

**INCUBATORS AND UNIVERSITIES:
HOW TO OVERCOME CULTURAL BARRIERS AGAINST INNOVATION**

Mostafa K. Eghbal¹, Mehdi Keshmiri², Kayvan Asghari³, and E. Roustazadeh⁴
Isfahan Science and Technology Town, Iran *

Abstract

Incubators have recorded a profile of success worldwide. The factor that hampers their success in developing countries involves cultural barriers. This paper will explore this aspect of the problem to develop and promote a culture of innovation. A reform in the educational system coupled with a pre-incubation program will foster a new outlook among the job-seeking university graduates. Incubators remain the major source of innovation and entrepreneurship while universities offer relevant short courses. The twin program, university courses and practical trainings by incubators, will be the solution investigated in this paper. Qadir Incubator's experience in developing this new pre-incubation program will be reviewed.

¹ ISTT President

² ISTT Vice-president for Technology & Research

³ Head of Pre-incubation Program, Qadir Incubator, ISTT

⁴ Advisor to International Affairs, ISTT

* All correspondence must be directed to: MKEghbal@istt.org

INTRODUCTION

Growing at a fast rate, incubators provide essential business services, consultation, training as well as flexible working spaces for start-up companies. They serve as tools to enhance economic growth in nations characterized by transition economies and to develop innovations into viable knowledge-based businesses. The success of incubators in many countries has been a good incentive for developing countries such as Iran to use the concept of incubators as a model tool to support entrepreneurs and to help regional economic development.

The number of incubators in Iran has been increasing rapidly in recent years. By the end of the year 2001, the only incubator in Iran was the Qadir Incubator in Isfahan Science and Technology Town, which was established in 1999. Since last year, however, 17 more incubators have received permission to start their activities in different regions of Iran. Considering that the main objective of incubators is to provide support to start-up companies, the main concern of these newly established incubators is how to attract young entrepreneurs to establish their own companies and how to promote a culture of innovation in their region.

Economic experts are increasingly pointing to the importance of a "regional innovative culture" in the private, public, and non-profit sectors as a primary basis for prosperity in the knowledge-based economy. They see innovation and entrepreneurship as the engines for economic changes aimed at regional prosperity. "Innovation" is defined as 'the creation of new technologies through mobilizing social or technical ideas toward commercialization where entrepreneurs act as agents of change'. For developing countries, the main question is 'how a culture of regional innovation is to be created and promoted'. The objective of this paper is to explore how universities and incubators can overcome the cultural and educational barriers for innovation, especially in developing countries.

INNOVATIVE CULTURE

Creating an innovative region is not an easy task. There are key ingredients that should already exist or be developed where they do not. These may include regional leadership with a vision for innovation, universities that supply the intellect and that foster innovation, incubators and innovation centers that support entrepreneurs, networking systems that host and conglomerate private sector firms and public institutions for research and development, and legislation and regulatory provisions that facilitate funding and cooperative work. The experience gained in Isfahan Science and Technology Town (Qadir Incubator), in establishing its first incubator, has shown that, at least in developing countries, universities and incubators can play the major role in promoting a culture of innovation. Incubators may set the stage for an interactive transaction joining the universities, public and private sectors, and the public at large with the hope that a culture of innovation may evolve from this collaborative network of relationships.

There are prerequisites to the establishment of companies by entrepreneurs within the framework of technology business incubators that do not always seem to exist in developing countries. There are, for instance, cultural and economic barriers, on the

one hand, while innovation, entrepreneurship and teamwork seem to be lacking, on the other. Without these, technology companies have practically no meaning. It is mainly because of such difficulties that university graduates, who are considered the engine to such companies, tend to prefer seemingly more secure, though not much rewarding, employment with the public sector or with the already established large industries rather than starting their own businesses. This preference is also partly due to the system of education in universities and lack of entrepreneurship training. Universities can play a great role in preparing their graduates to look for alternatives other than employment in government and non-government organizations. Entrepreneurship education in universities may combine a formal, structured curriculum with a practical, real world business activities.

