

Role of Business Incubation systems to facilitate Technology Transfer and Development

A.Balachandran
Manager
VIT-Technology Business Incubator
(VITTI)
VIT University
Vellore-632014, India
Tel: +91-416-2202301, +91-416-2243097
Email:abalachandran@vit.ac.in

ABSTRACT

This paper deals with a suggestive frame work of using Business Incubators for the purpose of providing “Technology Transfer” support to start ups and Small and Medium Enterprises(SMEs). This is in the context of South-South Cooperation, using several networks and linkages that are available in the Business Incubation arena.

KEYWORDS

Technology Transfer, Business Incubators, Small and Medium Enterprises (SMEs)

1. INTRODUCTION

The Technology transfer issues pertaining to SMEs in developing nations are much different from that of USA and Europe. The challenges are mainly due to lack of an enabling ecosystem which is needed for facilitating an active interaction among various actors involved in the Technology transfer activities. The challenges could be as varied as ‘limited interaction’ between Technology providers and Technology seekers, lack of awareness about emerging technologies and related opportunities, the after effect of globalisation & liberalisation and also the cultural & regional factors that affect the growth of SMEs.

The Business Incubators in India have started establishing stronger local, regional and global networks. Many of the Indian Incubators are sponsored by the Department of Science and Technology (DST) and are generally hosted by reputed Academic Institutions.

This paper attempts to portray a suggestive framework that explores the possibility of using the Business Incubation systems for facilitating Technology Transfer among SMEs under the South-South Cooperation umbrella.

2. TECHNOLOGY TRANSFER: ISSUES AND CHALLENGES IN THE LIGHT OF LACK OF A FAVOURABLE ECOSYSTEM

The author had a couple of opportunities in the past to interact with Technology Transfer Officers, Technology Licensing Officers and members of Association of University Technology Managers in the United States of America and Europe. Though there is a general grievance that the interaction between Academia and Industry is difficult, the context is very different from a developing country's perspective. The lack of a favourable eco system in the developing country's context breaks down to many of the following issues:

2.1 Strong Industry-Academia Linkage

Universities in USA have a strong patenting culture that results in huge revenue generation not only to the University but also to the Inventors. Billions of dollars are generated through these systems and this in turn benefits everyone in the process. The direct beneficiaries are the inventor (mostly Academic experts), the University System, the Industry and the economy in general.

It is widely believed that the **“Bayh-Dole act of 1980”**¹ has paved way for the success in University Technology transfer and the consequent economic benefits. This act gave US universities, small businesses and non-profit organisations “intellectual property control of their inventions” and other intellectual property that resulted from such funding. Prior to the enactment of Bayh-Dole, the U.S. government had accumulated 30,000 patents. Only approximately 5% of those patents were commercially licensed. Hence, the provisions of the act provided an incentive for universities to protect their innovations and, therefore, for industry to make high-risk investments resulting in products made from those innovations. This is evident from the royalty income generated by the top 20 US Universities in the year 2004. The New York University topped the list with USD 109 million and California Institute of Technology occupying the 20th position with an income of USD 9.86 million.

In the same lines, the National Knowledge commission in its recommendation to the Prime Minister of India in 2007 has stated that

“Our consultation with diverse stakeholders has revealed that there is a need to provide incentives to increase innovations, collaborations, licensing and commercialization. It is therefore recommended to enact a legislation that creates a uniform legal framework for the government funded research and gives universities and research institutions ownership and patent rights”.

This must have resulted in the introduction of a bill on “The Public Funded R&D (Protection, Utilization and Regulation of Intellectual Property) Bill, 2007 drafted by the Central Government of India. While this is expected to be the Indian version of “Bayh-Dole”, one should be aware of the basic reason of success of “Technology-Transfer” in the USA. **There has been a strong linkage between Industry and Academia even before the Bayh-Dole act and the act only provided motivation for accelerating the growth.** Hence, the basic issue is to build on a strong linkage between Academia and Industry.

Excepting few institutions like IISc, IITs, CSIR labs and very reputed private institutions, the Industry-Academia interaction needs a huge thrust and momentum to spread the culture across the country.

