The Effect of Techno-entrepreneurship on Indian Economy

N. Santosh Ranganath

Faculty Member, Dept. of Commerce and Management Studies
Dr. B.R. Ambedkar University, Srikakulam, Andhra Pradesh

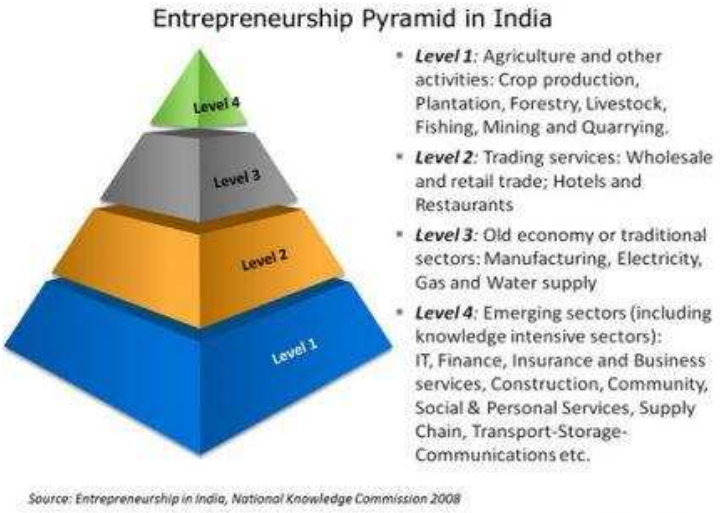
Abstract: Entrepreneurship generally and technological entrepreneurship in particular are now considered as the engine for economic development. Technology-business incubators (TBI) are seen as a means of tackling developmental challenges. Most developed and emerging economies and developing countries have adopted TBI to fast-track the creation of new technology-based enterprises because of its more than 80% success rate of new venture creation, and have consequently benefited from its multiplier effects such as technology/knowledge transfer, employment generation and wealth creation. The paper also confirms that TBIs will help the start-up of enterprises, especially in the technology sector with its attendant benefits of employment generation, technology prospecting. This will lead to technology transfer both domestic and cross-national boarders and will ultimately lead to regional development. Besides, it also portends as veritable poverty reduction tool because of its multiplier effects of job and wealth creations and it may also help stem youth's restiveness which has become a major crisis of international proportions.

Keywords*:* Cultural Ethos, Techno-preneur, ICT sector, Nano-technology, STEP.

Introduction

For any economy entrepreneurship is very crucial. The objectives of achieving sustained industrial development, regional growth and employment generation have always depended on entrepreneurial development. Entrepreneurs are, thus the seeds of industrial development and the fruits of industrial development are greater employment opportunities to unemployed youth, increase in per capita income, higher standard of living and increased individual saving, revenue to the government in the form of income tax, sales tax, export duties, import duties, and balanced regional development. In India, entrepreneurism is in its cultural ethos. Entrepreneurship and enterprises are a continuous process and it is growing from centuries to centuries. In country like India, we are facing a problem of unemployment for so many years now. And one of the best solutions is to have as many job creators as possible, so we need Entrepreneurs. Now our economy is growing but in this growth, the contribution of Entrepreneurship cannot be neglected. Various Government and Non Government agencies are doing lot of work to promote Entrepreneurship.

