



**VPM's
DR. V.N. BEDEKAR INSTITUTE OF
RESEARCH & MANAGEMENT STUDIES,
THANE**

**Seminar on
“CAN INDIA BE AN ASIAN TIGER BY 2020?”**

Saturday, 23rd April, 2005

Venue

**VPM's Polytechnic Hall
“Jnanadweepa”, Chendani Bunder Road,
Thane (W.) 400 601**

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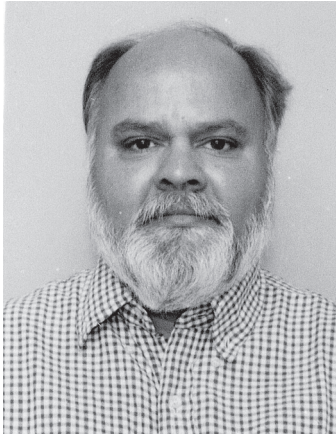
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D.K. Nayak

Principal

V.P.M.'s Polytechnic, Thane



Chairman Speech...

In the language of development, India is categorised as a developing country. It is also known as third world country. More than half the population of the world resides in Asia. Except Japan, none of the Asian countries could qualify as developed or first world country.

However, the things are changing very fast. China is emerging as a superpower. India is not lagging behind and is aspiring to become an economic and technological power. There are solid reasons to believe this. During recent American presidential elections, India did figure as a threat to American white-collar jobs. India already has become a back office of many business houses in US and Europe. During last five years, more than hundred IT and Science based companies have opened their R&D labs in India. John F. Welch Technology Centre in Bangalore is General Electric's (GE's) Largest single location R&D Centre in the world employing over 2300. Similarly, IBM, Motorola and Intel all have established their R&D Centres in India. This number is growing every month. John F. Welch remarks justifying his decision to open the centre at Bangalore "India is a developing country, but it is a developed country as far as its intellectual infrastructure is concerned. We get the highest intellectual capital per dollar here." speaks volumes as India's potentiality to become a knowledge superpower. A recent study indicated that India is emerging as the third largest wind energy market worldwide in terms of new installations. Today wind energy accounts only 3% of the overall generation capacity of the power sector. It is expected to grow at the rate of 40% in coming years. India is also looking for alternative energy sources like solar, biodiesel etc.

Many reputed financial institutions have been continuously upgrading Indian companies, banks and nation as a whole for investment category. India which hardly was getting any space in the international political and financial publications, is now frequently appearing in front and editorial pages. India is the eleventh largest economy in the world today. IT industry which contributed 1.3% of India's GDP in 1999



has doubled and is more than 3% of GDP now. In 1991, India's foreign exchange scenario was precarious. Today it is more than 140 billion dollars and is posing a problem for its management. There are other industries like biotechnology, pharmaceuticals and film industry which are growing at high rates creating employment and wealth. On agricultural front, though there are no spectacular achievements India is more or less self sufficient in her agricultural needs. India is one of the largest milk producers in the world today.

If India really wants to continue this growth and surpass her competitors like china Japan, South Korea and want to become a Developed and first world country a lot will have to be done.

Our infrastructure and overall energy industry is not only inadequate but is growing at snail's speed having a disastrous effect on our industrial growth. Our economic reforms go one step forward and two steps backwards. Archaic labour laws and policies are the biggest obstacle in the industrial growth.

India is a democratic country and democracy is run by political parties. Unfortunately there is no genuine intraparty democracy in political parties of India. Most of them have become dynastical or personality centred clubs filled with sycophants. The biggest casualty of this structure is the democracy itself. This highly hypocritical political structure has given rise to corruption of vulgar and monstrous proportion. If India wants to become a superpower, we need to change this scenario urgently and with all sincerity.

So we are fully justified in selecting the topic for this year's seminar — "Can India be a Asian tiger by 2020 ?.

The speakers in this seminar have contributed immensely in providing technically literate human resource to the engine of growth. I am sure that today's discussions will enrich us and help us to find solutions to many of the problems faced by the country.

Dr. Vijay V. Bedekar

Chairman

Vidya Prasarak Mandal, Thane



From Managing Director's Desk...

At the outset let me congratulate my team at the Institute for selecting most appropriate and at the same time a controversial topic like CAN INDIA BE AN ASIAN TIGER BY 2020? for the seminar on 23rd April 2005. Eminent and internationally reputed personalities will express their views on the topic, listening to which is going to be a feast of knowledge to the participants comprising of professionals, corporate managers, young executives and management students etc.

There should be no disagreement regarding the fact that India commands a potential that, if properly exploited, can make the Country a real super power in a period of couple of decades to come.

The last decade of the twentieth century has become a turning point with the introduction of New Economic Policy (N.E.P) from 1991. The policy is labeled as LPG i.e. Liberalization, Privatization and Globalization. Knowledge has been and will always be our heritage. The NEP has opened vast opportunities to the Indian economy which if wisely exploited, can drive the country to become not only ASIAN TIGER but a WORLD SUPER POWER by showing a marked improvement in Macro Economics Indicators.

