Lessons from international experience for the promotion of business incubation systems in emerging economies

Rustam Lalkaka*

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* Business and Technology Development Strategies, New York
Rustam Lalkaka is presently President of Business & Technology Development Strategies, International Consultants, New York, and has been involved in various aspects of planning and operating incubators and other SME support services in over twenty countries. Earlier, he was with UNIDO as industry and technology adviser in Thailand and Turkey, and with UNDP as head of the UN Fund for Science and Technology.
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Director  
Private Sector Development Branch  
Investment Promotion and Institutional  
Capacity-Building Division  
UNIDO  
P.O.Box 300, A - 1400 Vienna, Austria  
telephone: 43-1-26026-4820/4821  
faxsimile: 43-1-26026-6842  
Internet: http://www.unido.org
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EXECUTIVE SUMMARY

The Challenge

1. The profound political and economic changes that have taken place over the last decade pose serious challenges for governments, private business, and the international development community. The conversion of command systems to more open markets and the restructuring of enterprises, with the consequent need to find employment outside big government and large corporations, have given rise to a tide of entrepreneurism (sections 1 and 2).

2. Concurrently, the new computing and communicating techniques are changing our concepts of time and space, altering traditional patterns of work, and spurring the growth of small entrepreneurial companies. But, in both the developed and developing countries, many new ventures fail for the few that survive and grow. A challenge, then, is to transform the traditional ways of supporting small enterprises - and the related programs of international assistance - in order to make them more cost-effective for today’s competitive environment.

The current paper addresses business incubation systems as one of innovative instruments to support small enterprise creation and development.

Business Incubation Systems

3. Business incubation is a relatively recent and innovative system, derived from the earlier SME support programs, but with its own distinctive characteristics. The concept of nurturing start-up and early-stage groups at managed workspaces appears straightforward but is complex in structure and execution. Incubators provide local, on-the-spot diagnosis and treatment of business problems, dramatically lowering the early-stage failure rate. However, the features that enhance the success of incubators (and their tenants) remain more art than science (section 3).

4. The UNDP - UNIDO - OAS incubator assessment carried out in Brazil, Czech Republic, P.R.China, Mexico, Nigeria, Poland and Turkey provides good evidence of the potential of incubators in creating innovative enterprises, greatly increasing their chances of survival and success, generating direct jobs while firms are still within the incubator and even larger employment when they graduate and grow: at the same time, promoting the commercialization of research, fostering skills for entrepreneurship, and influencing national policies for small enterprise development.
5. While some developing country incubators continue to focus on technology-based enterprises, new models are emerging (section 3). The ‘second-generation incubator’ will serve businesses within its walls as well as others on an outreach basis in their own premises. It will also be required to provide ‘pre-incubation’ services and continuing support to graduated businesses, (section 6).

6. Planners are looking at business incubators to help revitalize economic development and generate new livelihoods at military bases that are closing or rural communities in distress. While the primary purpose of an incubator is to help entrepreneurs develop enterprises, a well planned facility, prudently managed, can indeed create medium-term employment. For instance, a central facility in a town (hub) with smaller staffs in the neighboring villages (satellites) can help many businesses, particularly in agro-related activities.

7. What is also now emerging is the “third generation” system, more appropriately called an “International Enterprise Center”, which will bring under a single aegis the full range of support services for development of knowledge-based businesses, with linkages to universities, research institutes, venture capital, and international joint ventures. This trend is already evident at the convergence of support mechanisms at business incubators/techno-parks in South-east Asia.

8. This study estimates that the present 500 incubators in developing and transition economies (of the world total of about 2,000) could grow at the rate of about 20% annually. Establishing incubators and improving their operations in these countries will require increasing technical assistance, which in turn will call upon the severely restricted resources of both the countries themselves and of international agencies.
1. **INTRODUCTION**

Since the 1950s developing countries have implemented, often with assistance from bilateral and multilateral organizations, a variety of schemes to support small and medium-scale enterprises. While many millions of dollars were spent, there are few benefit-cost analyses to assess their effectiveness. Nevertheless, small enterprises have flourished, due more perhaps to their inherent characteristics than to the government programs to promote them.

In the search for effective means of creating and growing small enterprises, the business incubation system has emerged. It has expanded rapidly, from about 300 incubators a decade ago, to around 1,500 world-wide today. Some 250 incubators are now operational in the developing countries and those in transition to market economy, with varying degrees of success.

This paper suggests that the business and technology incubation concept is at the convergence of two global movements: the emergence of small and medium scale enterprises as instruments of economic growth and the accelerated pace of technological change. The rationale and characteristics of business incubation systems are reviewed, together with an assessment of their effectiveness. Then, we outline the nature and extent of technical assistance needed to help developing countries establish and operate their business incubator programs. UNIDO has a mandate and record of experience in industrial development, and in small business creation and technology development in particular. This mandate and record give UNIDO a strong position in the incubation field.

2. **TECHNOLOGICAL INNOVATION & NEW VENTURE GROWTH**

In the last decade, the global environment has changed dramatically. There is a greater urgency today to strengthen the small enterprise creation and the total innovation systems in the context of the major trends.

First, there is the movement worldwide towards individual freedom. With open minds come open markets. The expansion of the Latin economies, the rapid progress of China, India and Southeast Asia, the emergence of Mercosur and the Asia Pacific
Economic Cooperation Forum, the possible extension of the North American Free Trade Agreement southward, and the new World Trade Organization make enhanced competitiveness an imperative, no longer an option.

Second, the pace of technological developments in informatics, biotechnology, special materials, robotics, space and other advanced techniques continues to quicken. At the same time, the complexity of processes has increased while product life-cycles have shortened. The knowledge-intensity and high costs of progress in the frontier technologies reinforce the need for effective linkages to universities and research institutions. As the sophistication of a nation’s requirements rises, it is becoming more difficult to import proprietary know-how in advanced fields.

It is only when national capabilities to choose and manage technologies are developed and when the intellectual property system inspires confidence abroad, that it will be possible to acquire, adapt, apply and innovate.

Third, life in the next century will require a renewed infrastructure of information highways, rapid transportation and smart cities. This infrastructure will have to be built based on today’s reality and tomorrow’s needs, relying on a partnership between state and private sectors. This smart infrastructure will be a network of human, technological and financial links, to facilitate access to information and resources.

Finally, future development will need to be much friendlier to the eco-system, more accountable and sustainable, with the human condition as the focus of concern.

2.1. TECHNOLOGICAL INNOVATION

The technology innovation process is not Research & Development (R&D) alone but a larger constellation of inter-related issues, including policies for investment, education and trade, and involving strong public-private partnerships, in-country and abroad. Indeed, R&D may typically account for only say two-thirds of the total Science & Technology (S&T) expenditures in a country. A number of advanced developing countries have the basic technical and social infrastructure, the human resources and financing mechanisms necessary to enter the global high-technology arena. In today’s world, true competitiveness requires entrepreneurial businesses that can establish strong
positions in niche markets through innovative products and services. Such businesses in their start-up stage are good candidates for incubation systems.

