



enhancing incubator performance towards sustainability

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Abstract

Small business incubator has become a widely effective used tool to implement small business development strategies worldwide. This report describes incubator programmes in 11 Arab countries. Comparing to the 4000 incubators worldwide, there are only 20 operating incubators in the 22 Arab countries. The need of launching hundreds of incubators in the Arab region is crucial.

The main objective of the paper is to identify the successful key factors towards sustainability. The paper discusses the evaluation and benchmarking of incubator operations in order to achieve the outcomes planned as well as to demonstrate the benefits and mobilize public support to increase the success opportunities of the future incubators in the Arab countries. The paper suggests 10 actions for enhancing performance in three phases: planning, operation, and consolidation.

The role of the manager in the success of the incubator is studied based on collecting data by face to face interviews with the managers of incubators and selected support SMEs institutions in Egypt.

The paper presents factors of success for the installation of incubation programme, the most important difficulties and challenges in consolidating incubators, the most used tools in the incubation business management, and the contribution of the incubation business strategy for the performance of its administration.

Introduction

There are currently over 300 million unemployed and underemployed young people aged 18 to 30 years around the world. At least 20% of these young people have the potential to become entrepreneurs, less than 5% do, YBI [20]. One way of tackling this unacceptable waste of energy and talent is to help young people into self-employment. Unemployment is representing a crucial social and economic problem in the Arab countries. Labour resources are used efficiently when they are devoted to their most important or productive uses. Unemployment seems to be an instance of failure to use the available labour. This paper discusses the importance

of incubators as an appropriate mechanism to fight unemployment and adopt the initiatives and innovated ideas within the Arab countries.

Objectives

The main objective of the paper is to find answers for the following question:

Which are the most relevant functions/roles for the success of an incubator?

Methodology

The evaluation and benchmarking of incubator operations and the success factors of the incubator are studied based on collecting data by face to face interviews with the managers of incubators and selected support SMEs institutions in Egypt.

Incubators and Arab Practices

Incubators will not constitute a panacea for ills that afflict entrepreneurship in the Arab countries. They do, however, provide effective means for achieving many worthwhile objectives in a number of directions, Shalaby N, 2003 [13]. This is demonstrated by experiences in developed and developing economies, where new employment opportunities based on new technologies has been created to meet the challenges of growing populations and new global, regional and local changes.

Initiatives targeting the establishment of technology parks and incubation schemes are already making progress in a number of Arab countries.

Some Arab countries have started initiatives by adopting incubation programs as follows:

Egypt

In the transition to a market economy, Egypt has experienced high unemployment rates, especially among college graduates and former state staff. At the same time, support services and finance for small business have been inadequate. Starting as a UNDP initiative in 1992, the Social Fund for Development of the Government of Egypt has established a major network of incubators as a component of its extensive small business development and employment generation programs. The implementation of incubators is being

undertaken by the Egyptian Incubator Association, an NGO set up in 1995 for this purpose.

The first business incubator started operations at Tala in the Nile Delta in March 1998, followed by a national master plan based on sets of parameters, in order to prioritize locations from Aswan to Alexandria Incubators have now been established in Mansoura, Assiut, Tabbin, Benha, Giza, Gharbiya, Beni Souf, Duweka, and the Mubarak Science City. These include mixed business, industrial and technology-based. Today, those nine incubators are in operation and many more are under planning or implementation.

Saudi Arabia

The Eastern Province Chamber of Commerce and Industry (EPCCI), has already started to establish the first business incubator in the Kingdom of Saudi Arabia, which is located at the first industrial zone in Dammam and aimed to help Saudi youth, Shalaby, 2004 [9]. The human resources development fund has involved as a donor for the incubator project. The incubator will concentrate on inventors, industrial and services ideas in specific sectors. Prince Abdullah Bin Abdul-Aziz Science Park (PASP) was inaugurated in 2002 under the patronage of H.R.H Crown Prince Abdullah Bin Abdul-Aziz. Strongly affiliated with the King Fahd University of Petroleum & Minerals (KFUPM). It enjoys an excellent on-campus location, spread over a sprawling 75-acre site and within close proximity to the various engineering and science colleges, as well as the University's 'research institute', Kayyal, 2004 [4].

