INDIA
2061

A LOOK AT THE FUTURE OF INDIA

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Dr. Ajit Ranade
Anil Sardana
Ashish Chauhan
Ayaz Memon
B. S. Nagesh
Dileep Ranjekar
Dinesh Kanabar
Dorab R. Sopariwala
Geet Sethi
Hasit Joshipura
Malini V Shankar
Pavan Sukhdev
Punit Goenka
R. S. Sodhi
Ravi Kant
S. Ramadorai
Sanjeev Aga
Shiv Visvanathan
Shivakumar
Thomas Mathew T.

EDITED BY: Dr. M.G. PARAMESWARAN & KINJAL MEDH

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TABLE OF CONTENTS

PART II - A data analytics view of India in the future

PART III - About Draftfcb+Ulka Group

PART IV - Further Reading

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Anil Sardana is the Managing Director of Tata Power. Prior to this, he has served as Managing Director of Tata Teleservices. An award winning CEO, he is also a recipient of the Asia Power CEO Award in 2006 & India Energy CEO of 2012.

Ashish Chauhan

Ashish Chauhan is the current Managing Director & Chief Executive Officer of the Bombay Stock Exchange (BSE). He was a member of the core team that founded the NSE. He has also had distinguished stints with Reliance Industries Limited, Reliance Communications and served as the CEO of Mumbai Indians, a cricket team in the IPL in the initial phase.

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Ayaz Memon is one of the leading journalists in the country. In a 35-year career, he has edited newspapers like Mid-Day, Bombay Times and DNA, writes on politics, cinema and social issues but his abiding passion is cricket.

B. S. Nagesh

B. S. Nagesh is the founder of TRRAIN, a not-for-profit initiative, working towards empowering people in Indian retail. Before this, he was involved in setting up Shoppers Stop and was the first employee of the company. He was also the first Asian to be nominated in the "World Retail Hall of Fame" in 2008.

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Dileep Ranjekar is the founding CEO of Azim Premji Foundation and is passionate about social and human issues.

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Dorab R. Sopariwala

Dorab Sopariwala is one of the country's leading election analysts, someone who has watched India's electoral process for over 25 years. Educated at the London School of Economics and the Imperial College of Science & Technology, he is Editorial Adviser to NDTV and Consultant with Draftfcb+Ulka and R&P Edelman.

Geet Sethi

Geet Sethi is a nine times world cue sports champion, founder of Olympic Gold Quest and author of 'Success vs. Joy', an inspirational book on mind control. He is also a motivational speaker, much in demand in corporate circles.

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Hasit Joshipura is Senior Vice President South Asia & Managing Director, India of Glaxosmithkline Pharmaceuticals Ltd.

Malini V Shankar

A doctorate from IIT Madras and post graduate in Chemistry and in Forensic Science with a PG Diploma in Management, Malini Shankar is Principal Secretary, Water Resources Department of the Government of Maharashtra and has experience of over 28 years of working in government sector across various departments. She has also conducted several seminars and workshops in the water and sanitation sector across the globe.

Pavan Sukhdev

Pavan Sukhdev is a banker-turned-environmental-economist who led the UN's 'Green Economy Initiative' & recently wrote 'Corporation 2020: transforming today's corporation for tomorrow's world'.

Punit Goenka

Punit Goenka is the Managing Director and CEO of Zee Entertainment Enterprises Ltd. Under his leadership, ZEE retained its ranking at the top in the M&E sector in India and the ZEE brand achieved global recognition. As a board member of the Indian Broadcasting Foundation, Punit played a vital role in the Industry's shift towards digitization.

R. S. Sodhi

R. S. Sodhi, 53, Managing Director of Gujarat Cooperative Milk Marketing Federation Ltd., (GCMMF Ltd.), is a first-batch alumnus from IRMA, Anand and obtained his B.E. (Ag) degree from CTAE, Udaipur. He joined GCMMF in the year 1982 directly from IRMA and rose to the present level of Managing Director in 2010. Shri Sodhi has 31 years of rich experience in Marketing and Sales function within the dairy industry, having served GCMMF in several capacities. He has been instrumental in taking brand 'Amul' to dizzying heights that it has scaled today, enabling GCMMF to retain its dominance in the Indian Food Industry.

Ravi Kant

Ravi Kant is the Vice Chairman of Tata Motors group and has been associated with Philips, LML and Titan in the past. He is on the Board of several companies, international not-for-profit organizations, NID Ahmedabad and is the Chairman of IIM Rohtak.

S. Ramadorai

As the former CEO and current Vice Chairman of Tata Consultancy Services, S. Ramadorai has been a key part of Indian IT journey from a mere idea in 1960's to a mature industry today. He was awarded the Padma Bhushan in 2006 and the CBE (Commander of the Order of the British Empire) by Her Majesty Queen Elizabeth II in 2009. In February 2011, he was appointed as the Adviser to the Prime Minister in the National Council on Skill Development, in the rank of a Cabinet Minister.

Sanjeev Aga

Sanjeev Aga is an alumni of St. Stephen's College, Delhi, and IIM Calcutta. In a business career commencing 1973, he held senior positions in Asian Paints, and Jenson & Nicholson. A former Managing Director of erstwhile BlowPlast, then Aditya Birla Nuvo, and finally Idea Cellular, since 2011 Sanjeev Aga engages in advisory roles for corporate and not-for-profit organizations. He is based in Mumbai.

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A social anthropologist with a Ph.D. from Delhi University, he is a professor at the OP Jindal School of Government and Public Policy. He was a visiting professor at Stanford University, and several other international universities, Professor Visvanathan is the author of several books and describes himself as a 'social science nomad' on Twitter.

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Shivakumar's team's achievements at Nokia India have been case studies at Harvard, ISB and the Ivey School of Business. Shiv is an award winning CEO, writes regularly for business magazines and teaches at some of the best business schools around the world.

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Kinjal Medh

Kinjal Medh till recently was the COO of Cogito Consulting. He has worked on projects across virtually all major categories including FMCG, Durables, Financial Services, and Pharma. Kinjal has been a part of several award juries including the EFFIEs and Cannes and JJMI CUBE Awards. He has also been a speaker at several industry forums. He recently co-authored a book on Brand Building Advertising - Concepts & Cases.

Introduction to the India 2061 Book

It was February 1, 1961. An agency was born in Mumbai, as Bombay was known then, with a group of seven professionals. The founders were setting out on a journey of creating an agency which would be a 'happy place for people to work' where clients will be treated with utmost respect and regard, where the ethos would be of partnership, with employees, associates and clients. The agency celebrated its 50th birthday in 2011 and soon after we started wondering what would India look like 50 years hence. The consulting arm of Draftfcb+Ulka Advertising, Cogito Consulting and Aterii Analytics were entrusted with the task of looking into the crystal ball and predict the future.

Cogito Consulting's India 2061 Report was published as a white paper. The numbers were very impressive and we were opening bottles of the bubbly, when some wise souls in the agency started ringing the alarm bells. We have seen such numbers before and done by equally worthy organizations. But there are too many challenges to be overcome. Will India and Indians rise to the challenge?

One small comfort, was that some of us will not be alive to see how wrong we were, but that really was a small escape clause.

Let us look back the last fifty years or last forty years. On the one hand nothing much has changed around India. The BEST buses are still the same. The Mumbai suburban trains are the same. The trams in Kolkata [not Calcutta] are still the same. But if we look back at our modes of communication, entertainment, travel, décor, buildings, a lot has changed. While we still visit the same temples as we did fifty years ago, we also have the opportunity of doing a remote e-darshan. The cricket we watch today is very different from what we watched some decades ago. In fact, the economy itself has moved from being a primarily agrarian economy to a service driven economy.

What will be the situation 50 years from today? And what are the challenges that India will face? And what will be our responses?

Instead of getting our colleagues at Draftfcb+Ulka Group grapple with these problems, we decided to reach out to subject matter experts for their views. Of the 35 people we contacted, we were happy to have 21 of them participating in this exercise. Our request to each of them was to look at the data tables generated by Cogito Consulting for India 2061 and then write what they saw as the opportunities and challenges the country will face. Will we be able to live up to

the dreams we have conjured? Or will we fall short? What do we need to do to realise this dream?

While this book is not a policy document, we submit that policy makers should take the time, to go through this report. In fact when our first report, which was just projections and forecasts, was published, we did get a request from the Planning Commission for a copy of the report. This time, we have not only put out the numbers but have also meshed them with the grey matter from some of the most fertile brains in the country.

What you have in this book is a collection of articles by experts on what they see as India 2061. What are the challenges? What are the hopes? What are the aspirations?

In his article on Management Education, Ajit Balakrishnan sees the need for management education to keep pace with new organizational realities like a 'post-Fordist' management structure and sustainability issues.

Dr. Ajit Ranade has used a Pac-Man analogy to navigate us through the contours of long-term economic change and has indicated the Indian economy's trajectory will be affected by several factors with three key ones being: Labour, Capital and Productivity.

The power situation is like the water situation and Anil Sardana as an expert in this area, brings his immense knowledge and vision to talk about innovations like wireless transmission and decentralized distributed power generation, pushing power back into the hands of the people, literally and figuratively speaking!

Ashish Chauhan's article on Capital Markets points out that the main thing that drives financial markets is uncertainty, and uncertainty is inescapable even in the future. This will continue to be a market for generating capital as well as create the need for new instruments. Visioning the situation in 2061, he sees full capital account convertibility allowing a Japanese housewife to invest in a small company in Jaisalmer and anytime, anywhere investments becoming the norm.

In a lighthearted article, sports writer and editor Ayaz Memon predicts a multi-sexual cricket game 50 years from today.

B. S. Nagesh, while amplifying on the multitude of retail options, actually brings

alive the scenario by imagining a family party covering four generations from multiple locations all being present in one room.

Dileep Ranjekar's article on primary school education points out that digital knowledge sources have made education by rote redundant. Thereby, demolishing one of the key attributes of Indian education today! Going forward, he visions Indian schools as leading the way for a society with strong values in 2061.

In his article on Taxation and Fiscal Management, Dinesh Kanabar interestingly points out that a sound economic system is vital for securing India's fiscal position. He brings to light a plethora of challenges that needs to be addressed to ensure economic sustenance over the long term.

As the world's largest democracy becomes even larger and more complex, Dorab Sopariwala takes the reader right into 2061 by going so far as to name new states that may get formed, new political parties and the electoral system in that era.

Geet Sethi, starts the article by predicting the number of medals that India will win at the 2060 Olympics, but more importantly goes ahead to make a strong case for sports as one of the most important means of fostering community development, accelerating integration and promoting social inclusion.

Healthcare veteran Hasit Joshipura predicts the use of technology in the Healthcare Environment. In his article, he has put forth interesting future trends like possibility of replacing a faulty organ, pretty much the same way as a faulty car part is replaced.

The water situation is already topical, critical and highly emotional in many ways. Malini V Shankar raises the issue several notches by anticipating huge social impact resulting from a steep rise in demand and the helpless dependence on finite resources.

Environmental expert Pavan Sukhdev's article on the ecology and environment similarly makes a case for much more immediate action and impact on this issue, as early as 2021 rather than wait for 2061. Highlighting the interdependence of four key areas of freshwater, food, ecology and rural poverty, he urges us to make sustainable small holder farming as one of the foremost priorities in our policy targets.

The early impact of multiple screens and audience control on consumption of entertainment is already visible. Punit Goenka, foresees a coming together of social media and higher content integration as well as individualization. Success according to him would depend on the channel's ability and willingness to get more adventurous and innovative in terms of content and form.

GCMMF's [Amul] chief R. S. Sodhi has highlighted that the ever growing problem India would face would be the gap between 'mouths to feed' vs. 'hands to produce'. Through his article, he has put forth key opportunities that the dairy sector would offer to overcome the global food scarcity.

The article on automobiles in 2061, written by industry veteran Ravi Kant, raises several issues including fuel, parking, traffic, infrastructure and predicts that personal mobility will be completely redefined by then. Automobiles will not be bought for mobility alone, but more for personal thrill.

In his thought-provoking article on information technology, Padma Bhushan S. Ramadorai stresses on the four most important areas for the country, healthcare, education, sustainability and security. Raising the challenge "what are the risks we are willing to take today to create the India for 2061"!

Telecom industry leader, Sanjeev Aga predicts that from the current sound and sight model, that by 2061, telecom will no longer be only telephony and will evolve to one that helps experience all five senses including touch, smell and taste. It will help re-arrange society in several ways but cautions that while it has the ability to provide tremendous benefits, like any other science, it has the potential to cause huge damage as well.

Noted sociologist, Shiv Visvanathan raises several intriguing questions (for which admittedly, Cogito has no answers, yet!). Increase in urbanization and vertical societies could dramatically change the nature of social interactions and create alternative ideas of identity and community. Its impact on ideology and electoral systems may be immense. In fact, he goes ahead and sows the seed for another book to capture the desires, anxieties and imagination of the 2061 society!

Shivakumar's article on the digital landscape is thought-provoking as he pictures a society that is more individual than collective and at the same time

he harbours the optimism that India will adopt a digital framework that will unite India like nothing else has done so far.

Life Insurance veteran Thomas Mathew's article dwells on the twin issues of a large under insured population combined with the demographic shift to a large population of old people with a longer lifespan than ever! A combination that can have serious consequences on the economy of our country, almost hinting at the fact that every delay in planning for this eventuality would cost us dearly.

These interesting articles in many ways drive home the same point – what we do today will have a significant impact on 2061. So, while some may see 2061 as two or three generations away, the time for decisions, actions and interventions may actually not be so far into the future. And that perhaps is what makes this book important and relevant right away.