Experience in the developed countries has demonstrated that a strong technological base is a prerequisite for industrial growth. Major ingredients for building technological capacity and competitiveness are:

- stable domestic economy with a good macro-economic performance;
- micro-economic policy instruments to stimulate the innovation system and remove barriers to free markets;
- demand-driven institutions to undertake world-class research and its proper utilization, with commensurate funding;
- technical, management and maintenance skills, together with the systems to develop and update them;
- flexible financing mechanisms;
- technical infrastructure of information, quality assurance, consultancy, and other support services.

The traditional production factors are giving way to a new paradigm characterized by informal networking to mobilize resources, time-based competition, total quality management, and prompt, flexible response to change. When the average labor costs in many manufacturing sectors drop to under 5% of sales value, low wages are no longer a significant advantage: this is even more so if low wages are accompanied by low productivity.

In the post-communist countries, the process of technological transformation is even more complex and painful due to the legacy of systemic problems. These resulted in a situation of massive budget cuts, exodus of talented scientists, acute shortages of research equipment and supplies, absence of financing mechanisms, regulatory barriers, distress sales of valuable know-how, and the painful process of reconversion.

A torrent of new technology-based goods hits the market every week, improving the quality of our lives while also creating disruption in social patterns and volatility in financial markets. The pace of progress in information technologies, robotics, advanced materials, biomedical sciences, space and other advanced technologies is significantly
changing the way we live. It is difficult for the industrializing countries to keep pace, much less catch up, with the industrializing countries when the R&D budget of a single GM or IBM is considerably larger than that of even large developing countries like China, India or Korea, and when the OECD countries spend $400 billion annually on research, compared to a total of $15 billion by the 15 largest developing countries. This predicament reinforces the necessity for cooperative research, know-how licensing and joint-venturing among industrializing countries, in addition to cooperation in these fields between industrialized and industrializing countries.

In this environment of change, continuous innovation is the only constant. Thus, the 3M Company in the U.S. plans that 30% of its annual sales must come from products less than four years old. Toyota recently opened the world’s first post-modern car factory that requires only 10 person hours per vehicle produced, roughly half the U.S. average. Canon snatched the lead from the competition with its ubiquitous copier, and Chrysler with its minivan. The pace of advanced new product introduction is relentless.

While the transformation from state-centered to market-oriented development is opening up enormous opportunities and options, it has also caused severe short-term hardships. In order to survive and prosper in these changing times, nations and their enterprises need enlightened government policies, good technical infrastructure. They also need access to objective advice on the appropriate choice of technology.

2.2. NEW VENTURE CREATION

The second global wave is the increasingly dominant role being played by small enterprises in any country’s economy. Following the barnyard nomenclature of elephants (the large, lumbering corporations), gazelles (the nimble, flexible entrepreneurial ventures), and mice (the profusion of micro and informal businesses), clearly the mice have proliferated. In most countries, privately owned small enterprises, defined here as those with under 200 workers, constitute 99% of the total number and account for over 50% of the employment and 30-40% of total value added in manufacturing. They are typically active in metal products, food processing, textiles and chemicals, leather products and garments. In the former socialist countries, however, large centrally controlled conglomerates dominated their economies.
The small player advantage includes lower capital intensity, local resource utilization, better communication, efficient networking, niche targeting, and responsiveness to changing demand. The new information technology greatly helps the small operate in comparison to the large, whether it is in design, manufacturing, or servicing. The issue of large versus small is less strident now that large corporations mimic the small through spinoffs and sub-contracting while the small act big through alliances. As the need to raise productivity calls for a lean efficient workforce, the net new jobs have to come from fast growing small businesses. A serious constraint is that the bulk of the small enterprises operates at low technological levels. They generally lack the skills to identify and address their technical problems, as well as the finances to pay for information, consulting, research or training services.

Future growth of a modern small business sector requires renewed efforts to improve its production methods, raise quality, shift to value-added products of modern design, and grow in symbiosis with large enterprises. It also requires special focus on support systems which provide integrated services on production, management, marketing and finance. This is where the incubation system provides the competitive edge.

A new direction for industrializing countries is to promote innovation by cooperative arrangements whereby clusters of units in the same sector can be provided with affordable consultancy and research services. Such approaches have proved effective in Europe through the work of the Federation of European Cooperative Research Organizations.

The trends are towards corporatizing the small enterprise service organizations and creating the synergy of clusters of similar businesses which both cooperate and compete. Large corporations have an imperative to support the small, particularly given opportunities of sub-contracting of components and participating in equity investments as a means to access the innovations arising at the small knowledge-based enterprise.

2.3. OBSTACLES TO BUSINESS DEVELOPMENT

Starting a new business at any time and anywhere is a hazardous task. Problems are compounded for developing countries in knowledge-based ventures:
• appropriate work-spaces are difficult to find and require long-term leases and demonstrated ability-to-pay that increase the financial pressure on early-stage businesses;
• capital requirements are generally larger, while traditional banks are ill equipped to deal with the perceived risk. Venture capital generally only becomes an option when the venture has documented the merits of its management, market and innovation;
• technology-based ventures can benefit from linkages to sources of knowledge, that is the technical university or research lab. Such mentoring needs to be cultivated;
• entrepreneurs often have technical skills but usually lack the business management and marketing skills necessary for success. They often lack credibility and contacts with business networks;
• in fields where technology is changing rapidly, it is often advantageous to make technology acquisition arrangements. Sourcing such innovations, negotiating technology licensing agreements and protecting the intellectual property itself require special skills;
• knowledge-based innovations are inherently more risky than others. The management of this unique risk requires assessment techniques and vision.
• technology based ventures often have social and environmental implications, which need to be managed carefully;
• penetrating a competitive niche market requires market intelligence, a sound strategic plan and good luck.

As agents of change and progress, entrepreneurs start by identifying a market opportunity and matching this with social or technical innovation, then proceed to mobilize the resources necessary to drive their business concept to its commercial realization.

Today's rapidly changing global environment calls for restructuring business development systems and creating the skills needed to transform innovations into market opportunities. A reorientation of the present processes and priorities of international technical and economic cooperation is also required.

As the product development cycle moves from concept to full-scale production, the level of skills needed and the capital requirements increase significantly. The traditional approach was linear - different specialist groups addressed problems stage-
by-stage. The current practice is to address problems in parallel with a multi-disciplinary product team, working simultaneously on several stages. A small business or individual inventor may need to engage outside help to accomplish work towards completion of product development. The focus of a successful enterprise shifts from planning and surviving to managing, and then to managing managers. As it makes the transition from the first crisis of leadership to the second of autonomy, the general manager either has to change from the role of promoter to entrepreneurial manager or to enlist the needed managerial skills.