The major hurdle towards the achievement of the goal lies in intergroup conflicts in our Country which take a variety of forms based on caste, religion, region, political beliefs etc. We are wasting our skills, talents and resources in dealing with these conflicts. A sense of understanding among all fractions of the society is a basic requirement to overcome the issue. At the same time, every Indian must realize the fact that with the advent of NEP 1991, it will be necessary to develop self-dependence rather than looking to Government for growth and development.

I am sure that with a change in the approach and attitudes of the Indians the Dream Will Become A Reality.

We at VPM's Dr. V.N. Bedekar Institute of Research and Management Studies are playing our squirrel's role in the process of building a powerful nation by introducing various managerial courses. These will make available young, talented and efficient executives and managers who have a crucial role to play in the process of development.

With warm regards,

S.W. Gokhale
Managing Director
VPM's Dr. V.N. Bedekar Institute of Research
and Management Studies, Thane





Convenor's page...

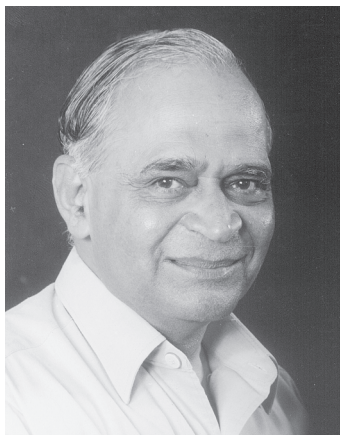
It is indeed a great pleasure to welcome all of you for a seminar that has created flutters in the minds of young & old on this occasion. The subject selected is of topical interest not only to the corporate world but also for young executives & management students. As a convener I was delighted by the response received from all corners. There cannot be a better proof, than today's seminar, which proves that " Dreams of today are realities of tomorrow" . Amongst the audience there are few students of MPIB- (2000) Masters Programme in International Business, who did submit a project on strategies to be adopted to counter the menace from China's imports. Thanks to Dr. Vijay Bedekar – who selected this subject for today's seminar.

When I broached this subject with Prof. M.M.Sharma – the acceptance by this internationally reputed educationist & technologist was almost instantaneous. Even one more speaker did confirm – that the subject proposed is very near to his heart. But for the preoccupation, the speaker regretted much against his desire. 50% of India's population is below the age of 25 but 100% of our future lies with them. Hence we appealed to management students yuppies to submit papers on this subject. The selection committee constitutes experts from academy & industry. Our objective of " Dare to dream big" is achieved to a certain extent.

Is India an elephant or a sleeping tiger? Are India & China are the stars of the 21st century? Is India whimpering when it should roar? Dragon vs. Elephant – myth or Reality? Elephant & Tiger need to dance together for mutual benefit? I am confident all these questions will be answered by the end of the day. Thus by today evening we will be wiser & older. Let us make the best of this situation.

Looking forward to your active participation in the panel discussion.

V.S. Bhakre



About Speaker...

Prof. M. M. Sharma

B. Chem. Eng., (Tech) (Bombay), Ph.D. (Cantab). D.Sc. (I.I.T., Bombay) (h.c.). D.Sc. (I.I.T., Delhi (h.e), D.Sc. (B.H.U.) (h.c.), D.Sc. (Kanpur) (h.c.), D.Sc. (Bundelkhand Unvi.) (h.c.), D. Eng. (Roorkee) (h.c.), LL.D. (Mumbai) (h.c.),

F.R.S., F.N.A., F.A.Sc., F.N.A.Sc., C.Chem, F.R.I.C. (U.K.), C. Eng., F.I.Ch.E. (U.K.), F.I.I.Ch.E., F.I.C.S.

Address : 2/3, Jaswant Baug, Behind Akbarallys, V.N. Purav Marg, Chembur, Mumbai-400071. (Ph. : 2529 1539; 2529 6876)

Email : mmsharma@bom3.vsnl.net.in

Emeritus Professor of Eminence, University Institute of Chemical Technology, Mumbai (2003)

Chairman, Research Council, National Chemical Lab. Pune (1998-)

Chairman, Scientific Advisory Committee, Ministry of Petroleum and Natural gas (1987-2001)

Member, Technology Development Board, D.S.T. (2002-)

Chairman, Drugs Panel, DST, (+DBT+CSIR) (1996-2003)

Member, Board of Governors, IIT, Bombay (2002-2005)

Member Council, I.I. Sc., Bangalore (2002-2005)

[Former Professor of Chemical Engineering (1964-97) and Director (1989-97). Department of Chemical Technology (Autonomous), Now University Institute of Chemical Technology (UIC) Matunga, Mumbai-400019]

AWARDS / HONOURS

Moulton medal of Institution of Chemical Engineers, UK (1971, 1977)

S.S. Bhatnagar Prize in Engineering Sciences (1973)

Fellow, Indian Academy of Sciences (1974)

Fellow, Indian National Science Academy (INSA) (1976).

(VP : 1987-88; President : 1989-90);

Vishwakarma Medal (1985);

Meghnad Saha Medal (1994);

Sir J.C. Bose Memorial Lecture (1994);

FICCI Award in Science and Technology, Engineering and Technology (1981)

Best Teacher Award Government of Maharashtra (1984).