United Arab Emirates

The Center of Excellence for Applied Research and Training (CERT) operates two science and technology parks, in Abu Dhabi and Dubai, providing access to world-class experts in technology through more than 20 multinational partners, including Lucent, Honeywell, Northrop Grumman, Daimler-Chrysler and Thomson CSF. These parks were established to foster the use of the latest technologies in the United Arab Emirates while building the technological infrastructure required for further sustained development. In 1999, the Government of Dubai launched the Dubai Internet City (DIC) initiative to create

the infrastructure, environment and attitude that modern businesses need in order to operate globally and efficiently in a knowledge-based economy. The ultimate objective is to establish Dubai as a major regional hub for e-commerce. By promoting ICT and Web-based businesses, DIC has created a cluster characterized by interaction among ICT developers, service providers, logistics firms, educators, incubators and venture capitalists at a single location.

Oman

Knowledge Oasis in Muscat (KOM) is a public-private sector-led initiative that is totally committed to creating an environment in which entrepreneurs, researchers and small and medium-sized enterprises, as well as established multinationals, can innovate and flourish within a Gulf Co-operation Council (GCC) setting. KOM is the ideal location for businesses starting up or expanding in the GCC. International, regional and domestic businesses will be attracted to KOM, not only by its excellent geographic location, accommodation, facilities, support services and tranquil and secure setting but also by the benefit of close links with the academic community and facilities of Sultan Qaboos University.

Yemen

Yemen is in the process of defining its strategic vision for 2025, in which science and technology strategies are expected to be prominent, as is the establishment of a national innovation system. Science and technology policy and strategy are expected to include the establishment of strong intersectoral links among education and training, research and development, production and services, besides supporting science and technology activities like maintenance and standardization. This was followed by a national plan for 2001-2005 that will seek to implement projects, such as a National Information Center, a National Information Network and a National Institute for Information Technology. It would also include steps for introducing information technology at school and university levels, encouraging private-sector investment in projects, adopting methodologies for e-administration, and promoting the use of the Internet and e-commerce tools by SMEs.

Lebanon

The private sector in Lebanon has also embarked independently on a number of technopole and incubation projects. Efforts by Saint Joseph University (SJU) to establish a technopole called BERYTECH aim at helping Lebanon regain its leadership in business formation, encouraging entrepreneurship especially among young graduates, enhancing competitiveness among small and medium-sized technology firms, and providing Lebanese universities with a tool that promotes creative thinking and applied research.

The Lebanese National Council for Scientific Research (NCSR) has plans for the establishment of a Lebanese Technology Incubator (LTI) to facilitate commercial technology applications by local start-up companies and small high-technology firms.

Syria

The first Syrian technopole is currently in the feasibility study phase. HIAST has expressed interest in setting up a technology park. It would include an incubator, and development activities leading to innovative products. The main objective of this park would be to enhance the Syrian Arab Republic's competitiveness and increase its productivity in technology-related industries through technological innovation, in the hope of improving the country's economic situation in a global market where more stringent quality criteria and standards are becoming mandatory.

Palestine

In reconstructing the Palestinian territories after a prolonged occupation, the Palestinian Authority has had to address basic problems such as job creation, poverty alleviation, rural development, infrastructure building and rehabilitation as well as education, health and social services. Accordingly, a Science and Technology Planning Unit (STPU) has been established in the Ministry of Planning to act as a focal point for development, planning and policy formulation in science and technology in the public sector. The UNESCO Biotechnology Educational and Training Center (UNESCO BETCEN), established in 1995 by the UNESCO Biotechnology Action Council (BAC) at Bethlehem University, aims at promoting the development of research in plant molecular biology and agricultural biotechnology in the Palestinian community and Arab countries in the area.