We see this book as our humble submission to the thinking that needs to be done if we have to make the India 2061 dream, a reality. We, the editors of the book made every attempt to ensure as many sectors are covered by our guest writers. However, we have not been able to get thought leadership articles on a few key sectors like agriculture, roadways, railways, corporate governance, packaged goods, consumer durables, housing, infrastructure, films, media, and many more. We do hope this book will act as a stimulant to our reluctant guest writers and their articles can be part of the next edition of the book. Fortunately, the book does not have a close shelf life and we will hope to bring out a few updated editions in the years to come.

We are indeed grateful to each of our contributors for their generosity and time. In some way, we are all kindred souls and we all want India to be a better country for our children's children's children. This book would not have been possible without the support of our guest writers. We dedicate this book to them.

- Dr. M. G. Parameswaran & Kinjal Medh

Experts' view of India in the future

INDIA IN 2061

Ajit Balakrishnan

Ajit Balakrishnan is the founder and CEO of rediff.com, an internet company listed on the New York NASDAQ market. He is a graduate of IIM Calcutta where he also now serves as Chairman of the Board of Governors. He is currently Chairman of the Govt. of India, Ministry of IT Committee on Internet Governance and Proliferation and chaired a recent Committee appointed by India's Ministry of Human Resource Development on 'Research and Faculty Enhancement at the IIMs'. He is a member of the Central Advisory Board on Education. He is the author of the book 'The Wave Rider - A Chronicle of the Information Age' published by Macmillan. His blog is at blogs.rediff.com/ajitb.

MANAGEMENT EDUCATION

In India of 2060, roughly a half century from now, what kind of management education are we likely to need keeping in mind that by then we will be, by far, the most populous country in the world, our citizens will be all literate, Indians will have a life expectancy on par with the West and our economy will be $57 trillion, which besides being many times larger than what we are today will also make it among the largest in the world.

What are the challenges management schools will face in dealing with this new India?

To start with, today's universities, not just in India but also elsewhere in the world are built on the industrial or 'Fordist' organization principles that Henry Ford employed in manufacturing his Model T cars in the early 20th century. Fordist organizations are geared to the production of standardized products. Henry Ford famously said, "Any customer can have a car painted any colour that he wants so long as it is black". These organizations work on the principle of economies of scale where unit costs reduce as the volume of production and the volume of inputs used increase. Work is broken down into different elements conducted by different classes of workers. Management is hierarchical with decisions being made at the top and passed down a line of command.

So, universities the world over administer standardized entrance tests which attempt to take as input a standardized student, use standardized textbooks and use standardized 'board exams' or 'university exams' to grade the exiting students.

Post-Fordist organizations, on the other hand, have a set of "core" workers who are highly educated and reasonably well paid. But non-core workers and functions are outsourced. The products of these organizations are adaptable to the needs

of customer segments and rapid feedback is used to modify products and their accompanying services. Work is accomplished by de-centralized, empowered teams of workers. These organizations extensively depend on partnerships and alliances with other organizations with complementary competencies. Silicon Valley technology companies are archetypes of this form of organization.

IIMs in India are even today organized on post-Fordist lines. Faculty members are loosely grouped along expertise clusters such as Behavioural Sciences, Finance, and Marketing. Management activity is done through "Programmes". Some of these programmes are organized around the main courses offered, for example, the "PGP Programme" deals with the flagship two-year full-time residential course, the "MDP Programme" deals with the short-term training programmes for working managers. Other activities are organized along classical line functions such as Admissions and Placement. People heading these "programmes" are faculty members who continue carrying their teaching and research activities even as they "Chair" these programmes. They occupy these positions on a voluntary basis and for two-year spells. On completion of which they go back to their normal teaching and research engagements. They don't get paid anything extra for doing these "management" jobs.

Successful senior managers from industry and government who serve on IIM Boards, watch IIMs function as described above and are driven to their wits end. No sooner does a Chairperson of an activity area acquire the expertise needed to manage it, then his two-year term is over. The next Chairperson, often a faculty member who has had no prior managerial experience has to start the learning cycle all over again. Some of these programmes are quite large scale. For example, the person chairing the CAT programme has to oversee the testing of 250,000 odd applicants spread over multiple cities. The person chairing the Management Development Programmes has to help create, market and run several dozen courses that train 3000-4000 managers a year.

External observers often ask, by rotating management are you not foregoing the performance enhancement that comes with the experience of managing the same function for a long period of time? What about the role of financial incentives? Why will people take on additional responsibilities if they are not paid more than their usual?

Yet, defying all such management theories, the IIMs flourish. Applicants flock to enter them, students love the time they spend there, recruiters from the world's top companies snap up a 400+ graduating class in a few days when placement opens. And

to top it all, many of the IIMs deliver a 25% profit-to-revenue ratio, a profitability level achieved by only a tiny minority of companies listed on the Bombay Stock Exchange.

What explains this paradox?

The answer perhaps is that by trial and error, the IIMs have evolved an organizational system that may be the prototype of post-Fordist organizations. Such organizations

> *The IIMs have evolved an organizational system that may be the prototype of post-Fordist organizations. Such organizations may be the norm in the Information Society that the world is gradually sliding into..................*

may be the norm in the Information Society that the world is gradually sliding into. In this new type of organization, work is not deskilled by excessive division of labour; all workers are assumed to be multi-skilled. There is no permanent class of people designated as "leaders" and others permanently designated as "followers". Like a cricket team, everyone gets to bat. Being reasonably well-paid is important, but extra performance is not drawn out through extra pay; rewards are more intrinsic: approbation from peers, satisfaction by contributing to institution building.

This trend towards a post-Fordist way of organizing may in all probability spread throughout the world of management schools.

The second and perhaps most counter-intuitive thing that management schools will need to learn and then teach its students and then the rest of Indian industry is the lesson of "sustainability"- learning to treat nature with respect and run organizations that are not resource intensive.

"Sustainability", is for most people a concept easy to accept at a theoretical level but not as easy to practice. Ask me, whether humans ought to live life in a way that we leave enough of the world's natural resources for future generations, I, like you, will immediately and unconditionally agree that we should. Press me a little more and ask me whether I am ready to give up my daily one hour car commute and use Mumbai's public train and bus system, I will start to squirm and add conditions. If only trains and buses were less crowded, if only there was air-conditioning, if only they were more frequent, if only! There is little surprise that the United States leads the world

in spewing into the world's atmosphere the carbon dioxide that makes us all sneeze and get headaches, but the Chinese and us Indians, I understood, are impatiently waiting in the wings to take over leadership from the US. The PPM (parts per million) of pollutants in the air is as much a badge of superpower status as the GDP. Buildings apparently are the biggest culprits, using up as much as 40% of the energy consumed. One can only conjecture the future if at the present level of a billion population, we Indians have started to suffer from water scarcity, imagine what will happen when it is 2060!

Solutions and counterpoints to these issues are often debated. Some suggest the capture of the vast outpouring of carbon dioxide and storing it in underground tanks, said some - but what would we do with these tank farms in the future, ask others. Switch to solar energy, but isn't the energy we expend to produce solar panels much more than that saved by them? Use algae to do photosynthesis, but how much energy can algae produce? Increase taxes on polluting processes, but are politicians ready to risk the ire of the public with more taxes?

Some suggest that the solution to the depleting natural resources problem is merely consuming less, says Paul Shrivastava, an IIM Calcutta alumnus, and now the Distinguished Professor of Sustainable Enterprise at Concordia University. "De-grow", he says, accept a life of voluntary simplicity.

Stuart Hart, best known for co-authoring The Fortune at the Bottom of the Pyramid, is sceptical about wind farms, solar farms and clean coal. These large scale and centralized efforts in the United States are based on government incentives and, according to him, are not inherently viable. The answer, he says, are small scale, decentralized, locally self-sustaining efforts.

If sustainability is going to be a key issue in the life of managers, a half century from now, who will be the stock market darlings of that time? Can we in 2013, for example, visualize a time when companies like Bombay Burmah, Kohinoor Mills, National Rayon, Scindia Shipping, Indian Iron & Steel were the stock market darlings of India? That's right; when I graduated from IIM Calcutta in 1971, these were truly among the darlings of the Indian stock market.

Fast forward to the present and see who the current favourites are: a clutch of software services companies, a couple of consumer banks and some mobile phone operators.

See the difference in the favourites and see how India has changed and that change is

not just in stock market terms. Bombay Burmah was a plantation company and in the 1970's there were many such widely admired growers of tea and coffee and which young men of that time aspired to work for. Kohinoor Mills was one of the several dozen textile mills that dominated the industrial landscape of Bombay. National Rayon was as close to being a technology company as that era could accommodate.

It is tempting to conclude that the rise and fall of companies merely mirrors the rise and fall of industries. But then, the tea and coffee plantation companies falling out of favour with the stock markets could not possibly be because we have cut back from drinking tea and coffee; if anything, Indians consume more tea and coffee and at higher prices than ever before. We even consume them at upscale places like Café Coffee Day, Barista and Starbucks and no longer at cheap wayside tea shops. And, at least on this logic, there is no reason for textile companies to decline as far as I can tell, we spend more money on clothes and bed linen and bath towels and replace them faster than we used to.

Maybe it is that intangible called "quality of management". Indian Iron & Steel was already a famous steel company when the founders of current stock market darlings such as ArcelorMittal and Jindal Steel were still schoolboys. Maybe, the management of Indian Iron & Steel spent more time in promoting art than in running their business.

There are of course those who say that the blame for the decline of Indian Iron & Steel and, for that matter, the decline of Bombay's famed textile mills of which Kohinoor Mills was one, could be laid at the doorstep of the militant trade unionism of the 1970's. It is true that Indian Iron & Steel had to contend with the rise of communism in Bengal and the Bombay textile mills had to battle Dr. Datta Samant and his union. But then, how does one explain that Tata Steel which is located in approximately the same area of Eastern India as Indian Iron & Steel battled through that era and is still a stock market darling?

The casual observer may notice the preponderance of IT services and Mobile services companies among today's stock market darlings and conclude that the mantra today is all about being in the technology-related industries. But then, how would you explain the imposing presence of a coal miner (Coal India) and a cigarette maker (ITC), two industries that date back to the Industrial Revolution, in the list of today's darlings?

Such paradoxes don't seem to be restricted to India. The darlings of the United States today include oil companies like Exxon and Chevron, venerable companies like Johnson & Johnson and P&G as well as information age companies like Amazon, Google and Facebook. I guess you could explain this by saying that between the many hours that we chat with friends online, play with wondrous iPhone Apps and buy eBooks, we also need to occasionally take time off to wash and bathe using products from these old economy companies.

If you had gathered my class of graduating bright sparks at IIM Calcutta in 1971, many of who went on to celebrated careers in industry and academia, and asked us to predict the kind of companies, or at least the kind of industries that would be stock market darlings twenty five years later, I wonder what list we would have come up with. As a hint-answer I can only tell you this: at that time, the microprocessor had not yet been invented and consequently so also not the PC, Microsoft was yet to be found, the mobile phone creator Motorola's main product was still walkie talkies (the kind you see in old World War 2 movies) and the Internet was yet to be conjured up. We would, in all probability, have conjectured better and sexier companies in the industries then in vogue - companies making tin cans (Metal Box), bread (Modern Bread), machine tools (HMT), not to mention plantation, steel and shipping companies.

> *For that matter, if we sat back today and imagined who the stock market darlings of the year 2060 would be, what are we likely to come up with?...............................*

For that matter, if we sat back today and imagined who the stock market darlings of the year 2060 would be, what are we likely to come up with? I suspect, we will imagine more and sexier companies in the internet, financial services and biotech industries. And, hard as that is to believe, we could be dead wrong.

What kind of education would it take to be a great manager in 2060? Here again history may provide us some pointers. There was a time when getting an entry-level job in India's corporate sector meant having a public school (Doon, Lawrence etc.) education on your resume and references from uncles in senior positions in similar companies. Interviews for jobs were held at locations like the Bengal Club, the

Delhi Gymkhana or the Willingdon Club. Employability in that era meant being able to negotiate your way through such staple requirements. Mercifully, the era that demanded such employability skills died in the 1970's with the "box-wallah" companies that demanded them - Metal Box, Binny's, Burmah Shell, to name a few.

The advent of the IITs and IIMs brought a different notion of employability-students who could run a new steeplechase: score at the very top in nationwide objective type tests, negotiate the group discussions and then survive the two-year grind that followed.

The French sociologist Pierre Bourdieu says that, what an educational institution imparts more than mere knowledge is "Cultural Capital". Cultural Capital is an asset that an individual possesses and on which an individual can get returns on just like the returns that a person with Financial Capital can and includes, among other things, the way a person speaks, the way he dresses and the educational credentials he possesses. Bourdieu's view was that exactly what types of Cultural Capital was deemed to be valuable in a society in general and in the job market in particular was determined by the powerful people of that society. Isn't it interesting to conjecture what kind of cultural capital will be in demand in 2060?

ENDNOTE: The themes in this article have figured from time-to-time in my fortnightly column in Business Standard and in re-shaping these ideas into its present form, I have greatly benefited from the comments that readers sent me.

Dr. Ajit Ranade

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INDIAN ECONOMY

History is like Pac-Man, the eponymous hero of the video game. Just like he relentlessly gobbles up the dot-like pellets, History too is a voracious consumer of pellets, we call "events". An event has but a momentary existence before it vanishes into the vast innards, and becomes part of History. The job of a futurologist is to gaze at, and describe all the pellets before they get gobbled up. Looking to India at 2061 is such an exercise. Of course, History is not a jealous hoarder of her treasures (the "events"). She reveals lessons from the past, only if you are willing to look. Often these lessons help us predict and anticipate the future, the part that has not yet been devoured by History Pac-Man. This is a process of linear extrapolation. It is also an implicit application of the maxim, that history does repeat itself.