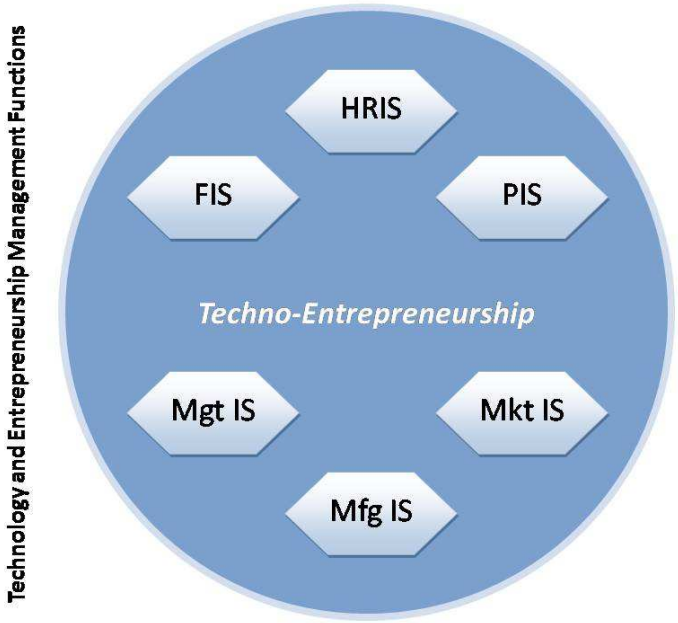
Figure -1



The Indian entrepreneurship pyramid consists of four levels (Figure 1), based on sectors and number of persons employed. First level consisting of agriculture related activities and second, third levels consisting of trading and manufacturing sectors. Whereas fourth level related to technology and communication sectors. The objectives of achieving sustained industrial development, regional growth and employment generation have always depended on entrepreneurial development. Techno-entrepreneurship can be defined as the Entrepreneurship in Technology area and the person who undertakes Techno-entrepreneurship is termed as Techno-Entrepreneur. Techno-Entrepreneur is also termed as Techno-preneur and hence Techno-entrepreneurship can be termed as Techno-preneurship.

Techno – Entrepreneurship is a broad concept and involves many things and not just Technology Innovation. Technology Entrepreneur is one, who organizes, manages and assumes the risk of a technology based business enterprise. For Entrepreneurship innovation in term of product development may require but it is not just enough as Entrepreneurship is not just all about innovation but also managing many things in business. Successful entrepreneur has to have managerial skills to utilize resource effectively, should be able to make appropriate feasibility analysis, should have skills related to marketing, human resource management, financial management, manufacturing management and networks. Following figure 2 will give inside of relationship between Management related information systems like MIS, Marketing information system (Mkt IS), Human Resources information system (HRIS), Financial information system (FIS), Production information system (PIS), Manufacturing information system (Mfg IS) and Techno – Entrepreneurship:

Figure 2 - Relationship between Techno-entrepreneurship and Management Functions



Entrepreneurship is 'the process of looking at things in such a way those possible solutions to problems and perceived needs may evolve in venturing.' Willingness to take the risks involved in starting and managing a business, particularly in establishing business on Unconventional Innovations is a major issue. As an Entrepreneur one has to think about all other components of business and not just about the Technology Innovation. And because of that only person who has Technology Innovation may require support for other components of business otherwise as mentioned earlier even the greatest innovation may die. Techno – Entrepreneur need to have Technical Management skills, Business management skills and motivation, then only he can be a complete successful Techno – Entrepreneur. Product innovation is not guaranteed by the solution of difficult technological problems.

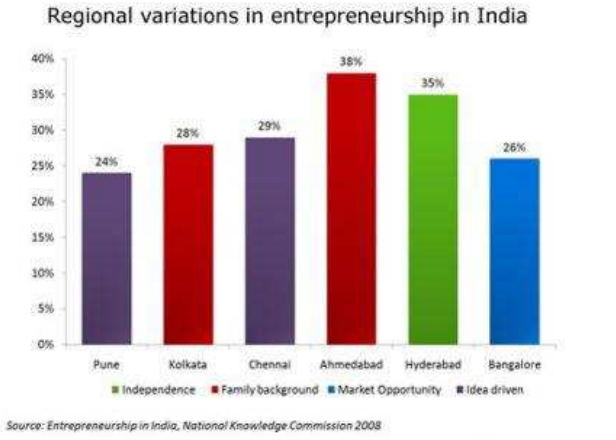
Building Techno Entrepreneurship in India

As technology based products and services continue to play a major role in modern processes from business, communications, security to health and education, entrepreneurs in the ICT sector are grappling with ways in which they can tap into the multi billion industry and reap associated benefits. However there have been some challenges in local content development perhaps hinged on the software innovation and commercialization. In the software sector, start-up entrepreneurs play a leading role in creating and disseminating new business models and changing restrictive institutional practices. New entrepreneurs not only help reform local institutions, but also begin building new institutions and practices which are now diffusing to other industries. Entrepreneurship is driven by several triggers including socio cultural factors and the business environment. An interesting analysis is the regional variation in motivating factors. Motivational factors for entrepreneurs at different locations in India shown

in figure 3 for the cities of Gujarat, Bangalore, West Bengal, Pune, Chennai and Hyderabad.