Jordan

The Hashemite University on its campus in collaboration with Hillwood Jordan, a subsidiary of the U.S. Hillwood development company, is establishing an industry and technology park. Cyber City will be established by a consortium of international investors led by the Boscan Jordan Group in co-operation with the Jordan University for Science and Technology (JUST). It is designed as a technology park specializing in IT and located within a duty free zone, and aims to promote ICT industries in Jordan and the region while also serving as a catalyst for co-operation between Jordanian academic institutions and the international business community. Several facilities and incentives will be available at the site such as high-speed telecommunications, technology incubators, medical services, leisure and living quarters, access to a major transportation network, and duty-free exports to United States markets.

Tunisia

The Tunisian national incubator project, initiated in 1999 by the Agency for the Promotion of Industry (API) at the Ministry of Industry with the support of UNDP aims to promote and coordinate all incubator-related initiatives. Three pilot sites were originally proposed at Tunis, Sfax and Gafsa. All interested institutions, mainly universities, institutions of higher education and research centers, have established a (virtual) network to discuss the project and follow its progress in its pilot phase.

In 1999, the Ministry of Higher Education and the Ministry of Industry signed a convention

on the creation and promotion of incubators in the country to stress collaboration between universities and industries as an effective means of supporting innovation through entrepreneurial initiatives. In 2000, Sfax Innovation incubator was established.

Morocco

The Moroccan e-commerce pilot project is conceived as the first few steps on the road toward a global knowledge-based economy. It is expected to be instrumental in helping potential users and providers to overcome the existing legal, cultural and mental barriers that are currently among the major impediments to the dissemination and development of ICT in the country, including establishing technology and ICT incubators.

Do incubators need to be self-sustainable?

Incubators can be considered as a part of the social infrastructure, like schools and hospitals, and thus justify initial support. Further, they are instruments for creating innovative ventures and self-employment, helping to overcome market failures and providing 'public goods'. Therefore, they continue to receive some forms of subsidy. But in future, a stronger case has to be made for government support to incubators by rigorous independent assessments of the total benefits to total costs, and credible demonstration of their effectiveness.

Success key factors towards sustainability Incubators, when properly planned and competently managed, they can become significant components of a national venture promotion program. But they invariably need initial public support, community consensus on objectives, strong technocratic leadership, realistic expectations together with rigorous follow-up and evaluation.

Some essential measures emerge for incubators to thrive, not just survive, as outlined below: Incubators perform poorly for some of the same reasons that their clients do poorly.

The suggested actions below for enhancing incubator performance also apply broadly to technology parks.

A.Planning issues

1: Initiate the first essential steps of assessing feasibility and preparing the business plan. This requires:

- Rigorous market assessments of the profiles and needs of potential clients by experts familiar with local conditions, followed by analyses of business plan parameters by those who are to implement the programme,
- Selection of strong public-private sponsors and an empowered Managing Board, willing to invest their reputation, energy and 'patient money', with consensus on goals and responsibilities. Also needed, a 'champion' who is prepared to fight to overcome obstacles.
- Reservoir of potential technopreneurs. In developing countries they may have to be

'pre-incubated', to revive repressed entrepreneurial skills and supported even after leaving the BIC

- Select the type of incubator most suited to the local market, skills, resources, conditions and culture. While most incubators in developing countries are technology-focused, the special need and imperative of empowering disadvantaged communities must now receive attention.

2: Develop linkages to a sound knowledge base. Successful incubators invariably have strong affiliations to university and professional network, in order to develop:

- Preferred access to or an embedded association with the resources of a major research laboratory, or technical university. Importantly, this also provides the aura of respectability for both incubator and tenants.
- Arrangements to enable graduate students to work, at small remuneration and/or credits at tenant firms, as well as to faculty to augment their incomes through consultant services. The protection of confidentiality becomes essential.
- Well developed networks of professional friends and alumni, who may contribute an annual subscription to a "donors club", provide mentoring to individual tenants, sub-contracting opportunities and serve on incubator advisory committees,
- Synergistic system of alliances which provide the financial, banking, technology, marketing and business support, to mutual advantage.
- Expatriate nationals can be instrumental in bringing back their expertise, wide contacts, financial and other resources to the countries of origin, as has been demonstrated by the long-running UNDP program on Transfer of Knowledge by Expatriate Nationals (TOKTEN). State policies in Korea, Taiwan, and China have facilitated the return of this valuable resource. In 1999, over two-thirds of China's direct foreign investment came from Chinese living abroad. The 20 million Indians abroad have an aggregate annual income of \$160 million – and measures are underway to attract some part of this. But more important is the wealth of knowledge yet to be tapped.