In this essay, we will confine ourselves to extrapolating the economic aspects of India into the future. Perforce we will be silent on many other fascinating aspects of life of the nation, such as science, education, health and culture. Of course, some (if not many) economists believe that economic issues pervade all parts of our lives. These people are the champions of extreme economic determinism, who feel supremely confident on prognosticating on every aspect, purely based on economic analysis. We shall desist from such overreach.

1. Unity of India is Robust

India in 2013 is already among the top ten economies, in sheer size. If size is measured in dollars, adjusted for changes in purchasing power across different countries, then India is the third largest economy in the world. When India was born as an independent nation in 1947, the world had around 120 other countries. Today, the United Nations membership has more than 240. So, India's ascent in global ranking has more potency, simply because the class size is bigger! Of course, it is not as if the world discovered new landmass. It is just that in the past seven decades, old and

new nations broke up into smaller parts. Even our twin, born in 1947 broke into two. Our erstwhile close friend, the Soviet Union broke into ten pieces. As late as 2013, a new nation was born out of Sudan. But India has remained intact, in one piece. Given its immense diversity on every conceivable dimension (race, religion, language, cuisine, culture), this indivisibility itself is a remarkable thing. Moreover it has remained united despite a political framework of multiparty democracy, which has inbuilt fissiparous forces. There is little prospect of civil war, or secession in the coming half century. In fact, there are many centralizing forces, which create national ties, making it less likely that India will break up. One such development is the creation of a common economic market across the length and breadth of the country. The rollout of a nationwide goods and services tax (GST) system, which will overcome inter-state barriers of trade and commerce will act as a binding glue for economic unity. This consensus among all 35 states of India has taken a decade, but is to be celebrated as a landmark in India's federal setup. The GST consensus involved surrender of semi-sovereignty by the states, in exchange for larger welfare of the nation as a whole. That this consensus was obtained without coercion, in a democratic setup is remarkable. Such political achievements lend support to our assurance that breakup of India is an extremely remote possibility.

> *The rollout of a nationwide goods and services tax (GST) system, which will overcome inter-state barriers of trade and commerce will act as a binding glue for economic unity…………………………………………*

This is not to say that there may be proliferation of sub-national entities. As more power gets devolved to lower strata of governments, the administrative manageability becomes a constraint. Many states of India, if they were independent countries, would be among ten most populous countries. Uttar Pradesh would probably be fifth and Maharashtra seventh largest nation. Hence, it is quite likely that in the next five decades, larger states will break up into smaller ones. The birth of states like Chhattisgarh, Uttarakhand and Jharkhand is testimony to this tendency, and feasibility. It is possible that India will be made up of fifty states, and maybe eight hundred districts. The spirit of empowering lower tiers, like village and town councils will manifest in many tangible ways. Already

much of government's welfare spending is getting routed through the lowest tier, i.e. the village panchayat. This phenomenon will only get stronger. It is quite likely that local governments will have a greater say in running schools, law and administration and building, upkeep and provision of local infrastructure. The national level constitutional mechanism of the Finance Commission will ensure that a greater share of tax revenue automatically devolves to lower tiers.

> *It is possible that India will be made up of fifty states, and maybe a eight hundred districts..............*

As for tighter national integration, there are several interlinked factors, which minimize the chance of the nation crumbling into smaller pieces. The India nationhood experiment is unique, because it has allowed citizens to maintain multiple identities. India has often been called a salad bowl, rather than the melting pot. The latter leads to eventual homogenous identity, but the former allows distinctions to be sustained.

One factor weaving the nation together, is the movement of labour, which is also a decisive factor. India has one of the largest intra-country labour migration in the world. Large scale movement of labour, and their connection via the remittance economy, to their homelands, also weave uniting threads in the quilt of the nation. The free movement of labour is a remarkable feature guaranteed by the constitution. It has had a dynamic effect in the evolution of India. Despite being tested by occasional political turbulence caused by regional parties agitating against "outsiders", this right to free movement has had a robust existence in this vast nation.

2. Evolution of Economic Size

The prediction of the economic size of India in 2061 is a relatively straightforward exercise. We know from the authoritative work of Angus Maddison, the renowned British economist, that India and China made up more than 50% of global GDP until the advent of the Industrial Revolution. India was the second largest economy even as late as 1870. The historic large share of India and China, commensurate to their population share is expected to be restored in this century. More recently, the publication of the BRIC report by Goldman Sachs (and its technical revision by the IMF), as well as several other similar reports point to resurgence of India's economy.

If we think of the economy as a machine in a black box which produces output called "GDP" and takes inputs called "labour" and "capital", it is easy to understand the logic of the BRIC report. India's labour force is expanding at around 2.5% per annum, and capital is expanding at a rate of about 3%. The latter is aided by India's high savings rate. Both these are structural features of the economy, unaffected by macroeconomic shocks, or political or business cycles. In addition to labour and capital stock, is the phenomenon of

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productivity. If one unit of labour combined with one unit of capital produces one unit of GDP, then in course of time, a productivity improvement, means higher output per unit of inputs. Productivity improvement is a consequence of better education and innovation, which are essentially enhancement to human and physical capital. Together these three factors, labour, capital and productivity are sufficient to forecast the economy's trajectory. To express the economic size in dollars, we need additional assumptions about how the exchange rates will evolve. (We also need to adjust for inflation.) Assuming a slightly appreciating bias of the rupee, the Indian economy will be roughly 60 to 70 trillion dollars, in today's prices. That's roughly four times the size of the present USA. It will be second or more likely the third largest economy, and the largest in terms of population.

Demographic projections are more reliable, since they are based on mortality tables, which have long-term stability. Human capital projections are harder, since they have to assume educational achievements, on top of demography. Even with these caveats, it can be asserted that India will be a very large economy by 2061. It may however be stuck in the "middle income" category. That is, the per capita income of Indians will remain in the middle quartile of the world. Very few economies in modern history have been able to make the transition from low income to very high (per capita) income in two or three generations. Japan

and South Korea are outstanding examples. But there are many other economies like Brazil and South Africa, who for long periods saw their per capita incomes stagnating. This may be true for India and China as well, although Chinese per capita income may be considerably higher than India.

3. Some Demography Changes and Implications

The changes in India's demography, even though predictable, will lead to some radical changes. These are termed "radical" only because it produces a picture quite different from the current circumstances. The median age of India is currently 26. A large proportion of those below the age of 26, are less than 15 years of age. But by 2061, the median age will move rapidly to 38 or 39. This acceleration is

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due to several factors. Life expectancy is constantly increasing, and will probably reach 80. The total fertility rate (TFR), i.e. the average number of children born to a woman of childbearing age will go down. The replacement TFR is 2.1. This TFR has already been achieved by states like Kerala, Tamil Nadu, Maharashtra, West Bengal and ten other states of India. India as a whole will reach 2.1 only by 2060. TFR reduction is aided by factors like rise in female literacy and female participation in the labour force (i.e. getting into paid work, as against unpaid work at home). TFR reduction has been unexpectedly fast in many states of India. This population stabilization is beneficial, because it then leads to rapid increase in per capita income and standards of living. Worryingly, the TFR for the country is stuck at 2.6 in 2011, and half the population live in states which have much higher TFR. This means that per capita income increase will be more rapid in the low TFR states. This will lead to increasing inter state, or inter regional inequality.

The phenomenon of ageing will also become more pronounced. India's population will go up only by 50% in the next 50 years, but the share of elderly will be up by 200%, reaching around 350 million by 2061. The elderly tend to

be net consumers, since they are "living off" their savings. In India, unlike in the West, a larger proportion of the elderly are poor, so their dependence on the state is greater. In the West, the elderly are relatively more wealthy, than the general population, and hence are often target of political canvassing. The rise of elderly population provides an opportunity for businesses that cater to their needs and lifestyle, but the size of the market will be tempered because of large presence of low income people. Resultantly, the responsibility of their care, on the state will be much greater.

4. Public Finance

Most of the projections to 2061 rely on demography. For the government's treasury too, the demographic phenomenon portends good fortune. With the rollout of consumption-based taxation in the form of GST, there will be tax buoyancy. With greater integration of information technology and tax administration, more people will be in the tax net. India's tax to GDP ratio at 11% is quite low among its peers. This is sure to rise in the coming decades. If agriculture income becomes taxable, through a constitutional amendment, that too will add to the ratio. This will also mean that the government debt to GDP ratio will not rise alarmingly. It is likely to stay well below 90%. We will also see more devolution of taxing powers to lower tiers of government, especially city councils. Local infrastructure provision will become primary responsibility of local governments, who will depend on their tax base or their own debt financing capacity.

However, these beneficial trends are also offset by contrary factors. India is a fractious democracy with more than 1200 political parties. Democracies have an inherent bias to produce fiscal deficits. This is because there is tremendous pressure from interest groups on spending, but there is no vested interest for higher tax collection. This feature is compounded in Indian context, since electoral victories are based on wafer-thin margins. Hence, there are often multiple (three or four) hopeful aspirants, with competing spending agenda. Since no national party can realistically hope for an absolute majority, it has to depend on allies to form governments. In the age of coalitions, the impact on fiscal health is adverse. Even with greater transparency and accountability in our electoral systems and the functioning of the government, the tendency toward fiscal discipline will be weak.

The best antidote to weak fiscal discipline is to increase the share of spending on public goods. This includes conventional things like physical infrastructure: roads,

bridges, public transportation. It also includes spending on primary health and education, since these have spillover benefits for society at large.

5. Worry Points: Energy, Resource Sustainability, Urbanization

India will have 21% of the world's population but only 2.4% of its landmass, and less than 2% of fresh water resources. In the coming decades, the per capita consumption of energy will rise at least as fast as GDP growth. This is much faster than most of the developed world. This will require energy sources like coal, oil and gas, and renewable sources like wind, solar, nuclear and biomass. India's current per capita consumption of electricity is below world average. This will need to rise faster than world rates. The world crossed an important landmark in 2010, when more than fifty percent of the world's population was located in cities. In India, the degree of urbanization is only 30% and will rise more rapidly than rest of the world. Urban dwellings have a much larger requirement of energy and resources. Hence, in the next 50 years, India will have to grapple these exponentially growing challenges. Aggressive pursuit of the Sustainability Agenda is called for. Water resources can be considerably enhanced with recycling. Cropping decisions have to be based not on maximizing production, but maximizing yield per unit of water. Similarly, industrialization too needs to focus on maximizing production per unit of electricity. Of course, maximizing employment (and hence focus on labour intensive industries) should remain a focus too. The management of energy and water probably are the greatest challenges in India's journey to 2061.

6. Concluding Thoughts

History's Pac-Man will quickly gobble up events, and indeed all the years from 2013 to 2061 in a trice. India is a much older civilization than it is a nation. In the life of a civilization, fifty years is but a tiny dot, the "pellet" that the Pac-Man will devour. Change will happen, but will be overshadowed by continuity. Discontinuous change is unlikely. But seen from the perch of 2061, it will still be a dramatic progress. It is like the ascent of a mountain along its slowly rising contours. The climb is gradual, often imperceptible. But a glance back from the summit displays some astonishing panorama. The world's second largest economy, a strong union after 114 years of Independence a large and vibrant middle class, a fractious and rambunctious democracy, a thriving industrial hub of low cost innovation, are but some of the descriptors of that panorama. For more details, we have to wait till 2061.

Anil Sardana

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POWER SECTOR

2061 is 50 years away - time sufficient for a transformation of India as a country, its economy, the demographic profile and the infrastructure in the country. In addition, global forces in the energy and environment sector will impact India's energy and

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power sector. The energy and power sector in India will hence need to respond to the growing and more evolved needs of the India of 2061 and will also be driven by the economics of energy globally and pressures related to the environment.

It also needs mentioning that given the capital intensive nature of the sector and plants having a useful life of 25-40 years, the power sector of 2061 will largely be determined by technology developments in the next 15-20 years.

Given this context, I believe the following five key forces will drive the future of the Indian power sector:

a) India's growth as an economy and the focus on giving electricity to all
   i) Economic growth will drive a massive increase in power demand, as per capita consumption of India can be expected to be benchmarked with developed economies, say 7,000-7,500 kWh per person from 800 kWh per person today and compared to 28,000 kWh per person in Norway and 16,000 kWh plus in the USA.

ii) Rapid urbanization of India will drive higher peak demand for power, something like 1000-1250 GW of capacity compared to 215 GW now. Though, the per capita consumption would increase, the load factor would be such that capacity need is contained as also most of the appliances would gain at least 50% in efficiency by then.

iii) Transportation would largely shift to electrically driven public transport as well as cars, buses, etc. and these would be through wireless charging stations thus giving life to moving with ease & without fear of distance to be traversed before charging. Also, public goods transports would follow hub & spoke models of auto-movements driven by robots & in special electrically guided tracks in standard & fixed corridors.

iv) Affordable electricity to all that will drive innovation in decentralized distributed generation, which would be very fascinating as people would be able to manage their means without indulgence from municipalities, be it electricity, water, sewage, health (largely tele-medicine based) & education, all of this will be managed independently by people.

b) Policy maturity to ensure the sustainable economics of the sector as a whole, more so on Energy Security.

c) Environmental pressures - that will drive India's generation portfolio as India becomes one of the top GHG emitting countries & thus would lay emphasis on decentralized distributed formats of generation which will include biomass based, renewable based, specialized storage arrangements as also hydrogen based systems.

d) Technology evolution globally driving cleaner and more efficient solutions including going beyond wind and solar to hydrogen as an economical fuel for those times.

e) Human Resource and enabling infrastructure for the power sector to cater to newer & decentralized format of generation and retail. In cities, one would see wireless charging corridors where cars would be driven by batteries and would be charged without wires.

India's growing GDP contributing to an increasing need for electricity

India today is the fifth largest in terms of its power generation and has 215 GW of installed capacity (as of Mar 2013). India's per capita, power consumption at

800 kWh per capita is quite low compared to the world average of 2800 kWh per capita. Developed countries such as United States are at levels of 16000 kWh per capita.