1. Gujarat- driven by family backgrounds in business
2. Bangalore- the new age, knowledge driven entrepreneur capitalizing on market opportunities
3. West Bengal- influenced by the migrant business community from Rajasthan
4. Pune and Chennai- idea driven entrepreneurship due to educational institutions
5. Hyderabad- driven by independence more than any other factor

Figure - 3



Lessons from the Indian Software Sector presents that entrepreneurs and their supporters need not wait for government policy or institutional reform—should they, they will wait a very long time for this. Instead, they should reject any notion that 'development is impossible' because of government bureaucracy and difficulties of doing business. Firms and business associations should be inspired by the Indian case to take the development lead, identify the business opportunities 'out there' and use their creativity to circumvent any barriers to growth. If Indian entrepreneurs could does it- so can others. As the newly emerging global IT industry boomed in the West, this led to a huge demand for trained engineers and technicians. Indian firms saw this economic opportunity and leveraged their cost advantage by occupying product market spaces and business models that avoided the penalties of their poor institutional environment and also head-on competition with incumbent firms.

The pioneering firm in establishing this model was Tata Consultancy Services (TCS), a subsidiary of the business house of Tata's. Despite being a large business group with deep pockets and entering into an industry (software) that was already reasonably well understood, TCS nevertheless had to behave like a pioneering firm because the industry was new to India. As a firm, it had to invest in many fronts—train engineers to learn software management skills as well as software languages; respond to changing technologies and negotiate with the government to obtain permission for exploring the business opportunity that presented itself. With full financial liberalization of the economy, firms such as Infosys also realized other advantages of operating in a global market. Being an entrepreneurial firm rather than a business house subsidiary, Infosys was vulnerable to periods of capital scarcity and this had been its experience in its first years of growth. From stifling entrepreneurial activity, the penalties of the domestic environment led Indian firms to be inventive in devising new value propositions to overcome that adversity. Indeed the dominant model has focused entrepreneurial energies along a narrow path of proven success.

Conceptual framework

1. **Technology business**

Technology based businesses can be referred to as businesses that engage in technology related products, processes and services. They may be low-, medium- or high-technology. One area of the economy which has seen significant growth is that focused on new technology-based products and services and the high-technology sectors are perceived as major sources of future economic prosperity and employment growth. Some of such high-technologies include nano-technology, bio-technology, ICT, etc.

2. **Business incubators**

Incubators generally differ from research and technology parks in their dedication to start-up and early-stage companies because research and technology parks, tend to be large-scale projects that house everything from corporate, government or university labs to very small companies and may even house an incubator. Business incubation is a dynamic process of business enterprise development.

According to Kim and Ames (2006), the definition of business incubators can differ by researchers' points of view. On the other hand, the most basic concept is the 'incubator' – maintenance of controlled conditions that are useful for the growth and development of start-up companies. Business incubators aim to assist entrepreneurs with enterprise start-ups and development. Likewise, BIs aim to maximise the chances of success of start-up companies by creating a supportive environment. Finally, incubators typically seek to provide workspace, often on preferential and flexible terms, for specific industries or types of firm.

NBIA (2008) defines a business incubator as an economic development tool designed to accelerate the growth and success of entrepreneurial companies through an array of business support resources and services by nurturing the development of entrepreneurial companies, helping them survive and grow during the start-up period, when they are most vulnerable. BIs provide not only basic services such as inexpensive space, but also provide various services to tenant firms in early stages to effectively connect abilities, technology, capital, know-how of entrepreneurs, thereby promoting development of start-ups and transfer of technologies.

Business incubators or holding companies that provide funding, technical support and networking capabilities, have become central to the development of early stage businesses in Western countries. Typically, this involves offering management assistance, mentoring, access to financing, flexible and low-cost leases, office services. TBIs, popularly called Technology Incubators (TIs), are offshoots of business incubators. Likewise, business incubators promote the development of new and qualified SMEs by providing qualifying new start-up businesses with a set of facilities – physical space, shared services, business and legal advice and financial inputs - to facilitate their creation and assist them until 'graduation', when they have the capacity to 'survive' in the outside competitive environment thereby improving their chances of success.