On the other hand, incubators play their role by increasing self-confidence among university graduates by providing real life examples of entrepreneurs who have proved successful in establishing their own businesses. In certain cases, the self-confidence and knowledge/skills required for setting up a business is so poor even among university graduates with bright and promising academic records that they cannot meet the requirements by established technology business incubators. The above limitations reduce the chances of success by start-ups in incubators and the incubator management may not be capable of lifting all the obstacles in the way of successful business activities. However, the adoption of appropriate measures by incubators and/or universities may prepare the grounds for higher interest by university graduates in starting their own business companies. It is, therefore, essential to have a system to build up the capacity and prepare these potential entrepreneurs for admission into incubators where they might find the opportunity to pave the way toward successful industrialists and economic pioneers. This remedial or preparatory stage, henceforth called pre-incubation stage, is now being experienced in Qadir Incubator and will be described in more detail in this paper. Although, at this point, pre-incubation has been implemented by Qadir Incubator, the ISTT management believes that this stage could be incorporated into entrepreneurial education in Iranian universities.

PRE-INCUBATION AT QADIR INCUBATOR

The pre-incubation program at Qadir Incubator started late in 2001 when the first 5 innovation teams were admitted. The criteria established for admitting teams are rather simple. Admission to the pre-incubation period may be granted to teams of university graduates (sometimes with academic or industrial peers on their team) who either have new technological ideas feasibly translatable into production or to those who can prove their capacity in good goal-oriented teamwork. The regulations and interactions with these teams are defined in such a way that they will make their final decisions on establishing a private company enabling them to enter the incubation program.

The major activity by these teams in the pre-incubation period includes the development of a prototype of the business idea, which is usually supervised by a technical mentor, often a university researcher. Once prototyping and model production is accomplished, market evaluation and the assessment of the working group by Qadir Incubator management become possible. At the end of the pre-

incubation period, the teams are in a position to register their companies in the incubator.

The following are the **executive objectives** of the pre-incubation program:

- Promoting innovation and creativity by university graduates;
- Facilitating admission to incubation programs;
- Providing technical advice and consultation; and
- Surveillance of the trend of pre-incubatees' growth trend.

The **strategic objectives** pursued by the program include:

- Establishing the required links between academic trainings and those by incubators;
- Application of new effective ways and methods of commercialization of scientific findings;
- Reducing the risks associated with establishing new companies/start-ups;
- Increased product quality through a competitive approach; and
- (In most cases) initiation of from-scratch production in any field as a response to the real needs of the local community aimed at reducing industrial imports.

Methodology: The services/support offered to pre-incubatees include:

- Office space, Information services, Consultation, Technical and professional services, Marketing services;
- Assistance to identify and consolidate a working idea and/or prototyping (through research grants);
- Organizing training workshops on entrepreneurship and management of SMEs; and
- Assistance in developing a business plan.

The office space allocated to each pre-incubatee is a partitioned open space of about 6-9 m². Information services are limited but free of charge and include access to Internet, access to local and national libraries through an inter-library system, LAN, etc. Professional and technical services include all general labs, wet lab, metallography labs and all workshops available within Qadir Incubator, besides lab services provided through the networking system established among local industries and Qadir Incubator affiliates. Marketing includes negotiations with public sector bodies to locate their needs in scientific fields and research demands, formulating these into project proposals, and nominating pre-incubatees and incubatees for contractual agreements with employers. These projects are allotted on the basis of the field of activity of each pre-incubatee company.

Each pre-incubatee is essentially characterized by its pivotal idea. This is the main activity field where the future SMEs will grow and work in. Certain manufacturing companies require assistance to manufacture their product prototypes which can be displayed to potential users for full production lines. The assistance is offered in the form of research grants from Qadir Incubator's internal resources and/or other resources as may be available in each case. The best way to think of this grant is as a "seed money" and the best that can be said about the ultimate work the pre-incubatees do is testing the feasibility of their ideas and modifications thereupon if necessary. Many success stories exist which have evolved from semantic notions but developed

into full production lines. Examples include software lock systems, industrial adhesives, etc.

Training workshops at Qadir Incubator are in full swing at the moment. Domestic and international companies are being called upon to organize courses and workshops.