2.2. Nascent stage of Patenting Culture

The number of patents filed is an indicator of the innovation and technology potential of any country. According to WIPO statistics² in the year 2005, India was at the 11th position with around 20,000 patents in the Top 20 countries list of Patent filings. Japan lead the list with over 350,000 patents, USA in the second position with little over 200,000 patents and China in the 3rd position with around 100,000 patents. In the year 2007, the Indian scenario hasn't changed much with around 35,000 according to Indian Patent office. Around 80% of the patent filed in this period is understood to have been filed by foreign companies. In the same period, the number of patents filed in China has risen to over 2, 45,000.

Another interesting dimension to this is the number of researchers per million of population. Number of persons doing research and development in Scandinavian countries is 7,000 per million of population and 4,700 per million of population in the US. In India, there are 156 researchers per million of population. Hence, there are basic issues relating to increasing the focus on research initiatives and also to promote research careers aggressively.

2.3 Lack of Government funding to harness research and development

“R&D spending as percentage of GDP”³ in India is only 0.8% as compared to China's 1.23%. Developed countries have R&D expenditure of up to 3% of GDP. Israel and Sweden are the only countries with over 4% GDP spending on R & D. Unlike in developed countries, most of the R & D expenditure is still incurred by the Government

While the points mentioned above highlight some of the issues and challenges at the macro level, there are challenges at the micro level also:

2.4 Lack of awareness about the emerging technologies and opportunities

- Widespread lack of awareness about emerging technologies and derived opportunities there in - as a means for creating a competitive edge in the trade and technology market for value addition.
- Indian SME needs more information, orientation and facilities for protecting their IPR, understanding the underlying issues in technology transfer.
- There is an immense need to educate the SMEs for Technology adaptation, up gradation and in turn to become knowledge driven industries.
- Improving awareness on the importance of networking with Technology providers
- Harnessing the potential of ICT as an enabler in bridging the gaps and to propel the sensitization and facilitation activities.

2.5 After Effect of Globalisation

SMEs are generally known for their labour intensive activities and also for use of local resources. However, these factors were also responsible for certain factors that amounted to lack of competitiveness in the light of globalization. Using run of the mill technology, inadequacy in meeting the quality requirements in packaging, finishing, entry of foreign players in the domestic market and inability to adopt or source new technology are the challenges. While the MSME is taking a number of initiatives to overcome these aspects and to make the SMEs competitive, the percolation to the length and breadth will take some time.

2.6 Cultural and Regional factors:

Traditionally SMEs were created by first generation entrepreneurs as a means of self employment. Due to cultural issues, the growth of the SMEs is limited to the ability of the individual to manage the affairs, in most cases. Unlike the SME contemporaries in the developed nations, there is less compulsion on accelerating a planned growth and expansion. As the day to day management of the business itself consumes considerable amount the promoter's time, it is seldom possible to concentrate on newer avenues. This is also due to the perceived losses due to delegation, lack of availability of skilled personnel for building a second line and lack of trust etc...

3. ROLE OF BUSINESS INCUBATORS

3.1 Business Incubators

The National Association for Business Incubation (NBIA), USA defines Business Incubation in the following manner:

“Business incubation is a business support process that accelerates the successful development of start-up and fledgling companies by providing entrepreneurs with an array of targeted resources and services. These services are usually developed or orchestrated by incubator management and offered both in the business incubator and through its network of contacts. A business incubator's main goal is to produce successful firms that will leave the program financially viable and freestanding. These incubator graduates have the potential to create jobs, revitalize neighborhoods, commercialize new technologies, and strengthen local and national economies.”

There are around 5000 business incubators in the world and the incubation industry is slightly more than 2 decades old. It has come a long way from the “**Real Estate and Shared resources model**” in the first generation to the current “**in house debt / equity financing and success sharing**” 3rd generation model. More than 3/4th of the business incubators are located in North America, Asia and Western Europe.

3.2 Status of Business Incubation in India

The National Science and Technology Entrepreneurship Development Board (NSTEDB), Department of Science and Technology (DST), Government of India has been in the forefront in setting up

Business Incubation Centres to encourage development of start-up companies and to generate employment among S&T graduates. The NSTEDB has already catalyzed and supported several Science and Technology Entrepreneurs Parks (STEPs), Technology Business Incubators (TBIs), in addition to many Entrepreneurship Development Cells (EDCs), in different parts of the country. NSTEDB has a plan to set up many more such institutions in the coming years. There are a number of other institutional mechanisms existing and promoted by other Departments of the Government of India in developing business incubation in emerging areas of science and technology such as the Software Technology Parks of India (STPIs).