3: Leverage state policy and legislative support, at the city and provincial levels. The supportive environment for sound incubator and park performance requires:

- Stable political, economic and regulatory regimes, providing a sound business infrastructure, initial funds, to facilitate venture creation despite the inherent risks,
- Competitiveness strategy which has analyzed and identified the sub-sectors of advantage, selected the change agents and markets,
- Human resources development which helps build the full range of specializations needed, from trainer to technician, innovator to manager.
- Functioning institutions for banking, insurance, stock markets, tax, intellectual property and environmental protection.

4: Plan the physical facilities to stimulate creativity and rental income. Essential features of the facility design to nurture technopreneurs are:

- Functional and flexible space, 2,500 sq m and more as needed in future,
- Layout to provide circulation to help interaction between tenants,
- Specific technology-related features such as Internet connectivity, effluent disposal, loading dock, storage, and selected shared equipment, but with focus on services, not hardware.
- And, when the stage is set, an aggressive marketing campaign using all available media, to promote the benefits of incubation to targeted groups.

Experience confirms that in countries with a supportive environment, the preparatory steps take about 9 to 12 months; another 12 months to secure funding and start, and a further 3 to 5 years may be needed to consolidate operations towards a successful incubator.

B. Operational issues

5: Build a dynamic, entrepreneurial management team. Searching, training and motivating the best possible team are key to success:

- Management team has to be lean, accessible and supportive, competent in diagnosis and referral but also opportunistic, properly remunerated with incentives for performance. It is noteworthy that some of the most successful incubators are managed by women.
- Its training, at home and abroad, is continuous, acquiring new skills for changing needs.
- Management's time and energy have to be allocated as much to the tenants themselves, as to strengthening the community network and responding to the sponsors/board.
- The managers must be proficient in the English language. In many countries this is not so and prospective managers should undergo intensive language training to participate in the exchange of experiences, publications and conferences. Also, they must be computer literate.

6: Select entrepreneurial groups with innovative, growth-potential, market-oriented plans Careful choice contributes to the success of both entrepreneur and incubator.

- Word of mouth is the best promotion. Therefore, the first batch of tenants should be selected with special care, so the incubator can start a reputation for success,
- Like the venture capitalist, the incubator is looking for the 3 Ms – Management, Market, and Money, all in short supply in an emerging economy.
- Tenants can be enabled to do a great deal of intra-incubator business among themselves.

7: Add value to client-enterprises through delivery of quality services. The ultimate aim is to launch the early-stage ventures into trajectories of growth through:

- Tailored programs of client-centered capacity-building, counseling, information, technology commercialization, sharing-caring services, suited to each cluster of client needs,
- Networking with the best professional services in the community and with other SME support programs to secure technology, market, quality and export advice,
- Become more results-oriented, exploring innovative ways of delivering services and raising revenues, focusing on gaps in the entrepreneur's skills, usually management and marketing,
- All at affordable terms, but keeping in mind the need to raise cash for the incubator itself,
- And, easing the exit of those whose efforts are not likely to bring the product or service to market despite all efforts.

8: Mobilize the needed investment and working capital for the incubator and its clients. The single greatest hurdle to incubator and tenant operations is requisite finance.

Management tasks are to assist the client:

- Secure information on – and facilitate access to credit, equity, royalty, grant, angel networks and other mechanisms,
- Prepare a financial strategy and persuasive business plan ,
- Develop in-house seed capital, purchase order financing, factoring, equity and angel funds
- Seek 'anchor tenants' and also serve affiliates outside the facility
- Explore a variety of creative ways, such as out-sourcing, bulk-buying, and bartering for supplies.
- Expand profitable services and drop others, persuading professional firms to provide initial free services in expectation of future business, and
- Extend the coverage of clients through virtual, hub-and satellite arrangements.

