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# **Incubators in Developing Countries: Status and Development Perspectives**

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## **Executive Summary**

The role of SMEs in growth and development is universally recognized, and is demonstrated by the quantity of studies, research, and literature dedicated to the subject.

Both in developed and developing countries, governments have been playing a key role in defining policies, programs and instruments which support the development of micro, small and medium enterprises.

One of the mechanisms employed to nurture small firms for more than two decades is “business incubation”. Incubators provide qualifying new start-up businesses with a set of facilities -- physical space, shared services, business and legal advice, and financial inputs – to facilitate their creation and assist them until “graduation”, when they have the capacity to “survive” in the outside competitive environment.

Success of incubators depends on several factors, and many lessons have been learned so far. Many of them can be applied to incubators in developing countries. Some aspects, however, require specific attention, depending on the status of the private sector development in each country.

Many developing countries have experimented with a variety of programs and schemes supporting small and medium enterprises, often with assistance from multilateral and bilateral organizations. Business incubation programs or initiatives have arisen especially over the last decade, with varying degrees of success.

From various developing regions, there is evidence that incubator initiatives help promising entrepreneurs launch their business and succeed. However, incubators still do not exist in most developing countries, especially where they could make the most dramatic difference in the development equation.

In this paper, an overview of the status and development perspectives of the incubator industry is presented, with a special focus on the needs and challenges observed in developing countries.

The role played by national, bilateral and multilateral support in fostering incubators in developing economies are also discussed.

The main lessons learned in business incubation, as well as their adaptation to the needs of developing countries, are presented in the final part of this paper.

# 1 From Small Enterprise Support to Business Incubation Systems

## 1.1 The Concept of Business Incubation

In both developed and developing economies, policies supporting small and medium enterprises (SMEs) are widely promoted as their role for economic and social development is universally recognized. In most developing countries, although figures may vary considerably across countries and over time<sup>1</sup>, micro- and small-scale enterprises account for the majority of firms and a relevant share of employment, and play a crucial role for economic growth.

Support programs range from technical assistance to tax incentives, from direct supply of capital to regulatory provisions, training, support to innovation and other types of incentives<sup>2</sup>. One of the mechanisms employed to nurture small firms for more than two decades is “business incubation”.

Business Incubation can have several definitions and approaches. According to the National Business Incubators Association (NBIA), “Business incubation catalyzes the process of starting and growing companies, providing entrepreneurs with the expertise, networks and tools they need to make their ventures successful. Incubation programs diversify economies, commercialize technologies, create jobs and build wealth.”<sup>3</sup>

Incubators are generally characterized by some relevant features, which generally include:

- A managed work space providing shared facilities, advisory, training and financial services, and a nurturing environment for tenant companies;
- A small management team with core competencies;
- Selection of start-up companies entering the incubator, 20 to 25 in the average, to be graduated generally after 3 years.

Incubator models may vary according to :

- their mandate (for-profit or not-for-profit)
- the type of sponsorship they have (public – private – mixed)
- their focus (mixed-use – niche). The most frequent types of niche incubators are related to technology (technology incubators) and bio-technology (bio-incubators). More recently, and especially in the U.S., a new generation of dot.com incubators emerged, although their number considerably decreased after the so-called ‘internet bubble’ in early 2000.

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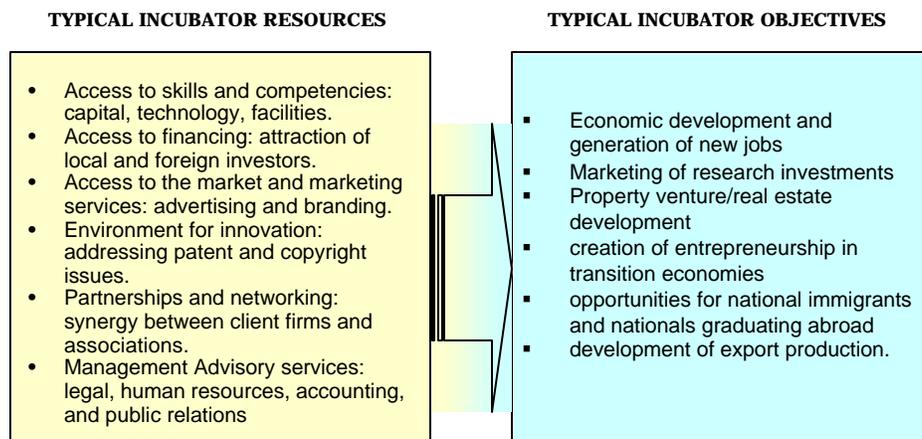
<sup>1</sup> For a review of the role of SMEs in economic growth in developing countries see: Kristin Hallberg [A Market-Oriented Strategy for Small and Medium Enterprises](#), IFC, Discussion Paper no. 40, The World Bank, Washington DC. and [Paths Out of Poverty – The Role of Private Enterprise in Developing Countries](#), IFC, Washington DC, 2000

<sup>2</sup> An interesting discussion of public support mechanisms to small high-risk firms in OECD countries is in an article by Margareth O’Shea and Candice Stevens, [Governments as Venture Capitalists](#), The OECD Observer, no. 213, 1998.

<sup>3</sup> [www.nbia.org](http://www.nbia.org)

Incubation programs may also have a wide range of goals, including:

- economic development and generation of new jobs
- marketing of research investments
- property venture/real estate development
- creation of entrepreneurship in transition economies
- opportunities for national immigrants and nationals graduating abroad
- development of export production.



Incubators started to appear in developed countries, namely in the U.S., in the early 1980s. According to the NBIA, there are currently about 900 incubators in the United States.

After two decades of steady growth, the U.S. business incubation industry seems to have reached a stage of maturity. It has produced a relevant impact in terms of business creation (19,000 companies created and still in business), fostering of employment (more than 245,000 jobs), and development of facilities (average size of an incubator is 16,000 sq. ft.). 75 percent of U.S. incubators are not for profit, 25 percent are for-profit. About 27 percent of incubators are academic-related. Most incubators in North America are located in urban or sub-urban areas, while 36 percent are located in rural areas.<sup>4</sup> NBIA also reports that 87 percent of all firms graduated for their incubators are still in business.

A general survey of incubators was conducted in 1998, showing the existence of about 2000 incubators in the world<sup>5</sup>. Today, it has been estimated that some 2,500 business incubators exist outside the United States<sup>6</sup>. About 1000 of them are located in Europe, including 300 in Germany.

<sup>4</sup> Source: NBIA

<sup>5</sup> State of the Business Incubation Industry Findings, NBIA, 1998.

<sup>6</sup> Barbara Harley, . International Business Incubator, Silicon Valley. Business Incubators: Good Old Models vs. Exciting New Models. A Presentation to the World Bank, February 2002. See also Barbara

In developing countries, incubators are a quite recent phenomenon. There are no comprehensive surveys regarding the current status of business incubation in developing and transition economies. About 500 incubators were estimated in 1997<sup>7</sup>. Today their number is considerably higher, taking into account the average 20 percent annual growth rate estimated in 1997<sup>8</sup>, and, above all, the impressive investments promoted in specific countries. The Republic of Korea alone is reported to have more than 300 incubators. In 2001 there existed some 130 incubators in China, against 110 in 1999<sup>9</sup>. Malaysia and India also invested considerably in incubators, especially in technology-oriented incubators. In Brazil 150 incubators were surveyed in 2001<sup>10</sup>.

Most not-for-profit incubators are supported by central or local government resources, although some resources may also be provided by other sponsors or partners, including from the private sector. For-profit incubators are funded by private investors. Venture capital firms are mainly interested in the equity investments in ventures of for-profit incubators, especially in the Internet sector. Large high-tech corporations tend to invest in incubators to foster their R & D activities, in the hope some of the incubated ideas may become successful marketable products and/or profitable start-up companies.

In developing countries, most incubators are not-for-profit, with funding generally provided by public resources. Over the last ten years, support has also been provided by multilateral and bilateral donor organizations, especially for the feasibility and planning activities associated with new incubator creation. It should be said, however, that in several developing countries the incubator industry is evolving rapidly, and in some cases incubators show levels of dynamism and innovation, as well as models of partnership and funding, which are comparable to the ones currently observed in industrialized economies.

