Management of innovation

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The paper highlights the concept of TBI (Technical Business Incubators) in the context of Innovation Management. TBI nurtures high-tech start ups and present a technology oriented variant of business incubation facilitating proliferation of knowledge based enterprises - typically TBI projects are implemented in 1 year, attaining self sufficiency in 5 years. The profits are shared with host institutions but the government, economy and society also get its enormous benefits.

In the dynamic and ever-changing environment, change is the key to success. As the invention emanates from need, the change in demand needs to innovate. The fierce competition in the customers' market has enforced the entrepreneurs to innovate so as to lead and survive for a long period. Innovation is a process where new products and services and more efficient production techniques are introduced by the entrepreneurs that have identified new market opportunities or better ways of meeting existing demands "Innovation means doing the new things or the doing of things that are already being done in a new way[1]." Thus, innovation is an art of doing new things. However, there is distinction between creativity and innovation. Creativity is the ability to bring something new into existence. Practically, it is the ability not the activity of bringing something new in to existence. It is possible for a person to conceive of something new and envision how it will be useful but not necessarily take the necessary action to make it a reality. The ideas generated in the mind of a man have little value until they are converted into new products, services or processes. " Innovation is the transformation of creative ideas into useful applications but creativity is a prerequisite to innovation.[2]"

Schumpeter has described entrepreneurs as innovators who use the process of shatter the status quo through the new method of commence. It includes new processes of production, introduction of new products, creation of new markets, discovery of a new and better form of industrial organization. Peter Drucker also elaborates that " innovation is the specific tool of entrepreneurs as the means by which they exploit change as an opportunity for a different business or a different service. It is capable of being presented as a discipline, capable of being learned, capable of being practiced." Entrepreneurs need search purposefully as the sources of innovation and they need to know and to apply the principles of successful innovation.[3]" Thus, innovation is the development process. It translates an idea into an application which adds value to the existing products and enhances its utility in the light of attributes intended in changed environment. It requires entrepreneurs to workout the details of product design or service analytically to develop marketing, obtain finance and plan operations.

Need for Innovators

Since earlier driven by curiosity, men and women have been able to stumble upon innovative technologies. In India, J. C. Bose and Dr. C. V. Raman's keen sense of observation and perseverance lead them to discover new phenomena in the last half century. However, the country has not been able to produce such curious men having outstanding ability to make fundamental discoveries in science and technologies. The Indian scientists have contributed more to incremental knowledge or minor innovation. In this context, it is important to mention that continuous efforts are needed to make the research and development activities more effective and rewarding. It will enable the innovation to be linked with developmental activities. For this purpose, grassroots innovators and communities with traditional knowledge and documents should be encouraged to popularize their innovations in the society through prototype designs or products. Besides protecting their intellectual property rights, planning process should be strengthened to link innovation, investment and enterprise to make the innovative efforts/creative work a strong movement. It is quite

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correct to say that individuals are creative. But the question arises that is society capable enough to recognize and reward these innovators. General practice in India is that the innovative people have been ignored or harassed until they were recognized by other nations. It is notable that central as well as State Governments are also not serious in supporting indigenous science and innovations. There were announcements of intent to provide six percent of the GDP to education. However, no steps have been taken to popularise research and development activities in concrete terms. Government is incurring huge expenditure on information technology, but formal sector has been affected by severe resource crunch for innovations. There are fewer students in the area of science and technology researches and the inadequate funding from the government also severely affects the innovative projects.

Thus, in present scenario, it would be better to ensure innovations for business survival and success. Actually, managing innovations effectively has become the key to the growth of India in the context of increasing competition owing to the globalization and emergence of disruptive technologies across the world. Both business managers and corporates need to constantly innovate, so as to stay ahead in the competition. Increasing competition leads to the emergence of disruptive technologies, thereby making the existing technologies obsolete. The future would not be about eliminating disadvantages but about creating new advantages. Moreover, " poverty has compelled Indians to have the cerebral edge as the country clearly had an edge when it came to innovtions.[5]" Similarly, efforts are also needed for innovations in customer relationship management and on the human touch in strengthening customer relations. New technologies would enable corporates to better their products and services. Human touch is quite imperative for successful business models.