Om Prakash Bhasin Award, Engineering (1985)

Danckwerts Memorial Lecture, Chemical Engineering Science Institution of Chemical Engineers, U.K. (1987)

PADMA BHUSHAN (1987); PADMA VIBHUSHAN (2001) by President of India

Honorary Fellow, National Academy of Sciences (1988); Prof. N. R. Dhar Memorial Lecture Award (1999)

P.C. Ray Lecture (1998); Hon. Member (1997); Indian Chemical Manufacturers Association.

Shreve Distinguished Visiting Professor, Purdue University, USA (1989).

Jawaharlal Nehru Lecture, (1989); P.C. Ray Memorial Award (1995); Platinum Jubilee lecture, Chemistry (1995); Shatabdi Puraskar, Engineering and Technology (1999); Millennium Award (2003); Indian Science Congress Association

Fellow, Royal Society, London (1990); Leverhulme Medal (1996).

Fellow, Third World Academy of Sciences (1990); TWAS medal Lecture Engineering Sciences and Technologies (1997)

H.K. Firodia Award for Excellence in Science and Technology (1999)

G.M. Modi Science Award, Modi Foundation (1991)

Life Time Contribution Award in Engineering, India National Academy of Engineering (2001)

Life Time Achievements Award, Dr. B.P. Godrej-I.I.Ch.E. (2002)

Life Time Achievements Gold Medal, Chemical Research Society of India (2003)

Life Time Achievement Award, Indian Chemical Society (2004)

Honorary Member, Perfumery and Flavours Association of India (1995) and Indian Speciality Chemicals Manufacturers Association (1994); Honorary Fellow, Indian Chemical Society (1997), Honorary Fellow, Indian Plastic Institute (2003)

UDCT Golden Jubilee Distinguished Fellow (1984). UDCT Diamond (1994), UDCT Alumni Association Distinguished Alumnus Awards (1990).

Editor : Chemical Engineering Science, UK (1975-1986); Associate Editor : Chemical Engineering Research and Design, UK (1974-1986); Member International Advisory Board, Canadian J. of Chemical Engineering (1989-1993); Member International Advisory Board, Reactive and Functional Polymers (1995-). Editorial Board, Separation and Purification Technology (1997-1999). Editorial Board, Green Chemistry (1999-2000), Member, Editorial Board, Clean Technologies and Environmental Policy (2002-)

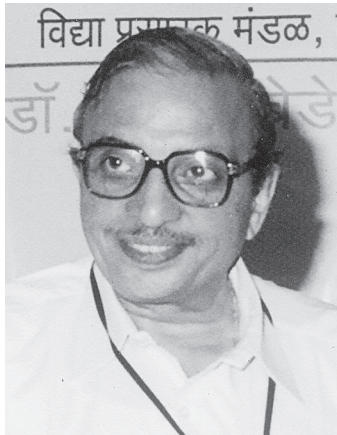
Published 250 research papers in Chemical Engineering Science Industrial and Engineering Chemistry Research; Chemical Engineering Research and Design; Candian Journal of Chemical Engineering; Reactive and Functional Polymers, etc.

Supervised 71 Doctoral Thesis and 35 M. Chem. Eng. M.Sc. (Tech.) Thesis.

Book Published : "Heterogeneous Reaction; Analysis, Examples and Reactor Design". Volumes I and II. Wiley-Intersciences, UAS, 1984 (with Dr. L.K. Doraiswamy)

Fine Chemical : Technology and Engineering, Elsevier, The Netherlands. Dec. 2001 (J.A. Moulijn, A. Cybuluski, M.M. Sharam and R.A. Sheldon)

Also contributed several chapters in renowned books.



About Speaker...

Dr. Deepak B. Phatak

Born on 2nd April 1948, Dr. Deepak B. Phatak graduated in Electrical Engineering from Indore and then completed his M.Tech. and Ph.D. in Computer Science. He is with IIT Bombay since 1971. He served in the Department of Computer Science and Engineering till January 2000 and was the Department head from 1991 to 1994. He also served as the first Dean of Resource Development for IIT Bombay from 1995 to 1998. He was the founding head of Kanwal Rekhi School of Information Technology set up in October 1998 at the Institute. He was appointed to the Subrao Nilekani Chair in the School in January 2000. Currently he heads the Shailesh J. Mehta School of Management at the institute.

His research interests are in the areas of Data Bases and Information Systems, Software Engineering, System Performance Evaluation, IT enabled Education and IT strategy planning. His primary research inclinations are in Technology application and deployment areas. He has been involved with curriculum development efforts for the undergraduate and postgraduate programs in Indian Universities and colleges in the field of Computer Science and has advised several Institutes in Setting up their CS Department and laboratories. He has worked on several AICTE and ISTE Committees and is currently chairman of the AICTE board on IT. He was invited to the working group of the National IT task force on Human Resource Development.