## 1.2 Incubation Models

### *“First Generation” Incubators*

Generally characterized by a strong ‘real estate’ component and proximity to research institutes or technical university environments, this type of incubator is generally created by building new facilities, such as science, technology parks, or technopoles, or by re-adapting abandoned buildings (e.g. industrial complexes). Its real estate component often implies considerable public investments, sometimes supported by national or local programs for innovation, job creation and economic development. Sustainability is considered a major challenge of these initiatives, which always require considerable fixed investments, have long development life-cycles and can suffer from inadequate financing and exit mechanisms for graduating companies. The most frequent “success factors” of these systems are tied to their capacity to focus on new venture creation rather than on

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Harley on the International Business Incubator. *infoDev eXchange*, issue 11, March 2002, [www.infodev.org/exchange](http://www.infodev.org/exchange)

<sup>7</sup> Rustam Lalkaka, Lessons from International Experience for the Promotion of Business Incubation Systems in Emerging Economies, UNIDO, November 1997.

<sup>8</sup> Ibid.

<sup>9</sup> Source: Proceedings ITBI India 2001

<sup>10</sup> Source: Anprotec

real estate management, governance with an entrepreneurial management, and a strategic marketing orientation.

### *University Incubators*

University incubators are established in or by university campuses. There are different models, sizes and nuances regarding these kinds of initiatives. The common factor is that these incubators generally promote the development of new research/technology-based firms inside their own facilities. The role played by universities consists of linking research, technology, capital and know-how to leverage entrepreneurial talent, accelerate the development of new technology-based firms, and speed up the commercialization of technology<sup>11</sup>. Their success is considerably tied to the capacity of linking research with industry.

### *Virtual Incubators*

Virtual incubators are considered the “second generation” of incubators. These incubators are non-property-based ventures which require lower fixed investments and are regarded as a possible way of servicing SMEs in areas with insufficient critical mass. Virtual incubators are often hosted by a university or a research center, and are characterized by their capacity to operate both within walls and outside. When they operate as “incubators without walls” they serve newly created firms without hosting them within the incubator’s facilities. They usually generate externalities among firms linked via computer and telecommunications networks. Most virtual incubators are technology-oriented, and are aimed at transforming research into marketable products. The offering of pre-incubation and post-incubation services are considered a natural evolution of this model. Examples of incubators without walls exist in several countries, including in Brazil, Russia and Australia.

### *International Enterprise Centers – International Business Incubators*

This model is considered the “third generation” of incubators. These incubators provide a full range of support services for the development of knowledge-based businesses. Most of them are export-oriented and show impressive growth rates and sales records. They link universities, research institutes, venture capital and international joint ventures. This incubation model – based on the convergence of support mechanisms – is already present in China, Korea, and Malaysia. Some of these incubators are beginning to create *Incubator Networks*, incubators within the same region or country, or with the same focus. Their strength is based on their capacity to share knowledge and resources, and on the linkages and synergies that can be created in a research and development framework. There are currently eight incubator networks in China.

### *Dot.Com Incubators*

Dot.com incubators present a ‘model’ with specific features. Created under the ‘wave’ of the new economy, dot-com incubators or Internet business accelerators are a relatively recent but well-known phenomenon in developed markets, the U.S. in particular. They are characterized by strong venture capital orientation and shorter incubation periods (a

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<sup>11</sup> Reference: Sarfraz A. Mian, The University Business Incubator: A Strategy for Developing New Research/Technology-Based Firms. Dot.Com Ventures, Incubators, Article no. 3, 1996

few months instead of 2-3 years). A few dot.com incubators started to appear in emerging and fast-growing markets around 1999<sup>12</sup>. Some consider these incubators as the ‘fourth generation’ of incubators. Characterized by higher levels of risk and mortality rates, the development potential of these incubators has not been sufficiently assessed so far, especially in developing countries.

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<sup>12</sup> The Shanghai Business Accelerator is China’s first Internet incubator. It was created by a partnership between Jiaotong University, Shanghai S&T Committee, Tianjin Innovation center and BTDS. Another “Internet business accelerator”, was created by the Shanghai Withub Hi-Tech Business Incubator. Created in April 2000, it provides Internet start-ups with support in technology, information, funding, management and marketing. Another Chinese business accelerator is planned to be created by Qinghua University Hi-tech Park in Beijing. These initiatives are aimed at fostering the creation of early-stage IT start-ups, or to Western or old economy firms looking for potentially interesting IT investments in the Chinese market.

## 2 Support to Incubator Initiatives in Developing Countries

### 2.1 Multilateral and Bilateral Assistance

Most developing countries have experimented with a variety of programs and schemes supporting small and medium enterprises, often with assistance from multilateral and bilateral organizations.

Business incubation programs or initiatives have flourished in the last decade with varying degrees of success.

The World Bank Group has been promoting several assistance programs and projects supporting SMEs, providing more than \$8.8 billion of financing over the last three decades. Several initiatives are either underway or planned, all designed to meet the key needs of small businesses in developing countries, including capacity building, information and technology, access to capital and improved business environments. Assistance is mainly provided in the framework of programs or facilities for SMEs, Technical Assistance, and broad development projects.

The World Bank Group does not have a specific program for Incubators, but has supported specific projects. The IFC has undertaken investments in Business Incubation in Ukraine, Albania, Bosnia and South Africa. The World Bank is also supporting the development of Technology Parks with an Incubator component in it, such as in the case of Morocco.

At the IFC, the private sector arm of the World Bank Group, business incubation projects are often a complement to IFC's SME work through financial intermediaries. Business Incubators are considered especially helpful for some of the projects where significant technical assistance, especially in marketing, is key to the success of the companies' development<sup>13</sup>.

The developments in the Internet sector have led the IFC to promote new initiatives, both in partnership with the Japanese investment firm Softbank and with other venture capital funds, and directly, through minority equity participations or small loans to new Internet-related businesses in emerging markets. In this framework, IFC also incubated new start-ups for projects whose cost generally ranged from \$1 to \$20 million<sup>14</sup>.

The potential for rapid exits via public offering of incubated companies during the Internet years made incubation attractive to private venture funds. A number of purely private-sector incubators were created in developed markets, but also in a range of emerging countries in East Asia, Latin America and elsewhere. However, the downturn of the technology markets made launching of new technology companies difficult, particularly in emerging countries. The recent crisis involving the Information and Communications Technology equity markets, a shrinking pool of global investment capital for innovation, and a number of failed privatizations, has induced lower tolerances for risk and a pull-back in private sector investment in emerging markets. A new

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<sup>13</sup> Araceli De Leon, Experience in Business Incubators. IFC, Corporate Planning Department, December 1999.

<sup>14</sup> See [www.worldbank.org/ict/](http://www.worldbank.org/ict/)

initiative, specifically targeting incubators in developing countries, has recently been announced by *infoDev*, a grant program managed by the World Bank and supported by a consortium of donors. The program mission is to promote innovative projects and initiatives based on the use of Information and Communications Technologies (ICTs) to foster economic and social development, with a special emphasis on the needs of the poor in developing economies. The Incubator Initiative will be developed as a flagship within the *infoDev* program and will complement and leverage the efforts promoted by the World Bank Group, and by the international community, in assisting developing countries to promote economic growth by fostering private sector development.<sup>15</sup> (see box 2.1).

Regional Development Banks promote several programs for SMEs development, including the establishment of regional venture funds, micro-credit systems, or national SME development initiatives. In some cases support for incubator projects is also provided. The Multilateral Investment Fund of the Inter-American Development Bank has provided support to incubators, including a \$3.5 million loan to fund a technology incubator in the state of Santa Catarina, Brazil<sup>16</sup>. The MIF has also co-funded a business accelerator in Panama, investing in Internet infrastructure, software, telecommunications and other technology-related ventures. The Panama Business Accelerator provides tenants with strategy consulting, technology consulting, investment banking, and often venture capital through internal resources and global partner networks.

The Asian Development Bank has also supported several projects aimed at fostering micro-entrepreneurship, including by providing loans for incubator-related activities. One of those projects is being implemented in the Kyrgyz Republic. The African Development Bank has provided approximately US \$ 8.52 million in loans and grants to finance a learning and skills development project in Zanzibar, Tanzania.

The Project objective is to contribute to human resource development and poverty reduction by providing alternative learning, skills and employment opportunities to out of school youth. It specifically seeks to improve the quality of training, non-formal education and to link education with the labor market needs. The project involves the establishment of a school for alternative learning and the establishment of two skills development centers with business incubators<sup>17</sup>. No comprehensive program specifically on incubators has, however, been promoted by any of those regional banks to date.

The European Union's PHARE program, providing early-stage funding for Central and Eastern Europe, and the TACIS program, offering funding for the former Soviet Union, have played a meaningful role in the development of projects supporting SMEs. Business support centers and incubators have been set up with PHARE co-financing in several countries, including Poland and the Czech Republic. EU's Programs supporting SMEs have also been launched in other regions. Such programs include AL-Invest (Latin America), Asia-Invest (Asia), and ECIP (Latin America, North Africa and the Middle East and South Africa).