As the venture progresses from start-up through its early stages to growth and maturity, its staff and sales also rise. When, and if, it crosses the threshold of say 20 employees and commensurate annual turnover, it is becoming a “modern” medium-sized undertaking. Its chances of surviving crises and reaching stability are better if its growth is evolutionary rather than explosive. The bulk of enterprises, however, will experience stifled growth and remain small.

2.4. SPECIAL CHARACTERISTICS OF ENTREPRENEURS

The popular misconceptions are that entrepreneurs are born, not made. In fact, entrepreneurial skills can be identified and developed. The entrepreneur is typically an innovator who formulates new solutions to existing problems, mobilizes resources and stimulates others to participate in the team. These aptitudes develop over time, often starting in childhood, as the person faces new challenges and learns from failure. Cultural differences among societies affect entrepreneurial activity.

Entrepreneurial opportunities can be found in every industrializing country, community and family. Principal sources of entrepreneurs for knowledge-based ventures are often the university and government research laboratories, the large industrial and military establishments, and professional service firms. Some stimulants to become an entrepreneur are the need to: be independent, create value, contribute to society, earn recognition, become rich or, quite often, not be unemployed. Value adding ventures with good growth potential can best be developed in an open market and in a culture that supports risk-taking.

It is not surprising that developing country nationals, who overcome bureaucratic
obstacles at home, flourish as immigrant entrepreneurs abroad. It is also worth noting that in the U.S., the stronghold of immigrant techno-entrepreneurs, 80% of all millionaires are first generation. Three million people plan to start their own businesses every year, more than are becoming married and more than are having children!

The techno-entrepreneur anywhere has the challenge of moving a concept through the prototype and production phase to meet market needs at a price consistent with the value created and with the ability of customers to pay.

Equally important, the market itself has to be developed, and sustained. It is not enough to be first with a better mousetrap if one does not have the skills to educate and reach potential buyers and to set the market standard.

Entrepreneurship development needs and learning programs vary as the potential entrepreneur moves from school to university, from plan to project and from first stage growth to expansion and diversification. Organizations providing practical help to techno-entrepreneurs include the public / private SEBRAE, Brazil, and KOSGEB, Turkey. International NGOs such as Foundation for International Training, Toronto, have also been effective in enterprise creation.

3. BUSINESS INCUBATION SYSTEMS

3.1. RATIONALE IN DEVELOPMENT CONTEXT

Small enterprise (SE) support systems have traditionally included:

- advisory services on the full range of SE concerns, specially management, marketing, business and financial planning, trade / technology information, and technology upgrading for increased quality and productivity;
- human resources development through a variety of on-the-job training, executive courses and raising enterprise development skills;
- networks, chambers and associations including ‘entrepreneur clubs’ for mentoring and cooperative activities;
- financial services for credit, equity, guarantees, etc.:
managed work spaces, particularly industrial estates and districts, export processing and special economic zones, and more recently technology parks and business incubators.

The incubation system was derived from the above modalities, and has the latecomer advantage of benefiting from earlier experiences, good and bad. Incubation is a complement to the other schemes, an innovative component of a national small enterprise development strategy.

The incubator combines a variety of SE support elements in one integrated affordable package. It has a special niche, that is, nurturing early stage, growth-oriented ventures, through focused assistance within a supportive environment. Its focus is large companies which, at this time, happen to be small.

3.2. INCUBATOR CHARACTERISTICS

The distinguishing characteristics of the incubator can be summarized as follows:

- a managed work space providing shared facilities, focused advisory services, and interaction among tenants, available frequently on short-notice and with the requirement for neither demonstrated financial resources nor a long-term commitment;
- a small management team with core competencies to provide early diagnosis and treatment or referral for business threats and opportunities through a wide network of professionals and friends in the local community;
- careful selection of 20 - 25 start-up groups entering the incubator, their nurturing, growth and graduation after 2 to 3 years. The selection and focused help, of course, account for the greater survival rate (two or three times greater of incubated businesses compared to those outside;
- the business incubator itself runs as a business, with the perspective of becoming self-supporting when operations are fully established;
- initial support, however, almost always provided by central or state governments, in the form of a low (or no) rent vacant building and operating subsidy, until rents and fees from tenants match operating expenses;
- in addition to nurturing tenants within the incubator, outreach assistance may also be
provided to businesses in their own premises. But if it has no tenant within its walls to benefit by interaction and focused attention, then it is like a traditional small business development center and lacks the defining features of an incubator.

Many incubators provide targeted support for technology-based businesses (sometimes referred to as “knowledge-based” enterprises). While common in developed countries, many industrializing countries also adopt such a “technology” theme. This orientation provides self-generated employment in firms led by local scientists and engineers while enabling the society to reap the rewards from investment in local universities and research institutes. Moreover, the environment of an incubator provides a supportive business culture for the technologically-oriented enterprises, helping them focus on markets and other business operations. There is every reason to expect industrializing countries to maintain and expand their focus on the support for such technology-based enterprises.

The incubator, then, offers the promise of creating new businesses and more than trebling their chances of survival. In addition to the say 20 surviving businesses with 200 workers within the incubator, the real benefit comes from the companies that leave and grow (some at rates of 20-30% per year). Such flourishing businesses stimulate economic activity, with collateral growth and employment at both suppliers and customers. Significant tertiary effects come from the incubator playing a catalytic role in developing entrepreneurial skills, modifying the culture of university - research - industry relations, and influencing national policies toward private small businesses (a major role in post-socialist economies such as Uzbekistan).

3.3. SPONSORS AND CLIENTELE

The incubation system is remarkably flexible and serves a variety of purposes and clientele. Depending on the predilections of the leading sponsors, it can be designed to meet specific needs and conditions, thus:

• Public sector/government & regional development: Such an incubator would seem appropriate in many developing country situations, particular if it can focus on local resources, such as agri-business, light engineering, and special artisanal skills primarily for regional markets. In practice, it has often been difficult to find good institutional
bases or the entrepreneurial framework for successful regional or rural development incubators.

- **Research/university** technology-based business: In many developing countries the university-linked technology-business incubator is predominant. There is also a trend towards siting technology incubators as the first building block of a future research park. All the innovation centers in China, and most of them in Mexico, Czech Republic, Indonesia and Turkey, have university affiliations and technology commercialization objectives. This may be due as much to recent public perceptions of the cache of technology, as to the disappointment at traditional means of transforming research to marketable products. As important as the technology, such linkages provide a locus for trained personnel to become an entrepreneur extracting technological possibilities to meet market needs and opportunities.

- **Public/private partnerships** industrial development: Given the technical infrastructure of an urban environment or an industrial estate, large enterprises can be linked to development of small businesses as vendor for components and services. Generally, the private sector will participate in the incubation process, only after the state has financed the establishment and initial operations. There are notable exceptions, such as the Federation of Industry São Paulo (FIESP) which has mobilized its own resources to run five incubators, and plans 11 more. The private for-profit incubator with a real-estate bias has yet to emerge in developing countries, although it forms a sub-set (10% of total) in the U.S. The potential exists to create innovative partnerships that meet large enterprise needs for new growth opportunities and suppliers with the needs of small enterprises for customers and financing.