The business plan includes identification and statement of market opportunities, recognition of challenges, economic assessment, market evaluation, identification of target competitive markets, demand analysis, development of advantageous products to win the upper hand in the market, etc. The pre-incubation program helps the pre-incubatees to develop a sound and working business plan which will be a decisive factor in winning admission to the Incubation program.

Performance: As mentioned earlier, the pre-incubation program started with 6 pre-incubatees. Presently, there are 24 pre-incubatees in the various fields of materials and manufacturing, ICT, and chemical engineering, among others. From these pre-incubatees, five have already been admitted to the incubation program, four are gaining admission to the incubation program, four others have basically failed, and the rest are still in their pre-incubation period. The average pre-incubation period for all companies has been 6 months with certain cases reaching even twelve months.

The main objective behind all these activities is to foster the culture of entrepreneurship and SME development among university graduates. One great milestone to measure the degree of success in fostering this culture among the local community is the number of applications we are receiving increasingly. When we started, there were few applications and the standards had to be lowered whereas the standards presently used in evaluating applications are rather high and the number of applications has risen far beyond what ISST can respond to. Hence, we have become more selective although we also try to increase our capacity so that the potential market does not decline and that the industrial and economic boost expected from science parks and incubators finds its fertile ground to flourish and bear fruit.

A corollary from the increasing public appraisal of the potentials of this new area of activity and the result from this initial but well-thought-out pre-incubation plan is the general consensus at Qadir Incubator that the pre-incubation program shall be a remedial strategy for all applicants who may have weaknesses in meeting the standard criteria for the incubation program. The plan for the current fiscal year, therefore, is to make the pre-incubation program a major consideration in granting admission to the incubation program. Part of the reason for this is the assessment of successful companies and the quality promotion we are witnessing recently. This may, of course, be a particular case resulting from the local situation. But the lessons learned can be generalized to other situations. Moreover, the culture thus cultivated will have far-reaching effects on the society, industries, and universities.

The above experience, in turn, will call for a new culture of learning and training; a better system of linkages between universities and incubation programs of the nature described above. Although the pre-incubation period is presently considered to be part of the incubation program at Qadir Incubator, the ISTT management strongly believes that this program is best suited for universities in the area. A proposal has been recently drafted and forwarded to Isfahan University of Technology (IUT) and

Isfahan University, both located in the same region as Qadir Incubator operates, as a complementary and supplementary program to the entrepreneurship courses held by these universities. According to this proposal, successful students from the entrepreneurship courses are granted unconditional admission to the pre-incubation program at Qadir Incubator where they can put their theoretical teachings into real-life practice in the form of a pre-incubation team.

The educational system in the third world countries must be reinforced to meet impending human resource needs and to promote the innovation culture. Concurrently, special measures are required to develop a new generation of entrepreneurs, who can start and sustain their own enterprises. These are generally the fields in which the incubators and, specifically, the innovation centers are making their important contributions and are expected to play an even greater role. These contributions are now seemingly mature enough to be formulated in a first attempt to develop courses and trainings for routine educational curricula at universities leaving the more practical aspects to the responsibility of incubators.

PROPOSALS TO UNIVERSITY AND EDUCATIONAL SYSTEMS

As a first step, the requirements for improving the profile of university graduates in terms of their business skills and the real world requirements must be assessed. The results from this assessment can be used in course design and curriculum improvement. Qadir Incubator has already started an assessment scheme which will be formulated in the form of proposals to universities and educational systems. The preliminary vision at Qadir Incubator vindicates the long-held belief that a sound and useful knowledge of management and management skills along with appreciation of economic principles will be a must for such university courses. Within this framework, an understanding of social systems, national law and regulatory systems, social psychology, general trade and market practices prevalent in the society, needs and challenges of the target society, potential sources of assistance and opportunities, banking and funding systems, etc. are among the major components that must be incorporated in the courses while realia will provide preliminary training in translating the theoretical trainings into real life situation problem solving activities. Based on these considerations, Qadir Incubator has designed a number of short courses and trainings to be offered within its pre-incubation program. These courses will be modified by feedback from instructors and participants in the light of new experiences, surveys, and new needs discovered. Below is the list of courses developed at Qadir Incubator:

1. Innovation and Entrepreneurship
2. Mechanisms of Support for entrepreneurs in Iran
3. Innovative Ideas and Opportunities
4. Teamwork
5. Business plan development
6. management skills