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<sup>15</sup> For information about the *infoDev* Incubator Initiative see: [www.infodev.org/incubator/](http://www.infodev.org/incubator/)

<sup>16</sup> <http://www.cni.org.br/>

<sup>17</sup> [http://www.afdb.org/knowledge/loans2000/adf\\_learning\\_Zanzibar\\_Tanzania.htm](http://www.afdb.org/knowledge/loans2000/adf_learning_Zanzibar_Tanzania.htm)

### **Box 2.1 The *infoDev* Incubator Initiative**

In May 2002 *infoDev* announced the launch of a new flagship initiative supported by the government of Japan which will foster entrepreneurship in developing countries by the use of incubators. The initiative is aimed at:

- Improving the performance of existing incubators in developing countries, achieving higher 'survival rates' of incubated companies, growth and sustainability.
- Promoting a synergetic approach focused on the needs of incubators in developing countries, based on improved knowledge, networking and capacity building.
- Seizing new opportunities offered by the more advanced use of ICTs within incubators, assessing incubators' strategies and processes.
- Building capacity within enterprises and enhancing their competitiveness, including trade competitiveness in the global business environment.
- Fostering entrepreneurship in developing countries, supporting the analysis, planning and testing of new incubator approaches within challenging private sector environments.

Aiming at economic and social development, the *infoDev* incubator initiative will combine the opportunities offered by ICTs on the one side, and incubators on the other. The recent downturn in ICT markets had a negative impact on the purely-private incubation model, resulting in a re-evaluation of the need for longer-term public financing. The initiative will specifically focus on ICT/business incubation in developing countries, expecting strong developmental implications within the overall 'digital divide' strategy under construction.

The program will initially be carried out over a three-year period and is structured into three main components:

*1. Creation of the infoDev Incubator Support Center for the assessment of private sector development and incubator-readiness at country level, and the collection of best practices and common performance objectives/indicators.*

A common platform of knowledge, best practices and services to be shared among developing countries' incubators would be a valuable contribution to improve incubators' success and performance. However, both in developed and developing countries, knowledge sharing and networking among incubators are the exception rather than the rule. Responding to a specific need shared by most incubators in the developing world, the first common repository of knowledge, best practices, experience and services - specifically targeted to the needs of technology incubators in developing countries - would be created by the *infoDev* Incubator Initiative.

*2. Support to the performance & growth of existing incubators in developing countries.*

Many incubators already exist in several developing countries, with different degrees of success. One of the objectives of this Initiative is to help existing incubators improve their own performance, and bridge the gap between their current progress and their development potential. Incubators will be invited to apply for grants aimed at improving their performance, sustainability and growth, in accordance with the strategy and objectives indicated.

*3. Technical assistance and Support to the planning of new ICT incubators.*

A specific activity targeting the countries that cannot draw on adequate private sector development environments, including the most disadvantaged countries or communities, would be implemented in the *infoDev* Incubator Initiative with the objective of helping them by providing specific technical assistance as identified and requested; setting up strategies, assessing the developmental impact and success criteria, and drawing feasibility studies supporting the planning of new ICT Incubators in particularly challenging environments; and assessing the specific gaps hampering ICT private sector development.

Technical assistance grants under this component shall be demand-driven, and shall demonstrate to be consistent and able to add value to the private sector development efforts being carried out in each country.

Many programs funded by the ILO, UNESCO and FAO are aimed at SME development but do not focus on incubation methodologies.

Several UNITED NATIONS organizations<sup>18</sup> have been involved in incubator projects since the early nineties. UNDP has supported the development of incubator projects in Indonesia, Malaysia and Uzbekistan; the UN-ESCWA has supported projects in Palestine, Syria and Jordan. UNIDO has supported the development of incubator projects in several countries, including in Poland, Turkey, Romania, Sri Lanka, Egypt, Ecuador, Uzbekistan, Czech Republic, Colombia, the Dominican Republic and Pakistan. Support is generally provided by funding feasibility studies, the review of strategy, regulatory and policy frameworks, or the building of local capacity. Depending on projects, funding tends to range from \$15,000 to \$60,000<sup>19</sup>.

UNIDO also offers incubator knowledge sharing initiatives, including Incubati-on-line, an information system providing reference information and best practices on the establishment of business incubators in emerging economies<sup>20</sup>.

At the bilateral level, relevant incubator programs and projects in emerging economies have been supported by the governments of the United States, Japan, Germany and the United Kingdom.

Starting from the early nineties, USAID has also been promoting incubators and other private sector-oriented initiatives in transition economies. In Russia, for instance, in 1993, USAID launched the Entrepreneurship Development Program. The initiative promoted the creation of incubators, including the first virtual incubators. One of them is the International Business and Technology Incubator (IBTI)<sup>21</sup>. Launched in Moscow, the IBTI was hosted by the Academy of National Economy, the main Russian graduate business school, and managed by Atlas Group Inc. (USA). Part of the USAID funds were used to fund selected technology projects submitted by research institutions and individual Russian scientists. Assistance was also given to support the development of new private technology-oriented firms. Due to its overall technical and operational responsibility of the project, Atlas Inc. implemented the methods for proposals' submission, evaluation, due diligence and funding. Efforts to facilitate US-Russian partnerships and ventures were also made. Training and other business facilitation activities were promoted within the Academy of National Economy. In June 1997 the IBTI had a portfolio of 400 research projects. 25 of them were selected for seed funding in the amount of \$25,000, supplemented by additional funding in the form of equity financing. Under the USAID program, the IBTI, or International Incubator of Technology, has given a total funding support in the range of USD 0.5-1.0 million to 32 start-ups. The incubator is currently involved in seminars, consulting, and partnership promotion. It also funds start-up companies through the FASIE, the Fund of Cooperative Development of Small Businesses in the Scientific and Technology Sphere, a Russian government funded program supporting entrepreneurship in Russia.<sup>22</sup>

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<sup>18</sup> References: Rastam Lalkaka, *ibid.*, and [www.unido.org](http://www.unido.org)

<sup>19</sup> <http://www.unido.org/doc/300458.htmls>

<sup>20</sup> [www.unido.org/doc/300459.htmls](http://www.unido.org/doc/300459.htmls)

<sup>21</sup> Reference: Katya Samsonova, Technology Incubators in Russia and Central and Eastern Europe, OECD/97-202

<sup>22</sup> [www.ibti.ru](http://www.ibti.ru) ; [www.fasie.ru](http://www.fasie.ru)

Japan is also very active in supporting incubators, both nationally and in developing countries, including, among others, Sri Lanka, Tunisia and Indonesia. Some of these incubators are also targeted at specific target groups, as in the case of marginalized women in developing countries. In this framework, Japan recently donated \$74,800 for the establishment of new business incubators in the Jabal Taj area of Jordan in a bid to assist underprivileged women to become income-generators, within an initiative funded by the Japanese government and the United Nations Development Fund for Women (UNIFEM).

Other bilateral assistance projects on incubators have been developed by the Turkish International Cooperation Agency (TICA) in Kyrgyz Republic and in Uzbekistan. Other incubators' initiatives in developing countries have been promoted by the United Kingdom and Germany. GTZ has promoted incubation initiatives in Uzbekistan and Poland. The German Association of Technology and Business Incubation Centers (ADT) plays a coordinating role in maintaining the network of innovation centers in Central and Eastern Europe, linking them to the European NICE network (Network of Innovation Centers in Europe). Moreover, in the framework of its TRANSFORM program, Germany, through ADT, has supported 6 pilot projects for the creation of technology and Business Incubation Centers in Russia, Poland, Belarus, Ukraine, Latvia and Lithuania<sup>23</sup>.

## **2.2 National Programs**

Most governments in developing countries support SME development. Some of them pursue this goal also by the use of incubators. Israel, China and Brazil present interesting examples of national entrepreneurship development programs leveraging on business incubation.

### **2.2.1 BRAZIL**

It has been estimated that in Brazil, micro and small enterprises account for 98 percent of the existing companies, employ about 60 percent of the active population, and contribute to 21 percent of the Brazilian GDP. However, 80 percent of such companies tend to run out of business before the end of their first year, mainly due to bureaucratic barriers, administrative barriers, and lack of management skills<sup>24</sup>.

These structural elements of the Brazilian economy have led the Brazilian government to establish several programs and financial instruments supporting micro, small and medium enterprises, as well as the creation of incubators. Support instruments include:

- equity funds, such as the CONTEC (Bndespar's Capitalization Program for Technology Enterprises) and the FINEE (Investment Fund for New Enterprises);
- loans and guarantees, through the FINEP (Federal Agency for Development and Innovation) and the BNDES (Bank for Economic and Social Development);

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<sup>23</sup> Reference: K. Samsonova, ibid.