- **Foreign sponsors** international trade and technology: Such a facility focuses on international collaborations, both financial and technological, to facilitate the entry of small foreign businesses, including returned expatriates, into local markets. A complementary program may support the export of local manufactures.

- **Other variants of incubator design:** special purpose incubators may support the empowerment of targeted groups, for example minorities, new immigrants (as in
Israel), women (as in Samarkand, Uzbekistan), or other disadvantaged communities (as in South Africa and Palestine).

• Single business incubators may focus on a special sub-sector, such as biotechnology (as in Fundação Biominas, Brazil) or informatics (the most popular activity is software development, in both industrial and developing countries). Generally, a good course is to start with mixed tenants - high-tech, low-tech and no-tech - until the strengths of the local entrepreneurial reservoir are clearly discernible.

Local conditions may call for a hub incubator, with satellites or a virtual incubator, where new ventures are nurtured in an existing university laboratory (as in São Carlos, Brazil), or even a seed venture capital incubator.

3.4. ASSESSMENT OF INCUBATOR PERFORMANCE

Clearly, incubators are a study in contrasts, each catering to its own potential entrepreneurs, in a given cultural milieu, conditioned by the available infrastructure and policy framework.

The incubation process is a recent phenomenon in developing countries, still evolving. Three quarters of the incubators are less than five years old, but they are increasing rapidly. Rapid growth invites critical attention: the incubator concept is praised as a useful tool for creating enterprises and damned as an expensive fad that does little for economic development.

Hitherto empirical evidence to support one or the other verdict, or something in between, was still lacking. The UNDP / UNIDO / OAS - sponsored Assessment of the Role of Business incubators in Enterprise Creation and Economic Development (1995) provides the basis for examining implications and impact in the difficult environments of seven industrializing countries. It also points to the data compilation needs and follow-up actions, for improved assessment and enhanced performance in the future.

While a variety of criteria can be identified for the assessment of an incubator program, these were not used in earlier assessments of incubator effectiveness. The task is even more difficult for this first assessment in the industrializing countries, given both the
recent implementations of incubators and the apparent lack of either local will or resources to mount the required systematic data collection activity.

Incubator performance can be assessed against its specific mission and objectives. Profiles of incubators in an entire country, much less seven countries, can only give a broad impression at one point in time. Such a “snapshot” is insufficient for the assessment of a number of disparate dynamic processes operating in unique local environments.

For an initial assessment, the scheme in the next page (figure 1) indicates the quantifiable and non-quantifiable process that can be reviewed.

The loops can be described as follows:

**Loop 1**  Enterprises created by incubator and increased success rate through incubation process, measured by numbers of firms incubated and number of discontinued businesses.

**Loop 2**  Jobs generated in the incubator, measured by employment years (one job lasting one year = one employment year) through the end of year 3;

**Loop 3**  Jobs and economic activity created by companies after leaving the incubator (graduates), measured by employment years and value added or sales through the end of year 6.

**Loop 4**  Public (subsidy) investments in incubator establishment and initial operations, measured in total investment per year;

**Loop 5**  Research commercialized through development work (by firms) at the incubator, measured in numbers of projects and economic activity (employment years, total cumulative revenues);

**Loop 6**  Surveys of tenant assessment of assistance received, measured in response rate and evaluation of specific activities;
Loop 7  Sustainability of the incubator, measured by revenue and cost performance to plan, including break-even as appropriate:

Loop 8  Taxes and other "social" contributions by incubator tenants and graduates, measured by property, income, employment and other direct tax revenues attributable to incubator, tenants, and graduates:

Loop 9  Capacity building and changes in mind-set, enhanced culture of research - industry linkages and entrepreneurship development, measured by public opinion surveys, numbers of collaborative research contracts between industry and universities (value, number of faculty and staff involved):

Loop 10 Changes in state policies to enhance support for private entrepreneurial activity, measured by numbers of policies and financial commitment to their design and implementation.

Figure 1: Incubator Assessment Overview
Clearly, only some of the above loops can be quantified in an initial review (and reality is far more complex than depicted). But consciousness among sponsors on performance, and its improved characterization and measurement, can be expected to result in better explication of the benefits and impacts of this and alternative modalities. For the UNDP/UNIDO/OAS review, indicators considered were:

**Tenants:**

Ventures created,  
Direct jobs (with other indirect employment)

**Community:**

Sustainability of the incubator (income in excess of expenses),  
Entrepreneurial culture, university-industry linkages, and other semi quantifiable benefits.

These measures have to be applied at the time tenant-businesses generally graduate from the incubator (say average 3 years) and reach a level of maturity (say at least another 3 years after graduation). Finally, how do the above benefits relate to real costs, measured as benefit / cost ratios or as a discounted cash stream.

The incubator characteristics in seven countries' studies are summarized in Table 3-l. These countries represent more than half the incubators in the industrializing world. The typical incubator can be characterized as leasing something over 3,000 square meters to two dozen tenants. Each tenant employs on the order of fifteen employees. The largest system is in China, involving 1,969 enterprises occupying 32 million square meters of space and producing products registering sales turnover of almost US$ 200 million (all in 1993). From a modest beginning in the 80's, Chinese incubators have graduated 159 enterprises, expanding their contribution to economic restructuring and development. This program is expected to expand to encompass 5,945 enterprises occupying 80 million square meters and recording 1,200 graduated enterprises by the end of the decade.
Based on consulting work by Business and Technology Development Strategies on establishing incubator programs in 20 countries and the 7 country studies in the Business Incubator Assessment, some essential means for successful performance emerge:

**A. The preparatory process:**

reconnaissance survey to selected locations during which potential stakeholders should be briefed frankly on probable benefits and costs of starting and sustaining an incubator, including their long-term responsibilities:

- local consultants who are familiar with local conditions:
- careful identification of a strong (existing) sponsor group to take local implementation responsibility, including a champion:
- issues concerning feasibility, particularly analyses of the entrepreneurial pool of potential tenants, linkages to universities, the support services network, the availability of suitable (vacant) building space, and financial cash flow estimates:
- commitment by state agencies at the central, provincial, and city levels to provide policy and financial support for investment as well as initial operation expenses.

### Table 3-1: Seven Country Incubator Summary

<table>
<thead>
<tr>
<th>Country</th>
<th>Incubators</th>
<th>Invest.</th>
<th>Building</th>
<th>Tenants</th>
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<td>951</td>
</tr>
<tr>
<td>Overall</td>
<td>143</td>
<td>496</td>
<td>3169</td>
<td>24</td>
</tr>
</tbody>
</table>

Note: n.a. = not available

3.5. **DETERMINANTS OF SUCCESS**
B. *The implementation process:*

- forming a strong managing board with advisory structure and enabling them to observe incubator operations;
- appropriate legal persona for the incubator;
- careful selection, training at home and abroad, and proper remuneration of the manager and team;
- screening of the technical, business and market potential of tenants;
- prudent capital expenditures on building renovation and furnishing;
- promotional campaign to mobilize community support.