Other courses required for incubation/post-incubation programs to be offered jointly by incubators and universities are as follows:

1. Fundamentals of Fiscal Management

2. Strategic Planning and Management
3. Human Resource Management and Organizational Behavior
4. Technology management
5. IT and E-commerce
6. Fundamentals of Operations and Quality Management
7. Business Communications Management
8. Project and Manufacturing Management
9. Purchase and Procurement Management
10. New Product Development

No doubt, experiences from incubators around the world must also be incorporated to yield a comprehensive syllabus for maximum output. Along these lines, international programs and lecturers may be called upon for help and contribution. This is actually the next step Qadir Incubator is trying to make provisions for.

INCUBATORS' SHARE

The more urgent and realistic aspect, however, is the real-life training to existing start-ups and spin-offs who fail to meet all the requirements for admission to incubation programs. Qadir Incubator normally filters out applicants for incubation programs by a set of criteria, namely, 1) Having a market-oriented pivotal idea (that can be translated to production), 2) An entrepreneur (team), and 3) Having a business plan. Those in possession of these requirements must also register a company and start their operation within the incubator. What naturally happens is that most applicants may possess only one or two of these criteria, and even so, the quality of their team is usually in doubt. The approach adopted by Qadir Incubator is to maximize the support offered to university graduates through provisioning an incubation program. During this program, start-ups will gain practical experience with their businesses while they also develop their pivotal ideas into feasible production/manufacturing systems.

The university curricula described above will be a good prelude to successful business in incubators. However, it will always be necessary to have more practical, specific, and goal-oriented trainings at incubators to complement the trainings offered at universities within the framework described above.

The twin system thus devised shall be adequate in creating the new atmosphere and the new culture for a new outlook to business and production. This is especially true with developing countries where a heavy reliance on public money and planning has existed over the time as a result of (over)centralization. University graduates will thus be trained to think of using their scientific trainings in production, inventing new products/services, and integrating their knowledge into the production and manufacturing systems operating in the society where the needs of clients and the society at large are the determining and the limiting factors of production. It is within this system that cultural understanding will become an integral part of the educational system. To affect the society, one should know about the culture and to respond to its needs, one should be able to adapt to its requirements. A business-oriented educational system that fosters entrepreneurship will have the capacity to respond to these needs and to promote a culture of entrepreneurship among the emerging populations.

CONCLUDING REMARKS

From the above considerations, it naturally follows that a reform is much sought for as far as the university curricula are concerned. This reform should be such that new courses on business management, entrepreneurship, and real production capability are accommodated to foster a true culture of innovation and production. This reform shall, no doubt, start from universities where formal education is offered. Developing countries in particular will need to develop the twin program described above as they lack the culture of innovation.

It will be necessary to set up pre-incubation programs distinct from the mainstream incubation program. The more theoretical part of the program may be accomplished by universities within the framework of short (optional/obligatory) courses while the more practical aspects must be handled by incubators. Distinctions must also be made between applicants on the basis of their training requirements such that they will be screened to admit some to the pre-incubation and others to the incubation program.

All these activities must be oriented toward the promotion of an innovative culture and entrepreneurship. University graduates will be educated not only to master science and engineering but also to run businesses, to develop new products, to compete in the free market, and to contribute to the local economy through sustainable production.

REFERENCES

1. Asghari, K. *et. al.* 2002; *Experiences with pre-incubation at Isfahan Science and Technology Town*. Proceeding of International Congress of Technological Research Institutes/Biennial Congress of WAITRO. Porto Alegre, Brazil.
2. Eghbal, M. K. *et. al.* 2001. *The challenge of supporting private enterprises through incubation programs in Isfahan Science and Technology Town, Iran*. Abstracts of Fifth Annual Meeting of the Asian Science Parks Association. Kyoto, Japan.
3. Florida, R. 2002. *The rise of creative class*. Proceeding of the XIX Conference on Science and Technology Parks. Quebec City, Canada.
4. Lalkaka, R. 2000. *Rapid growth of business incubation in China, lessons for developing and restructuring countries*. Proceeding of 2000 International Conference on Business Incubation and Technology Incubation. Shanghai, China.