At IIT Bombay, he participated in the initial conceptualization and planning of the School of Information Technology with a clearly defined applied research focus of an interdisciplinary nature. Apart from strong academic programs leading to Ph.D. and M.Tech., the school has developed two unique programs. One is in the form of an IT Business Incubator which permits young start-up teams working on innovative technology ideas and a good business plan, to develop their themes to a level where they can attract VC funding and grow outside to become technology companies of the future. The



other program proposed to offer IT courses to a very large number of people in the country through a unique Distance Education Program using VSATs along with the internet technologies. The program simulates a class room environment at multiple remote centres permitting a complete audio/video interaction with the participants. The program currently runs at 14 remote centres in India and offers foundation and advanced courses to working professionals, teachers and general engineering students.

In 2002-2003, Dr. Phatak set up the Affordable Solutions Lab in the school. The lab is engaged in R & D towards development of innovative technologies, applications frameworks, applications and appliances using which the total cost of ownership for a particular IT solution is significantly reduced so as to propel greater penetration of IT usage in India. The lab has already produced some innovative solutions adapted by some Indian companies. The lab proposes to extensively use Open Source Software to build such solutions. He believes that in near future India should become a net "Giver" to the Open Source community. Towards this end, he is setting up a web portal that will facilitate coordinated participation of 30000 student developers across the country in making useful contributions through their final year project work in an annual basis. He is currently engaged in an exercise to set up an Indian forum comprising industry, academia and user organization to buttress these efforts.

He was on a year long sabbatical leave during July 2003 to June 2004 during which he extensively toured the country giving talks to Engineering college students and teachers, and interacting with them to understand the grass root level pulse of the Indian CS and IT education. He is currently writing book on this experience titled "Indian IT professional for the 21st Century".

Dr. Phatak has a long association with Computer Society of India (CSI) spanning over two decades. He was awarded CSI Fellowship in December 1999. He is currently the chairman of the software division of the society. He has also been elected fellow of IETE in March 2000.

He has been a consultant and advisor to many organizations on issues related to Information Technology. He has been on I.T. advisor to the State Bank of India for several years. He has also been a consultant and advisor to several other financial and industrial organizations like Reserve Bank of India, Unit Trust of India, Industrial Credit & Investment Corporation of India, Life Insurance Cooperation of India, New India Assurance, United India Insurance company, etc. He works on several committees advising Government department on issues related to IT strategy planning and deployment. Dr. Phatak is currently on the boards of HDFC Asset Management Company, National Institute of Bank Management, Institute for Banking Personnel Selection, and National Insurance Academy.

Dr. Phatak's dream is to see a resurgent India catching up with the world using Information Technology as the spring board. He hopes to make IT work for the millions of Indians so as to enable them to lead an honorable, comfortable and peaceful life full of love and harmony.



About Speaker...

Shri. B. Rajaram

Born on 1st Feb. 1945, Yellamanchille, Andhra Pradesh, India is currently the Managing Director and Chief Executive Officer of Konkan Railway Corporation a Public Sector Undertaking with an asset base of 3,600 crores. He graduated from Andhra University obtaining Bachelor of Engineering (Civil) with 1st Class Distinction and also establishing a record of being the University's first rank holder as well as combining the responsibilities of being a General Secretary and President of the University's students union. The same year 1966, on invitation he joined the Indian Institute of Technology, Khargapur obtaining his Master of Technology degree in Structural Engineering and further continued thereafter in 1970 work as Research Scholar pursuing doctoral programme. Though the aptitude was for continuing with the research because of certain inequity shown to one of his colleagues he differed with the Director of the Institution chose to write the All India Competitive examination to join the Indian Railway service of Engineers, Ministry of Railways, Government of India. It was also in IIT Kharagpur, that IBM computers entered his life and the digital world has been his most comfortable working environment. He is currently Chairman Of Computer Society of India, Navi Mumbai Chapter.

Having joined the Railways in the year 1970 till 1979 he worked in various capacities on the field in the operations and maintenance of rail tracks, bridges, buildings and formation. The period from 79 to 89 was spent in pursuing the Research and Development programme pertaining to Railway technologies, as well as designing and consultancy to foreign countries like Jordan, Zambia and Austria. He also received specialised training in General Management as well as, construction of project management in UK.

As a field officer, in the initial years of service he has to his credit 4 awards and 3 publications in the technical journals. During the period that he spent on research and development as well as, consultancy he has to his credit more than 350 research and test reports



published from research, designs and Standard Organisation, 4 patents in India and 4 countries United States of America, United Kingdom, Australia and Bangladesh, also granting Patent for his 'Resilient Clip'. In addition, he has path breaking new theories published in reputed International journals - 'Rail International' published from Brussels giving new insights into vibrations between wheel and rail. In fact, his work became a reference work for designing of high-speed locomotives. During this period of research

RESEARCH, DEVELOPMENT AND PLANNING POLICY REPORTS

- Tralis - Track Lifting cum & Slewing Device (originated by me in '85-'86) which made small tools based track maintenance possible for heavy concrete sleeper tracks ('86)
- Re-structuring of Research Designs and Standards Organisation - Report - significant contributor as author ('86-'87)
- Planning Group on technology For Railways - a significant role was played by me ('86-'87)
- Worked as member of UNDP sponsored taskforce for implementing system improvement for Project management on the Indian Railways