C. Consolidation and internationalization

9: Monitor performance and evaluate outcomes: As in other human endeavor, success calls for constant vigilance and improved performance, not complacency.

Towards this end, management must:

- Keep precise and regular records of the main parameters of its operations
- Bench-mark, audit and evaluate its performance compared to its peers,
- Based on this demonstration of its effectiveness, persuade the stakeholders, politicians and donors of the benefits/costs of the incubation process in the medium to long-term.
- Monitor client progress regularly against its business plan goals, with mentoring by board members and other professionals to facilitate networking and advice.

10: Keep antennas pointed towards emerging trends. Incubator and park managers in this millennium are becoming more:

- Professional and forward-leaning, willing to experiment with franchising and virtual incubation, royalties and angel networks
- Virtual systems for distance learning and

counseling, to nurture entrepreneurship and innovation in distant and disadvantaged communities

- Service-oriented, with firmer linkages to university, public, NGO and corporate partners,
- Financially self-sustaining, with movement towards the venture capital-consultant, co-sharing, for-profit model. Conditions are changing fast in developing countries and what appears unfeasible today may soon become appropriate, even inevitable.
- Mutually connected, intra- and internationally, with exchanges of information and experience through national, regional and international incubator networks.
- Socially-motivated and willing to transfer their incubation prowess to help build incubators in other parts of the country and region.

Role of manager in the success of the incubator

The relevant factors on the management are evaluated in terms of how capable they are on providing business success. The experience of the professionals who work with the "every day" of business incubation can contribute to the development of a work methodology which will optimize the results on business incubation management.

A study on the role of managers in the success of the incubator based on collecting data by face to face interviews with the managers of incubators and selected support SMEs institutions in Egypt. It is also based on interviews of public authorities and institutions whose goal is to encourage SMEs, such as Small Enterprises Development Organization (SEDO) and Small and Medium Business Support Project (SMBSP). Those institutions allow the collections of data able to get more information about Egyptian Incubation Business.

This study seeks the answers to questions such as:

1. Factors of success for the installation of incubations such as: the importance of the institutions in the national and regional scenario, the amount available for the everyday management process, the kinds of management tools used etc?
2. Which were the most important difficulties and challenges in consolidating the incubator in the domestic environment?
3. Which are and how to process the different phases of installation and improvement of Technology Base Incubation through the managers' view?
4. The way on how the installation was conducted by the managers influenced the success of the incubation business?
5. How is involvement of managers in the development of the incubator?
6. Which are the most used tools in the incubation business management?
7. Which are the manager, the institutions and the own incubator contributions on the formation of the incubation strategies?
8. It is necessary to identify or understand the contribution of the incubation business strategy for the performance of its administration?

Models of management and implementation of incubator

By means of the data collected, it is noticed that several requisites or pre-conditions must be followed when implanting an incubator. The most important requisite was the selection of the incubator manager's outline; the region where it will be established, and a rigorous selection of the companies where it will be implanted. A set of items was elaborated to summarize these aspects so that the most important ones are presented, as shown in the following table:

Table (1) important topics for the implantation project of the business incubation

Topics	Items to be Evaluated
Justification for the incubation creation	- Reasons to implant a business incubation; - Analysis of the physical space necessity; - Benefits expected; - Expenses estimated.
The partner institutions	- Outline and motivation; - Roles and responsibility; - Setting of financial and/or economic resources by the partners; - Justification for the participation.
Productive sector outline, the enterpriser and market	- Economic calling of the region; - Company outline; - Demand of services, support and place.
Local Community	- Community interest; - Informal sector engagement; - Knowledge about the incubation system dynamics.
Clients	- Outline of the interested companies; - Action directed to the enterprise.