3.3 Number Business Incubation Environments in India

There are 40 Business Incubators and Science and Technology parks functioning in the country that are supported by the DST. Another 16 are under various stages of establishment. There are around 40 “Software Technology Parks (STPIs)” that act as Business Incubation systems under the Ministry of Communication and Information technology. While the STPIs primarily focus on the I.T. businesses, the incubators supported by the DST focus on different technologies like Agriculture, Auto components, Biotechnology, Consumer Durable, Design, Electronics, Hi technology, Information Technology, Manufacturing, Medical Electronics and others. Many incubators work on a “Mixed Technology” model. DST is also planning to increase the rate of creation of the business incubators to meet the emerging requirements.

MSME is planning another 100 incubation systems in the next 4 years and some of the existing Business Incubators under the DST program will be further strengthened under this MSME initiative.

The following is an extract from the report on “Entrepreneurship”⁴ released by the National Knowledge Commission:

Quantity:

There is a need to massively increase the number of incubators in the country. USA has about 1400 incubators while China and Korea have about 800 and 400 respectively. According to ‘The Indian STEPS (Science and Technology Entrepreneurs’ Parks) and Business Incubation Association (ISBA), the apex professional body supporting business incubation’, India has only about 100 incubators. Scaling up the numbers also means widening the reach beyond centres of excellence in metropolitan cities (i.e. beyond IITs and the top-grade engineering and business schools), going beyond alumni entrepreneurs and exploring areas beyond high tech. Further, there is a need to widen the incubation horizon beyond the idea-stage to accommodate issues relating to scaling up. There are initiatives already being proposed. For example, there are plans in Gujarat to set up a number of incubation centres with possible venture capital infusion in certain selected regions. Expansion of incubation centres on a globally competitive scale will necessitate much greater involvement of private players as well as PPPs to supplement the current governmental initiatives.

Hence, it is evident that there will be a conscious effort to scale up the incubation system in India not only in numbers but also in making them available across India.

3.4 Business Incubator Networks

The DST supported Business Incubators in India are parts of one or more of the following networks:

3.4.1. Indian Science and Technology Parks and Business Incubators Network (ISBA)

The Indian STEP and Business Incubator Association (ISBA) was set up in 2004 as a registered professional body to promote business incubation in India.

ISBA aims to promote business incubation activities in the country through exchange of information, sharing of experience, and other networking assistance among Indian Business Incubators, Science and Technology Entrepreneurs Parks (STEPs) and other related organizations engaged in the promotion of start-up enterprises.

ISBA organizes Annual conferences to facilitate networking of Business Incubation managers with various other stake holders in the system and to identify opportunities in promoting technology business incubation and co-operation among the incubators and other related organisations.

3.4.2. Asian Association Business Incubators

The Asian Association of Business Incubation (AABI) promotes business incubation activities by facilitating information exchanges among Asian Incubators, incubator clients and related organizations. AABI comprises of associations that organize incubation resources and facilities, organizations operating incubation programs, and more, located in Beijing(China), Shanghai(China), Hong Kong(China), Chinese Taipei, Japan, Korea, India, Kazakhstan, Kyrgyzstan, Pakistan, Uzbekistan, Singapore, Malaysia, Philippine, Australia and New Zealand, totally covers 16 nations and regions. Since ISBA is part of the AABI network, Indian incubators have linkages with all the incubator associations in Asia.

3.4.3. infoDev network

infoDev is a global development financing program among international development agencies, coordinated and served by an expert Secretariat housed in the Global ICT Department (GICT) of the World Bank, one of its key donors and founders. It acts as a neutral convener of dialogue, and as a coordinator of joint action among bilateral and multilateral donors—supporting global sharing of information on ICT for development (ICT4D), and helping to reduce duplication of efforts and investments. *infoDev* also forms partnerships with public and private-sector organizations who are innovators in the field of ICT4D. Priorities and strategies for *infoDev* are guided by a governance framework, approved by *infoDev* Donors in June, 2005.