Half Hearted Efforts

In our country, CSIR has been entrusted to undertake necessary efforts for innovations in formal sector to develop effective prototype for the society. Its efforts to form an Indian Association of Inventors made little program because only a dozen of truly outstanding inventors could be located. Another scheme "Crazy Ideas Fund" for Scientists in the 40 national laboratories located across the country has also been launched. Under this scheme any scientist, who lame up with an idea which found to be exciting by a group of experts has to be funded by the CSIR. In this context a dozen or more initiatives are underway.[4]

The Indian Government has come up with the intent of supporting efforts to scount and help grassroots innovators and inventors. Accordingly, the National Innovation Foundation (NIF) has been setup at Ahmedabad with the financial support of the Department of science and Technology (DST). Another initiative launched in 1999 was the Techno- entrepreneur Program which allows innovators in the informal sector (illiterates, housemates and others, that is those outside the academic circle) the necessary infrastructure and funding to convert the ideas into reality. The Technopreneur Promotion Program (TEPP) jointly operated by the Department of Science and Industrial Research (DSIR) and the Department of Science and Technology (DST) is aimed at promoting individual innovators to become technology based entrepreneurs. All it requires is to dream up an original idea or come up with an invention or know-how to be supported.

To emphasis it is supposed to identify innovations based in rural areas and outside the formal system of scientific research and academics. In this context, it is notable that development of products like a tilting bullock cart with brakes and shock absorbers and sprayers a cost effective polythene there bag filling device and a membrane oxygenator are the direct result of this scheme. Whether this small effort to bring the grassroots innovators to limelight and support the unconventional inventor really triggers a definitive step towards creating a sound knowledge base is indeed an interesting issue.

Technical Business Incubators

Technology Business Incubators (TBIs) have evolved from the convergence of two global movements, namely the recognition that small and medium enterprises (SMEs) are the instruments of economic growth and the accelerated pace of technological change. TBIs are making a significant contribution to the economic development of various nations and the era of TBIs has just now begun in India as well. The TBI model of facilitating the growth of knowledge based enterprises has much scope in India due to continuous improvement in scientific and technological base, both in terms of infrastructure and skilled manpower. In India, however, TBIs are associated with and are aided and supported by centres of educational technological excellence. The prominent industry segments where TBIs can play a major role are information technology, pharmaceuticals, bio-technology, instrumentation, sensor based electronics, embedded system, bio-medical drugs and agro bio-technology. The focus on any specific industry segment is in consonance with the core competency of the TBI in question.

Actually, the TBI model greatly facilitates the proliferation of technology based start up companies even as it ensures speedy commercialization of R & D findings. "TBIs nurture hi-tech start ups and present a technology oriented variant of business incubation. Besides, they improve the prospects of survival of start-ups companies. TBI projects are typically implemented in

one year. They generate revenue from the first year itself and attain self-sufficiency in five years. While profits are shared with the host institution, indirect benefits also accrue to the Government, the R & D community, the corporate sector, the tenant company and society at large. The growth of global economies and lifestyles of civilized societies are being increasingly determined by knowledge and innovation created and nurtured by knowledge institutions. The close interaction of such institution with entrepreneurs, communities and industry has therefore, to be mandated as a social contract with society. In this context, it is important to note that importance of TBIs must be gauged in the context of the global shift in emphasis from decaying industrial economies comprising large firms to a knowledge based entrepreneurial economy driven by innovative technology. Now-a-days, it is "e-ncubate, e-nnovate and e-nvest" for the present generation of business incubators which are followed on profit orientation." Therefore profit incubators are intended to mobilise information and communication technology and provide convergence of support towards creating knowledge-based ventures. Some of these, in turn can expand rapidly and contribute to economic growth. Moreover, TBIs enhance national intellectual property, provide opportunities for others, help to create wealth and facilitate global competitiveness.

Scope in Indian Scenario

The scope for adopting the TBI model in India to nurture knowledge-based enterprises is immense, given the fact that the country has over 600 technical institutions and 200 universities. Besides, over 4,00,000 engineering graduates are out every year. Additionally, over 400 national laboratories and 1300 in-house R & D units in the corporate and university sector provide the critical man that can make all the difference.

Present Position

The National Science Technology Entrepreneurship Development Board (NSTEDB), launched a scheme for TBIs in 2000-01 around academic centres of excellence. The scheme provides for financial, assistance for infrastructure creation and recurring expenses of TBIs for a period of five years from inception. TBIs in India are located near academic institution of excellence and work for catalyzing the growth of innovation- based entrepreneurship. In several developed and developing nations the TBI model has proved quite successful. In fact a UNDP/UNIDO study carried out on the functioning of TBIs in seven countries, namely China, the Czech Republic, Poland, Turkey, Brazil, Mexico and Nigeria has concluded that TBIs are the ultimate effective instruments that help entrepreneurs investing enterprises that generate employment and facilitate economic growth and wealth creation. Business incubators the world over have not just facilitated the growth of technology-based new enterprises but have also improved their survival rate substantially. Besides, business incubators also facilitate speedy commercialisation of research findings.