C. *The start of initial operations requires:*

- access to equity, credit and royalty facilities by tenants, so that they in turn can pay for incubator services and for their development needs;
- involvement of private sector, through subcontracting and other arrangements;
- continuing programs for improving the management skills of the incubator staff and tenants;
- links to other SME programs in the country;
- exchanges of information and experience through national incubator associations and international networks.

D. *The sustainability of incubator operations calls for:*

- proactive pursuit of business opportunities at home and abroad;
- imaginative ways of raising income through corporate memberships, appropriate fees for securing finance, equity/royalty in tenant companies;
- an objective evaluation of the incubator experience, and replication as warranted;
- political stability, macro-economic policy structure and regulatory framework that encourage entrepreneurial activity and stimulate the market for new goods and services.

Experience confirms that in countries with a generally supportive environment, the preparatory and implementation steps (items A and B above) take about 6 months each; and a further 2 or 3 years may be needed to establish a self-sustaining successful
incubator (steps C and D).

Without patient and continuing support from the state and communities over the whole program cycle of 3 to 4 years, the incubator may find that developing sustainable performance and having positive impact on economic development are difficult.

The incubator success factors were reviewed above in the sequence of the incubator establishment process. An overall view can be taken in the context of the enterprise process (Figure 2). Success, or failure, is determined by the national and international environment as well as by the micro-environment at the incubator.

While good international technical assistance is only one of the success factors, it can help enhance the effectiveness of business planning preparation, human resource development and incubator operating practices.

Figure 2: National and International Environment: Incubator Success Factors
4. TECHNICAL ASSISTANCE FOR INCUBATOR DEVELOPMENT

The characteristics of business incubators in industrializing countries, their present performance and the factors which affect success, give good indications of possible technical cooperation needs.

4.1. TECHNICAL SERVICE REQUIREMENTS

Professional expertise for successfully starting and managing incubators covers a wide range of services. The incubator itself requires relatively small investments, and technical assistance at small costs can have good impact. For instance, the United Nations Fund for Science and Technology for Development (UNFSTD), in the period 1987-89 was able to initiate the incubation concept in several countries with catalytic inputs of US$ 50,000 to $ 150,000 each. In the next cycle of projects (1990 to date), the initiation and feasibility exercises, together with support to planning, implementation and initial operations, required larger inputs of US$ 300,000 - 500,000 per pilot program.

Technical assistance can be helpful, from starting until reaching sustainability and at varying intensities depending on the prior industrial and entrepreneurial experience in the country concerned. To supplement the country-level work, programs are required for information, networking and research on incubator-related matters. Such research could also help on important issues, such as supporting national policies towards more SME-friendly regulations and persuading governments on their responsibility to provide initial financing for both incubators and tenants.

Lessons for Technical Assistance

International assistance should supplement (not replace) local management responsibility, as without full “ownership” by the stakeholders, the incubator cannot succeed. The needs and conditions on the demand-side must take precedence over the donor’s agenda.

Even in a European milieu, as in Poland and the Czech Republic, western business approaches must be adapted to meet local conditions. In Uzbekistan, where private business ownership, banking and regulatory legislation are still nascent, the incubator
manager's problems are of forbidding complexity. In Turkey, the issue of secrecy is paramount, as the tenant fears that his neighbor in the incubator will run with his idea. In Indonesia, the small business prefers to operate at home, with the comfortable support of family and friends rather than among strangers. And in many countries, the entrepreneur is wary if the incubator is seen as a government initiative, because the promise of earlier government schemes has not materialized.

These cultural issues reinforce the need for: a local champion and local consultants, a careful survey of the real problems of the entrepreneurs before facilities and services can be designed, building on an existing institutional base where possible, and mobilizing wide community, corporate and university involvement from the start.

A pilot program, starting with say one to three incubators, is a good way to test the local environment and make adjustments to suit emerging short-term needs, keeping the overall mission and distinguishing characteristics of a proven incubator system as the long-term goal.

Importantly, the expectations of the incubator's role should be realistic. The incubator cannot do all things for all people. It has a clear niche and measurable results, when adapted to market needs. Likewise, technical assistance can play a useful role, when there is a supportive environment. An evaluation of UNFSTD-supported technology incubator projects (1992) recommended more fully developed feasibility studies and business plans, better monitoring of technical assistance, and better relationships between national and international consultants.

4.2 MULTILATERAL AND BILATERAL SERVICE PROVIDERS

Bilateral Assistance

USAID has indicated interest in supporting business incubators in specific countries as part of its small enterprise promotion, credit, entrepreneurial development programs. It is creating a number of small business assistance centers in Poland. A number of incubators are supported in the Former Soviet Union. Several incubator initiatives are being pursued in Africa in the wake of the economic and political restructuring of South Africa. The development of a number of Enterprise Funds in the FSU is leading to the
development of incubator-like support, including the development of business planning professionalism in Uzbekistan for the Central Asian - American Enterprise Fund in concert with the Eurasia Foundation. USIA has supported incubator training for the Baltic states at the Rutgers incubator, New Jersey.

In Uzbekistan, the GTZ entrepreneurship training program and the UNIDO-executed incubators have established contacts for collaboration. German-Polish collaboration within the Innovation Centers in Eastern and Central Europe Work Group (ICECE) has resulted in creating several cross-border innovation centers.

TICA, the Turkish International Cooperation Agency, has started an incubator in Kyrgyzstan where Turkish small businesses have formed joint ventures with local entrepreneurs. TICA has also expressed interest in collaborating with UN on an additional incubator in Bukhara, Uzbekistan. This can be a model arrangement, combining Turkey’s geopolitical and business interests, UNIDO’s experience, UNDP’s stature in Uzbekistan, and the governments desires to stimulate private small enterprises.

The British Council has in the past provided training opportunities and experts to UNIDO incubator projects in Turkey and Uzbekistan. Their English language programs are of interest to both incubator staff and tenants in non-English speaking countries. In Poland, the British Know-How Fund is involved in two incubators and the Japanese government has set up one.

COSPE (Cooperation for Advancement of Developing Countries, an Italian NGO) is establishing an incubator for women’s enterprises in Nablus, Palestine.

At another level, private companies, incubator associations and foundations from industrial countries are bringing together commercial and development agendas in developing countries. For instance, the incubators at Rensselaer Polytechnic Institute and University of Texas - Austin ran custom-designed courses on management for incubator personnel from Russia, Mexico, Malaysia, South Africa, and Indonesia. They also provided their staff for feasibility work in several countries.

The Frederick Ebert Stifting has supported incubator development in Palestine and Syria, while U.S. foundations related to ethnic-communities have been active in
Ukraine and Poland.