3.4.3.1. infoDev incubators initiative

Developing countries are increasingly embracing innovation and entrepreneurship as a key to their social and economic development, and have implemented national business incubator initiatives as one tool for supporting this agenda. Business incubators can help entrepreneurs to leverage ICT in a global marketplace where information and networks are important competitive assets for spurring innovation.

Since 2002, *infoDev*'s Business Incubator Initiative has provided financial and technical assistance to more than 70 incubators in over 50 developing countries worldwide and has helped establish five regional networks of incubators

There are six Indian incubators in this network. *infoDev* so far organized three major events with the partnership of DST in India. An Asia regional workshop on Business Incubation was held in Bangalore during October 2003, a Global forum on Business Incubation was held in Delhi during October 2004 and 2nd Global forum was held in Hyderabad during February 2006. Apart from this the Asian regional workshop is held in different Asian cities every year. *infoDev* also has established an online incubator support centre iDisc (www.idisc.net) which provides opportunity for online networking. All these initiatives are resulting in intensive networking activities among like minded incubators and the benefits are increasingly visible.

The author himself had an opportunity to execute an *infoDev* project titled **“Developing a business ecosystem for augmenting incubation”** in VIT - Technology Business Incubator (VIT-TBI). Apart from own capacity building activities, the project also had a networking & knowledge dissemination component.

VIT-TBI established networks with incubators in Thailand, Sri Lanka, Nepal, Mauritius, Malaysia, Philippines, Viet Nam, Australia, New Zealand and United States. This helped the network to share the good practices and also challenges. Under this project VIT-TBI collated “Technology Opportunity & emerging needs” from two major industries with Technology focus namely Bharat Heavy Electricals Limited and Honeywell Technology Solutions Labs. This information was also made available for the benefit of all the Indian incubators under the DST support and also the *infoDev* global network. The project also shared all the pertinent information through a project portal www.knowledgebiz.org.

More recently, another Business Incubator, PSG-Science and Technology Entrepreneurs Park (PSG STEP) has been awarded an *infoDev* project titled **“Incubation Asia Pacific Network Project”**.

According to PSGSTEP, the Incubation Asia Network development initiative shall mount a series of project platforms to add directional value to the Incubation Asia Pacific Network. These synergistic set of activities range from Promotion of the Incubation Asia Pacific Network to existing and potential incubation community members, Dissemination of incubation value packages, specific process based Quality Enhancements Drives aiming at standardization and replication of incubation processes, Facilitation and Leveraging member driven initiatives, Participation Interfaces and Advocacy Initiatives, broad basing incubator performance by bringing in more resources, innovation, inter linkages with allied processes, planned and focused Reach outs with potential partners and developing New models and conceptual inputs for incubation. This activity spectrum shall be multifaceted under pinning to launch the Incubation Asia Pacific into vibrant sustainability levels and modes of performance.

3.4.4. EU-India project to promote Cross Cultural Ventures

Another successful incubator “TREC-STEP, Trichy” has carried out a major initiative in building networks among European Business Incubators and Indian Business Incubators for promoting cross cultural ventures. The incubators under ISBA in India, Swedepark (an Association of Science Parks and Business Incubators in Sweden), ADT (Association of German Science Parks and Business Incubators in Germany) and UKBI (United Kingdom Business Incubators Association). The program focused on creating cross cultural ventures through a structured creation of an information exchange platform. Initially the Indian Incubation Managers were sensitized on the necessity for making themselves ready for global alliances and partnerships. This resulted in exchange visits comprising of Incubation Managers, interested entrepreneurs & SMEs, Government officials. A logical outcome of this project also resulted in creation of a “Venture Showcase”⁵, an online SME marriage portal that will provide information on technology seekers and providers from the participating countries.

The venture showcase is a platform for showcasing technologies in incubators which are ready to enter into joint venturing / collaborations with incubates / SMEs in other countries, through business incubator networks. The Venture show case displays details of companies having aspiration for partnerships with incubates supported by other incubators and provides concise information about technologies, markets etc required for initial match making. Depending upon the opportunities and requirements, TREC-STEP and partnering incubators provide soft landing services for the cross cultural ventures. Along with TREC-STEP’s partnering networks, mentoring support for cross cultural ventures shall be available on request from incubates.