<sup>24</sup> Source: SEBRAE

- microcredit finance instruments, through the BNDES Microfinance, Banco do Brasil (Fundo de Aval – PROGER) and the SEBRAE<sup>25</sup>.

Apart from these ‘horizontal’ support programs and instruments, Brazil has created specific programs addressing the development of Technology SMEs. The PACTI Program,<sup>26</sup> launched by the Brazilian Ministry of Science and Technology includes:

- the Alfa Program, offering grants up to R\$ 20,000 for feasibility studies regarding the introduction of technical innovation in small industries (up to 100 employees). The projects selected under the Alfa program, if successful, are then addressed to FINEP for the negotiation of loans, under the SEBRAE guarantee;
- the PNI (National Enterprise Incubation Support Program), aimed at fostering the creation of new incubators, and the consolidation and expansion of existing ones.

The PNI is promoted by the Brazilian Ministry of Science and Technology, through the Technology Development Office (SETEC), the CNPq (National Council for Scientific and technological development) and FINEP (Financing of Projects and Studies), the Ministry of Industry, Commerce and Tourism (SPI and STI), Banco do Nordeste, SEABRAE (Brazilian Support Services to micro and small enterprises), the SENAI - Industrial Apprenticeship Services, IEL and ANPROTEC (National Association of Technology Promoters).

The Program has set the following objectives to be achieved by the year 2002:

- Increase the number of incubated companies to 1500
- Increase the number of graduated companies to 500
- Increase the number of new jobs in incubated companies to 4500
- Market 5000 new products, services and processes
- Reach 80 percent survival rates

The PNI supports both existing incubators and the launch of new ones (technology, mixed purposes and traditional incubators). Support consists of two main components: technical assistance for incubator management and clients (feasibility study, strategic planning, management, ISO certification), marketing, technology, legal, administrative support, etc.) and training services (strategic planning, management, marketing, project preparation and management).

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<sup>25</sup> The SEBRAE (agency of the Ministry of Industry, Development and Commerce) offers several programs supporting the development of micro and small enterprises. The Brazil Emprededor Program was launched in 1999 by the federal government of Brazil to support micro, small and medium enterprises. Objectives of the program include the assistance and support to 2.3 million entrepreneurs during the first year, and the creation of 3 million jobs. The total budget of the program is R\$ 8 billions. The program is based on four main activities: promotion, training, credit and technical assistance. The program is managed by the SEBRAE and is operated through a network of commercial banks, NGOs and 5,000 entrepreneurial agents, selected and trained within the program. Training on the preparation of business plans is one of the pre-requisites for the concession of loans up to R\$ 50,000. The program has been playing a major role in incubators’ development. Support from the SEBRAE is received by 54 percent of Brazilian incubators.

The PATME program is aimed at supporting micro and small for-export companies in increasing their productivity and quality standard by the use of technology. It is offered by SEBRAE and FINEP. See: <http://www.sebraepb.com.br/credito/patme/>

<sup>26</sup> See: [www.mct.gov.br/prog/empresa/pni/Default.htm](http://www.mct.gov.br/prog/empresa/pni/Default.htm)

Support for the establishment and the running of incubators comes from different sources, including SEBRAE, CNI, Industrial Federations, SENAI, municipal or local institutions, CNPq, universities, and other associations or financing institutions.

According to a survey taken in 2001 by ANPROTEC<sup>27</sup>, there are currently 150 incubators in Brazil, versus 135 in 2000, 100 in 1999, and only 27 in 1995. 83 percent of incubators are currently located either in the South or in the South East of Brazil.

Most Brazilian incubators are formally tied to universities or research centers and are located in or near such facilities. Brazilian universities have also been playing a pioneering role in the creation of ‘without walls’ incubators. Several of them exist in the country, including in ‘niche’ markets (see box).

Technology incubators currently represent 55 percent of the total. Of these, 70 percent are focused on software and information systems, where support may come from several national programs, including the PNI program, and the Information Technology Programs supporting innovation and research in the ICT industry offered by the CNPq (National Research Center)<sup>28</sup>, including the Softex and the ProTem-CC.

#### **Box 2.2.1 The Cultural Virtual Incubator in Rio de Janeiro**

In March 2002 the first virtual incubator for the culture sector in the state of Rio de Janeiro was launched by the Catholic University of Rio de Janeiro (PUC-Rio).

The initiative is aimed at fostering entrepreneurship in the field of culture, including, among the others, performing arts, music, sculpture, photography, cinema and events. The incubating process is structured into two phases.

Initially, candidates participate in a pre-incubation phase, consisting of a one month training course on how to create a business plan for an enterprise in the culture business. All trainees have to pay a R\$ fee to attend the one-month course organized by the incubator.

After the training, applicants submit their business plan. Selected tenants are given orientation and consulting services over two years in order to support them set up their business. Consulting services range from marketing, to business administration, from quality, to legal advice, all customized to the needs of the culture sector. Consultation services for the incubatees are also delivered on-line, against a flat monthly charge of R\$ 200.

The next rounds of applications will be announced at the beginning of 2003.

According to the year 2001 survey, about half of the Brazilian incubators have a capacity between 6 to 15 tenant companies. Only 8 percent of incubators may host more than 25 companies. The current level of occupancy is in the average 74 percent.

Monthly leases paid by tenant companies generally range from R\$ 100 to 200. Only 19 percent of tenant companies pay more than R\$ 300. Services provided by incubators in Brazil include business orientation, general assistance, shared facilities, financial

<sup>27</sup> Source: Panorama 2000 Anprotec. [www.anprotec.org.br](http://www.anprotec.org.br)

<sup>28</sup> See [www.cnpq.br/programas/index.htm](http://www.cnpq.br/programas/index.htm)

consulting, legal consulting and information systems/technical facilities. Annual operational costs of incubators in most cases range from R\$ 50,000 to R\$ 150,000, but 32 percent of incubators have costs exceeding R\$ 151,000. Tenant companies cover only 19 percent of operational costs, while the rest are covered by the managing incubator entity (56 percent) or other sources.

The average incubation time for most Brazilian tenant companies is between two and three years. Only 5 percent of all incubated companies are incubated for more than 5 years. Incubators currently host 1,030 residing enterprises, an average of 7.4 per incubator. Total number of employees of such companies is 6,100; 61 percent are also shareholders or partners.

According to the annual surveys conducted by ANPROTEC, graduated companies were 450 at the end of 2000 and 500 at the end of 2001. Main sectors of activities of graduated and still active companies include: software and IT (27 percent), telecommunications (21 percent), mechanic and automation services (12 percent), Internet and e-commerce (9 percent), food (4 percent), bio-technologies (3 percent).

A survey of Brazilian graduated companies was also promoted by the Ministry of Science and Technology and the Euvaldo Lodi Institute in 2001, with 392 graduated companies were surveyed. The survey highlights that only 39 out of the 392 companies contacted had gone out of business. Graduated companies directly created over 5,000 jobs. Half of them had revenues exceeding R\$ 500,000 per year and employed in the average 15 people if operating in the service sector, and 20 people if operating in the industrial sector.<sup>29</sup>

The Brazilian incubator environment is one of the most dynamic in the world, with growth rates averaging 30 percent over the last five years. Brazil's incubators tend to be small (8 tenant companies in the average) and are generally tied to research/academic environments.

Over the last three years, incubator networks started to appear in Brazil. Today there are ten incubator networks. Each of them serves the incubators located in specific regions/states, often linking them through an intranet service. A few incubator networks also offer portals to facilitate the sharing of information among the incubators and the companies in the region, and provide services to the incubator network<sup>30</sup>.

A comprehensive 'portal of portals' for Brazilian incubators and networks of incubators was recently created by ANPROTEC to support the development and the networking among the several networks of incubators in Brazil, as well as to promote knowledge sharing and networking with incubators in the rest of the world<sup>31</sup>.

## 2.2.2 CHINA

The Chinese incubation model differs considerably from the Brazilian. Incubators in Brazil tend to be smaller, they are generally linked to academic institutions, and are generally funded by a plurality of government and non-government resources.

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<sup>29</sup> [www.redeincubar.org.br](http://www.redeincubar.org.br)

<sup>30</sup> The first regional portal ([www.incubadoras.com.br](http://www.incubadoras.com.br)) was established by the Rio Grande do Sul network

<sup>31</sup> [www.redeincubar.org.br](http://www.redeincubar.org.br)

In China, Incubators tend to be larger in terms of size and incubating capacity.

Involvement from the government is more evident and has an impact on the incubator models, organization, and funding structure. The incubator scenario in China has been evolving rapidly, with new incubator approaches appearing over the last few years.