According to data from SEDO (1999), SMEs stop to operate one rate varied from 30% to 61%, in the first year of existence, from 40% to 68% in the second year and from 55% to 75% in the third year of working. There is an optimistic view on the incubation movement in Egypt. The way of acting and thinking of different organs, which promote incubation in Egypt, is detached. It was observed in the early 90's after launching Social Fund for Development (SFD), a favorable gathering of conditions - seeking for technology which incorporate more and more a high knowledge level, the awareness about the need of an enterprise, and growing of universities and research centers - the conditions start promoting an effective support for the students, in relation to the theme, getting, in some cases, helping them to open their own enterprise.

This gathering of factors, in not so favorable economical tendencies in Egypt, made the country to have considerable increase in the number of incubations, started being seen as a fundamental tool for the local, regional and consequently national development. In 2003 there were 9 operating incubators in Egypt, 4 of mixed incubators, 2 traditional and 3 technological incubators. The data prove that the technological base incubators in the country are more relevant if compared to other kinds of incubators, which had a faster growing recently. A significant number of professionals, in which 67% of the

responsible people for incubation projects are engineers, the remaining are accountants, chemists, biologists, among others. It is also pointed out that the level of instruction in these incubation enterprises is predominant from the academic formation or post graduation in a total of 49%. The number of researchers involved in the development of products or innovation process, are still incipient if compared with industrial hi-tech countries such as USA, Japan, and Germany.

In Egypt, little by little the authorities and even the academic and enterprise community are

giving value to the incubation enterprises as important tools for local and national development. IDEAVELOPERS is a technology incubator, which have started from an initiative by Egypt's Ministry of Communications and Information Technology, and took the lead to establish the region's first integrated funding, venture development and incubation services firm focused on the ICT business.

The main deficiencies pointed in 2000 in relation to Egyptian incubations were: centralized dictatorial decision-making in one hand (EIA), less liabilities given to incubators managers, the lack of culture to establish partnerships with universities and research centers; lack of tradition in the associative work, precarious accompaniment and management, faults in services to incubators, bad-prepared management group, predominance of private political interests in the projects; bad dimensioned physical structure, and the like.

The managers' influence in incubation enterprises

In spite of the importance, the manager's role, as one of the factors for the success of incubation, was still very little explored. The emphasis in the peculiarity of the manager's outline and its influence on the incubation performance is also little known.

Data obtained from incubation enterprise managers, verified that some problems are

common and were pointed out as the main situation faced by them. They are: (1) few number of interested people with an interesting project presented for existent vacancies; (2) the members if incubation enterprises do not dedicate themselves to the project as much as they should; (3) lack of managing knowledge (were the most cited: they do not know the market/lack of market research/ ability for sales); and (4) they do not get sponsors for their projects. According to the study and the collection of data, it can be assured that a real opportunity for business together with an enterprising group and a well done business planning could be the nearly ideal solution for the generation of new successful businesses.

Other important aspects in relation to the manager's outline are those of having an enterprise feature in which virtues like point of view, engagement, leadership, creativity, obstinacy, and enthusiasm are indispensable. The importance given to the selection process and training of people involves in this activity, specially the incubation manager, and the main character in enterprise support growing". In other words, the manager role is fundamental to assume the incubation enterprise success.

Benchmarking of incubators performance in Egypt (2003)

Evaluating Services and Impacts	Average	Range	Benchmark
Survival rates of tenant firms	82%	65% – 100%	85%
Average growth in client turnover	20%	5% to 100% p.a.	25%
Average jobs per tenant company	4.2 jobs per firm	1 to 120	200
New graduate jobs per incubator	18 jobs	7 to 197	500
Cost per job (gross)	LE6,800(\$1080)	\$1,240 to \$29,600	\$8,000

Capital investment and operating costs: It is inappropriate to set benchmarks for incubator capital investment and operating costs because these will vary widely depending on the type of incubator. For example, a biotechnology incubator in Mubarak city, Alexandria requires dedicated laboratory space as well as office space, whereas an incubator in Duweka, Cairo providing just office to new start-ups will require less capital investment.

Proportion of revenue dependent on public subsidies: Whilst the public funding requirements of incubators will inevitably vary depending on location-specific factors such as the dynamism of the regional economy and the extent of market failure, the author assumed that incubators should try and increase the proportion of operating costs derived from their own activities (rent, advisory services, etc).