Patents : granted/applied for

Granted :

- Indian Patent for 'Resilient Clip'
- Indian Patent for 'Toe load measuring Device'
- Indian Patent for 'RAMTRAK system (microprocessor based)'
- Indian Patent for 'RAMTARAK system (manual)'
- Resilient Clip - patents in United States of America, United Kingdom, Australia, Bangladesh

Applied for :

- SKY BUS METRO - A Novel Suspended Coach Transportation System
Five patent Applications
 1. Sky Bus Metro- No 715/MUM/2001
 2. Swing Arrester - No 716/MUM/2001
 3. Derailment Arrester - No 717/MUM/2001
 4. Collision Arrester - No 718/MUM/2001
 5. Suspender - No 719/MUM/2001
- Anti Collision Device 'Raksha Kavach'
Patent Application No. 668/BOM/99 dated 29.11.1999
- Satdham Safety System - An Intelligent Signalling and Transport System
Patent Application No. 1150/MUM/2001 dated 29.11.2001
- Self Stabilising Track
Patent Application No. 900/MUM/2001 dated 18.09.2001

ALL THE ABOVE PATENTS ARE IN MY NAME AS INVENTOR AND STAND ASSIGNED TO PRESIDENT OF INDIA



“CAN INDIA BE AN ASIAN TIGER BY 2020?”

Prajakta Damle

Executive summary

Our nation has got the capacity to become an Asian tiger by 2020. By doing SWOT analysis we can see that with some strengths we also have got some weaknesses but we can with good planning change them to our strengths. We have many opportunities, which we should not miss out. Along with this to make our nation a developed nation in the whole Asia we have to get ready for all the threats coming in our way.

We all know that nothing is impossible in this world. Many a times it happens that we just plan at work and forget to work on that plan. This could be seen from many of our politicians. Politicians are the one who promises to construct the bridges even where there are no rivers.

From the forthcoming events mentioned in this report we know that we have got many opportunities to get success but the thing is that we have to grab that opportunity.

By proper planning I can definitely say that India can surely be an Asian Tiger by 2020.

Vision

A vision is a picture of what is possible or what is desired in a longer-term future. It could be of one individual in origin or it could be a collective in its conception.

The impact of globalization is felt first and foremost in economic life. The globalization of the economy refers to the increasing integration and interdependence of all realms of economic life, including trade, finance, production, and consumption. Debates about economic globalization include whether integration has helped or hindered the plight of poor people around the globe; whether jobs lost to ‘outsourcing’ really contribute to the health of an economy by



lowering end-users' costs; whether business and accounting practices and principles (so-called 'corporate governance' issues) developed in one social context can be transferred and utilized productively across national boundaries; and whether government policies should promote foreign direct investment in every sector of the economy or whether some sectors should be protected for the benefit of domestic companies.

India Vision 2020

The resounding success of 'Indian Beyond 2002' and for that we must plan a Bigger and More Vibrant event. The "India Vision 2020" will highlight the various steps taken by different State Governments, Public Sector Units and Research & Development Institute for the rapid and overall development of the economy. At India Vision 2020 we have tried to bring the excellence from all major key sector in making India developed nation by 2020. It will give a guide line to the policy makers / implementers and the decision makers. This is going to give an spirit in every Indian. Proper planning will not only guide the industry to move towards proper direction but will also help them to achieve their desired results in planned manner which will ultimately results into over all growth of the countries.

INDIA FIGURES

➤ **The Larger Democracy**

India is the largest functioning democracy in the world with political consensus on the economy. 619 million voters.

➤ **A true Babel**

18 major languages, 1600 minor languages and dialects, 6400 castes and sub-castes, 52 major tribes, 6 main ethnic groups.

➤ **Growth**

The average annual GDP growth rate was over 5% in the last 10 years (1995-2004). In 2004 was 6,6%.

As regards the quality of technical and management schools is concerned India is placed at number 8.

➤ **Human Capital**

A stock of over 3 million scientific and technical manpower

➤ **Brain Drain**

100,000 Indian professionals leave India every year to take jobs in the US. The resource loss of this brain drain is up to 2 billion per year for India. 25% of Silicon Valley companies are founded or managed by Indians.

➤ **Middle Class**

India today has a 'middle class' of over 300 - 350 million (with an average purchasing power of 300 dollars per month) and with increasing number of youth entering the economic system the sector is growing at double digit figures. China, as a benchmark, at this time is about 125 to 170 million that can be considered middle-class.

➤ **R&D location**

100 global companies set up their R&D centers in India during the last five years. Second largest R&D center in the world is in Bangalore

➤ **Financial market**

23 stock exchanges with more than 9,000 companies listed

➤ **High Tech Exports**

Indian IT exports are of the order of \$12.5 billion. By 2008, will be around 30 billion.

➤ **58% share**

From the 137 software houses certified by the SEI-CMM at level 5 in the world, 80 are from India.