The Chinese National Incubation Program (Torch Program) – administered by the Ministry of Science and Technology – was launched in 1988. The program has invested over US \$ 150 million in 12 years. At the end of 1999<sup>32</sup>, 127 incubators and another 64 ‘software parks’ were surveyed in China. 77 incubators had been created under the Torch program. It was also estimated that in China one incubator was created every two months. In 1998, Torch-sponsored incubators had an average floor space of 11,475 square meters, 54 tenants and 896 employees. Average tenant sales amounted to about US \$9.5 million, with profits of about \$625,000. Other benefits were highlighted in the 1998 study, including the social benefits, jobs created, and the innovation and cultural impact in the country.

In 2000, incubators created under the Torch program were 110. They occupied a total area of 1.41 million square meters, they incubated 5151 enterprises, of which 1785 graduated,. The incubators employed 170,000 people. The combined annual revenue of these enterprises is over 21.7 billion yuan (US\$2.6 billion)<sup>33</sup>. It has been estimated that, by 2006, there will be 200 incubators created under the Torch program, that the area of incubating sites will double, and that international business incubators will represent one-third of the total.

General Technology Incubators represent about 87 percent of incubators in China. Most of them were created under the Torch Program and present features of the ‘first generation incubators’, with a strong real estate component. Priority technologies include new materials, environmental technologies, biotechnology, aerospace and information technology. Tenant companies are mostly spin-offs from universities, research institutes and state-owned enterprises, but ownership typically remains with the parent institution. Only recently an increase of privately-owned tenant firms has been observed, as well as the raising of alternative sources of finance.

The majority of high-tech enterprises which are now performing well in China were set up in high-tech development zones and high-tech innovation areas across the country which play the role of business incubators. China's 53 state-level high-tech areas have so far helped build up 18,000 new enterprises, contributing greatly to the development of the country's high-tech sector. Shanghai has 13 business incubation centers which have fostered the growth of more than 40 enterprises and are still working toward the goal of setting up an additional 330 firms.

In the past few years, new models of incubators have been emerging in China, some of them showing considerable growth rates.

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<sup>32</sup> References: R. Lalkaka, Rapid Growth of Business Incubation in China: Lessons for Developing and Restructuring Countries. WAITRO – World Association of Industrial and Technological Research Organizations, 2000.

<sup>33</sup> Mi Zuping, Development and Prospect of China New and Hi-Tech Business Incubators. Proceedings from the IBTI Conference, India, 2001.

- International Business Incubators are created to support either the start-up of Chinese for-export companies, or international companies interested in entering the Chinese market. Eight international business incubators exist in China today.
- University incubators are among the fastest growing segments in the industry. Their management arrangements -headed by faculty members- have proved to be effective, while their focus is generally IT-oriented. Incubators of this type are currently 16. It has been observed that some of China's university incubators provide a quality of support and an entrepreneurial environment comparable to those of similar incubators in developed countries<sup>34</sup>.
- Overseas Chinese Scholars' Parks are aimed at Chinese students returning to China after undertaking advanced technical education abroad. There are currently 37 Overseas Scholars S&T Parks, including in Beijing, Shanghai and Suzhou. The model seems to be promising in terms of enterprise growth and technologies commercialized.
- 'Cyberincubators' or Internet business incubators incubate dot.com companies. They generally provide Internet start-ups with support in technology, information, funding, management and marketing. These initiatives are aimed at fostering the creation of early-stage IT start-ups. Sometimes they are promoted by western or old economy firms looking for potentially interesting IT investments in the Chinese market. The Shanghai Business Accelerator is the first Internet incubator established in China. It was created by a partnership between Jiaotong University, Shanghai S&T Committee, Tianjin Innovation center, and BTDS. Another cyberincubator was created by the Shanghai Withub Hi-Tech Business Incubator in April 2000. International internet incubators are located in Chend and Xian.
- Sector Incubators, operating in different types of industries, including Biochemistry, Pharmaceuticals, Marine Science and Agriculture.

The Torch Program plays a continuing role in incubator development. Taking into account the success of incubators, especially in fostering the creation of high-tech businesses, the Chinese Ministry of Science and Technology has decided to make the promotion of incubator construction part of its 10th Five-Year Plan (2001-2005), providing annual funding support of 50 million yuan (US \$6 million) for incubator construction. It has been projected that each large or medium city with Science & Technology production sites shall create at least one incubator within a period of five years.

In addition to the Torch program, other sources of sponsorship are becoming increasingly available in China. Today there are government-sponsored incubators, university-sponsored incubators, self-financing incubators, enterprise-sponsored incubators, and public-private co-financed incubators. These latter, are typically sponsored and funded by both public and private firms; some of them are run as for-profit businesses. Support to incubator development has also been part of donor-sponsored initiatives aimed at fighting

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<sup>34</sup> R. Lalkaka, *ibid.*

unemployment by fostering entrepreneurship in the Chinese transition economy (see box).

#### **Box 2.2.2. The Tianjin Women's Business Incubator**

The Tianjin Women's Business Incubator is an initiative aimed at promoting women's participation in China's small business sector and reducing urban unemployment and poverty. The incubator is part of the "Re-employment and Venture Creation for Laid-off Women Workers" program. The initiative is supported by UNDP, the Australian Government, and the Chinese Government.

The project targets women laid-off from their job, and helps them start their own businesses. The northern industrial city of Tianjin has been selected as test area for the ground experience. Tianjin, is a key place to offer such a plan. The city, once hosting many state-owned enterprises, over the last 20 years has been witnessing high levels of unemployment due to the difficulties met by many of those companies to keep up with China's growing market economy. It has been estimated that in Tianjin 60 percent of the jobless are women. If successful, the Tianjin model will be presented to the Central Government for consideration for countrywide replication.

The project's strategy includes four components: 1) improving relevance and outreach of the local employment support services; 2) enhancing the local training capacity and outreach; 3) introducing a microfinance loan program with integrated venture creation consulting services and training and 4) creating a business incubator for women entrepreneurs.

The micro-credit facility started in 1999. Since its establishment the Tianjin initiative has disbursed micro-loans totaling of 5.5 million yuan (US\$660,000). The repayment rate so far has been 100 per cent.

The incubator, that was formally set up in 2000. It provides low-rent facilities, micro-credit, counseling, training and advocacy services over a period of three years. At the Tianjin Women's Business Incubator, prospect women entrepreneurs are able to share experiences and exchange information in an informal setting. Since its opening, the incubator has received approximately 2,000 laid-off women workers and provided training for more than 600 persons. Training is mainly focused on fostering re-employment, starting from re-building self-confidence. More traditional training modules include management, technical subjects, and enterprise creation.

Up till now, 34 enterprises have entered the incubator and created 1,619 jobs, of which approximately 300 jobs have been offered right at the incubator. Examples of businesses stationed in the center include a small shop to sell paper lunch boxes, a workshop of knitting and sewing, and a small shop to make and sell clothes.

Local authorities in Tianjin donated a \$ 1.5 million facility for the incubator, which previously had housed a state-owned enterprise. The incubator is managed by the Tianjin Women's Federation. China's International Center for Economic and Technical Exchanges is the executing agency of the program.

When this initiative was initially designed, a primary consideration was that the Chinese institutions should be placed in a position to continue the initiative after the completion of the support from the donor agencies. Therefore, capacity building of local institutions and direct involvement in the management of the initiative have been strongly emphasized.

Over the last decade, considerable efforts have also been made in terms of creating a suitable financial market environment. The venture capital (VC) investment industry in China – also fostered by the launch of Technology Innovation Fund for SMEs by the central government in 1999 - has been playing an important role to this extent.

Although most venture capital firms are government-funded in China, other types of VC firms are developing very fast. Joint ventures account to 10% of the total VC firms. VC firms investments mainly focus on hi-tech industries, including electronics, IT, and biomedicine. It has been estimated that 89 percent of VC firms fund high-tech projects in

science parks or technology business incubators, since many of them have tight relationships with government-funded VC firms.<sup>35</sup>

The establishment of the hi-tech stock market offers hi-tech enterprises a good development environment. The Hong Kong market also provides the mainland hi-tech enterprises a way to raise capital in the overseas market.

As regards the development of the Chinese incubator industry, the improvement of the innovation environment, efforts to reform the management skills, and the availability of an adequate information infrastructure, are considered the main challenges to be addressed in the near future.<sup>36</sup>

### **2.2.3 ISRAEL**

Although Israel is not a developing country, the case of Israel's Incubator Program is considered particularly interesting and worth presenting in this study. The incubator approach in Israel is broadly known as one of the most successful and innovative in the world. Taking into account Israel's scarcity of natural resources, as well as its geo-political constraints, there are many lessons that can be learned from this model, which presents interesting peculiarities.