Private consulting groups, such as SPEDD, Pittsburgh, have joint ventures on incubators in Slovenia. Control Data began early, aggressive support of the incubation concept that was discontinued due to internal business pressures and priorities.

Annual Conferences of the National Business Incubation Association (NBIA - US) are being attended by large developing country teams. NBIA has recently established an International Task Force to increase its overseas linkages. The German Association of Business and Technology Centers (ADT) conferences in Germany attracted considerable interest from CIS, central and eastern European countries, while EBN is expanding its activities beyond Europe toward Asia and South America.

**Multilateral Assistance**

The large regional development banks have, not yet financed incubator-type programs. EBRD is presently supporting a technology park program in Russia. A technical assistance component for incubators was part of a World Bank private sector development loan to Poland. This program was transferred to PHARE. The Bank presently supports micro-enterprise development projects for employment generation with the Polish Ministry of Labor and Social Policy. This includes 37 small business assistance centers and 23 business incubators and enterprise development funds. The International Finance Corporation has had interest in incubator-type arrangements in St. Petersburg, Russia, and Pilzen, Czech Republic.

The European Union, through the PHARE program, has been extremely active in central and eastern Europe through TACIS in Russia. For instance, in Poland, it has helped set up 30 business support centers and four business incubators in the 1991-95 period. In the Czech Republic, PHARE helped establish three BICs, as well as various consulting, information, training and business promotion programs. In Hungary, PHARE supports the Hungarian Foundation through the Columbus program of EU. European universities have collaborated with Latin American incubators on training and business development.

EBN plays a leading role in PHARE-assisted Business Support Centers and Innovation Centers. For instance, Lodz (Poland) is twinned with Lyon (France) at the level
of BSC/BIC and the chambers of commerce and industry.

The Organization of American States, Washington DC, has supported feasibility studies on incubators in Cuernavaca and Merida (Mexico). It has also been co-sponsor, with UNIDO and UNDP, of the recent ‘business incubators’ assessment and Tianjin Workshop (1995). The Project on Support to Technological Entrepreneurship under the OAS MERCOCYT program has actively promoted electronic information exchanged for technology incubators. Following its Florianópolis (June 94) and Guadalajara (December 1994) meetings, the information system is now under preparation.

ILO, have clear interest in employment and technology issues, UNESCO in university - research - industry linkages through programs such as SIPAR and STEPAN, FAO in agri-business development, and UN/DDSMS in privatization and entrepreneurship. These agencies, have not yet been active on business incubation systems to date, however represent potential providers of business incubation assistance.

The Privatization and Enterprise Development Branch of UNCTAD organized useful sessions of the Ad Hoc Working Group on the Role of Enterprises in Development (April and July 1995) covering such topics as regulatory framework, human resources, and SME access to capital markets. UNCTAD also now has joint responsibility (with UN/DDSMS) for the Empretec program, which has some characteristics of incubators-without-walls. To find space for continuous nurturing of its ‘empretecos’, UNCTAD has supported a feasibility study for a technology incubator in Uruguay, and this message was carried forward in the MERCOSUR countries.

The UN Economic and Social Commission for West Africa, ESCWA (Amman) has been supporting entrepreneurship development as well as incubator establishment in Palestine, Syria, and Jordan. UNIFEM is establishing an incubator for women entrepreneurs in Amman and Beirut.

UNDP, through the UNFSTD and PSDP programs, has been active in initiating incubation programs. These were followed with country IPF resources, as in Indonesia and Malaysia (national execution) and in Uzbekistan (UNIDO execution). UNDP’s priorities for the future have changed significantly and its voluntarily pledged resources are in decline in real terms. Nevertheless, UNDP will continue to have interest and catalytic
funding for incubators as an instrument for private sector development, enterprise creation and employment generation,

To summarize, among multilateral agencies with current programs and / or capabilities on incubation systems, ESCWA, OAS, and UNDP have been active. The European Union has significant funds and a strong capability through EBN. Likewise, the technical assistance components of World Bank credits could be readily deployed on incubation systems. US AID and USIA resources - as those of the UN system - are under threat.

4.3. **UNIDO’s COMPARATIVE STRENGTHS AND OPPORTUNITIES**

Within UNIDO’s prime mandate of promoting industrial development, support to small and medium enterprises is one of its six programmatic themes. Business incubators have now become a component of national small enterprise strategies. Further, the majority of tenants in incubators world-wide produce innovative goods and technical services in agri-based, chemical and engineering sectors and in advanced materials, microelectronics, information and bio-technologies. These are all within UNIDO’s competence.

UNIDO has specific experience in establishing incubators as an executing agency. Its work in Turkey, Poland, Czech Republic, Romania, and Uzbekistan, and more recently in Columbia, Dominican Republic and Pakistan has provided the basic capability to build upon. UNIDO has had research experience in preparing publications of guidelines for business incubation and software in financial planning for incubators. Further, a good network of incubator contacts and consultants was established. Importantly, UNIDO has the unique capacity of bringing together a range of specializations, within the organization to address the demand of technical assistance services for incubation systems. Incubator development clearly must take fully into account the current priorities in the international dialogue on safeguarding the environment, rational use of energy, employment generation and full involvement of women entrepreneurs in the development process. No other multilateral or bilateral agency has such integrated in-house capability.

The mandate, experience and strengths of UNIDO discussed above must be mobilized for the opportunities outlined below:
Entrepreneurship and venture creation have become major forces of economic growth, endorsed by recent UN General Assembly resolutions and global experience;

Exponential growth in innovative products strengthens the comparative advantage of entrepreneurial ventures and creates opportunities for value-added goods and services;

Incubation is now a 'growth industry', with the number of incubators in developing and transition countries expected to double from about 500 to 1,000 in the next 4-5 years;

No other multilateral or bilateral agency has the full range of in-house service capabilities for incubator systems, as UNIDO does;

UNIDO's initiatives in rural industrial development can be nicely complemented by higher-value products through the incubation modality;

These is presently a gap in the systematization of knowledge and approaches in the incubation field, which UNIDO in concert with associations such as EBN and NBIA can fill;

Networking opportunities have been greatly expanded by Internet and custom-designed electronic systems such as BATORLINK / BCNET, while HRD can be enhanced by CD-ROM and other advanced learning systems;

With industrial re-structuring and downsizing of large conglomerates, the experienced workforce can be mobilized at intrapreneurial spin-offs through incubator-type arrangements;

As global investment and trade expand, opportunities for sub-contracting and partnering will increase, using international incubators as a mode.

4.4. PROPOSED PROGRAM STRATEGY

The proposed incubation support program should be based on four strategic elements. These are outlined below together with key services to be provided and possible partners.

1. Analysis, Benchmarking and Special Programs:

• characterize the operations of existing (and discontinued) systems;
• develop programs to test hypotheses on alternative operating paradigms to include
tailoring programs for specific needs and opportunities;
- develop new “products” such as “international business incubators” (now requested by China), and “rural incubators” (for poverty alleviation programs).