➤ **Scientific productivity**

The intellectual capital available per dollar in India is the highest in the world. India is the top world nation in SCI journal publications per GDP per capita per year, with 31.7 papers. China follows with 23.32 and then the US with 7. India is also the top world nation in citations per GDP per capita per year, with 77.40 citations, followed by China (69.06) and the US (67.27).

➤ **Hot clusters**

IT, biotech, pharmaceutical (generics exporter), space, milk (1st world producer), diamonds (nine of every 10 finished diamond stones sold in the world pass through India), entertainment (“Bollywood”).

➤ **Software**

A McKinsey & Co. recent study concluded that China remains years behind India in software development; China’s IT services revenues are rising, but are barely half of India’s \$12.7 billion;

➤ **Main clients**

United States (21% of exports) and the Arabic Gulf Countries (11,4%)

➤ **Main suppliers**

United States (6,6%), UK (4,7%), China (4,7%)

➤ **Foreign Direct Investment**

The world’s second preferred market destination for FDI after China (2004 A.T.Kearney Report); 14 special economic zones

➤ **A huge internal gap**

24% of population leaves above the line of poverty. PIB per capital is of 3,200 dollars per year in purchasing power parity (less than 270 dollars/190 euros per month). More than 1/3 of population is illiterate.

➤ **Strategic interest**

India and China together could become an economic juggernaut if they built closer technology ties.

More dynamic regions in India

Generally in the recent times the Indian peninsular region has been more dynamic ‘economically’ - especially the metropolis of Bangalore, Hyderabad, Chennai & Mumbai-Pune. Some of the other peninsular towns such as Cochin, Goa, Ahmedabad, Surat, Indore etc. are also fast emerging as counter-hubs to these metropolis.

Europe has been India’s trading partner since ancient times. We have complementary of resource endowments and synergism of objectives. While India has a large young working population, Europe has mature technological resources and markets. But let the EU firms not underestimate the huge buying power of the Indian middle class. Indian and EU companies can form win-win partnerships.

India also looms large on the radar screen. Despite the halting progress of its economic reforms, the software and business-service industries, which support corporations in the United States and other advanced economies. Regulation remains



inefficient, but a quarter-century of partial reforms has allowed a dynamic private sector to emerge. Economic success is also starting to change basic attitudes. Deforestation, soil erosion, water pollution and land degradation continue to worsen and are hindering economic development in rural India. Rapid industrialization and urbanization in India's metropolises are also serious concerns.

India has made significant efforts in the field of environmental protection, developing environmental standards for both products and processes, requiring environmental impact statements in certain areas, and introducing environmental audits. Sheer population growth and urbanization, however, dictate that these measures are only the first steps on a long and challenging road.

Besides generating a level of performance that is too low and a process of change that is too slow, a purely market-driven process of convergence is bound to be too blunt. Good ecosystem and resource management requires sensitivity to local ecological and social conditions. Diversity of goals and approaches both across and within nations will yield a better environmental outcome than uniformity. Without policy coordination, markets are likely to promote harmonization without fully incorporating specific environmental goals.

Dr. Abdul Kalam speaks, writes and works having a live vision at the back of his mind "**Be India a Developed Nation**". The action plan to realise this blue print of mind into reality must have on the top of its itinerary '**the technology**'. Grooming '**technology**' from seed upto a fruit bearing tree is an art, science and a specialised enterprise in itself. Like in other businesses, finance is an important element here too. However, the key to success lies in assessing where, when and how to facilitate entry for money in the process of technological project realization.

The author has a wide exposure to the whole tree of '**technological growth process**' in various capacities – a grass root scientist, technocrat, industrial consultant and writer. It is with this backdrop that he enumerates the basic ingredients involved in making a technology idea grow into a full business, by ensuring the entry of financial sources at pre-assessed stages.

In actual life, science and technology are distinct elements though intertwined. Technology and technological skills and knowledge are not automatic input-output derivatives of basic scientific research

It is necessary for a company or an entrepreneur to look ahead in time as to what would be the status a few years from now. This looking ahead will help in initiating actions right now. This is where the role of technology financing starts.

Those who want to have a good business for the future where his or her company will have a specific commanding role or a powerful role or at least a role in which the company fortunes are not fluctuating too fast then the company has to learn to take up just now in the present new activities where there are some higher business and market uncertainties and which are likely to become desired products or services a few years from now. As the, lost time cannot be easily regained. Therefore, the correct management strategy is to grapple with technological uncertainties and technological risks as well as business and market uncertainties at the same time well in advance of the time in which we anticipate results to flow.

The technology financing is not a mere exercise in calculating the returns of investment or giving money as per procedures and formats but is more complex

The success of the Indian software

firms shows that there is more to India than simply cheap programmers. Rather, we are seeing the rise of new capabilities to provide services on a global scale.

Our multinationals are also beginning the process of converting from Indian firms sell in overseas to firms who are multinationals, drawing on talent and resources from all over the globe. India, the world's second most populous nation, has seen its population explode from 300 million in 1947 to approximately one billion today. This rapidly growing population, along with increased economic development, has placed a strain on India's infrastructure, and also on the country's environment.

India was the first country to insert an amendment into its constitution allowing for the state to intervene and to protect public health, forests and wildlife.