Under this initiative, the author has witnessed development of a number of significant technologies in the incubators in Europe. The major advantages of such early stage alignment between technology provider and seeker are “affordable licensing fee or royalties”, “possibility of collaborative development to suit the local needs”, “minimal chance of being exploited as the background checks are done by the incubators”, “facilitation by the incubators in arranging partnership”.

Some of the interesting examples are highlighted below:

3.4.4.1. Healthier fast-food- A Sweden Company

MicVac is the name of the company which has developed a new and unique method of keeping the nutrition and good taste of microwave fast-food when warming it. MicVac develops, markets and sells two methods for processing and packaging convenience food. Both solutions (for pasteurised and unpasteurised foods respectively) use a valve that offers several benefits for both the producer and the consumer.

The MicVac method is based on the principle of cooking and pasteurising food using microwaves directly in the sealed consumer package. The film cover on the package has a valve that opens during cooking, releasing the overpressure in the form of steam and oxygen. After cooking, the valve closes and a natural vacuum is created in the package – another of the product’s many advantages. The Wisselpac steam technology is used for unpasteurised products. The producer packs the product and applies a Wisselpac valve to the package. The food is cooked by steaming in the consumer’s microwave oven.

3.4.4.2. Electronic Nose by a UK Company

Scensive Technologies Limited produces bio mimetic sensor instruments for research and commercial applications. Current products are based on the proven Bloodhound™ electronic nose which uses chemical sensor array technology.

The Bloodhound™ has been manufactured for some years, producing truly ground breaking results in a variety of applications and research fields. Recently upgraded by Scensive Technologies and available for both general purpose and specific application use.

The purpose of highlighting the above two examples is to illustrate the possibilities of Technology transfer through the business incubator networks. The complete listing is available in the TRECSTEP's website and the link is <http://www.trecstep.com/model-sen/showcase.htm>

3.4.5. Euro Office Services:

TREC-STEP also offers access to the EurOffice Network, the international network of Business Incubators and Science Parks, which provides pragmatic business services that facilitate access to global markets. The EurOffice Services initiative promotes dynamic networking opportunities between companies located in different regions of the Network. Innovative start-ups and small companies can select from the range of EurOffice services those which will best suit their needs. Services are provided both in India and abroad.

The TREC-STEP helps companies to select the right EurOffice-services in accordance with their needs. TREC-STEP's wide experience in providing services for incoming firms, including soft landing and business development services, networking, mentoring and access to financing services, guarantees our professionalism in services related to the EurOffice Network.

4. SOME OF THE TECHNOLOGY TRANSFER FACILITATION ACTIVITIES IN INDIA

4.1. Department of Science and Technology

Mission Reach program of TIFAC division, indigenous technology development support through Technology Development Board (TDB), several sector focused technology development initiatives through project funding in reputed academic institutions and sponsoring of Technology Business Incubators are some of the major initiatives of the Department of Science and Technology.

4.2. Technology Development Board

Technology development Board aims at accelerating the development and commercialisation of indigenous technology or adapting imported technology to wider domestic application. The Board provides financial assistance in the form of equity soft loans or grants. The Board has signed 137 agreements - 134 with commercial enterprises and 3 with other agencies adding up to a total project cost of Rs. 20,438 millions. The board has committed to provide financial assistance of Rs. 6629 millions in these projects till 2005

4.3. Council of Scientific Industrial Research Initiatives (CSIR)

Apart from spearheading patenting culture and technology transfer activities in all the labs, the recent New Millennium Technology Leadership Initiative of linking Academia, Industry and Government seemed to have resulted in 57 Technology commercialization activities. This program had a funding outlay of Rs.5000 million and periodic announcements are made to enable industries to take part.

4.4. Asian and Pacific Centre for Transfer of Technology (APCTT)

APCTT is a regional institution of the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) servicing the Asia-Pacific region. It was established in 1977 with the objective of facilitating technology transfer in the Asia-Pacific region. The Centre is headquartered in New Delhi with host facilities provided by the Government of India.

APCTT provides “Technology Exchange” services both in online and in periodical forms. It also provides matchmaking services for a fee.