In 2000-01, the NSTEDB has established four TBIs at Noida, Chennai, Hyderabad and Bangalore which are responsible for focusing on facilitating entrepreneurship in the areas of IT, Bio-technology, Materials and Composites respectively. Each TBI is expected to help to create at least 20 companies within the first 5 years. TBIs are also free to participate in the equity of these companies. The Department of Science & Technology (DST) has further accorded in principle approval for setting up 5 more new TBIs in the country in the financial year of 2001-02. These proposed TBIs would be setup in Hyderabad, Pune, Ahmedabad, Vellore and Kozhikode. While the ones in Hyderabad and Pune would be focused as nurturing and providing support to start ups in agri-business, TBIs in Ahmedabad, Vellore and Kozhikode would focus on design, leather technology and IT respectively. SIDBI Venture Capital Ltd. has also formulated its own scheme for financing incubation centres. The organisation has provided grants for at least two-incubation centres— at the Indian Institute of Technology, Kanpur and the Birla Institute of Technology, Mesra. The National Advisory Committee (NAC) on Science and Technology Entrepreneurial Park (STEP) has also announced for two incubators– one at Anna University in the area of bio-technology and the other at Indian Institute of Technology (IIT) Delhi in the area of software. STEPs helped in establishing 668 units and developing 330 technologies, of which about 117 products are commercialised so far and the annual turnover of which is over Rs. 88 crores. Grants for other incubation centres are also under consideration. Actually, TBI concept is sector specific and technology driven. They also require huge investment. In this way, TBIs would focus on specialised projects. However STEP is broader concept and responsible for helping in creating an entrepreneurial culture. DST is also trying to extent technology transfer in a quicker way through the STEP concept.

Innovation and Patent Regime

There have been many positive changes in India in a very short time. Just a few years ago, the country was losing the battle to retain the best and the brightest of its engineers and computer scientists. The absence of an effective copyright law forced many of those scientists and technicians to emigrate to countries where their work would be protected from unfair exploitation by competitors. Recognizing this the Government has already enacted the copyright law to protect the hard work and creativity of its computer scientists. The result is a burgeoning

high-tech industry producing some of the worlds most advanced software and employing thousands of workers who might have otherwise have left the country for greater pastures elsewhere in the world.

A major development was the recognition that knowledge-based industry sectors can improve standard of living while protecting the environment. This prompted the Government to allow an Indian company Mahyco and a US firm Monsanto to commercialise a biotechnology cotton variety. India has tremendous potential in other economic sectors as well. Its pharmaceutical industry has some of the world class research- based sector. With some $ 2 billion exports, India is already the fourth leading supplier of bulk pharmaceutical products and active ingredients and thus pharmaceutical industry has established itself as a global player. India also posses the world's third largest pool of scientifically and technically trained personnel. In 2000, the Drug Controller-General of India (DCGI) received five applications for clinical trials involving new drugs. In 2001, the it has received some 80 applications. Indeed, in the number of applications filed under the world Intellectual Property Organizations Patent Cooperation Treaty, India now ranks third on the developing countries list. The work of India's highly trained pharmaceutical researchers can only bear fruit if it is sheltered by strong intellectual property rights protection. The successful example set by the computer industry makes a sound patents regime that protects pharmaceutical products which will give the research pharmaceuticals sector room to flourish in the same way as the computer industry has given. As a member of WTO, India is committed under the Agreement on Trade Related Aspects of Intellectual Property Right (TRIPS) to establish a patent regime by 2005. The Government has also enacted world class patents legislation in 2001 as a second set of revisions to its patent law which dates have from the 1970s.

Problems and Prospects for TBIs

TBIs model had great scope for creation of a new generation of entrepreneurs who in turn would provide jobs and generate national wealth as well. "The scope is there but the difficulty lies in the lack of understanding of the concept by the beneficiaries. However, necessary actions are being taken to address the problem, which include awareness creation through workshops and seminars and talks by successful entrepreneurs. The thrust areas in which DST proposes to promote TBIs include information and communication technology bio-technology, new materials, instrumentation and maintenance, agriculture and food processing, garments and fashion technology and services.