2. Preparation, design and operation of incubation systems:

- for existing projects, services would cover:
  - sourcing of technology partners for higher value added products;
  - diagnostic survey and technical advice on improving productivity and quality;
  - investment promotion;
  - marketing and management training;
  - innovation strategies.
    Possible partners: bilateral donors and UNDP.

3. Strengthening institutional capabilities for the complete incubation system:

- publications program, including the UNDP - UNIDO - OAS Business Incubator Assessment;
- Good Practice manuals based on UNIDO project experiences;
- dedicated software for incubator businesses;
- research program (for linking of topics for research, verified by the Incubator Assessment Study - see Annex 1 and n.1 above);
- innovative business arrangements and systems, such as franchising of incubators, linkages to large enterprises, and benchmarking;
- development and accreditation of consultants and service providers;
- quarterly newsletter, as proposed in Tianjin (September 1995), starting in the Czech Republic.

4. Partnerships with key players in incubation programs to encourage exchanges of information, experience and commercial opportunities through:

- promoting private - public partnerships;
- subcontracting exchanges between tenant companies and larger corporations;
- databases and information networks to facilitate access to technology, expertise and finance;
- formation of incubator associations at national level and their linkage internationally;
- directories of incubators, tenants, service providers;
- network of incubators in developing and transition countries, as proposed in Tianjin;
- sub-regional workshops to help disseminate and refine the Business Incubator Assessment, provisionally in: Cameroon with UNDP, Palestine ESCWA, Vietnam UNESCO, Brazil OAS, Uzbekistan TICA, East / Central Europe BIC (in Trieste)

**Figure 3: Support Inputs in Incubator Establishment**
The key services proposed above are based on the current demand, and others will emerge as the program matures. Such a program requires at the outset a commitment at the highest management level to make business incubation a component of the portfolio of services and an allocation of staff, travel, consultant and related resources to design and implement the incubation support system effectively.

5. FUTURE TRENDS AND EMERGING ISSUES CONCERNING BUSINESS INCUBATION SYSTEMS

5.1. FUTURE TRENDS IN BUSINESS INCUBATION SYSTEMS

The international response to the needs of developing countries has to be based on their present conditions for establishing and operating incubators, outlined in Chapter 3, as well as on future trends. The discernible trends are:

Technology orientation will continue. Exponential change in informatics, microelectronics and communications systems will create opportunities for small firms in the advanced developing countries. In others, these are opportunities for blending advanced techniques with traditional processes, as in agribusiness, textiles, and environment technology.

Concurrently, a better model will be needed for addressing early-stage entrepreneurs in smaller towns and rural settings, in innovative products. A bottom-up, regional development focus will call for appropriate choice and blending of technology, better design, packaging and quality, higher value-added in agri-business, environment and energy-conservation, light engineering and chemicals, higher-end garments and artisanal goods, for both domestic and export markets.

Special purpose incubator designs for women entrepreneurs and for international business. Enhanced professionalism in incubator design and operation, including development of sustainability, benchmarking and monitoring of performance.

‘Second generation’ incubator system will provide services not only to selected tenants within its walls but, increasingly on outreach basis to small existing businesses in their own premises and businesses graduated from the incubator.
More concerted efforts will be needed on pre-incubation of potential entrepreneurs. While ideally entrepreneurs must start with their own innovative concepts, the need has been expressed for ‘project profiles’ from which they may choose and develop a business.

While some governments, as in China and Malaysia, have recognized the need for financing the initial costs of establishing incubators as a social investment, most have yet to be persuaded that this is a proper use of public funds.

Incubators are increasingly being linked to universities or sited inside research parks and industrial estates. This creates synergy, to mutual advantage.

Development of post-incubation programs to provide continuing support, including the development of strategic alliances with current incubatees and large enterprises, while monitoring the results of the incubation process.

Implementation of hub and satellite systems to provide economies of scale in incubator operations and including the developing of franchising arrangements to provide enhance professionalism in management and operation.

Finally, while interest of the private sector in developing countries has been indifferent to business incubators, these are signs of change. The better involvement of private sector corporations and chambers requires clear demonstration of mutual benefit.

We estimate that the present 500 incubators in developing and transition countries could grow at the rate of about 20% annually, that is one new incubator being established each week over the next 4-5 years. Such growth will come from:

• countries which are now planning incubators (Candidates include: Egypt, Morocco, Tunisia, Syria, Palestine, Lebanon, Jordan, Kenya, Senegal, Tanzania, Zimbabwe, Pakistan, Sri Lanka, Vietnam, Slovenia, Myanmar, Thailand, Iran, Columbia, Ecuador, Albania, Bulgaria, Romania, and several central Asian countries).

• countries which plan significant expansion of their programs, for example, China
plans to increase the current 73 to 200 incubators (with 10,000 tenant enterprises), and Indonesia from 8 to 30 incubators by the year 2000).

• further, major enhancements of existing incubator operations will be needed (such as in Brazil, Turkey, Malaysia, Mexico).

With a few exceptions, the private sector is notable for its apparent absence from the incubator scene. Private sector involvement in the incubation process focuses on direct participation through service providers and mentors for individual entrepreneurs. Indirectly, private enterprise forms a vital role in financing (including through formal venture capital organizations), particularly graduates, behind the scenes. Direct participation through equity investment or leadership of business incubators is not widespread. As private enterprises realize that incubators provide significant reduction in the risk of early-stage failure, and to the extent that incubator management and supporters reach out to involve private enterprises in incubator operations, the participation of the private sector can be expected to increase.

Industrialized countries are witnessing similar trends. Centers of entrepreneurial success, such as Silicon Valley, are undergoing economic restructuring associated with demilitarization, and seeking incubators as a vehicle for economic growth. Concurrently, operating incubators are under varying pressures to achieve economic sustainability as government funding for such operation looks increasingly unreliable.

The business incubator/technology park provides a good platform for the convergence of support mechanisms towards a synergetic “third generation” system. It de-emphasizes low rentals and focuses on enhanced services to knowledge-based enterprises, both before and after their incubation, both within and outside the incubator. This purpose fully integrates the key support agencies within the community as well as looking outwards to the globalized market for imports of capital and technology and exports of goods, services and know-how. Good examples of the integrative trend are the Technology Park Malaysia and the International Business Incubators in China, both of which have had UNDP support. The prerequisite for a “one-stop system” is a management team with superior business, networking, technical and management skills. It must be carefully selected, fully trained and properly remunerated.
The attempt to do too much without adequate human and financial inputs risks the danger that little is done really well.

5.2. EMERGING ISSUES FOR RESEARCH IN BUSINESS INCUBATION SYSTEMS

**Sponsors**

- What are the alternative means of attracting participation of the private sector in terms of results for the incubator?
- What is the nature and extent of community support?
- What are the alternative roles for chambers of commerce and other associations?
- What are the desired structures for a Board, in the continuum from support through cajoling to controlling?
- What are the appropriate roles for universities in light of their motives and benefits?
- What are the impacts of alternative legal structures?
- What is the effect of alternative roles for groups, such as friends of the incubator” / “entrepreneur clubs?
- What are the implications of different forms of governance?