4.5. Indian Institute of Sciences (IISc) and Indian Institute of Technologies (IITs)

Society for Innovation & Development (SID) of IISc, The Foundation for Innovation and Technology Transfer –(FITT) of IIT Delhi, Industrial Research & Consultancy centre (IRCC) of IIT Bombay, Industrial Consultancy & Sponsored Research (IC & SR) and TeNet group of IIT Madras , Sponsored Research & Industrial Consultancy (SRIC) of IIT Khargpur are some of the successful initiatives for transfer of technology from these institutions.

4.6. Technology Export Development Organisation (TEDO)

Technology Export Development Organization (TEDO) is a joint initiative of Confederation of Indian Industry (CII) and Department of Scientific and Industrial Research (DSIR). The main objective of TEDO is to promote Indian technologies (Technical Know how / Technology Intensive Products, Services and Projects). The services of TEDO comprise of Training, Company Assessment for Readiness for Exports (CARE), Market & Export information services, Advisory Services and Promotion.

4.7. FICCI Lockheed Martin Corporation and IC² Institute, University of Texas, Austin -India Innovation Growth Program.

The two-year, nation-wide project, has been created to enhance the growth and development of India's entrepreneurial economy. The aim of this new program is to accelerate innovative new Indian technologies into new markets in the United States and around the world. The India Innovation Growth Program is the only program of its kind, because of its focus on teaching and using world-class commercialization strategies. Though this is a time bound program, the model is an interesting one where there is an inbuilt capacity building for the innovator.

5. SUGGESTED FRAMEWORK FOR ENGAGING BUSINESS INCUBATORS TO FACILITATE TECHNOLOGY TRANSFER

The attempt made here is to suggest a structured approach of enabling Business Incubators as facilitating agencies for Technology Transfer. This implies that the established business incubation systems across India will leverage their position, complimentary role to the existing technology transfer mechanisms. This is essential as the requirements of SMEs in India can not be catered with the existing systems alone owing to the numbers and location factors.

This framework focuses on augmenting Technology transfer activities for SMEs by effectively using the Indian Business Incubators network. The major reasons and benefits are discussed here and it also addresses some of the challenges highlighted in Technology transfer.

5.1. Linking SMEs (Industry) - Academia

Majority of the business incubators in India have strong connections with academia (as many are part of reputed institutions) and this brings in tremendous value to the SMEs as they will be interacting with an agency that will be more sensitive to their needs. The bridging between institution and needy SMEs will happen in a more effective manner.

5.2. Enabling Technology development & IPR support

Most of the business incubators are supported by the Department of Science and Technology. DST is also planning to increase the number of business incubators and currently it is growing at a rate of 15%. Due to the pioneering efforts of DST in the recent years, a strong working relationship is established with other Government agencies like the Department of Scientific & Industrial Research, Technology Information Forecasting and Assessment Council (TIFAC), Ministry of Micro, Small and Medium Enterprises and Department of Biotechnology.

DSIR has established Technopreneur Promotion Program (TePP) outreach centers in 20 places in India in which 13 are Business Incubators under DST. This TePP program provides grant funding to innovative ideas and innovators can obtain support up to Rs.6 million for developing prototypes. While up to Rs.1.5 million funding is available to individual innovators, the second phase seamless scale up support provides up to Rs.4.5 millions. The innovators have the option of starting their ventures or commercializing the technology through licensing deals. The wherewithal required for protecting the resulting IPR and also to showcase technologies is covered by TePP program. Recently DSIR launched a thematic Technology Development & Demonstration Program (TDDP) for start ups in the SME category. The support by way of soft loan will be to the tune of Rs.100 million and carries an interest of a mere 2% per annum.

5.3. Facilitating access to Government funding for Technology Development:

In the past 3 years,10 Business Incubators were provided a grant of Rs.10 million each under a Technology Development Board sponsored seed fund initiative. Under this qualifying Technology ventures will be funded to the tune of Rs.2.5 million at the incubator level with minimal procedures. NSTEDB division of DST is scaling up this initiative by increasing the threshold to Rs.5 million with

an individual incubator grant to Rs.20 million. Incubators are also frequently sensitized about various other emerging funding schemes and opportunities and hence are in a better position to handle such requirements relating to arranging finance for technology development.