The business incubation process adds value by accelerating the start-up of new businesses and helping to maximize their growth potential in a way

that is more difficult for alternative SME support structures to achieve. Folinas et al. (2006) opined that one of the key determinants for the growth of an entrepreneurial society is the empowerment of private initiatives and the nurture of new enterprises on their way to sustainability and that one of the mechanisms employed to nurture small firms for the past two decades is the business incubation approach. Accordingly, incubators have become increasingly popular in the industrialized world and in developing countries

3. Technology-business incubators

Expectedly, newly started firms are often very vulnerable with most young high-tech companies encountering and having to cope with a multiplicity of challenges. Therefore, most countries and regions have organisations that provide support to assist these companies overcome their challenges. One of the means young high-tech companies receives such support and assistance is through the tutelage in a TBI.

According to the UN Millennium Project (2005) Technology incubators are a special type of business incubators that focuses on new ventures that employ advanced technologies. However, even though technology incubators share the same general goals as business incubators, they focus more on the commercialization and diffusion of technology by new firms. They nurture hi-tech start-ups and present a technology -oriented variant of business incubators. However, the first requirement for creating a successful technology-based firm is the existence of a good business idea with a good market potential, to be converted into a new product or service by an entrepreneur. It seeks to effectively link talent, technology and know-how to leverage entrepreneurial talent in order to accelerate development of new companies and speedy commercialisation of R&D and innovation. It also helps in value re-orientation by creating an environment for changing the attitudes towards personal initiative, innovation, risk-taking and entrepreneurship.

The effect of Techno-entrepreneurship on Indian Economy

The spectacular growth of the industry in the 1990s was also marked by an improvement in the institutional infrastructure surrounding the software outsourcing industry, which generally served to ease the constraints on the industry's further growth. These included capital and labour market reform, better access to finance, improved IP right protection and contract enforcement. Capital market institutions did not understand how to evaluate the financial needs of the emerging software industry.

Infosys, India's most famous entrepreneurial firm was refused a bank loan when it was set up in 1981 and had to borrow the start-up money from the wife of one of the founders. It was probably not the only one. Faced with a situation where bank finance was not readily available and venture capital was not forthcoming, software firms were conservative in their own cash flow calculations but experimented with importing the use of capital market institutions in the US. Many software firms voluntarily listed on stock exchanges in the USA and in Europe with more stringent disclosure norms in order to raise money for investments and acquisitions. The compliance of some firms to international norms was a powerful force for improved corporate governance with the

chairman of Infosys being involved in committees to promote these changes.

Training and the supply of human capital also improved. As the software industry grew in the late 1980s and early 1990s, labour markets for software programmers became tight due to global market expansion and fierce competition. In this period, scores of privately funded and organized educational and training institutions emerged to meet the demands for skilled labour, expanding supply beyond what could be produced through the state funded educational establishments. Privately financed training institutes such as the National Institute of Information Technology Ltd. and Aptech Ltd sprung up to provide software training throughout the 1990s—a dramatic institutional departure in a country where reliance on publicly funded training institutions had been the norm. Intriguingly, all of these changes occurred after the software growth opportunity had been spotted by entrepreneurs with some initial success. India's software firms did not wait for institutional reform. On the contrary, software success caused the reform to take place.

Entrepreneurship is gaining significant importance in almost all walks of life and plays a vital role in development of both individuals and societies at large. Techno entrepreneurship will go a long way to empower people's ability to make sensible decisions, better plan their resources, be ethical and duty conscious and thereby ensure success and sustainability. These are also qualities that contribute to a nation's economic development and growth. As discussed in this paper, there are many supports for Techno -Innovations which can be converted in to Techno entrepreneurship in effective manner. Even journey of Techno-entrepreneurs through Technology Business Incubation approach in India will be interesting study which may give insight in to the problems and difficulties they might be facing. Technology Business Incubation involves the commercialization of science and technology through newer community institutional arrangements which can be thought of as technology venturing. It concentrates on alliances as an economic development strategy. Technology venturing is based on creative and innovative ways of linking public sector initiatives and private sector resources within and across regional and national boundaries for promoting economic growth.

For any economy entrepreneurship is very crucial. The objectives of achieving sustained industrial development, regional growth and employment generation have always depended on entrepreneurial development. All over the world, researchers have taken lot of interest in studying entrepreneurship. Entrepreneurs are, thus the seeds of industrial development and the fruits of industrial development are greater employment opportunities to unemployed youth, increase in per capita income, higher standard of living and increased individual saving, revenue to the government in the form of income tax, sales tax, export duties, import duties, and balanced regional development.