**Policy**

- What should the goals of the incubator be and how should measurement against those goals be accomplished?
- What are the implications of alternative goals? Goals are promulgated without the benefit of research establishing either their appropriateness or effectiveness in ensuring incubation success, particularly in industrializing countries.
- What is the appropriate role of the incubator in regard to tenants post graduation?

**Facilities**

- What are the implications of building a new facility compared to renovating an existing structure?
- What is the impact of building size and relative net rentable area on incubator success and financial sustainability?
- What are alternative mechanisms for handling occupancy and exit issues?
- Are work spaces essential for successful implementation of the incubation process?
- How can on-campus support be combined with out-reach services to clients in their own premises?
Managers

• What is the best mechanism for recruiting and remunerating managers and staff?
• What are the most effective characteristics of an incubator manager and staff?

Managers are acknowledged to be key in the success of the incubation process. However the pay for managers and staff tends to be modest and career paths are not apparent. Research needs to document the relationship between qualities of the incubation staff and incubator success. Creativity in the design of compensation packages and career paths is a requirement for the development of this profession.

• What is the effectiveness of alternative training programs for managers and staff?

Operations Management

• What are the most effective entrance policies and under what conditions are the effectiveness enhanced or diminished?
• What is the benefit of focusing on a particular technological sector compared to alternative sectoral policies?
• How do alternative mechanisms for assessing the character of the entrepreneur and the business (technology) affect the results of the incubation process? Many admission criterion focus on technology, while venture capitalists reiterate better a second-best technology and a quality management team, than a second-best management team and the best technology in the world. Accordingly, research on entrepreneurship should evaluate this aspect of enterprise development. Concomitantly, instruments should be developed to guide incubator admissions committees in evaluation of the quality of the management team.

• What is the effect of alternative admissions policies and procedures?
• What are the most effective graduation policies and under what conditions are the effectiveness enhanced or diminished? Since incubators require a significant investment, the consensus of a three year graduation policy should be reviewed. The maximization of return would argue for a more intensive incubation process over a shorter period of time... analogous to the recent adoption of a similar policy in hospitals in many countries. During a significantly shorter incubation period, say six months, incubatees would be supported during the business planning and development phase, including the design of prototypes and securing of initial financing. Suitable work spaces would be found, as part of the incubation process. Subsequently, the business would be served through an active out-patient process, including weekly visits and performance reviews.
• What are the most necessary and effective services that an incubator can offer, and how should they be funded?
• How should tenants be monitored and those who are not achieving planned potential be treated?
• What periodic monitoring, benchmarking, and reporting should be conducted on incubator operations? The effectiveness of incubators as a policy tool needs further study to determine the characteristics of either success or failure. In addition, warning signs need to be developed for sponsors to highlight specific actions that can be taken in time.

Financial Management
• What are the critical values of operating costs that contribute most to the success of the incubation modality?
• What financial goals effect, either positively or negatively, the effectiveness of the incubation process?
• Should an incubator be expected to be, and driven for, financial sustainability?
• When, if ever, should an incubator break even?
• Can incubators be structured as effective, for-profit organizations that deliver a return to investors consistent with other private sector investments?
• What are alternative sources of finance for incubator start-up and costs of operations?
• What is the most effective balance of rental and service income?
• What is the role of computer software in preparing financial plans for establishing business incubators?
• What is the appropriate role for the incubator in assisting tenants with the financing of their business? What payment terms should the incubator require from tenants, with what actions for which types and extents of delinquency?
• What is the preferred profile of entrepreneurs?

Service Providers
• What is the most effective means for service providers (accountants, attorneys, consultants, etc.) to work with the business incubation modality for maximum effectiveness for the provider, the incubator, and the entrepreneur?
• What is the most effective means of the incubator developing a strong service network?
• What is the appropriate role of incubator associations? How are these to be financed? What are the best means of communication between associations, incubators, tenants?

**Community**

• What are the effects on the community from an (un)successful incubator?
• How should they be measured, when by whom?
• What is the payoff to the government in terms of tax revenue, both direct and indirect?
• What are the overall, time-phased, social costs and benefits of the incubator modality?
• What are the community-associated factors that impact the effectiveness of the incubator modality?
• What is the effect of implementation of the incubator modality in an economy in transition from planned to market oriented?
• What is the appropriate linkage between an incubator and a university, research institute, community college, high school?
• What are the appropriate linkages between educational structures in industrializing and industrialized societies?

**Research Modality**

• Who will do what research and when?
• Who will sponsor/pay for what research done by whom?
• What is the data to be collected, on incubators, their tenants and graduates?
• What are the appropriate benchmarks for assessing the performance and impact of business incubators

6. **CONCLUSION**

The Business Incubation Modality has developed in response to needs for effective business support. Workspaces, financing, shared equipment and network of contacts to customers, suppliers, governments and delivery agents provide the basis of a proactive, decentralized program. A criticism of the incubator system is that it is expensive.
But compared to what, as no serious benefit/cost analyses have yet been made of the traditional SME support mechanisms. Nevertheless, incubator managements are well advised to move rapidly towards self-sustaining growth, through prudent investments in the building and facilities, careful monitoring of operating expenses and innovative means of raising income. For this reason also, the incubator must serve a larger clientele, to spread the benefits and to reduce total costs (investment and initial working capital) per job. Towards this end, incubators in the fertile Ferghana Valley, Uzbekistan, serve as hubs with satellite out-posts in a large region for agri-business services. Likewise, incubators in the expanding national program outside Java in Indonesia, serve more people “out-wall” through out-reach services than “in-wall” within the premises. Another significant trend is towards International Business Incubators. Eight of the existing 85 incubators under the TORCH program in China are being converted to the International Business Incubator mode, each with over 5,000 sq m space and about 100 tenants. Half the tenants will be Chinese companies planning exports and joint ventures and half will be small, high-tech foreign firms which need facilitation services to enter the complex Chinese market.

UNIDO has proven skills in the development and implementation of industrial development systems. The challenge to supporting economic restructuring can be met by a Small Enterprise Strategy. Such a Strategy would be built on an entrepreneurial base and rest on the four legs of the customer, supplier, employee, and entrepreneur. Focused on a Business Incubation System, such a Strategy would take the lead in characterization, expansion and diversification of “incubator” operations. Using internal and external analytical skills, UNIDO would contribute towards better understanding of the nurturing of small enterprises with potential for growth. Implementing these lessons through an incubator modality would enable UNIDO to leverage limited personnel and financial resources for maximum impact. Support for the incubation process would be consistent with philosophies to support maximum latitude in individual self-determination. Finally, UNIDO’s considerable world-wide experience with larger enterprises and governments would develop into new paradigms for linking small and large enterprises for mutual benefit while advising on the development of supportive government structures.
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