Air pollution

Industrialization and urbanization have resulted in a profound deterioration of India's air quality. Of the 3 million premature deaths in the world that occur each year due to outdoor and indoor air pollution, the highest number are assessed to occur in India. According to the World Health Organization, the capital city of New Delhi is one of the top ten most polluted cities in the world. Surveys indicate that in New Delhi the incidence of respiratory diseases due to air pollution is about 12 times the national average. According to another study, while India's gross domestic product has increased 2.5 times over the past two decades, vehicular pollution has increased eight times,

Energy Use and Carbon Emissions

Overall, 60% of energy needs in India are met by commercial energy sources, while the remaining 40% are comprised of non-conventional and renewable fuels. Behind

China, India is the second largest commercial energy consumer, comprising 19% of the region's total primary energy consumption. Industrial sector energy consumption accounted for 41% of total energy consumption in 1998 Renewable Energy

India is the world's second most populous nation. With 70% of the population living in rural areas, meeting energy requirements in a sustainable manner continues to be one of India's main challenges. Hydroelectric power and wind energy are two India is also endowed with rich wind resources and currently is ranked fifth in the world in wind power generation. of India's primary answers to the needed increase in electricity generation.

India faces great challenges in energy and the environment in coming years. With a rapidly increasing population, the demand for electricity generation and vehicular usage also is going to rise. Electricity is the key to economic development and India's current shortages of electricity have hampered industrial growth

There are more illiterates in India than in the rest of the world combined, and illiteracy among women in the Indian subcontinent surpasses 50 per cent.

Thus, while there is ample brain, it outweighs the rest of the body ? the brawn is weak. The brain drain has been acute: At one point, over 80 per cent of India's software engineers went to work abroad. The failures in basic education are compounded by widespread poverty; a highly over-regulated, closed, and hence corrupt environment for business;



appalling infrastructure.

India is now reaping benefits of the investments made in time and money in creating sustainable democratic institutions. India's other advantage is that the working population will be growing over the next 3 decades, giving India a sustainable competitive advantage in labour productivity. The probability of the projections being realized are very high. The annual GDP growth rate of over 7% is now a reality, we should even be approaching 10% growth rate, at least over several 3 to 5 years periods.

India's GDP has fallen from more than that of China's in 1980 to half of it in 2000. It will reach relative trough of 44% around 2012 before starting to rise and close the gap. By 2025 the ratio of India's to China's GDP and power will be 48% and 37% respectively. By 2050 the ratio of GDP and power potential will have risen to 69% and 57% respectively. We project both gaps to be eliminated during the last quarter of the century, thus restoring the Position that prevailed in the early 1980s. It is therefore imperative for China and India to normalise their bilateral relations based on mutual respect and recognition of each other's role in Asia and across the World. As China is the stronger power.

China's huge population and food demand make it particularly vulnerable. It is hit by increasingly unpredictable monsoon rains, which cause devastating floods in drought-denuded areas. Other parts of Asia and East Africa are similarly stressed. Much of Bangladesh becomes nearly uninhabitable because of a rising sea level, which contaminates inland water supplies. Countries whose diversity already produces conflict, such as India and Indonesia, are hard-pressed to maintain internal order while coping with the unfolding changes.

In fact, the climate record suggests that abrupt change is inevitable at some

point, regardless of human activity. Among other things, we should:

- Speed research on the forces that can trigger abrupt climate change, how it unfolds, and how we'll know it's occurring.
- Sponsor studies on the scenarios that might play out, including ecological, social, economic, and political fallout on key food-producing regions.
- Identify "no regrets" strategies to ensure reliable access to food and water and to ensure our national security.
- Form teams to prepare responses to possible massive migration, and food and water shortages.

"Also if all States adopt VAT, and at the central level there is already VAT. India will become a fully integrated market and this gives us a huge advantage,"

Long-term projections about the Indian economy are based on sound analysis and reasoned projections

- 71% or 742 million people are below 35 years of age . Indians are young and 29 million people are born every year.
- 6%, which is our so called educated youth, go in for a regular college degree which may not be very relevant in today's context for employment generation.
- 73% of all graduates from colleges are Arts graduates. While 95% of the world youth between 15 to 35 years of age learn a vocation, a skill or a trade, with a choice of 3000 vocational education & training programs, in India have only identified about 171 trades so far after 57 years of Independence.
- We can get engineers in India but no carpenters, plumbers, drivers and other skilled personnel as per international standards!

➤ The only exception is I.T. 1.5% of the world GDP. India's present share is about 3%. We need to concentrate on the balance 97% of the Economy & Enterprise and make it world class, for rapid economic growth and employment generation. Approximately 300 million unemployed and only 45 million have actually registered with employment offices with little or no hope of getting employment.

➤ Of all new employment generated, 1% are Government jobs, 2% are in the 'Organized sector' and the balance 97% in the 'Unorganized sector'. Out of our 409 million workforce, 93.5% work in the unorganized sector and about 6.5% in the organized sector. 1.7% of the entire population, viz. 18 million people work for the Central & State Government; another 9 million work in the 'private organized sector', total 2.6%.