Given that the services sector in India has grown faster than the manufacturing sector, India has seen a gradual decline in the elasticity of power with respect to GDP. This trend will continue as India becomes a predominantly services-oriented economy. As India's GDP grows by 5-7 per cent per annum in the next 50 years, its installed capacity (GW) will need to increase to almost 1000-1250 GW by 2061 and reach power consumption levels of 7000-7500 kWh per capita - almost 10-fold increase in both installed capacity and per capita consumption.

This growth in capacity addition by ten times in the next 50 years translates into an average capacity addition of 15 GW every year for the next 10 years and 25 GW every year from 2022 to 2061. Compared to the achievement of 70 GW in the 11th Five Year Plan, this poses a significant challenge for the country in terms of land, water resources, fuel supplies, logistics in terms of railway capacity, etc.

India is the 5th largest power producer in the world, however, has a very low per-capita energy consumption

Countrywise power generation *(TWh)*
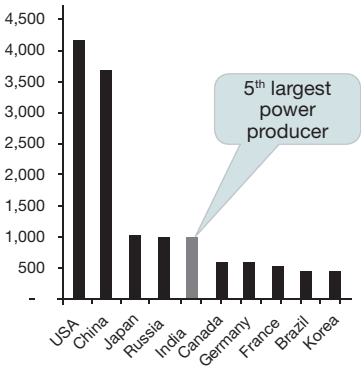
Per-Capita power consumption *(kWh)*
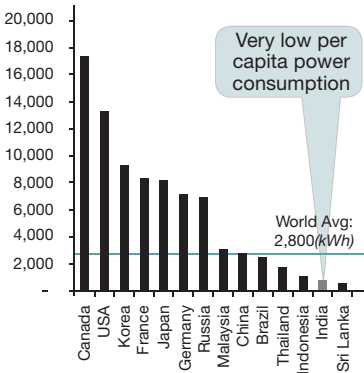
Note: 1 TWh=10⁹ kWh

Electricity for all

While this growth in demand does pose challenges in supply for the Indian power sector, a contrasting challenge is electricity accessible to everyone in the country. According to IEA, approximately 400 million people in India do not have access to power currently. On a country-by-country basis, that is the

highest scale of population without access to electricity in any one country. In fact, the population in India without access to electricity is more than the total population of the United States.

By 2061, we would expect that the Indian power sector and the Indian government would have found sustainable solutions that can make decentralized solutions affordable and reliable.

Rapid urbanization of India driving higher peak demand
While we have this large unmet demand, the nature of the demand is changing as India becomes more urbanized. Research by McKinsey Global Institute estimates that 40 per cent of India's population is going to be in cities by 2030 (up from 30 percent in 2008). Coupled with a growing population, this means that India will have close to 600 million people in urban areas by 2030 (an increase of 75% from current levels). Five states (Maharashtra, Tamil Nadu, Gujarat, Punjab and Karnataka) are expected to be more than 50 per cent urbanized by 2030. By 2060, a lot more states will fall in this category and India as a whole is expected to have 55 to 60 per cent of its population in urban centres.

This transformation of India as a nation has important implications for the power sector. Higher urbanization will lead to higher peak load demand - an area where the Indian power sector today is weak. India today has a peak power deficit of close to 10 per cent. In addition, development in other sectors such as mass-scale electric car usage in India by then will put additional demands on the power sector - hitherto being served by liquid fuels such as diesel and gasoline.

Policy maturity to ensure the sustainable economics of the sector as a whole
The challenges that the Indian power sector faces are well documented. Some of the major challenges facing the sector are - the financial condition of the State Electricity Boards and Distribution Companies, the non-availability of coal to meet the growing installed capacity in the country, the challenges in usage of imported coal driven by lack of carbon parity between domestic and imported coal, challenges in land acquisition and lack of a streamlined process for environmental clearances. Over the next 50 years, India will have to solve these issues to enable the scale up of the sector. Some of the possible solutions that may emerge in the different areas are:

Fuel

- By 2061, we may expect coal mining to be fully privatized with the increased pressure on fuel supplies to feed India's growing generation capacity.
- Parity in pricing (at a calorific level) between Indian and imported coal – which will open up the usage of imported coal in India thereby helping set up more coastal plants.
- New fuel in the form of Hydrogen will form part of energy mix, as also storage system alternates would evolve and would be a competitive source for fuel displacement.

Increasing the basket of fuels to expand our generation options

- As India's generation capacity increases, the country needs to focus on energy security and expanding the basket of fuels and fuel sources. For example, India has only limited usage of gas as a fuel. Gas supplies in India have been hit by two challenges - inadequate gas availability and mismatch between pricing of domestic natural gas and LNG options globally. Several options for boosting natural gas supply have been considered over time. Over the next 50 years, if the geo-political situation is amenable, the Iran-Pakistan-India gas pipelines can increase the supply of gas to the country.
- Decontrol of gas pricing (from Administered pricing mechanism) can enhance usage of imported LNG and take advantage of the dynamics in the natural gas sector driven by the development of shale gas in the US and possibly in China.
- India also has shale gas deposits estimated at about 500 trillion cubic feet (as against 35-40 trillion cubic feet of natural gas). Over the next 50 years, as India explores, development is expected in extraction of Indian shale gas reserves reducing the country's needs for gas imports.
- Inter-linking of rivers will provide opportunities for small hydro across the country.

Transmission

- India already has a complex transmission network and is expected in the next 1-2 years to have a fully integrated national grid interconnecting all the regional grids in the country.
- Over the next 50 years, the transmission capacity will need to keep pace with the growth in generation capacity as well as the controls needed to ensure a stable grid will need to be scaled up.
- We can also have a higher degree of international collaboration in the power sector with large international transmission projects in the SAARC region transmitting power to India from neighbouring countries such as Nepal, Bhutan.

- We may even witness a fully interconnected grid between countries in SAARC and ASEAN regions on the lines of EU today.
- Portable grids may become the order of the day.

Distribution
- A structural solution will need to be found to ensure the robust health of the state electricity boards.
- Over the next 50 years, we will find more states opening up the sector to private players at first in urban centres so as to improve the efficiency of distribution through reduction in losses.
- Also an important part of this puzzle is to reflect the true cost in the chain energy-water-food i.e. Free or heavily subsidized power to the agriculture sector coupled with water that is not priced/accounted for appropriately can make the chain unsustainable. As India matures as an economy and the standard of living improves, steps will be taken to address this imbalance.

Environmental pressures that will drive India's generation portfolio as India becomes one of the top GHG emitting countries

At current levels, India is ranked third in terms of carbon emissions after China and the United States. While the per-capita emissions for India are quite low (1.6 as compared to 17.6 for the US, 6.2 for China and 4.9 as world average), pressure on India both from within public opinion in India as well as internationally will grow as India scales up its power generation capacity.

Given the abundance of coal in the country and the lower costs, coal-based power generation will continue to have a significant share of generation (40-50%).

> *India will need to find solutions to both reduce demand (through efficiency measures) as well as driving cleaner sources of generation in the country...*

Thus India will need to find solutions to both reduce demand (through efficiency measures) as well as driving cleaner sources of generation in the country. One can certainly expect renewable sources to contribute a larger portion of power generation in the country - most technologies for renewable power whether solar,

wind, biomass, etc would be better than thermal in terms of levelized costs by that period, hence bring the focus on making these solutions scalable to meet a large portion of the incremental demand.

Nuclear power will need to evolve and address safety concerns to enable it to grow significantly as a means to provide cost effective base load power. Alternate to the current large scale nuclear plants are micro-nuclear plants that are being evaluated.

Technology as an enabler

Technology over the next 50 years can transform the shape of the power sector. Fifty years back, none of us could have foreseen changes such as the internet, mobile telephony, air travel becoming economically feasible for a large segment of the population, etc. Over the last 50 years, power sector has seen development in technology such as development of solar photovoltaic, smart grids, supercritical coal based plants, etc. However, the pace of innovation needs to be multifold to address the conflicting demands of rapid electrification of the developing world, climate change, stresses on land and water as finite resources.

Some of the developments that may transform the face of the sector are as follows:

- Use of hydrogen as an economic source of clean fuel
- Dramatic reduction in cost of solar power with step change in conversion efficiencies of solar power from 18-20% today to over 40% coupled with alternate materials such as Copper-Zinc-Tin Sulphide
- Continued development of other renewable technologies that are not economic such as offshore wind, tidal and ocean currents, etc.
- Next generation transmission technology with wireless transmission
- Fuel cell based power generation
- Technology for Carbon Capture and Reuse (CCR) and associated developments such as production of algae to sequester carbon dioxide from power plants
- Power generation and transmission at short distances could shift to DC as most of the electronics of the day run on DC power, thus avoiding intermediate AC-DC conversions
- Wireless charging of batteries & electronic devices
- Newer appliances, which consume lesser power. There would be increased efficiencies in appliances & devices ranging up to 50%
- Developments in usage of nano-technology, especially in power plants & various applications which will reduce requirement of energy ab initio

Human Resource and enabling infrastructure for the power sector

To enable the power sector of 2061, both the human resources supporting the sector as well as the enabling infrastructure for the sector needs to go through a transformation. Larger number of institutions that train manpower with the right set of skills required for the power sector would be required. Corresponding improvement in infrastructure, transport and indigenous manufacturing facilities for critical equipment would be the need of the hour.

Conclusion

India's growing GDP and urbanization will continue contributing to the increasing need for electricity in the country. We expect India to have sustainable and reliable power supplied to all of its citizens by 2061. Fascinating technological interventions, Wireless battery & appliance charging equipment; Newer fuels like Hydrogen and lowering prices of power generated from currently known fuels will expand the generation options available. Policy maturity with most issues resolved will ensure a smooth running of the sector. Technology will be one of the key drivers of change helping the country with developments as well as meet the environmental challenges, a rapid growth can pose.

Ashish Chauhan

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CAPITAL MARKETS

As they say, the past was a different country. Future looks even more fascinating and full of possibilities.

In this article, an effort is being made to look at the history, the trend of developments in the world of capital markets and make an attempt at extrapolating the results to arrive at a picture of how Indian markets would look like, in the year 2061.

As per Investopedia, Capital markets are "markets in which individuals and institutions trade financial securities. Organizations/institutions in the public and private sectors also often sell securities on the capital markets in order to raise funds. Thus, this type of market is composed of both the primary and secondary markets."

> *Financial securities are essentially a way to connect the 'present' with the 'future' - using 'Trust'.................*

Financial securities are essentially a way to connect the 'present' with the 'future' - using 'Trust'. Trust in essence is intangible and ephemeral. It is very fragile. To a large extent, it is also a function of the society we stay in. The norms, mores, technical capabilities, institutions in a society all have a role to play in maintaining and enhancing this 'Trust'. Dysfunctional societies do not support vibrant financial markets.

Mankind has been making the investments in capital markets for millennia in some way or another. The first set of organized lenders in Egypt and other places several millennia back, were large religious establishments. It is not surprising given the fact that, even thousands of years back, religious establishments were adept at

dealing with connecting present with future (even beyond death and in next lives) and knew how uncertainty plays a role in human lives and how to make more money by connecting present with future.

A question arises as to whether by 2061, will the future become certain?

If the future becomes certain, will there be a need to differentiate between two investment opportunities? Since, we will be knowing with complete certainty, the outcome of an investment event (default, repayment, interest payments, yield curve across the duration, returns from competing instruments etc.), corollary will be whether there will be a need for the Capital markets in that case? Since the entire future would be known for every one and for the smallest duration of time to the longest duration of time, there will be no uncertainty and hence no need to invest.

However, it will perhaps be a boring life.

Hope, by 2061, uncertainty will still persist especially about the future. Perhaps, even beyond.

Capital markets therefore will still exist in 2061, perhaps even beyond

An investor investing in a financial security is expecting the money to come back with returns in future. This is called 'risk free return' in the investment parlance. Usually, the investments in sovereign securities within the same country are considered risk free in nature. Modern 'fiat money' allows only the sovereign to print money. Hence, theoretically, sovereign can always print the money and give the same to the lender. However, if 'printing of money' creates hyper inflation, the society may not find it acceptable. Any other investments in debt, equity, derivatives therefore, has a finite risk associated with it. Risk in some sense, is a function of time. The longer the maturity of the investment (when the original money is supposed to be returned by the borrower), more the risk. Methods to identify, measure and manage these different types of risks have evolved over a period resulted in very sophisticated models. By 2061, even more fancy models may be developed. However, the unknown unknowns and known unknowns in Donald Rumsfeld world would not have been captured even by then. Models would be even more accurate than what they are today. However, the incremental value addition from here to 2061 in model creation industry for risk management may still keep out a large delta that will continue to provide employment opportunities for many IIM graduates even in 2061.

There are 3 important features of a Capital Market, we can discuss here:-

1. Transaction processing and price signalling

Transaction processing is what makes market look like a market. However, the prime function of a market, surprisingly is not transaction processing, but price signalling. Squeaky clean price (not manipulated) is what one expects from a well functioning market – indeed, it is the obligation of a market to provide one. Transaction processing is a means to achieve that end. If a market has a great way to process transactions, but does not worry about the manipulations, that market might not survive for long.

Over the last 20 years, Indian markets have seen a great move towards automating transactions processing. From floor-based markets in 1994, we have screen-based markets now. We have set up even risk management and settlement guarantee organizations called Clearing Corporations and Depository Institutions which keep

> *By 2061, we might be in picosecond response time. We might be using algorithms which take into account each and every part of economic and social data to predict future and still might fail……………………………………………*

stocks in dematerialized format like banks keep money in bits and bytes for you. Connectivity to banks have improved and surveillance mechanism has become real time. Mobile trading, web trading, algorithmic trading, etc. have become commonplace. Sub-milliseconds response time is no longer aspirational but a reality. By 2061, we might be in picosecond response time. We might be using algorithms which take into account each and every part of economic and social data to predict future and still might fail.