Strategy & Evaluation Services

Incubator space/number of tenants: The average incubator space in the survey was 2,000 m². There is a good deal of evidence to suggest that a minimum of 1,000 m² space is needed (enough to accommodate 20-30 companies) to achieve economies of scale. The author suggests a range of between 2,000 m² to 4,000 m² as a benchmark depending on the type of incubator.

Length of tenancy: A benchmark of 3 years is

suggested. It should be noted that the benchmark applies to the average incubator and would not be appropriate for some specialist types of incubators, e.g. biotech incubators, high-tech R&D and high-tech manufacturing because of the longer product development lead times associated with those business sectors, amongst others.

Number of Managerial Staff/Ratio of Staff:

Tenants: The benchmark of at least two managers assumes an average of 20-30 tenants and allows sufficient flexibility to cover absence (training and professional development, conferences, holidays, sickness etc.) while still ensuring that tenant firms have permanent access to managerial-level advisory support at all times. Given that the real added value of incubation lies not in real estate aspects but in the quality, relevance and utility of business advisory, the ratio of incubator managers to incubator tenants should ideally not exceed 1:20.

Proportion of Management Time Advising

Clients: Currently, the proportion of management time spent advising clients, highlighted in the survey, stands at 39%. The author assumed that, ideally, it should be possible to 'free-up' management so that

more time is spent advising tenants and less on administrative matters.

Survival rate of tenant firms: The survey revealed that the survival rate of firms reared in an incubator environment was significantly higher than the business success rate amongst the wider SME community, estimated at 30-50% (over a 5 year period). In the survey, there was a notable clustering of incubators reporting a survival rate amongst tenant firms of 80-90% and the benchmark is based on this. The survival rate of incubator tenant firms operating in more high-risk sectors such as high-tech industry may well be lower. The author emphasizes that survival rates are one indicator of the performance of incubators, of more importance is the extent to which incubators can contribute to the accelerated development of innovative, high-growth firms and their capacity to create new jobs.

Job creation – average jobs per tenant company / new jobs per incubator: Whilst employment creation is one of the key objectives of business incubators, setting a benchmark for the number of jobs created per firm or per incubator would be inappropriate because the number of jobs created will vary greatly depending on the type of companies being incubated, the amount of tenants the incubator can accommodate and the amount of available space. The number of jobs generated by a typical tenant company will vary immensely depending on the type of

industry the firm specializes in, the extent to which industry is technology-intensive as opposed to labor intensive. Similarly, the total number of graduate jobs created per incubator will vary because the total aggregate number of firms varies widely between incubators specializing in different types of industries.

Cost per Job: The average gross cost per job according to the incubator survey was \$1,080. When set-up costs and the amortization of capital are taken into account, the figure rises to \$4,700. Rather than setting a benchmark, the author have set a range, which he feels is more appropriate given that incubators receive widely differing levels of support from the public sector depending on location-specific factors.

Evaluation process

Previous studies invariably found incubators to be cost inefficient. However, they didn't include intangible benefits, such as the creation of a new entrepreneurial culture or an increase in the ranking of the university. Once started, the sponsors and board have to pro-actively monitor incubator operations, ensuring that performance information is systematically collected, for the clients, graduates and, if possible, control groups operating outside the incubator. Finally, the outcomes (not only outputs) have to be objectively analyzed, the satisfaction of the client and community beneficiaries surveyed, remedial actions taken to overcome weaknesses, and the system re-engineered to realize the benefits.