Israel is sometimes referred to as the second Silicon Valley. The country has become home to some of the most successful high-tech companies in the world. In the fields of electronics, medical systems, software, Internet security, and multimedia, Israeli companies are at the cutting edge of innovation. In this small country with a population of only six million, over 3,000 high-tech companies exist today; 1,000 of them are start-ups. The high-tech industry today generates more than 70 percent of Israeli exports.

Several points of strengths support Israel's success in the high-tech industries. These include the high level of education of the workforce in the country; the compulsory military service, which contributes to training young people in new technologies; a flow of skilled and relatively inexpensive workforce fuelled by immigration; a vibrant capital market; and policies, resources and fiscal incentives offered by the government to foster capital inflows, exports and research.

Over the last decade, Israel has also developed a vibrant venture capital industry<sup>37</sup>. In 1991, Israel had one venture capital firm; today, than 150 local and foreign venture capital firms operate in the country. Many of the investors include major companies from North America, Western Europe and the Far East looking to profit from Israel's unique capabilities in high tech industries, including communications, computer software, medical equipment and biotechnology.

Israel's incubator program was established in 1991, while immigration from the former Soviet Union reached very high rates. The idea was to give both Israelis and new

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<sup>35</sup> Reference: Linmin Ma, The Development Situation of Venture Capital in China, 2001. [www.analyzed.com](http://www.analyzed.com)

<sup>36</sup> Mi Zuping, Development and Prospect of China New and Hi-Tech Business Incubators. Proceedings from the IBTI Conference, India, 2001.

<sup>37</sup> Reference: Guegan Nathalie, Growth Entrepreneurship and Venture Capital in Israel, 3i Venturelab, 2000. See also [www.israelventure.com](http://www.israelventure.com)

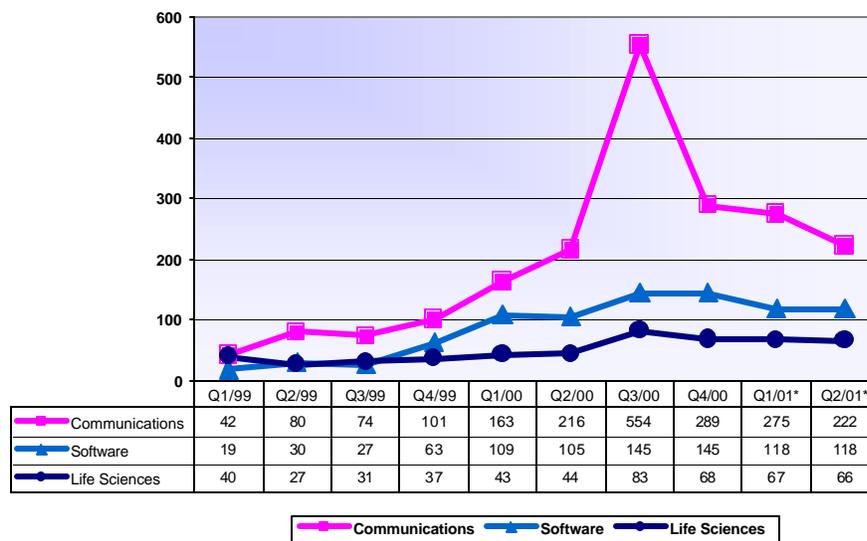
immigrants the opportunity to transform research or ideas into commercial and exportable products and services. The Incubator Program was started and is still operated by the Office of the Chief Scientist (OCS) within the Ministry of Industry and Trade<sup>38</sup>.

Through the technological incubators, the government provides entrepreneurs with physical space, financial resources, tools, professional guidance, and administrative assistance—so that, during their stay at the incubator, they may turn ideas into products of proven feasibility, and meeting the demand of the international marketplace.

The State of Israel provides most of the budget during a project's incubation phase, and each incubator management is the State's trustee in running the incubator projects.

Technology incubators in Israel are autonomous non-for-profit corporations, run and managed by a professional management and staff. Public bodies participate alongside the government in the expenses of running the incubators. In addition, private donors, local authorities, universities and high-tech business enterprises are involved.

### Capital Raised by Israeli Companies in High Tech Industries (\$ M)



Source: IVC Research Center

There are currently 24 incubators developed within the OCS's initiative in Israel. They are structured to permit ten to fifteen R&D projects to run simultaneously, and are organized and equipped to support the projects from pre-incubation to graduation.

Incubators provide several services, including:

- Assistance in determining the technological and marketing applicability of the idea and drawing up an R&D plan;
- Assistance in obtaining the financial resources needed to carry out the project;

<sup>38</sup> See <http://incubators.org.il>

- Assistance in forming and organizing an R&D team;
- Professional and administrative counseling, guidance, and supervision;
- Secretarial and administrative services, maintenance, procurement, accounting, and legal advice;
- Assistance in raising capital and preparing for marketing.

Project are selected for their sustainability and marketability potential and their average incubation process is two years. State support is up to US \$300,000 for a maximum of two years. It is awarded in the form of a grant, covering approximately 85 percent of the approved budget. Special requirements include:

- Initial ownership of the Project Company has to be as stipulated as follows:
  - At least 50 percent— the developer/entrepreneur;
  - At least 10 percent— key staff members other than developers/entrepreneurs;
  - Up to 20 percent— the provider of supplementary financing (i.e., additional to the State grant) for project implementation.
  - Up to 20 percent— the incubator.
- The State has to be reimbursed up to the sum of its grant through royalties on sales. Royalties are 3 percent of eventual sales or consulting fees. Once received, they are reinvested in the incubator.
- The new product has to be manufactured in Israel.

Immediately upon entering the incubator, the project is registered as a limited-liability company and learns to operate as a commercial venture.

There are no predetermined fields of specialization at the incubators. Activity takes place in all fields of R&D. Some technology incubators are also strategically located near the country's universities, where researchers work hand-in hand-with the budding entrepreneurs at the incubators and the university graduates are often the inventors whose patents are being developed.

The incubator program has shown a good impact on jobs creation. During the incubator period, recent immigrants receive professional and business instruction and guidance along with social support.

Approximately 240 projects are being carried out in the technology incubators today; half of them are the initiatives of recent immigrants. Approximately 900 professionals serve on project teams at the incubators.

By the end 2000, 643 projects had left the incubators (in addition to the 240 that remained). Of these "graduates," 53 percent have continued on their own and 47 percent have been discontinued. The project companies that have continued on their own are already employing about 1900 professionals and their growth rate is satisfactory. Most of the ongoing projects have managed to attract private investments. The total private investment obtained so far is in excess of US \$525 million.

The low average survival rates of incubatee companies in Israel, compared to the above 80 percent rates observed in most other countries, can be explained by the admission

policies in Israel's incubators. In Israel, the incubation process starts from an 'idea' stage, which doesn't necessarily require a 'company' or a 'product'. Then, the business is built around the technology. Usually, 70 to 80 percent of project ideas are accepted. In other countries, incubators accept companies that have already developed a product (at least partially).

Government support may also include the 'post-incubation' phase. After leaving the incubators, companies may qualify for other government incentives, such as the regular R&D support programs for start-ups, with a ceiling of \$250,000 for each of two years; the government's export promotion funding; grants from the Israel-US Binational Industrial Research and Development Fund (BIRD) and other R&D funds<sup>39</sup>; and the services of the Israel Export Institute. The BIRD Foundation was established in 1977 to promote cooperative projects in industrial R&D between U.S. and Israeli high-tech companies. BIRD gives conditional grants, but acquires neither equity nor rights to the intellectual property that is developed. BIRD is a financial tool that assumes part of the risk. If a project succeeds, BIRD receives repayment, which is a pretax expense of up to 150% of the grant received; if the project fails, no repayment to BIRD is required.

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<sup>39</sup> <http://www.bsf.org.il/> . For other US-Israel funds, see also [www.us-israel.org/jsource/US-Israel/binatltoc.html](http://www.us-israel.org/jsource/US-Israel/binatltoc.html)

## 3 Lessons Learned

### 3.1 Understanding the ‘Value’ of Incubation

As we have seen in the previous chapter, several models and approaches of business incubation currently exist in developing economies.

Our goal is now to discuss if and how incubator best practices learned over 20 years of business incubation can be used or adapted to meet the needs of incubators in developing countries.

Despite the number of incubator programs and projects existing today, the literature regarding the assessment of their effectiveness is quite limited. However, some interesting assessments have been conducted<sup>40</sup>.

The main statistics regarding incubator effectiveness in OECD countries show that the survival rates of incubated firms range approximately from 80 to 85 percent, against much lower survival rates for non-incubated businesses (30 to 50 percent)<sup>41</sup>.