Cost of transactions and post transactions activities in Indian market have come down by 99% in last 20 years. However, volumes in the market have gone up by 1000 times or even more.

By 2061, transaction cost may come down by further 99% or more but transactions will increase manifold. Market participants will also figure out new ways of making

money. We will witness many innovative business models. We will witness a transformation in the way business is conducted in this sector.

In the last 3 years, BSE response time reduced from 300 milliseconds to 10 milliseconds and number of orders went up from 75 lakh orders per day to 11 crore orders per day. In Indian capital markets, current working day lasts 6 hours and 15 minutes. BSE plans to change this system in near future to a system that will give response time of 100 micro seconds and can take 3 crore orders in a minute. The trading day might last practically 24 hours by 2061 which is currently the case in many other countries. In Indian commodities markets, trading takes place till 11 pm every day or beyond.

By 2061, micro second might become too slow. However, for people who invest for long term, the pursuit of speed may not be very important. They may want to worry about identifying the right companies and business ideas to invest in, like today.

Capital formation will continue to remain the key touchstone of the effectiveness of capital markets and not necessarily at what speed the markets are able to transact. For that reason itself, corporate governance becomes an important aspect to discuss even in 2061.

In India, today only 1.5% of the people invest in capital markets. The returns derived from the non-regulated, non-matured asset classes have far outperformed the capital market returns in last few years. A similar trend, on a comparatively smaller scale was

> *By 2061, we can expect a large part of population actively trading and investing in capital markets as financial literacy and awareness increases across the country, across classes...*

witnessed in all developed markets as well. Sooner or later, as those alternative asset classes mature, or undergo correction, or generally reach peak prices, investors will once again turn to the capital markets for capital formation and capital appreciation.

With the investor awareness programmes and other initiatives undertaken by SEBI,

BSE, etc., the market size in terms of number of market participants has been growing at a steady pace and is expected to accelerate once the high returns currently offered by alternate asset classes dry up. Government initiatives like the recently launched Rajiv Gandhi Equity Savings Scheme will help attract new investors. By 2061, we can expect a large part of population actively trading and investing in capital markets as financial literacy and awareness increases across the country, across classes.

Due to the lower cost of creating faster and better technology, many more exchanges might come up. Many more transactions processing platform may come up. They need to be interconnected in a variety of ways with existing systems and systems that are expected to come up. Regulators will have their hands full in coping with newer technologies, newer instruments and newer challenges of corporate governance. The pace of change in regulations that has seen tremendous acceleration in last 5 years will accelerate even further. Many more regulators may come up time and again and perhaps, may get merged in each other again and again. US, UK and several other countries are going through this creation and destruction process of regulators over last decade.

Markets will become safer. Already, we see a trend where regulators and markets across the world are moving towards a centrally cleared model. Central Counter Parties (CCPs), with their collateral-based trading limits model and client collateral segregation will make the capital markets virtually immune or less sensitive to the risks of defaults, market volatility and other similar risk factors. We can expect this trend to continue to its logical conclusion and by 2061, all products and assets will work on a centrally cleared model. The banking and payment system will evolve to cater to the need of real time 24x7 payment systems and gateways through mobiles, mind movement. There would probably be full capital account convertibility making it possible for any investor in any part of the world to trade in a security in India at any time of the day, any day.

Automation of trading, clearing and banking systems has already happened. The small degree of manual intervention in these financial infrastructure units would also get completely automated, come 2061. The main system will be automated, the near Disaster Recovery system will be automated and the far Disaster Recovery system will be automated. We will probably even have DR systems which are situated in different continents on different continental and oceanic plates.

Connectivity across the globe has already been discussed. Economic activities might be even more tightly integrated looking at a time horizon of 50 years. Cooperation across countries in terms of money laundering, terrorist financing, financial misdemeanor etc may increase. It will ensure there is no safe haven for crooks to run away to.

At the same time, perhaps, a Japanese housewife will be investing in a handicraft unit in Jaisalmer using BSE's Micro Stock Platform with complete confidence that her money is safe and is used for the purpose she is investing in.

2. Corporate governance

In capital markets, a person invests with a 'Trust' that he is investing in the business as a partner or a lender. He may be willing to face the losses if his investment calculation goes wrong. However, he will feel cheated if his identification of the business idea is correct but the system allows promoters to not share the riches with other investors and only losses are shared with the other shareholders; or if the company does not return the money when the bond matures despite the company having sufficient money.

Corporate governance therefore will continue to remain an important issue. Corporate governance, faster and fair legal system etc would continue to remain important for the capital markets as they are today. They will become perhaps more relevant. The performance of the Indian corporate sector is directly linked to the investor confidence in the corporate governance practices followed. Companies which take leadership in corporate governance norms are richly rewarded by investors.

Companies were earlier required to give annual results which have now been made quarterly. In future, it is possible that the companies may be required to provide details at shorter durations, maybe even real time basis or perhaps not – for strategic and competitive reasons.

3. Need for capital and new instruments

Current Indian demographics and even future Indian demographics suggest that India will continue to be a large and fast growing economy till 2061 and beyond.

Currently, more than 50% Indians are below age 25. On the other hand, less than 1.5% of Indian population has invested in capital markets. Given the formation of nuclear families and rapid urbanization expected to take place, it is natural for

this young workforce to invest in financial instruments for their old age pension, children's education, health care etc. Whether they invest in financial instruments by investing in stock markets directly or investing through intermediaries such as Mutual funds, Insurance companies, Pension funds etc. remains to be seen. Safe guess would be that they will continue to invest directly as well as indirectly. They will have perhaps, many more choices of instruments, companies to invest in. Derivatives which were not available till 2001 in India have become part of life in 2013 with index futures, index options, stock futures, stock options,

> *While trading will continue to be an integral part of capital markets, so will investing. Indian debt market, which has remained dormant for too long can get a new wind and follow the success achieved by similar products worldwide........*

currency futures, currency options, foreign index futures and options etc. being available to and widely traded by investors. Many more sophisticated instruments might become available.

While trading will continue to be an integral part of capital markets, so will investing. Indian debt market, which has remained dormant for too long can get a new wind and follow the success achieved by similar products worldwide. And it cannot be any sooner. As per current estimates, India needs to invest US $1 trillion in infrastructure till 2020. If we estimate the total need for the capital till 2061, it could run into several 10s of US $ trillions. While part of this capital requirement will be funded by Government, a major part will come from investors, both from within India, as well as from abroad, in the form of investment in infrastructure debt or investment in equity of infrastructure-based companies or through project based financing.

The role of the investor in creating institutions like the Birla, Reliance, Tata or the younger institutions like Infosys and TCS cannot be over emphasized. The same investors will play a big role in developing the infrastructure in India to help make India into a Global power and a services and manufacturing leader 50 years hence.

Ayaz Memon

Ayaz Memon is one of the leading journalists in the country. In a 35-year career, he's edited newspapers like Mid-Day, Bombay Times and DNA, writes on politics, cinema and social issues but his abiding passion is cricket.

CRICKET

By 2061, the question of why sports is important for India will no longer be asked. It will be taken for granted. Sports not only gives you soft power and increases the health index of a society but more than that it allows the human experience to be stretched to its peak. There is not a single major nation - past or present - which has not also been a sports powerhouse.

But before we get there, where will India be in 2061? Research shows it will no longer be the overwhelming young country it is now - all these young people will be on senior citizen benefits. It will also be more urban than rural. The economy will be far more stable, booming in fact, and per capita income will have increased dramatically.

> *By 2061, India will be a country of tech-nerds, producing not just breakthroughs in technology, but also 'gaming' wizards...*

This will have a deep impact on social development. Literacy levels will be close to 100 per cent across the country. Th e male female ratio will not be as dismal as it is now - but only after several young men fi nd that there are not enough women to marry given the sex ratios in 2013!

But what does all this mean for sports? That's an easy one. It means that India has to make the jump to become a serious contender on the international arena right now. The crystal ball I gaze into says that cricket will no longer be India's dominant sport. But it will still be very, very important.

It also says that football and Formula 1 will continue to thrive in popularity which means that sooner or later, Indians will have to perform in these disciplines. Tennis will continue its upward trajectory as people get wealthier and prosperity leads to more free recreation time as well as facilities to nurture, train and excel.

"Gaming" will acquire major acknowledgement as well. At the dawn of the millennium, India was seen as a major service provider for the global information technology economy, but largely in head-hunting and modestly-priced skilled labour. By 2061, however, India will be a country of tech-nerds, producing not just breakthroughs in technology, but also 'gaming' wizards.

When it comes to cricket, change is inevitable and some of it will be painful. While skill is hardly in doubt when discussing India, serious questions are still quietly raised about the athleticism of our cricketers for instance who seem to believe that their talent makes them exempt from excelling in fielding, catching or running between wickets.

The modern game punishes such laxity heavily. This means that even when it comes to India's favourite game, fitness is key. This is the problem area facing India for with economic prosperity, lifestyles can also be adversely affected where diet and diseases are concerned.

The optimum path has to be in school programmes that focus on fitness, stamina as well as talent. If India wants greater success in sports, a new generation of more athletic Indians is non-negotiable.

Right now, the Board for Control of Cricket in India rules the roost. But this may not last forever. The BCCI can flex its money muscles only for so long. In any case, a healthy balance sheet does not necessarily guarantee excellence. That has to be nurtured and become part of the culture.

A more serious effort has to be made to identify and hone talent at the junior and domestic levels. Indian pitches always create international comment – and in a global playing environment Indian players have to not just adapt but be adept at playing conditions elsewhere.

Above everything else, however, is the need for a cultural shift in our ethos where the game is concerned: of the administration going from being profit-driven to only performance-driven; players (and fans) from being records-stricken to results-driven.

> *Unlike many sports which feast on brute strength and muscle power alone, cricket requires intelligence and nuanced thinking. Conventional wisdom suggests therefore that women would be ideal for the game and indeed would enhance it...*

Apart from all this, cricket needs to make a mind-shift, perhaps taking off from a comment made by the former Australian captain Steve Waugh in early 2013. He has suggested that T20 cricket teams could include at least one female player.

This is a potential game-changer. Bar tennis, there is no major global sports where men and women play at the same level for the same money and with each other. There is ample scope for cricket to create its own world of gender equity.

Unlike many sports which feast on brute strength and muscle power alone, cricket requires intelligence and nuanced thinking. Conventional wisdom suggests therefore that women would be ideal for the game and indeed would enhance it.

Without being sexist, Waugh's idea that women start at the T20 level is worth considering. Although the format requires intense concentration and effort, the shorter duration makes it easier to experiment with.

As time passes, it is easy to project that more women should and will be included in T20 teams and even that a shared tournament can be planned at the Test level as well. Women are not short on stamina or on resilience and both are vital for a cricketer.

To survive, all sports have to rethink their traditions and remember that nothing is cast in stone. Sports has brought social upliftment for so many through the years - e.g. African Americans to shine in what was a racist society - and gender discrimination therefore will become more and more distasteful.

Even if there are sports where men and women may not be able to compete with each other in interests of fairness, it is surely possible to integrate women into some aspects of the game - like mixed doubles in tennis or like Waugh's idea for cricket. Also, like tennis, women can also be paid at the same level as men as well as compete at the same time at the same arenas.

On a different note, cricket in 2061 may have little bearing on how the game is played and seen today. Indeed, the transformation would have been dramatic. The 'Gentleman's Game' (or of 'Flannelled Fools' depending on your perspective, though both were always euphemistic) with Test matches as its pinnacle will have been over-run by limited overs leagues.

It's not that Test matches would have died completely. Rather, they would have acquired a heritage status and be revered as a hark-back to a glorious past, now seen as the golden era in the story of the sport's evolution. The closest parallel one could draw is classical and folk music which are the fountainhead of every other kind of music.

A Test World Championship, played once in two years, would evoke much nostalgic interest among fans and advertisers alike. By now, new countries would have joined in too: China, because it is impossible to keep them out of anything, the United States which want to be in every endeavour in which China and India are involved, as also Japan, South Korea and European countries like France, Holland and Spain.

The Test championship would be based on a two-tier league of eight teams each with the bottom two from League A dropping off into the weaker League B, and the top two teams from the lower migrating to the tougher A.

Tests would be of three days duration (as they were at its origin in the 19th century) played from Friday afternoon through Sunday on uncovered pitches and under lights with coloured clothing. Every effort would be made to get results, with major points for victories and very meagre for draws.

Those players who can adjust and adapt to the demands of the longer format would be not just venerated, but also be rewarded handsomely. They would be the truly iconic figures. Statistics would still be integral to the game. The records being chased would be from the past - Don Bradman's average of 99.94, Muralitharan's 800 wickets and Sachin Tendulkar's 100-plus international centuries still not breached as much for their hardship quotient as the fact that the number of Tests would have been drastically reduced.

But the lifeline of the sport would be the limited overs leagues, some even Ten10 which would become the staple diet for non-established cricketing nations, and played by multi-millionaire cricketers who fly from destination to destination, tournament to tournament in their own private supersonic jets.

Every country would have its own T20 League, each jostling for pole position where

spectator loyalty is concerned but the biggest, most lucrative of such tournament would still be the Indian Premier League, offering a billion USD in prize money - a far cry from the 2 million USD it offered in 2013.

" By now, the IPL would have become the most valued sports property in the world – bigger than the NFL, the NBA and World Series Basketball, the mainstays of American sports.."

By now, the IPL would have become the most valued sports property in the world - bigger than the NFL, the NBA and World Series Basketball, the mainstays of American sports. Those who had invested in teams at the start in 2008 would be multi-billion dollar entities, bigger than some small nation states.