In India, entrepreneurism is in its cultural ethos. Entrepreneurship and enterprises are a continuous process and it is growing from centuries to centuries. In country like India, we are facing a problem of unemployment for so many years now. And one of the best solutions is to have as many Job Creators as possible, so we need Entrepreneurs. Now our economy is growing but in this growth, the contribution of Entrepreneurship can not be

neglected. Various Government and Non Government agencies are doing lot of work to promote Entrepreneurship. Particularly Government of India is doing great work to promote Techno – Entrepreneurship by providing support through various agencies under the umbrella of Department of Science and Technology (DST). Even it has established National Science and Technology Entrepreneurship Development Board under DST. The objectives of achieving sustained industrial development, regional growth and employment generation have always depended on entrepreneurial development.

Techno-entrepreneurship can be defined as the Entrepreneurship in Technology area and the person who undertakes Techno-entrepreneurship is termed as Techno-Entrepreneur. Techno-Entrepreneur is also termed as Techno-preneur and hence Techno-entrepreneurship can be termed as Techno-preneurship.

In India, to promote Techno – Entrepreneurship, many Government and non Government agencies are doing great work. Particularly Department of Science and Technology, Government of India has established National Science and Technology Entrepreneurship Development Board (NSTEDB) with full fledged website and even web portal TIME IS – Technology Innovation Management & Entrepreneurship Information Services with web site: http://www.techno-preneur.net which gives all the information about Techno – Entrepreneurship and how to convert innovation in to Entrepreneurship with the help of various schemes of DST in India. Under the NSTEDB, Department of Science and Technology has major schemes like: Entrepreneurship Development Cell (EDC), Science and Technology Entrepreneurship Development Project (STED), Science and Technology Entrepreneurship Park (STEP) and Technology Business Incubators (TBI). There are more than 30 E D Cells established by DST all across the India. STED projects are located at more than 35 places in India. There are 14 STEPs all over the India. And most importantly there are as many as 24 Technology Business Incubators which are acting as a real booster to convert Technology Innovations in to Techno – Entrepreneurship.

Some of the major Technology Business Incubators in India are:

- National Design Business Incubators, National Institute of Design, Ahmedabad
- Centre for Innovation, Incubation and Entrepreneurship (CIIE), IIM Ahmedabad
- Nirma Lab, Nirma University, Ahmedbad
- GIAN, Ahmedabad
- Society for Innovation and Entrepreneurship - SINE, IIT Bombay, Mumbai
- TBI – Vellore Institute of Technology
- TBI – NIT Calicut
- Foundation for Innovation and Technology Transfer (FITT), IIT Delhi
- TBI – Centre for Biotechnology, Anna University, Chennai

Apart from these, Department of Science and Technology has established National Innovation Foundation (NIF) in February 2000. Society for Research and Initiative for Sustainable Technologies and Institution (SRISTI) and Honey bee network are also doing great work to support innovations to be converted in to entrepreneurship. GIAN – Grassroots Innovations Augmentations Network is an Incubator

for grassroots innovations and traditional knowledge. It is established by NIF at Ahmedabad, Gauhati and Jaipur. By looking at above data, one may definitely feel that there is enough support for the Innovations and Innovation based Techno – Entrepreneurship in India but 'how effective they are?' is a matter of research.

Conclusion

Entrepreneurship is a determining factor in economic growth of nations. Governments and other institutions concern with economic development are increasingly being asked to operate more entrepreneurially. Many of these bodies have governance structures that are not well suited to play entrepreneurial role. Taking a long jump from entrepreneur through entrepreneurship to entrepreneurism in order to sustain economic growth of the country is an uphill task. Shadowing the entrepreneur had great negative impact on many developing countries as it influenced them to see economic development purely from the perspective of governments using capital derived from savings to invest in economic growth. This led to the society undermining people engaged in entrepreneurial activities. From this perspective, the economic theory failed to illuminate formal analysis of entrepreneurship.

