services:** As mentioned, incubators do not need to provide all support services internally; this should rather depend on the availability of equivalent services elsewhere in the proximity of the incubator. Some of the most typical services that can be offered in a technology incubator are listed below:
 - Training workshops aimed at specific business skills such as strategy planning, finance, intellectual property, marketing, raising debt and equity finance, etc.
 - Individual mentoring sessions with experienced businessmen.
 - Finance clinics aimed at raising investment finance.
 - Market research clinics and marketing advice.
 - Technical consultancy on issues related to intellectual property, patenting, and licensing.
 - Business plan evaluation done at different stages of the incubation programme.
 - Scientific support through direct linkages with academic departments and faculty who do work relevant to the business.
 - Provision of loans, grants or, in some instances, participation in the equity of tenant firms.
 - Provision of a small salary, which can be offered to promising participants to sooth the uncertainty related to the move from wage employment to self-employment.

Appropriateness and feasibility

Technology incubators are best used to promote the commercialisation of university research, the diffusion of cross-fertilising technologies and the emergence of a selected group of technology-based firms with growth potential. Technology-based incubators should therefore have a narrow focus on firms ready to make significant innovations and on those skills aimed at enterprise growth and opportunity exploitation.

Technology incubators should then be in a place where a selection of advanced business support services is available. Particularly important appears the availability of sources of business financing, especially forms of equity (business angels and venture capital funds) and semi-equity (mezzanine capital) capital that are crucial to the development of growth-oriented firms.

Technology incubators should moreover be launched with the active involvement of one or more local universities. It is indeed common practice that technology incubators have close links with universities, when they are not directly promoted by HEIs and/or established within university campuses. This entails that technology incubators are more likely to succeed in countries and regions where legal and institutional constraints to the engagement of academics in business support are not too binding.

Success factors

The following factors are reckoned to contribute positively to the success of a technology incubator:

- The goals of the programme should be made explicit, based on a thorough analysis of local economic circumstances and of the problems which the incubator is intended to address. Setting clear goals beforehand will also ensure the proper monitoring and evaluation of the scheme.
- The incubator management should be of high-quality and consist of professional with business expertise and past work experience in the private sector.
- The incubator's range of services should complement the offer of support services locally available. There is no need for an incubator to replicate BDS already available and the final objective should be that tenant firms have at disposal the widest possible array of services, regardless of whether they are internally or externally provided.
- As a result, close linkages with the local business community, training organisations and financial operators are all relevant to the success of an incubation programme. In particular, the availability of equity and semi-equity capital can facilitate the development of growth-oriented companies.
- When not established or directly promoted by universities, technology incubators should engage with local universities and thereby promote the transfer of knowledge from university to industry and the commercialisation of university research.

- On the other hand, when established by a university, participation in the incubator should still be open to people who do not belong to the same institution. A similar constraint is indeed unnecessary as it prevents the recruitment of the best pool of talents at the local and international levels. Indeed, not few incubation programmes are also open to the participation of skilled entrepreneurs from abroad.
- Some commonalities among tenant firms with regard to industry, use of technologies or background of management (*e.g.* postgraduates in related disciplines) are likely to encourage interaction and to enhance peer-based learning among participants, which is in turn considered one of the main strengths of business incubation schemes.
- Any training and teaching, even in a campus-based incubator, should be practice-rather than academic-oriented so as to be seen as relevant to the reality that start-ups must deal with. In this respect, the involvement of real-life entrepreneurs as mentors and consultants is generally welcome by participants, as real entrepreneurs can talk by experience about the difficulties they have encountered and how they have overcome them.
- The establishment of alumni networks can also be helpful, as previous participants who have graduated from the programme can give insights on how to successfully move out of the incubator and how to survive and grow in open market conditions.

Risk factors

While many incubators have proven successful in the OECD area, others have failed to achieve their objectives. If possible, technology incubators are even more challenged by the fact that host firms typically deal with intangible assets more than the average enterprise. The following list includes a number of risks that policymakers should consider when launching a technology incubator.

- Especially when universities are closely involved in the set-up of the incubator, there can be a conflict of views on the role of the incubator as a training tool (*i.e.* the view of education policy) and as a generator of high-potential start-ups (*i.e.* the view of business support policy). These approaches need to be reconciled, bearing in mind that a business incubation programme that has a purely educational function is questionable and likely to produce poor value for money, though training and mentoring do play an important role in this policy.
- When incubators are established within campuses, there is a danger that a wrong message about the contents of the programme is transmitted to potentially interested participants. The incubator management will have to make it clear that training and teaching for tenant firms is of practical rather than academic nature.
- On the other hand, technology incubators that are created without the direct involvement of a university will still have to develop linkages with local HEIs, which can be a challenge when the local legal and institutional frameworks set barriers and disincentives to the engagement of academics with industry.

- The growth-oriented companies that are targeted by technology incubators need different types of finance, including of equity nature, to fuel their stages of business development. However, as a rule, venture capital funds are reluctant to engage with early-stage companies. The incubator management may therefore have to focus on other sources of equity finance such as business angels and mezzanine capital.
- Sunset clauses are needed to avoid that firms outstay the agreed period of tenancy and prevent others benefiting from the same support. Nevertheless, termination of the programme should not be abrupt. A staged reduction is more appropriate as companies are still at a vulnerable stage of their development on completion of the programme and a “step down” process would put less pressure on them.
- Finally, many technology incubators, possibly because of the type of technology fields in which they work, end up attracting many more men than women. The incubator management may wish to set quotas if this were to be perceived as a weakness of this policy or be in conflict with gender equity concerns.

Evaluation

Typical criteria used to assess the effectiveness of a technology incubator include tenant firms' survival rates, improved sales and profits, creation of employment (*i.e.* number of jobs per firm created) and cost of public support per job created (*i.e.* public investment required for each job created).

A control group methodology comparing tenant and non-tenant firms is the most solid approach to assess the effectiveness of an incubation scheme. However, this can be a complex undertaking. For instance, information on non-tenant firms is usually found in sources which exclude early enterprise failures, which complicates the identification of a truly comparable set of firms. Similarly, because of the selection process, the firms that participate in the programme are expected to be better than those unselected and can therefore have inherent characteristics that will make them more successful than external firms regardless of public support. Finally, the dynamic effects of incubation on firms may be missed in the short term.

One possibility would be to use as a control group firms that were very close to be selected but that could not be accepted for reasons other than eligibility or the quality of the proposal (*e.g.* lack of space). However, while obtaining information on these companies is easy at the time of the application, it can become impractical two or three years after due to privacy issues. Moreover, even if feasible, this would represent a heavy burden on the time of the incubator management.

Should these methodological issues be overcome – *i.e.* it is certain that the incubated firms and the control group are comparable – still an increased rate of survival or improved sales and profitability are to be expected for firms in receipt of assistance. This means that the critical point for the evaluation of this public policy is the ratio of costs incurred through the incubation to the generated benefits; *i.e.* the public subsidy per job created.

Further resources

Ireland's Hothouse Business Incubator: www.pdc.ie/development/startup/outline.asp

OECD (2008), *A Review of Local Economic and Employment Development Policy Approaches in OECD countries*, OECD LEED Programme, Paris.
www.oecd.org/document/17/0,3343,en_2649_34417_42750737_1_1_1_1,00.html

University of Twente's TOP Programme: www.utwente.nl/top