In terms of job creation, NBIA estimates that North American incubators have generated about 500,000 jobs since 1980, and every 50 jobs created by an incubator client generate another 25 jobs in the community. Information on the impact of incubators on incubators tends to be limited. Information of the indirect effects of incubators on the surrounding communities (increase in property values, multiplier effects, etc.) is also very limited and anecdotal in nature.

Survival rates in the United States are in the average 87 percent. Estimates of survival rates in for profit incubators are even higher (90 to 95 percent). It has also been estimated that at any given time, about 7 million people in the U.S. are engaged in starting roughly 1.5 million new businesses, and that start-up costs could be cut by 40-50 percent by using an incubator<sup>42</sup>.

A comprehensive benchmarking study on incubators in Europe was promoted by the European Commission and published in February 2002<sup>43</sup>. In EU Member States, some 900 incubators exist today, generating about 40,000 new jobs every year. 77 percent of EU incubators are non-for-profit. Public funding accounts for a high proportion of the set up costs of most incubators (about Euro 4 million in the average), and for about 37 percent of operating revenue (averaging about Euro 500,000 per year). 40 percent of operating costs are covered by tenants. The incubation process lasts from 3 to 5 years.

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<sup>40</sup> For a review of the research undertaken in the assessment of technology incubators, related to the US, see: Sarfraz Mian, Technology Business Incubation: Learning from the US Experience, State University of New York at Oswego, 1997. A review of the main evaluation factors is provided in the OECD paper : Technology Incubators: Nurturing Small Firms, 1997. Another interesting source is Best Practices in Business Incubation, prepared by the Maryland Technology Development Corporation, June 2000. <http://www.marylandtedco.org/programs/PDF/NBIA-Best%20Practices%20Report.pdf>

<sup>41</sup> Sources: NBIA and OECD

<sup>42</sup> Reference: NBIA and DotCom Ventures.

<sup>43</sup> European Commission Enterprise Directorate General, Benchmarking of Business Incubators. Center for Strategy & Evaluation Services, February 2002.

The average incubator space is 3,000 square meters, with average occupancy rates of 85 percent. Each incubator hosts in the average 27 tenant firms, each employing in the average 6.2 people. The average survival rate in EU Member States incubators is 85 percent. Similar survival rates are observed in most industrialized countries.

As regards to developing countries, incubatee survival rates can also be very high, and tend to rank above 85 percent in countries with strong support from the government and tight links with the university system, like for example in Brazil or China.

Survival rates tend to vary according to the different incubator admission policies adopted. In the case of Israel, for example, the below-average survival rates (53 percent) are explained by a precise choice by the government to push innovativeness, and consequently lower the threshold to entry in the incubator.

Existing data, which tend to focus on company survival and growth rates, are important to get to the conclusion that ‘incubators add value’ to the business creation process. We should recognize, however, that assessment methodologies tend to differ considerably, and for this reason, comparative analyses are difficult to undertake.

A comprehensive methodology effort for evaluating incubator performance would represent an important step to increase the overall knowledge in this sector, which is still limited, fragmented and anecdotal in nature, especially in developing countries.

In developing countries, this should preferably be conducted in broad terms, in order to consider incubators as part of an often ‘challenging’ private sector environment. In this way, it could be analyzed and discussed whether incubators could be a cost-effective mechanism for development purposes, compared to alternative choices, and eventually be incorporated into broader national strategies.

Best practices for incubator development, management, monitoring and evaluation in developing countries are analyzed in the following sections of this chapter.

### **3.2 Best Practices in Business Incubation**

What are the main lessons learned in over 20 years’ incubator industry development? What best practices should be considered before initiating an incubator project or program? What are the most common mistakes that should be avoided when starting an incubator, especially in a developing country?

According to a study recently promoted by the Maryland Technology Development Corporation, best practices should address ten different domains of business incubation. These include the incubator approach in business assistance; the professional infrastructure offered by the incubator; the provision of client capitalization and financing; client networking; technology licensing and commercialization; university linkages; facility basics; governance and staffing; client screening and graduation; and incubator evaluation.<sup>44</sup> Most of the research has been conducted by interviewing incubators managers in the United States.

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<sup>44</sup> The Maryland Technology Development Corporation, Best Practices in Business Incubation, June 2000.

The study offers interesting insights regarding best practices performed by technology incubators, which are relevant to the incubator industry worldwide.

In developing countries, however, incubators tend to present specific features and challenges which are linked to the status of the local economic and financial environments.

In spite of the differences that may exist from country to country, there are three main 'dimensions' in the incubator activity which are relevant for its success. Two of them can be defined as 'core product activities', since they can be associated to precise objectives and 'deliverables' of the incubator. The first one relates to the 'internal functioning' of the incubator. The second one relates to the 'output' produced during the incubation process. The third group of best practices can be defined as a 'horizontal' flow of activities aimed at assessing and improving, throughout a continuous process, the performance of the previous two.

The three groups of best practices are:

- *Best Practices for the Incubator Creation and Management.* They include the strategy, positioning and the long-term sustainability of the incubator, as well as its internal organization and governance system.
- *Best Practices for the Incubation Process.* They include the admission, incubation, and exit mechanisms adopted by the incubator for client companies.
- *Best Practices for Performance Assessment.* They include the monitoring and evaluation processes adopted to measure both the performance of incubator itself, and the 'added value' of the of the incubator in fostering business development.



### **3.2.1 Best Practices for Incubator Creation and Management**

This set of best practices regards the functioning of the incubator itself, namely its strategy and goals, its governance system and its internal organization, and the resources used to enable its sustainability over time.

When planning the establishment of a new incubator, an assessment of the private sector environment where the incubator should be established, and a survey of entrepreneurs' needs, should always be conducted. A study of incubators' effectiveness and best practices in similar environments would also be recommended in the pre-feasibility project phase.

The concept/model of "incubation" should also be clearly identified and be consistent with the objectives the incubator wants to achieve. In the preparatory analysis, the 'incubation process' - in terms of objectives, targets, services, and deliverables – should be clearly identified. Incubation models should be considered in accordance with the country's private sector development status and needs. Successful models and governance systems should also be analyzed in order to select the approach better fitting the initiative's goals, mandate, and operational capabilities. The long-term sustainability of the incubator should also be considered key in the strategic planning of the incubator.

Key issues:

- **Definition of the goals of the incubator.**
  - Goals should be realistic and consistent with the market environment, as well as with the resources available in the country.
  - The incubator should be able to offer its clients, on the long term and on a self-sustained basis, valuable resources at affordable cost.
  - The positioning, model and focus of the incubator should take into account the main market opportunities that can be seized, and the comparative advantages that can be achieved.
  - The main market and financial constraints should be clearly identified and addressed.
- **Organization and Governance**
  - The incubator's legal structure will be influenced by its mission (for-profit, non-for-profit) as well as by the financial model selected to sustain its operation. The incubator should create a board to govern its activities.
  - Consensus among staff and major stakeholders on the mission of the incubator should be achieved.
  - The incubator management team should be composed of a Director, and a few full time staff – their number depending on the size, clients and activities managed by the incubator.
  - The recruitment of a good team is key to the incubator success. The Director should be a very dynamic person with business experience, preferably in a small company. She/he should also be able to attract

sponsors, investors, financial stakeholders and clients. Certain staff should be designated to work directly with client services.

- The incubator should be able to attract the highest number of qualified professionals, including volunteers and interns, to support specific activities of the incubator and of clients at no cost or at very low prices.

- **Sustainability**

- The achievement of incubator sustainability is one of the main challenges the incubator management has to face. Managers ability is also measured in terms of their capacity to raise funds, human capital and other resources that can be used to run the incubator and better serve its clients.
- Generally, rental and provision of space are not sufficient to cover all the costs of the incubator. In many incubators, especially in developing countries, sustainability is an issue.
- Considerable sources of revenue may come from incubator's equity participations in client companies and subsequent IPOs, or through the payment of royalties to the incubator for a certain number of years when a new product by an incubatee company is commercialized. This model is particularly widespread among technology incubators in industrialized countries, especially in the USA and in Israel.
- Agreements with universities and national R&D programs can provide public funding or in-kind support to incubators.
- Public support, as well as international donor support (in the case of developing countries), may be required, especially during the first years of life of an incubator, or under particular circumstances. Long-term sustainability should however be one of the main goals of any incubators, and the structure of costs and revenue be accurately planned during the design phase.

### **3.2.2 Best Practices for Incubation Processes**

The incubation process is composed of three main steps, consisting of the entrance of the entrepreneur in the incubator; the development of the company's product and organization; and the 'graduation' of the company from the incubator, as soon as it is ready to compete and grow in the open market.