➤ While MP's, MLA's and Municipal Councilors and the village Panchayats, can only be elected for a maximum of 5 years. 650 million illiterate people, based on the international definition of the 3R's (reading, writing and arithmetic, education up to primary level). The Indian definition of literacy, "If you can write your name, you are literate"; nobody has seriously ever challenged this definition! 300 million live below the Government of India's definition of Poverty Line of Rs.10 per day! (based on being able to buy enough rice and wheat from the Public Distribution System / Ration Shops. Nobody has ever challenged this definition of 'Poverty Line'.

➤ How can one expect people to live with a few kilos of raw uncooked wheat or rice? As human beings don't we need more? How about one set of clothes to cover our bodies, one set of chappals for our feet, some vegetables, milk and fruit, in our diet? How will we cook without any energy and fuel? Average GDP of an Indian is about US\$ 495 per year per person (1.06 billion people and a GDP of US\$ 525 billion) India has only

1.35% of the World GDP and is 17% of the world Population.

➤ Demands are high but buying power is low. Hence we will need to increase our export related activities by 10 times, as the foreign markets are 75 times bigger than the Indian market.

➤ Our share of world markets or foreign trade is 0.8%, down from 33% ,1000 years ago, down from 27% when the British landed in India and down from 3% in 1947.

➤ Only 5% of Indians understand English, yet most of the websites of the Government of India, State Governments and Public Institutions are in English! While English is a language used in countries which account for about 40% of the world GDP, viz., USA + UK + old British Colonies, yet in India while we talk of Globalization, we are not serious to learn the other languages of the world, e.g., Japanese, German etc, unlike the Chinese youth who are doing otherwise. India is probably at the bottom of the heap, as far as the human development index is concerned . Democracy is to the people, for the people, by the people. If we have to succeed the Citizen has to get involved and participate in Governance

Agencies which have funds will be able to do this well because often the potential customer would not like to spend a lot of intellectual and other managerial efforts in scoping when there is severe uncertainty about funding. That is why, the real role of a technology funder starts at a time before the line shown in the fig.1 as "launch of the project".



Management of Uncertainty From Forecasting Assessment up to Project Realisation

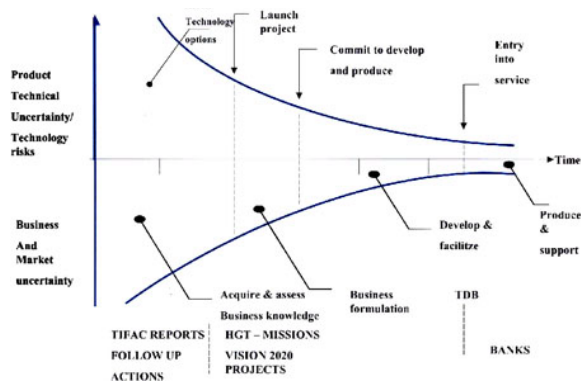


Fig 1

Thus a crucial role of agencies like TIFAC in technology financing is to give options of ideas at an early stage through its reports and other interactions) and allow the potential companies and technology tengerators to enter the left side (broad side) of funnel in a synchronised manner and then be able to launch specific projects and work along till the uncertainties are brought down to minimum. so the technology financing is not a mere exercise in calculating the returns of investment or giving money as per procedures and formats but is more complex.

NRDC is one major facilitator in technology financing. while it can enter in any part of the funnel of fig.1, often it is better done in the middle of funnel when uncertainties are not too high

PATSER of DSIR is another source. again it is better to target patser when you are in the middle level of the funnel. it is a part grant with royalty clauseson the whole technology financing in India is fast entering a phase where industry and entrepreneurs are respected. about 85% projects funded by TIFAC, TDB and patser are for industry – big, small and medium. take advantage of them, enter into development well ahead of time. be not afraid of the broad end of uncertainties as **“the early bird catches the worms”**.

SIDBI is another source but often in the right side (narrow side) of the funnel. It is a loan.

The main strength of India in a benchmark with China, the other emergent global power

India’s basic strengths arise from the quality of its human resources. The top of Indian technologists and management personnel are MNCs the world over. The global competitiveness report 2003-04 of the World Economic Forum has ranked India 37th out of 102 countries as against China’s ranking of 46. The ranking, based on Business Competitiveness Index (BCI), considers a country’s quality of business environment as well as the sophistication of the companies. As regards the quality of technical and management schools, India is placed at number 8. India thus has a formidable strength in its creative and innovative human resource base as demonstrated by the IT experience.

Its attitude to relations with India will be an important driver of the India-China relationship. Good relations between India and China based on mutual respect and equality will be critical to peace in Asia. As peace and stability in Asia will be of vital economic interest to the rest of the World, the advanced democratic countries (EU, Japan, US) must consider how to ensure a stable balance in Asia

And the weaknesses

There are a number of well-known weaknesses, also related to the Indian democratic structure. These include the slowness with which political and economic decisions are taken, tensions with Pakistan and the problem of Kashmir. as well, credible ways have to be found to ensure that the benefits of economic growth are broadly shared and are not confined to the urban middle and upper classes.