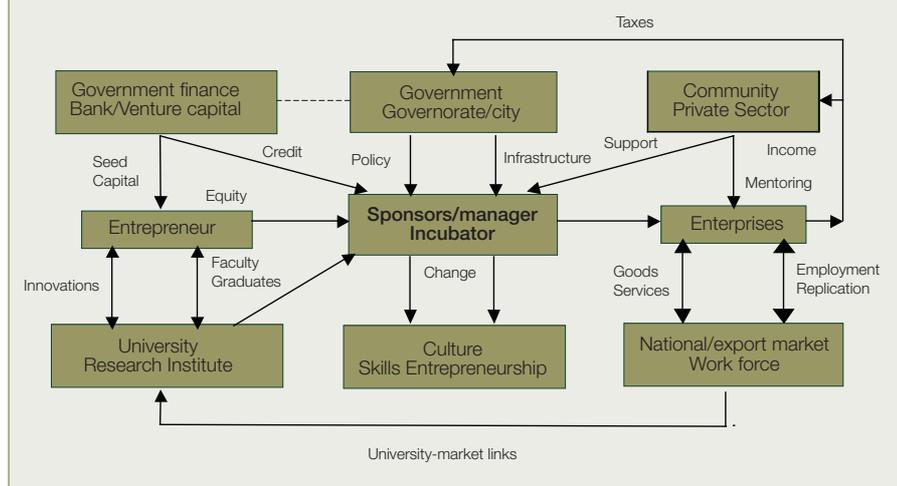
The figure (1) shows typical loops of inputs and outcomes expected from an incubation system.

Benchmarking is a dynamic process of identifying good outcomes in organizations which could be attributable to their successful practices and adapting these to another group's operations. It is a continuous learning and self-correcting process with quantitative comparisons of performance at participating organizations. It is best undertaken within a region, preferably one which has an association or focal body to help mobilize a consensus among participating incubators, implement the programme, compile and circulate relevant statistics, anonymously if necessary.

Conclusion

1. The aim of this article has been to identify the relevant key factors for the success of an incubator.
2. Launching a national business and technology incubators programme is crucial for technology innovation, exporting tech-based products, and to foster entrepreneurship.
3. Compared to the 4,000 incubators worldwide, there are only 20 operating incubators in the 22 Arab countries.
4. Initiatives targeting the establishment of technology parks and incubation schemes are already making progress in a number of Arab countries.
5. Various forms of business and technology incubators capacity-building initiatives have

Figure (1) Assessment of Incubator Impacts, Effectiveness and Sustainability



proved their effectiveness in developed and developing countries alike. Similar initiatives are needed in the Arab countries in order for them to meet the socioeconomic challenges that the twenty-first century brings.

6. Governments have a crucial role to play in creating an environment in which incubators capacity-building initiatives can flourish. They hold the main responsibility for adopting appropriate legislation and regulations that will effectively advance R&D, and promote entrepreneurship.
7. To identify success key factors towards sustainability, the paper discussed the evaluation and benchmarking of incubator operations and their importance, in order to achieve the outcomes planned as well as to demonstrate the benefits and mobilize public support to increase the success opportunities of future incubators in the Arab countries.
8. The paper presented ten actions for enhancing performance in three phases: planning, operation, and consolidation as follows:
 - a. Initiate the first essential steps of assessing feasibility and preparing the business plan
 - b. Develop linkages to a sound knowledge base.
 - c. Leverage state policy and legislative support, at the city and provincial levels.
 - d. Plan the physical facilities to stimulate creativity, and rental income.
 - e. Build a dynamic, entrepreneurial management team.
 - f. Select entrepreneurial groups with innovative, growth-potential, market-oriented plans
 - g. Add value to client-enterprises through delivery of quality services.
 - h. Mobilize the needed investment and working capital for the incubator and its clients.
 - i. Monitor performance and evaluate outcomes.
 - j. Keep antennas pointed towards emerging trends
9. The relevant factors on the management are evaluated in terms of how capable they are on providing business success.
10. Data obtained from incubators managers in Egypt, verified that some problems are common and were pointed out as the

main situation faced by them. They are:

- a. few number of interested people with an interesting project presented for existent vacancies;
 - b. The members of incubation enterprises do not dedicate themselves to the project as much as they should;
 - c. Lack of managing knowledge
 - d. They do not get sponsors for their projects.
11. According to the paper and the collection of data, it can be assured that a real opportunity for business together with an enterprising group and a well done business planning could be the nearly ideal solution for the generation of new successful businesses and incubators.

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