All the Business incubators have good working relations with the local District Industries Centre and are in a position to spot Technology Centric SMEs easily. This association also enables incubators to strongly advocate the SME funding requirements with bankers and also for sensitizing the SMEs on the Credit Guarantee Trust Fund scheme to avail collateral free loans from banks. Not with standing this, MSME is also launching 100 business incubators with an outlay of Rs.700 million in the next four years. This opportunity also will help many of the business incubators to build their capacity to support SMEs.

As explained earlier, the Business Incubators' strong local, regional and global network will be great boon to provide support to both Technology seekers and technology providers. The soft landing arrangements with incubators abroad will also help SMEs to look for business expansion overseas.

5.4. Increasing the awareness

The business incubators can also play a vital role in increasing the awareness levels of the SMEs to know the emerging trends in Technology and business opportunities. This is very much possible by aligning with the local industry associations, clusters and develop a need gap metrics. This will also make the Host academic institutions to include SMEs in their conferences and workshops. The Business Incubators also can leverage their networking strength to trigger a channel of information flow to the connected SMEs. Already many Business Incubators are performing this task by way of News letters, Innovation funding programs, advertisements in the media and also through exhibitions. What is needed is a more dedicated approach targeting SMEs and consistency in the approach.

5.5. After Effect of Globalisation and Cultural & Regional Issues

It may be difficult for the Business Incubators to offer complete solution to these issues under this framework. However, since most of the Business Incubator service delivery will happen at the personal level, a case to case analysis of individual short comings and appropriate actions to overcome these deficiencies is possible.

6. CONCLUSIONS

While the above advantages seem to project a positive outlook, there are some challenges that need to be addressed to make this proposed model operational. The current core activity of Business Incubators is creation of successful start up ventures. To enable them to undertake this additional responsibility, a nationwide Business Incubator capacity building program is essential. A joint activity by DST and MSME will help business incubators to provide this technology transfer support in addition to their core program. The arrangement shall result in Technology Transfer facilitation cells in the business incubators. After creation of these cells, a nationwide promotion of this new initiative to reach out to SMEs either directly or through their associations has to be carried out.

This attempt of bringing in Business Incubators to support the SMEs Technology transfer issues will provide a new dimension to the business incubation movement and will also lead to evolving growth accelerator programs as a major value benefit to SMEs. The SMEs in need will get a personalized and holistic support in their entrepreneurial journey.

References

1. ³Brandon Shackelford, 2006, U.S. R&D CONTINUES TO REBOUND IN 2004, an article from Info Brief, National Science Foundation, USA
<http://www.nsf.gov/statistics/infbrief/nsf06306/nsf06306.pdf> (accessed on 20th July, 2008)
2. Department of Scientific & Industrial Research, Technology Development and Demonstration Program (TDDP- Start ups)
<http://dsir.nic.in/> (accessed on 18th July, 2008)
3. infoDev, 2006, “The infoDev Global Network of Business Incubators”
<http://www.infodev.org/en/Publication.6.html> (accessed on 18th July, 2008)
4. ¹Jennifer A. Henderson, J.D., M.P.H., 2002, Academia, Industry, and the Bayh-Dole Act: An Implied Duty to Commercialize, a report by Regulatory Affairs Program, Center for Integration of Medicine and Innovative Technology
5. ⁴National Knowledge Commission 2008, A report on “Entrepreneurship in India”.
6. **National Science and Technology Entrepreneurship Development Board** , 2008, A list of “Supported Organisations”
<http://www.nstedb.com/> (accessed on 15th July, 2008)
7. Technology Development Board,2006, A report on “Enabling Commercialization”
8. ⁵TREC-STEP, Trichy, 2006, A report on EU-India Venture Showcase
<http://www.trecstep.com/model-sen/showcase.htm> (accessed on 20th July, 2008)
9. ²WIPO PATENT REPORT Statistics on Worldwide Patent Activities
http://www.wipo.int/export/sites/www/freepublications/en/patents/931/wipo_pub_931.pdf (accessed on 18th July 2008)

Acknowledgements

The author is thankful to Management of VIT-Technology Business Incubator, Mr.H.K.Mittal, Advisor & Head-NSTEDB, DST, New Delhi and colleagues in the ISBA for their support and cooperation to write this paper.