In fact, basketball would see massive erosion in its appeal as more and more youngster migrate to the cricket leagues with its wider spectator appeal and greater monetary rewards. Lalit Modi, still ostracised by the IPL, would nevertheless be a prized speaker on the lecture global circuit on how he had masterminded the league against heavy odds.

The IPL will have grown into 24 teams as India gets more urbanised, but would be played all over the world to cater to the Indian diaspora. In any case, in a globalised world with the accent on business and balance sheets, multinational corporations would be the new nation states.

The big threat to the IPL will be from the CPL, or the Chinese Premier League. As in every other aspect of life, rivalry between India and China would extend to cricket too. And as in every aspect as the world has come to both admire and fear - they would progress by leaps and bounds once deciding to accept cricket.

Like Indian players, the Chinese would also be more stylish than powerful; relying more on skills than strength. One major advancement on the game as it was played till 2013, they would bring - as they seem to have done with every sport they've played at the international level - would be to get every player to be ambidextrous.

Till the second decade of the 21st century, a switch-hit or reverse sweep would be a novelty; once the Chinese enter the fray, it will be par for the course. And not just in batting, but bowlers too will trundle right arm or left arm.

There is no clear reason why the Chinese would do this except that because they will breed such cricketers before everybody else, they would enjoy the advantage for at least a couple of decades more before everybody else wised up.

That's not the only way the Chinese would exploit the situation to their advantage. A big breakthrough would be made in the two essential elements used in cricket – bat and ball. The bat would undergo a material change of character: it would be made of metal instead of willow, while retaining every attribute of wood viz. feel, weight, sound et al.

Dennis Lillee had tried this way back in 1979-80 and run foul of the game's administration. But by circa 2061, the objections would have collapsed primarily because of the Chinese. Their argument at saving trees would win favour from environmentalists and conservationists with earth's natural resources drying up.

But there was also an insidious angle to this driven by commerce too. Given the number of people playing cricket on the planet (one billion Indians plus 1.5 billion Chinese plus half a billion others) made production of cricket bats amongst the biggest industries in the world. And who could do it cheaper than the Chinese?

Interestingly, the ball would retain its cork, leather and seam constituents, but the Chinese would influence one important notable innovation here too: every ball would be fitted with a chip that would map its path after delivery automatically. This would make the use of predictive analysis mandatory, despite the (still) persistent objections from the BCCI but to no avail.

Umpires would still be around, of course, but hardly recognisable from those seen in the first half of the millennium. On the field, they would be in shorts for swifter mobility; off it, they would wear the trousers and coat, just for old times sake. However, the only job remaining for the on-field umpires was to call for the start and completion of an over. Redundant? Not if you are still paid as much as a player!

Match-fixing would be a scourge still to be fought. Despite advancements in vigilance, geometric progression in player salaries and time and effort spent in mentoring youngsters, every now and then a story of mala fide practice would erupt to cast a shadow of doubt.

The problem is not inexplicable though: while 50 years would bring about a cataclysmic change in almost all things, human nature would still be what it is.

B. S. Nagesh

B. S. Nagesh is the founder of TRRAIN, a not-for-profit initiative, working towards empowering people in Indian retail. Before this, he was involved in setting up Shoppers Stop and was the first employee of the company. He was also the first Asian to be nominated to the "World Retail Hall of Fame" in 2008.

RETAIL CHALLENGES AND OPPORTUNITIES

In 2061, I will be 102 years old, my daughters will be in their mid 70's and I do not know how many grandchildren & great grandchildren I will have. However, imagining all of us together on a shopping trip across traditional outlets, high streets, shopping malls with the assistance of technology is probably the best chance I will get to dream and visualize with a hope that I will live long enough to see what I have visualized.

It is important to reflect on the last 20 years of retail development and see how businesses have taken advantage of retail opportunities. We should also reflect on the changes in the traditional market and the adoption of modern practices by traditional retailers in the last two decades. The best examples of these changes are development of T Nagar in Chennai, Commercial Street in Bengaluru, Linking Road in Mumbai and South Extension in Delhi.

In all these traditional markets, we have seen one thing in common, the strongest of the traditional retailer has survived the onslaught of Indian globalization. They have been able to attract new generation of customers without losing the older generation traditional shoppers. Whether it is Nallis in Chennai, C. Krishnaiah Chetty in Bengaluru, footwear & kiosk retailing on the footpaths of Linking Road or Heritage Emporium in South Extension. In all the cases, the Indian business family, small and big entrepreneurs were able to capitalize on the retail opportunity in spite of competition from modern retailers from within the country or global competition. They have been able to understand consumer needs whether it is street footwear in Linking Road, or street fashion in Bandra. The traditional saris from Nallis have adopted modern designs for the younger generation and the jeweller in Bengaluru has moved seamlessly from gold to diamond jewellery from traditional temple jewellery to modern contemporary designs.

All these have happened while transitioning from an older generation to the newer generation. From handwritten cash memos to the most modern retail ERP. From the family HR thinking to the modern HR practices. One thing that an Indian retail family has demonstrated very clearly is the resilience and the ability to understand customers and adopt accordingly.

Similar trend has been noticed with small shopkeepers whether he is running a kirana store or an apparel store. Many Kiranas have seamlessly adopted the open format stores, are buying peanut butter from importers and using electronic register. Apparel stores started selling new age brands and also the Bangkok imports for women's western wear clothing.

Arterial roads and high street residences have converted into ground floor shops and boutiques. Transformation of North Linking Road in Mumbai is remarkable. Malls have mushroomed and Indian malls have created a mass-market destination in South Mumbai to Luxury mall in Vasant Kunj, Delhi.

Consumers are wearing a salwar suit for sangeet, ghagra choli for wedding and a gown for reception within a three-day wedding function showing versatility of adoption. They have a $2 boxer short, $100 formal shirt, $1000 suit, $10000 watch, $100000 car and $1 million home. These are upper middle class consumers of India not the super rich. The value consciousness in their behaviour (many of these purchases are done in SALE) and versatility of their spend is what amazes me, and confuses the marketer in me when I am targeting this consumer.

One thing that has not changed much is the Government's adoption of the retail business whether traditional or modern. There is no developmental plan for the traditional retailers except for protection plan and using them in the name of politics. Today 32.7 million people who work in retail have an average age of 26 years plus, even if we consider them to be 18 (which they are not) all of them will be 68+ by the year 2061, how will they survive the retired years of their life with no social security or means to live? Neither the Central Government nor the State Government have seen the opportunity in modernizing retail by creating zoning for commercial areas or creating laws, which can facilitate creation of modern retail destinations. With fast-paced changes in the new generation, globalization and technological changes in the way we live, it is becoming very evident that the next decade and the century will be period of dramatic changes. Many changes that we will see in the next two decades and many more changes will make our country not recognizable over a period of few decades.

With this backgrounder on the ground situation of retailing in India in 2013, let me attempt to predict the scenario in 2061 for various constituents of the retail ecosystem one by one.

It will be apt to begin with the infrastructure, which will play a key role in the growth & development of the retail business. In the next 50 years, almost all the top metros will have monorails and metro systems for travel. The road network will grow by 1-2 times, but the number of automobiles will grow by 8-10 times. Since the Indian mentality of showcasing their net worth and wealth will be by displaying the kind of cars they travel by, therefore people will still use cars and the roads will be jammed. I see the traffic situation in the top 20 cities as pathetic or worse than Hongkong or Mumbai of peak hours. Wise men will emerge who will travel by the metros, however the metros of tomorrow are not likely to be build under the shopping malls or the parking lots of shopping districts. This kind of developments requires Dictatorship or visionary Governments. With India remaining a federal state, it is difficult to imagine such leadership at the centre and state and in sync with each other. In a situation like this, I believe reaching shopping destinations will become very chaotic & cumbersome especially in the heart of the cities. Today's rural markets will become the urban centres of tomorrow. With around 150 towns of population more than 1 million, we will see all actions in those towns. Therefore a new Indore, Nagpur, Mangalore, Chandigarh & Lucknow of tomorrow will emerge. Since these will be the new towns, they will be better planned with roads and infrastructure of modern days.

With the cost of real estate also zooming, the malls are likely to be in the outskirts of the city or the periphery of the city all around the ring road. Alternatively, one will find satellite and conveniently connected neighbourhood villages and towns developing into mixed-use township developments. We have seen such developments in Gurgaon, further now in Manesar, in Yelahanka, and now Devanahalli is fast developing and Thane in Mumbai getting connected to Panvel. This fact is further supported by the need for affordable integrated township development all across the country. The Japanese city in Gujarat near Ahmedabad or the similar township near Mysore is the beginning of such developments. In the meantime, Citi Centres in Tier 2 & Tier 3 cities of today are developing malls and shopping centres, as was done in the Tier 1 city in the last 2 decades. Glaring examples are Shoppers Stop in Andheri suburb of Mumbai, Bandra in Mumbai or Ansal Plaza in Central Delhi or Central at Panjagutta, Hyderabad. It is unimaginable that such properties will ever be available in the future at an

affordable price for retail to survive. Can we imagine a Selfridges in Oxford Street or C K Tang in Orchard Street Singapore being recreated?

As much as this, cumbersome infrastructure will become a big hurdle for growth of brick & mortar retail, as much it will create an opportunity for e-commerce business.

It may be pertinent for us to look at European e-commerce business and growth. In the last 15 years, retail players like John Lewis & Waitrose have continuously invested in their e-commerce business and seem to have got major benefits out of the same. In the last few quarters, 25% of the total business is coming from online sales. Compared to the like-to-like sales growth of 12% plus the online sales growth is 40% plus. Similar trends will be seen in India in the next 5-10 years and I expect the online contribution in retail will be around 5%. This may look miniscule when

> *E-commerce will expand the market and we will have millions of shoppers who will directly graduate to online shopping...*

the total modern retail will be around 10-12%. However, e-commerce will expand the market and we will have millions of shoppers who will directly graduate to online shopping. Even today, we are seeing online shopping growing at 3-4 times the offline sales, although with a lower base.

Let us look at the consumer of today and tomorrow. It is very difficult to say whether changing consumers are an opportunity or a challenge. In my opinion they are a great opportunity for start-up and new businesses and a great challenge once you are in business. The rate of change in their behaviour is not over a generation but in few years and definitely within a decade. For businesses to maintain and cope with the rapid changes in a consumer is very tough. Businesses have to be very nimble and businessmen have to be very flexible, otherwise it is very difficult to manage and exploit the change profitably. Look at the way mobiles have taken over pagers, ATM's have taken over cash tellers, travel sites on e-commerce have taken over travel agencies, or for that matter a very inefficient railways has one of the largest and efficient rail booking system on the net. These changes and successes are because consumers are changing and making producers innovate or they are responding positively to changing and launch of innovative products. 10 years back whoever thought Apple will sell millions of iPads and iPhones.

I believe the rates of change will only accelerate over the next 4-5 decades. India is experiencing multitude of new product and new concept launches in the last one decade. We have seen specialty stores, department stores, super market, hypermarket and malls being launched together. For a retailing starved nation, we have got an overdose of retailing and therefore have lost the sense of categories as defined by retailers. In our mind, every outing is a shopping occasion. Even before modern retailing gains momentum and size, we have tens of e-commerce retailers who have entered the market and are gaining grounds. They are competing not only with the brick & mortar retailers but also with television shopping channels and multi channel retailers. I will not be surprised if today's milk vendor, newspaper vendor, maids & housewives become part of multi channel retailing. These are people who as a profession have built relationship with customer households and have been able to create a door-to-door reach. With this kind of proliferation of retail formats and delivery model, combined with our traditional retailers and kiranas, I believe Indian consumers will have the best of both worlds and will be pampered in the next 5 decades. I see a convergence of many of these models; I also see collaboration of formats and businesses rather than competition.

As customers, we will be able to see and select what we want on our mobile devices and collect and get it delivered from the store of our choice by people of our choice who have access to our house due to multitude of relationships. Environment consciousness will ensure that no receipts are printed, but are emailed to us or a copy is available on demand. Our computers/laptops/tablets/mobiles will all be linked, our needs and desires will be captured, organizations will design and personalize the products and we will have a choice of seeing and picking up from the store/mall or get it delivered at our homes.

Organizations like Apple or Reliance or businesses which have control on flow of information and technology through their networks and also become providers of goods and services will virtually control the value chain and the supply chain (everybody is connected everywhere and everything is sold by them anywhere and everywhere). They will wire the country and the world and many of us will become slaves of such wired network. However, one solace is that I see retailers with shops in colonies and localities always having a role to play. Either they will be the touch point for selling & collection or they will become part of the network, because there is no way merchandise and services can reach the consumers. With electronic cash & e-wallets, there will be no risk of carrying, collecting or paying cash.

A new trend I expect in urban centres is of leasing or hiring of various consumer durables. With properties becoming very expensive and homes becoming smaller, consumers will rent a car, hire a drill machine, vacuum cleaner etc. as the products are used once in a week/month and are unnecessarily kept in the house and occupy space. With labour becoming very expensive, many service businesses will open up. We will see many small shops converting themselves into Laundromats, e-commerce delivery points, and telecom and banking services, ATM's. They will also become points of sale for goods & services required for the senior citizens. With close to 400 million senior citizens, this will be a huge market to serve.

If I have to look at the products that will go through a change, I see the maximum impact on the food side. With the population of the world growing and ageing, and the environment getting destroyed day-by-day, most forms of food that we will have will be processed and ready-to-eat. May be 50 years down the road, we will get tablets and supplements which can give us all the nutrients, as they will become more affordable than fruits, vegetables and grains.

Many of these fresh products will become very expensive in emerging countries, as inflation in food products will be higher than per capita income growth. Villages and

> *With close to 400 million senior citizens, this will be a huge market to serve..........................*

rural areas that are big producers will also become big consumers. Many products will not reach the urban areas. This is very similar to what is happening between emerging economies and developed economies of today.