As the entrepreneur's role in economic development and growth is becoming increasingly appreciated job, techno-entrepreneurship is fast coming to the lamplight, it is important to highlight the benefits that can be derived from its growth. This would through more light on the fact that techno-entrepreneurship is not only limited to the world of business, its usefulness extends to all walks of life, thus contributing greatly to economic development. Economic development cannot occur in isolation. Individuals are responsible in creating market successes. Entrepreneurs are talented at spotting external changes that leverage the demand for new products and services. Analytical studies in entrepreneurship derive their inspirations of 'creative destruction', where an entrepreneur's key tasks is to constantly identify business and market opportunities which exist all the time.

References

Aggarwal, P., Cha, T. and Wilemon, D. (2008) 'Barriers to the adoption of really-new products and the role of surrogate buyers', *Journal of Consumer Marketing*, Vol. 15, Vol. 4, pp.358–371.

Bower, J. and Cristensen, C. (1995) 'Disruptive technologies: catching the wave', *Harvard Business Review*, January-February, pp.43–53.

Charantimath P. (2008), Entrepreneurship Development Small Business Enterprise, Pearson Education, New Delhi, pp. 48-96

Dosi, G. (1982) 'Technological paradigms and technological trajectories: a suggested interpretation of the determinants and directions of technological change', *Research Policy*, Vol. 11, pp.147–162.

Drucker, Peter F. (1985). Innovation and Entrepreneurship: Practice and Principles. UK: Richard Clay, The Chaucer Press Ltd. Suffolk.

Galende, J. (2008), 'Analysis of technological innovation from business economics and management', *Technovation*, Vol. 26, pp. 300–311.

Gupta A. (2009), Through the doors within: Network, Institutions and Movement, Honey Bee, Sristi Innovations, Ahmedabad, 17(3)

Krueger, N.F. and Brazeal, D.V. (2004), Entrepreneurial Potential and Potential Entrepreneurs. Entrepreneurship Theory and Practice 18, pp. 91-104.

Michael N.T., Summe G.L. & Uttal B.(1999), Commercializing Technology – What the best companies do, Harvard Business Review on Entrepreneurship, Harward Business School press, USA, (originally published in HBR – 1990), pp. 175-203

Murmann, J.P. and Frenken, K. (2006), 'Towards a systematic framework for research on dominant designs, technological innovations, and industrial change', *Research Policy*, Vol. 35, pp. 925–952.

Oakey R.P. (2008), Technical entrepreneurship in high technology small firms: som, Elsevier, Technovation, 23: pp. 679- 688

Peter C. Van der Sijde (2007), Developing Strategies for Effective Entrepreneurial Incubation, International Journal of Entrepreneurship and Innovation, pp. 232-236

Santosh Ranganath N., (2012), "Technological impact on Human Resource Development in India" Global Research Publishers, India, pp. 179-189.

Santosh Ranganath N., Kama Raju T., (2011), "Rural Entrepreneurship: An Economic Development in India", ESRI Journal, Journal of Economic and Social Research Institute, Rajasthan, pp. 50-58.

Santosh Ranganath N., Tulasi Rao G., (2011), "Techno-Entrepreneurship in India: An Innovative Tool for Economic Development", Entrepreneurship Business Review, pp. 63-71.

Selwyn, N. (2008) 'Apart from technology: understanding people's non-use of information and communication technologies in everyday life', *Technology in Society*, Vol. 25, pp.99–116.

Sikka P. (2007), Technological innovations by SME's in India, Pergoman, Technovation, 19: pp.317 - 321

Tulasi Rao G., Santosh Ranganath N., (2012), "ICTs for Growth of SME Sector in India: An Analysis", International Journal of Management Research and Review, pp. 122-131.

Venkatesh, V., Morris, M., Davis, G. and Davis, F. (2008) 'User acceptance of information technology: toward a unified view', *MIS Quarterly*, Vol. 27, No. 3, pp.425–477.

Walsh S. and Kirchhoff B. (2007), Entrepreneurs' opportunities in Technology – based markets, Technological Entrepreneurship, A volume in research in entrepreneurship and management, Information Age Publishing, pp.17 – 30

Wright M., Hmieleski K.M., Siegel D.S. & Ensley M.D. (2007), The Role of Human Capital in Technological Entrepreneurship, Entrepreneurship Theory & Practice, Baylor University, pp.791-806.