The process is complex, and the incubator's success depends on its capacity to successfully implement it. Best practices have been identified for each of those steps.

Key issues:

- **Admission Criteria and Procedure**

- Admission criteria should be clearly set, and guidelines and transparent evaluation procedures applied. The screening activity should be conducted by using standard procedures and forms, and managed by a team of professional evaluators. Evaluators generally include the incubator

manager and some members of the team, consultants, interns, academics, etc.

- The selection should be conducted in an ongoing effort to identify applicants' needs, while determining whether the services offered by the incubator can have a 'value' to the applicant.
- The screening process should be conducted according to criteria which are fully consistent with the goals of the incubator.
- Screening criteria generally include issues such as the innovativeness of the business/product idea; product feasibility and patent protectability, understanding of market and growth potential, financial plan, risks/opportunities involved in the project, professional and education background of the applicant, community benefits, ecological awareness, etc.
- The screening should be conducted taking into account the potential synergies among clients. The incubator should also avoid incubating companies directly competing in the same market/product, in order to avoid potential conflict situations.

- **Incubation Process**

- Once admitted in the incubator, companies should be offered a 'nurturing' environment and a set of services adding 'value' to their stay in the incubator. Services include:
  - *Facilities.* Offer of modular and inexpensive space and facilities. Optimize use of common space to foster informal networking among companies.
  - *Professional services.* Offer of professional advice, counseling and mentoring at no or very reasonable cost. Some incubators, especially in the U.S., offer qualified resources to join the client's board of directors, until a 'formal' one is created by the company after graduation.
  - *Networking opportunities.* Organization of seminars, forums, and events facilitating contacts and networking among companies located both inside and outside the incubator.
  - *Access to capital.* This is often perceived as one of the most valuable services provided by incubators. Equity capital generally comes from venture capitalists, business 'angels', corporate investors, or public funding programs. Some incubators offer venture capital funds specifically established to fund the incubator's clients. Debt capital is generally provided by lending institutions or community lending programs for economic development. Some incubators offer their clients in-house lending and/or equity investment programs. Linkages with corporations may overcome the funding aspects, to include valuable resources

such as support in product development and prototyping, and sales/distribution agreements.

- Creation of support mechanisms and partnerships to encourage cooperation of incubator clients with universities, corporations and the government.
- **Graduation**
  - The incubator should clearly define and communicate to applicants its graduation policies. Such policies should include the time limits, and the type/amount/value of services that would be provided by the incubator during the incubation process.

### 3.3 Measuring and Evaluating the Impact of Incubation Initiatives

Incubator evaluations can be approached from different perspectives, which tend to reflect the goals of the incubator itself. When evaluating the effectiveness of non for profit incubators, public organizations tend to focus, for instance, on the number of jobs created; the number of graduate firms generated and their survival rates; increased sales and profits of tenant firms; incubator's revenue and sustainability over time; taxes paid by incubators; and the number of new marketed technologies. Technology incubators linked to a university tend to be interested in knowing the number of technologies commercialized through a new incubated company. For-profit incubators are generally interested in indicators such as the profitability and level of equity investment achieved by the incubator; and so on. Therefore, what is really important is that incubator programs be compared and benchmarked with other others of similar type and mission<sup>45</sup>.

An interesting framework for assessing Technology Incubators is provided by Mian<sup>46</sup>. His model is based on three sets of indicators:

- a) *Performance outcomes* – which include program sustainability and growth, tenant firms' survival and growth, contribution to the incubator's sponsors mission, and community-related impacts.
- b) *Management Policies and their effectiveness* – measuring the effective use of resources against the incubator's objectives. The elements assessed include the goals, organization and governance of the incubator, financing and capitalization, operational policies and target markets.
- c) *Services and their value added* – assessment of the perceived value added to the client firms in terms of services and facilities provided, and the perceived value associated to the knowledge sharing and to the incubator's environment.

Despite the fact that this model addresses the features of U.S. incubators, and especially those created in university environments, this methodology seems to be applicable to other environments, provided that the needed data is available.

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<sup>45</sup> Reference: Best Practices in Business Incubation. Ibid.

<sup>46</sup> Mian, Ibid.

In developing countries, business incubation practices are recent, although rapidly expanding, and statistics and assessment studies are limited, sometimes dated, and non homogeneous in their approach.

A suggested methodology for incubator performance assessment is provided by a UNIDO study conducted in 1997<sup>47</sup>. The seven countries reported in the study accounted for about one half of all incubators in developing economies - 143 incubators out of about 300 then estimated. The study reports some compared data related to incubators average investments, size (in terms of building space), average tenant firms and number of employees. In this study, evidence shows that incubators in Latin America tend to be smaller in terms of built facilities, firms incubated and number of employees. China and Eastern European countries tend to show larger incubator facilities. Although the study does not present data on survival rates of incubatee companies, it suggests the main indicators that should be considered to conduct assessments of developing countries' incubators performance, including:

- enterprises incubated in the incubation process and their survival rate
- jobs generated in the incubator
- jobs and sales created by graduate businesses after six years
- public investments per year
- research commercialized by incubated firms
- survey of tenant evaluation of incubator's added value
- sustainability of the incubator, measured by revenues and costs generated
- taxes and other contributions by tenants and graduates
- social impact, measured by public opinion surveys and research contracts between industry and university
- changes in state policies and their financial commitments.

It is widely recognized, however, that the mere survival of tenant firms cannot be considered a sufficient criterion of success. Technology-based businesses tend in particular to grow faster than other businesses and are often quoted on secondary stock markets in very short timeframes. The current trends regarding survival rates of tenants firms should always be compared to the growth rates of graduated firms after 3 to 5 years, in order to avoid that incubators become a mechanism simply supporting the survival of businesses in a "protected" environment, and not their expansion in the open market.

An in-depth analysis of the demand and supply of incubation in developing countries, would be useful, especially if linked to the monitoring and evaluation of the results achieved by broader private sector development strategies. Micro enterprise development, as well as the availability of data, which tends to reflect the level of

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<sup>47</sup> R. Lalkaka, *ibid.* The study is conducted for seven countries: Brazil, China, Czech Republic, Mexico, Nigeria, Poland and Turkey.

‘informality’ in the economy, tend to vary from country to country. This makes the monitoring and evaluation effort particularly challenging and complex.

As regards the demand, a survey regarding the needs of small businesses in the Eastern European transition economies was commissioned some time ago by UNIDO to the European Foundation for Entrepreneurship Research (EFER).<sup>48</sup> The survey does not focus on incubation and start-ups, and is conducted on a regional basis. However, it explores the ‘perceived value’ of training and support services offered to small businesses in the region, and gives some interesting indications regarding the demand of small businesses in emerging contexts. For example, small firms recognize:

- The need of support in key areas such as marketing, finance and management;
- Shortage of skilled labor force was perceived as a limiting factor to growth;
- Limited market development and regulatory and financing barriers were perceived as major external barriers to growth;
- Problems perceived with taxation, social security and labor law;
- Lack of access to finance, absence of long term credits, bureaucratic procedures and high interest rates;
- Lack of clarity in government policies for SME support;
- Absence of relevant and/or effective support institutions.

Strategies improving the enabling business environments (legal, financial, fiscal, market, etc.), and the quality of the local labor markets and management skills, seem to be perceived as the most valuable elements for micro and small enterprise development. A stable macro-economy, an adequate trade environment, a competitive financial sector, the local availability of infrastructure and skilled workforce, are also considered the fundamental conditions for private sector development.

Institutional barriers – including the regulatory environments, tax regimes or labor market rigidities – represent a serious obstacle to entrepreneurship development. In 1996, a survey of almost 4,000 firms in 69 developing countries was conducted by the IFC<sup>49</sup> to assess the evaluation of different aspects of the institutional framework for private sector development. In many of the countries surveyed, firms stated the minimal institutional infrastructure for a market economy was nonexistent or very poor<sup>50</sup>.

As a general recommendation, incubator monitoring and evaluation in developing countries should preferably be pursued by integrating two main layers of information :

- ◆ Measurement of incubator effectiveness versus alternative approaches. This monitoring and evaluation activity should be carried out for measuring the performance both of the incubator itself, and of the companies that are incubated in it;
- ◆ Measurement of the enabling factors for private sector development and of the main institutional and structural gaps at country levels.

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<sup>48</sup> [www.unido.org/doc/331345.htmls](http://www.unido.org/doc/331345.htmls)

<sup>49</sup> World Development Report 1997, The World Bank, Washington DC.

<sup>50</sup> Reference: K. Hallberg, *Ibid.*

In this way, incubators can be considered as part of a broader development strategy, and their cost-effectiveness and development potential be more easily assessed.

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