Fashion and lifestyle products will continue to dominate, and with affluence one will see large consumption of luxury products. We will see a globalized product range in the luxury segment. With three quarters of a billion people travelling by air and 99% of the population being literate, one will see a fully globalized retail and lifestyle industry.

Analytics, Insight & Big data would have got fully entrenched into the modern retail system. Modern retailers would have become invasive with understanding shopper behaviour and consumer understanding to the core. Many of the

businesses especially retail will understand us much better than ourselves.

I must also say that entertainment industry will be heavily based on technology use and will be literally seamless and fully connected. I believe, we will all celebrate and watch movies and eat similar things using virtual technology although we are going to be miles apart.

However one thing, which will not change for us in India, will be the use of colours and spices. We as Indians, will always dress and drape ourselves in multiple colours. International brands and fashion gurus will create the fashion around our Indian colours. The spices of India will influence not only Indians but also the world of food and cuisines. I will not be surprised if British puddings have the taste of saffron, jaggery, cardamom, clove & cinnamon. India has given McAloo burger to the world; they will also make methi, mutter (fenugreek & peas) pizzas in the future. I am told the most popular cuisines in the world are Chinese & Italian, however the future cuisines will be Chinese and Italian made with Indian spices.

With so much happening 50 years down the line, let me visualize the reunion of 2061 that our grandchildren have organized for the family. Me & my wife, in our 100's with our daughters and son-in-laws in their 70's with our grandchildren in their 40's with our great grandchildren in their teens and twenties.

Location is the party hall of our apartment in Mumbai that has been blocked by the family. Our grandchildren had invited bids from various restaurants and fashion & lifestyle stores who have bid to participate. The new twist is that some of our grandchildren cannot come as their semester exams are going on. In order to ensure that we are all together, one of the network companies has won the bid to make the re-union real although some of the family members are few thousand kilometres away.

As soon as we entered our party hall, we were surprised with what we saw, we actually had entered a temple, as our daughters wanted the re-union to start with traditional Puja and lighting of lamp, and they had planned one wick for each family member to light. The store organized an electronic lamp along with the traditional lamp, which can be lighted through an electronic ignition that can be triggered through a click on the mobile. After we lit the lamps, one of our grandsons lit it along with us and actually I saw him standing next to me in the room and his hand came out to light the lamp and at the same time he pressed a

button and the wick had caught on flame. We prayed together in the temple. We hugged all our family members and greeted them, I missed hugging my grandson, but he was there all the time. Then we decided we would go shopping and buy gifts for each other. The youngsters got into the vehicle and left for the store and we along with our daughters and son-in-laws decided to stay back and go through our family album of 75 years. My elder daughter had already pulled all of them from our cloud-based digital photo studio. We kept going through the pictures and we shortlisted a few of them, so that we could get them printed and go through the same at a later date. I didn't realize that our shortlist was already mailed to the store who were printing it and customizing the same and sending it to all our family members to put their comments and sign the same. As we were in the hall, our family was working together, a few of them with us, some of them in the car on their tablets and grandson across the ocean. Once they reached the store, they started shopping for themselves and for us. What was amazing is they showed us the garments and if we liked them, they allowed us to wear the same and see ourselves on the screen in the hall. I was surprised that I could turn around and see myself 360-degree view as if I had actually worn the dress. In fact, the alteration guy in the store virtually measured my trouser length for alteration. All the family members shopped for each one of us with 100% participation. They bought Indian wear for my wife, a tuxedo for me, branded bags for my daughters, footwear for them and belts and watch for my son-in-laws. The shopping was completed in two hours, every one was back into the hall for a 7-course meal. What shocked me was the table layout. Both our teenage great grandchildren were seating next to us and had meal with all of us as if they were physically present. Post the meal, we had games together and some of the screen games were such wherein all of us at different age got our handicaps, so that we at 100+ could compete and play table tennis with our great grandchildren in teens. In fact, my wife and I won two games against kids who were 80 years younger to us.

The celebration ended with a great party with 50 of our close friends from the building, physically present, another 50 of our friends from 15 countries joining us and two of my great grandchildren participating in the party without missing their semester exams.

Welcome 2061.

Dileep Ranjekar

Dileep Ranjekar is the founding CEO of Azim Premji Foundation and is passionate about social and human issues.

SCHOOL EDUCATION: CHALLENGES AND OPPORTUNITIES

A. Introduction

The last 75 years have seen dramatic changes in human life across the world - primarily in terms of concept of society, concept of economics and concept of interdependence of human beings.

Probably, the most significant events for India in the last 75 years have been - freedom from the "British Regime" and opening itself to the "process of globalization".

There are several changes that are happening simultaneously. People - especially in urban India have realized the importance of emerging boundarylessness of the world and newer customer demands. They have also realized the dynamic nature of knowledge and global standards of quality. What may be less known is how to provide strategic responses to the impact of all the above on us. However, what is least known is the future of discontinuous changes in technology, the future of the kind of people that we would be required to deal with and the dramatic difference between the current generation of people and the generation that we would deal with.

Quite often, issues and challenges are not what we think they are. To begin with, we need newer ways to identify issues and challenges.

B. Context of Education

It is often said that India has had a very rich tradition of an "education system" and in the ancient era, it was a fountainhead of knowledge to the world.

Most education philosophers, starting from Aristotle to Tagore and Gandhi, while discussing the purpose of education have stressed on three aspects of education - happiness in life, developing an independent responsible thinker and providing

necessary skills to survive in life. There is also a uniformly accepted view that education is probably the only non-violent medium for social change.

However, the current educational system followed in a majority of our schools is more than 150 years old. The British context in which the system was evolved has become obsolete long ago. It is based on archaic notions such as "child is an empty vessel and needs to be filled with knowledge", "education happens only in the school", "some children are clever and some are not", "all children have to learn the same subject within a fixed period of time" etc. Whereas learning experiments and neurological research has established radically different realities such as "all children have similar potential to learn", "children learn at varying pace", "children have varying preferences on what they want to learn more", "children are able to significantly contribute to their learning" etc.

Lack of synergy in the educational objectives among various stakeholders is a serious problem. Teachers, parents, education functionaries, children themselves and society in general - have fairly conflicting view of the purpose, process and delivery of education.

After 65 years of Independence, our politicians and bureaucrats, like in several other development areas, have miserably failed to deliver quality education that

> *In essence, education is futuristic in its very nature since it helps young minds realize their potential and in many ways prepares them to successfully face the real life that they are likely to face when they become adults........................*

achieves the goals set in the constitutional and policy framework. India is clearly a nation that is "receiver of knowledge" than "creator of knowledge". Since our education is merely focussed on "cramming" or "rote memorization", our children are weak in independent thinking, analysis, application of their knowledge and in challenging existing paradigms.

C. The Power of Education

Both academics and the practitioners in social sciences accept the all powerful role that an education system can play in shaping the society and in a way contributing to

social change. In essence, education is futuristic in its very nature since it helps young minds realize their potential and in many ways prepares them to successfully face the real life that they are likely to face when they become adults.

Shaping society through an educational process is a long-term and relatively slow process - the effect of which might not be experienced by people within a generation or two. It requires a long-term vision on the part of a nation as well as willingness to address some fundamental issues.

Promise of a Just, Humane and Equitable Society for Indian Republic

Our constitution promised the people of India that we would be a social, democratic, secular republic with justice (social, economic, political), equality (of status & of opportunity), liberty (of thought, expression, belief, faith and worship) and fraternity (assuring dignity of the individual & unity and integrity of the nation) for all citizens.

The National Policy for Education has promised education that is aimed at acculturation (refined sensitivities, empathy, care etc.), developing independent thinkers (with abilities to independently analyze, synthesize and with scientific temper) and developing skills that are necessary for the economic growth of the nation.

The National Curriculum Framework has laid down detailed guidelines on what is worth learning in the given philosophical, social and psychological situation, how it can be achieved through classroom processes that are democratic, highly interactive, rooted in practice and those that allow children to realize their potential in a facilitative manner.

The current realities

Today, we are a country of over 1.2 billion people - accounting for over sixteen percent of world population but contribute to only about five percent of the world GDP. Our ranking in important parameters such as the human development index (134/189), governance (bottom 25%), transparency index (bottom 25%), literacy (65% vs. world average of 80%) and many other development indices is shamefully low. After 65 years of Independence, over 50% people don't have electricity, 60% women are anaemic, over 40% children below 4 years of age are malnutritioned and our gender ratio (934:1000) is among the worst in the world.

Despite being among the top three fastest growing economies in the world, over

70% have an income of US$ 1.5 per day (less than ₹2200 per month) and 44% have an income of less than ₹1000 per month. Our development and growth pattern is not only deceptive but acutely skewed. While primary schools are now available practically over 98% of the habitations, practically every rural person has to move out of the native place if he/she were to acquire higher education and subsequent employment or livelihood opportunities owing to lack of corresponding vocational opportunity at native place. Thus two distinct classes are developing in our country - those who are benefiting from the globalization and economic development and those who are not.

The most critical issues that are staring at us are "inequity" and "disharmony". We have inequity in every possible form - socio-economic, gender based, caste-creed based, urban-rural based, power based etc. There has been dramatic erosion in our values and in our social behaviour - that was earlier based on three time tested values - truth, non-violence and tolerance. Many parts of our country have become "boiling pots" of discontent that is based on regionalism and religion or caste-based animosity. The democratic structures are exploiting the factionalism in the society.

All this necessitates radical change in the society if we were to achieve the constitutional goals for the nation.

D. Challenges of 2061

Ideally, any discussion about evolving an effective educational system should begin with a deeper and long-term analysis of the future of the society for which young people need to be prepared. This needs a group of multidisciplinary people who put their mind together and evolve a coherent picture of the future. The education system that we envisage needs to have a strong linkage to this picture of the future.

It is often difficult to predict the world 50 years from now. History does not really help - nor does pure imagination. Whatever we may use - we can only get a hazy image of the future - so far and so distant. The picture that occurs to me has the following hues:

1. **Redundancy of importance of knowledge -** what you know at a given point of time will be increasingly meaningless. By implication, rote memorization of any knowledge would not be required - since there are several external devices of memory that would serve the same purpose.

2. **Primacy of learnability -** what would matter is how open you are to learn newer things, how quickly you learn, how well you understand the immediately future context and equip yourself with the same, how quickly do you master newer technologies etc.

3. **Social and emotional abilities -** would probably be the most important in surviving and making things work. There would be increasing pressure on realizing the constitutional goals related to equity, justice, rights, freedom of the society which would require an appreciation and genuine acceptance of these principles.

4. **Physical fitness -** environmental deterioration, increased population, inadequate infrastructure and inadequate space will put enormous pressure on need to survive in difficult physical and mental circumstances. A certain physical fitness will have to be developed right from childhood in everyone.

5. **Importance of social security measures -** while India may yet be comparatively younger country in the world, it would have a significant population of aged people – who would be reasonably fit but unemployed. Governments and society in general will have to invent and execute elaborate social security measures that take care of health, entertainment and meaningful occupation of such population.

6. **Dealing with the future generation -** there is sufficient evidence to believe that the generation that we would be dealing with by 2061 would be fully literate, technologically savvy and far more left-brain oriented owing to the overall influence of their parents and the society around. They would be highly impatient; more worried about self, highly articulate, independent-minded and rational thinkers.

> *Education would be a highly collaborative process between the three pillars of society - the Government, business/corporate and parents/members of society..................*

E. My Dream of Education and Society in 2061

By year 2061, education in India would be entirely reformed. There would be high quality education for everyone. In fact, there would be great positive competition for

which schools will provide better quality education. Schools would have successfully managed to integrate development of cognitive abilities with social, emotional, physical, spiritual abilities. School education would effectively combine sports and cultural education with life skills. The students that emerge from these wonderful institutions would be socially aware and would be strong believers of and contributors to a just, humane, equitable and sustainable society. These would be responsible, proactive and law abiding citizens. Education would be a highly collaborative process between the three pillars of society - the Government, business/corporate and parents/members of society.

Challenges and critical factors contributing to the above school education system would be:

1. Political will

The nation has to have a long-term (at least fifty years - broken into ten, fifteen, twenty five years' phases) vision that is politically understood and backed. Such vision and agenda has to transcend beyond petty politics and has to be pursued

> " *All efforts to achieve quality in education would come to naught if we fail to create institutions that continually develop top class education professionals of adequate numbers.......... "*

irrespective of what political party is in power and which bureaucrat is leading the administration. Brazil resolved to pursue a certain vision for 15 years to get significantly different results in education access and quality. Finland dramatically restructured its Teacher Education system, over 40 years ago to gain a position of leadership today.

Political will has to manifest in several ways that could include radical reforms in policies, providing necessary budgets and resources, ruthless (and yet sensitive) execution of policies through effective involvement of stakeholders etc.

2. Developing competent people in education

All efforts to achieve quality in education would come to naught if we fail to create institutions that continually develop top class education professionals of adequate numbers. Each state must have multiple Universities that develop

top notch professionals in education who can build capacity in the Education Functionaries of Government and private schools.

We need experts in the areas of curriculum, classroom transactions, leadership of educational institutions, teacher education, assessment and examination, pre-school education (where the development of the child really begins), special and inclusive education, technology in education, administration of education system etc.

In the developed countries, practically all high quality universities have a "School of Education" that develops such professionals and also does quality research in education to understand more about the complex issues in education.

3. Building a strong cadre of school leaders

Research has conclusively proven that a school leader has, by far the highest influence on the quality of school as an institution. The school leader is responsible for providing leadership in academic, administrative, community-relations and culture building areas for the school. As a leader, he/she needs to have a sound perspective of the purpose of education, understanding of intricate academic issues, ability to develop teachers in a meaningful way and provide direction to administrative and relationship issues and integrate the socio-economic realities of the children that learn in the school.