Thus, on the basis of above analysis, we can say that Indians have always been entrepreneurial. India has already produced great stalwarts like JRD Tata, Walchand Hirachand, GD Birla, S.L Kirloskar and Dhirubhai Ambani. There are few significant economies across the world where Indian entrepreneurs have not struck deep roots, few countries where they are not amongst the most successful of the immigrant communities. The Indian spirit of enterprise strudelles the entire spectrum from silicon valley to wall street, from the Kiranawala to high tech start up, from shipping and steel to software, from manufacturing to service and from Dunkin Donuts to Hot mail.com. However, the key question is to introspect with a sense of urgency to have a depth analysis of how can India be a much more powerful incubator for entrepreneurship in the years to come, given the size of our country, our brain power and business acumen?

Suggestive Framework

Following suggestions are to be implemented for ensuring incubating process at an accelerated pace :

1. There is a need to ensure systematic changes in our method of education. Currently, the system pigeonholes individuals into a narrow range of discipline and straight jackets them into rigid career tracks. Given the overwhelming emphasis on grades, creativity and independent thinking and up taking a backseat. The need of the hour is an education system that fosters exploration, questioning and debates. A system that can help each student to pursue a path that best stimulates their creativity and challenges him or her. The objective should be to create citizens who have the ability to think laterally. Students who are equipped to step out into the real world and become thoughtleaders rather than products of machinery that churns out yet another commodity.

2. There is also need of a shift in societal and individual attitude at different levels. More often than not, our social environment tends to suppress precisely those attributes that are prized highly in an entrepreneurial culture. For instance, our system still remain largely driven by a credential-oriented mentality that discourages individuals from deviating from traditional educational and professional paths. Strikingout in an unknown direction is frawned upon and failure entails a very heavy price. Regrettably, our environment also accords considerable premium to conformity. The nail that sticks out get hammered. In this context, we need to develop a much greater tolerance for the thinkers the so-called eccentrics and the mavericks. Because, very often, they are the ones who turn out be the visionaries.

3. There is also a compelling need to get the institutional framework right. To start an entrepreneurial activity, get the financing in place, to obtain the approvals and get the process kick started is a back breaking and conserted exercise. Generally, in case of a business failure, the aftermath degenerates into

a legal quaquire. However, recent guidelines on venture capital funding will give a fillip and provide a meaningful avenue for entrepreneurs to realise their vision more speedily and easily.

4. There is a need to innovate for giving Indian entrepreneurs a head start. For instance, Government can easily design suitable micro-equity arrangements for entrepreneurs. The Government should develop micro-stock exchanges to address the need of the entrepreneurs. The Internet certainly makes this possible. Given Indian genius in financial innovation- for example the badla system and hundi this is certainly within our grasp. Such arrangement would considerably lower the threshold at which businesses could reduce debt and replace if with equity capital, thereby helping spawn many more entrepreneurs.

5. Entrepreneurship is a quality that large business enterprises require as much as small start-ups and much more today than ever before. The challenge for large corporates is to turbo charge the entrepreneurial spirit in the organisation. One way is to structure large organisations in small entrepreneurial islands within. Going forward, such a structure would be more conducive to pursue experiments to innovate, to develop cutting edge products, to dream new and better ways of running the business and creating value in an unfettered manner. In essence, to create thought leaders-people who are perpetually willing to step out of the box, think laterally and go that extra mile to make huge positive impact on the organisation. The idea is to have intrapreneurs and partners in business rather than just employees.

6. The Government should try to push the entrepreneurship beyond the boundaries of business. Entrepreneurship should be much broader in its scope. There is a need to have entrepreneurs in all wake of life- in government, in the public sector, in educational institution, in non-governmental organisations and in societal endeavors too.

7. There is a need to look upon entrepreneurs as role models in the society because it is only they who contribute in a great measure to the process of wealth creation and nation building. They are the persons who create the order out of disorders. Actually, they are not job seekers, they are job providers to others. Thus, they also contribute in job creation activities. That is why, Government has already taken many proactive initiatives. Among these are rewriting some of the more restrictive regulations, building a world class science park for technopreneurs and a total overhaul of educational system etc.

8. A proper network with effective feedback system should be developed to provide training & development facilities to the budding entrepreneurs. Thus, efforts are needed to develop well-rounded individuals who would be the entrepreneurs of the future. It is, in this context, society, potential entrepreneurs and Government should play their respective roles in developing a conducive environment for multidimensional development of the economy as a whole.

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