Today, as a country, we do not have pre-qualification for a person becoming a school leader. Typically, a senior teacher becomes a school leader by default and receives no inputs whatsoever, leaving the responsibility of development - entirely to the leader. Nor is any ongoing support available to such leaders from the education system or otherwise.

4. Teacher Education reforms

To serve the requirements of high quality school education, today's model of developing teachers in ten months after a poor quality graduation is untenable. Some of the key issues involved are (a) Teaching Profession is not a profession of choice for better quality graduates, (b) Teacher Education curriculum is not consistent with the requirements of the education process nor is it comprehensive to cover the holistic issues of child development. Illustratively, it does not address important issues such as multigrade teaching that prevails in over 75% of our schools or the issue of democratic, participative and interactive learning process that is demanded by the national curricular framework, (c) The

quality of teacher educators does not meet the standards - the quantity too does not meet the large requirement, (d) About 70-80 percent of Teacher Education institutions are fraudulently operated where the students are enrolled for a fee and are issued certificates at the end of ten months - without adequate or

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any teaching or learning happening, (e) The assessment process at the end of the Teacher Education programmes is not rigorous enough to ensure that the teachers so prepared meet a certain basic minimum standard.

It is important that every Teacher Education institution is situated in a multidisciplinary University that provides the benefit of inputs from experts from the discipline of sociology, philosophy, psychology, anthropology, technology, basic sciences etc.

5. Examination reforms

The fundamental purpose of assessment in education is to cause development of the learner and also to provide continuous feedback to the teacher on how the education process is working. Examinations are supposed to be so designed that they measure the achievement of curricular goals. Today's examinations almost entirely focus on "retrieval of knowledge" by the learner and hence promote "rote memorization" in a big way. A systematic analysis of the papers for SSC board (10th standard) in several states, reveal that almost 78% of the questions are focussed on "retrieval of knowledge".

Since the examinations primarily focus on "rote memorization" that is what the teachers and students too focus for preparation.

As a result, there is no focus on education goals in the affective and psycho-motor domain. Areas such as empathy, care, sensitivity, team work, understanding, analysis, synthesis, independent thinking, scientific temper etc. are just not tested.

Student assessment must be a continuous and comprehensive process vs the current one-time process. Several processes must be deployed as relevant for the competency to be assessed.

6. Developing education perspective among parents

It is pivotal that the schools and the parents have a shared view of education goals, process and assessment of children. The current view of the parents that education is merely a passport for their children for economic development and improving their social status through the material gains they can compete with has to dramatically change. While education would develop life skills that would enable children to earn livelihood, it would also empower them to do that in a responsible manner - preserving their values, culture, sensitivities and independent thinking. Parents will have to give up their thoughts that the entire responsibility of educating their children has to be with the school. They have to accept an important role in supporting the education from their homes through a culture at home that is supportive and enabling for the same goals of education as the schools strive for.

F. Epilogue

A nation that would be of close to 2 Bln people - contributing to over 20% of world's population by 2061 - has to lead the way for the rest of the world in every possible way. The power to do so would be derived from the kind of values (of equity, democracy, justice, sustenance) the society accepts and promotes. My personal belief is that the school education would create a strong foundation for a society with such values.

With her human resources, knowledge power and being the largest and lasting democratic nation in the world, India has to be regarded by the world as "Knowledge Creators" and not remain as "Knowledge Receivers".

The only hope we have for such a Utopia - is our education system.

Dinesh Kanabar

Dinesh Kanabar is the Deputy CEO of KPMG's operations in India. He specializes in corporate and international tax, tax litigation and transfer pricing matters. He has worked closely with the government on matters relating to tax policy, tax administration and related matters.

TAXATION AND FISCAL MANAGEMENT

Simulating the status of Indian taxation and regulation in the year 2061 is an important albeit an extremely speculative exercise. It will entirely depend on the expected level of fiscal discipline in the Indian economy that currently is pegged at US$ 4.7 trillion (GDP at PPP) and is expected to sustain a compounded annual growth rate of 5 percent over the next 50 years.

Indian economy's high growth rates in the post-reform era have been quite impressive, but one must appreciate that these were possible only because the low base of GDP to start with. While traditional challenges like weak infrastructure, low governance, excessive bureaucracy and corruption don't seem to have really hindered the early phases of growth, the growing wealth disparity and now creeping frustration in economically backward sections is a clear indication of the lopsided nature of India's economic development. One always needs to bear in mind that the 'bottom of the pyramid' segment makes up a larger part of the Indian population and promises to be the prime engine for future growth. Consequently, the potential in the Indian market can be optimally harnessed only with the appropriate empowerment of the people along the weaker sections of society. Leading from here, the next 50 years of growth will clearly be defined by how effectively India deals with the traditional challenges, and any simulation on the future tax and fiscal scenario will have to keep that background in mind.

" *Indian taxation in the post-reform era fortunately has been consistently rationalized but a lot still remains to be done..* "

The purpose of taxation along the history of universal society has been to raise finances for the government to meet public expenditure. In the context of a developing economy like India, this is being surreptitiously used as a handy tool to bridge the burgeoning fiscal deficit year-on-year, and also as a social tool to even out the disparity in wealth levels. This goal of rationalizing wealth levels however took an extreme turn in the eighties, when the government thrust a radical income-tax rate of over ninety per cent. Indian taxation in the post-reform era fortunately has been consistently rationalized but a lot still remains to be done. High rates of taxation over the years, has bred unaccounted 'black' money which by some estimates stands at around US$ 500 billion. Despite the government efforts at extracting taxes through all viable means, the total value of tax collections in the system continues to seriously lag. Besides the business community, a very small fraction of individuals actually come under the purview of income-tax. There continues to be an ongoing debate on increasing the spread to cover additional segments of society such as the rich farmers and traders and to move away from direct-taxes to indirect-taxes model, but this idea on 'inclusive taxation' has been obstructed each time by myopic political considerations. The weakening standards of integrity and governance in Indian political and business circles are equally accountable for the flourish in unaccounted money.

Politically driven expenditure on unproductive assets, investments and schemes has traditionally been the root cause of the spiralling fiscal deficits in India. The exchequer typically has three options to bridge the deficit - increase taxes, borrow money or print currency. Winston Churchill's quote "… for a nation to try to tax itself into prosperity is like a man standing in a bucket and trying to lift himself up by the handle" so rightly captures the danger of using the tax option to bail out of fiscal problems. The other two options can push the economy into a vicious spiral, severely impacting inflation and liquidity, just the way some Latin American and European countries suffered in the last two decades. The outstanding Indian borrowing of sixty percent of GDP is predominantly local and often touted as being healthier in comparison to other developing countries that have capitulated under the weight of foreign debt. One however needs to objectively view this in the context of the extraordinarily high cost of Indian borrowing which if not regulated could see it implode under the weight of its own debt.

The secret to securing India's fiscal position ultimately lies in the mitigation of its plethora of challenges. The prime challenges in India can be classified under two categories - (a) soft challenges that don't need financial support for mitigation; and (b) hard challenges that are reliant entirely on financial support.

The ideal strategy would be to identify critical soft challenges and develop a viable plan to systemically uproot them and catalyze an effective transformation process towards changing the public mindset and driving them closer to the goal of empowerment. Excessive bureaucracy is a serious challenge abetting corruption that not only raises serious doubts on integrity of the Indian system, but also hampers investment from private and foreign investors depriving creation of

> *Black money thrives as a big problem in India creating a parallel economy that fuels inflation, socio-economic discontent and deprives the much-needed funding for investment. The reform in the tax regulation and structure is the simplest solution to purge unaccounted money from the system.............................*

national wealth. To combat this chronic problem, India needs to instil best standards of process, systems, transparency, governance, accountability and most importantly, enforcement. Black money thrives as a big problem in India creating a parallel economy that fuels inflation, socio-economic discontent and deprives the much-needed funding for investment. The reform in the tax regulation and structure is the simplest solution to purge unaccounted money from the system. While fiscal deficit persists as a big problem, populist politics continues to severely impede Indian economic growth and leads to policy inaction and excessive bleeding of the hard-earned public money on subsidies and unproductive items of investment and expenditure. Thomas Jefferson's quote "the same prudence which in private life would forbid our paying our own money for unexplained projects, forbids it in the dispensation of the public monies", lays down a written code for people in influencing positions to desist from spending money lacking spirit of propriety. India could consider empowering the Election Commission to closely work with the Finance Ministry in curbing populist spend. Rapid growth and industrialization in India has been at the cost of environment and is quite apparent from the alarming scale of pollution, deforestation and disregard for socio-economic sustainability. Unless checked immediately, this threatens to snowball into a serious impediment for India's economic sustenance over the long term.

Let us now look at some of the hard challenges that need immediate address. The Indian growth in the post-reform era has been predicted around the remarkable success story of the services sector. The consistently plummeting share of

manufacturing and agriculture in the GDP is a cause for concern, given that a high percentage of population relies on these sectors for livelihood. India is one of the few countries abundant in two most invaluable natural resources - sunlight and water. Unfortunately, agriculture, the sector of choice has languished over the years for want of appropriate regulation, investment, technology, irrigation and logistics. The topic of unifying Indian rivers to build a reliable grid for assured irrigation water and inland transportation has been discussed ad nauseam since Independence, but political considerations continue to hamper progress. The recurring drought and flood situation in various parts of the country over the years has caused thousands of deaths. An effective river integration plan is expected to objectively help wheel water flows per regional needs and avert disasters in the process. The Delhi-Mumbai Freight Corridor has clearly shown the way at promoting industry in backward areas as long as there is good logistic connectivity. Besides the Golden Quadrilateral and a few expressway projects, a lot of investment will have to flow into regional roadways and rail projects to improve linkages and help promote manufacturing activity along the diverse Indian hinterland. Besides providing an alternate source of employment for next generation families of marginal farmers, it can arrest the migration of people to the over-stretched cities and help in the process of urbanizing rural India itself.

> *One needs to realistically look at rationalizing the production cost factors such as taxes and duties on procurement and imports, towards making Indian products globally competitive...*

Indian exports continue to be driven by traditional items of gems, jewellery and software. While the Chinese juggernaut that hinges on price advantage is now starting to also disrupt Indian manufacturing, the local industry will have to draw comfort and confidence from its success in pharmaceutical and automobile sectors that have attained international acclaim for quality standards. One needs to realistically look at rationalizing the production cost factors such as taxes and duties on procurement and imports, towards making Indian products globally competitive. The power situation continues to be grim and India's position as a net importer of hydrocarbon-based fuels is an indication of that. What puts an added pressure on local infrastructure projects is the undue weight accorded to the price factor in relation to the technical quality. It is in India's long-term interest to embed the virtues of awarding contracts based

on project life cycle rather than only the price. Interestingly, a larger part of the infrastructure built in India till date has been financed by commercial banks which typically are trustees of short-term deposits and not by the traditional custodians of long-term funds i.e. project finance institutions and pension funds. This anomaly will soon have to be corrected to mitigate the risk arising from the mismatch of funding long-term projects with short-term money. Education and healthcare are two segments of Indian social infrastructure which if not improved expeditiously risk crippling the Indian economy from a progress and continuity perspective. While the Indian demographic mix is often euphorically highlighted as a valuable asset, the last thing India would want is a young population that is illiterate and disease prone. Add to this, the issue of vocational skills that seem to be grossly lacking even across a large percentage of students graduating from colleges and professional institutions. India will have to seriously look at investing in these areas to optimize the benefits of a young demography. Wherever necessary, and especially in areas with deficient local strengths, foreign technology and investment needs to be actively encouraged through liberal regulation and development of an attractive eco-system. Besides all the above measures, the recent initiatives around UID and Aadhaar cards promises to definitely help the process of achieving inclusive growth. The idea of distributing cash rather than subsidies will go a long way in correcting levels of abject poverty and wealth disparity helping the overall growth of the nation. The basic telephone took a long time to penetrate into the common Indian household and even after seventy years it has only managed to scratch the surface. The technology driven mobile telephone in comparison has made real inroads to help bridge the divide on communication. The internet promises to do the same trick in the context of banking in India. A thirty per cent banking coverage is indeed a weak penetration number in the context of a large and growing country like India. However, recent initiatives allowing post-offices and large industrial groups with a countrywide footprint, to enter the banking business are positive steps in the right direction towards correcting that deficiency.

A resolution around soft and hard challenges promises to drive empowerment, more so amongst the category that was hitherto outside the radar. That empowerment ultimately can only translate into a wider distribution of wealth; emergence of middle-class with aspirations; bigger spends on goods and services; and finally trickle down into a wider coverage of people to contribute to taxes. The solution to addressing concerns on fiscal management ultimately sits in creating an effective economic system.

Dorab R. Sopariwala

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STATES OF THE NATION

Today is Republic Day. It is January 26, 2061 and India has now been a Republic for 111 years. The first few decades of the republic saw democracy grow in the normal Westminster form of single party governments and elections at five-year intervals. The next few decades saw the growth of regional parties and coalitions at the Centre. The last few decades have witnessed significant periods of instability at the Centre with governments lasting, on an average, for 2-3 years, leaving the country in an era of almost non-stop elections.

The Lok Sabha elections are likely to take place a few months, as the government does not seem to have the numbers to get the annual budget passed. So, the voters are going to the polls again just a year or so after the previous elections to elect 850 members to the Lok Sabha from 56 states and union territories.

In 2047, on the 100th anniversary of India's Independence, the report of the Third States Reorganisation Commission (SRC) was published. This was the first

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SRC set up since 2021. As per the recommendation of the SRC, 12 additional states were formed in 2048. Together with the new states that have been set up

from time to time, the total number of states and union territories now stands at 56 (see Table 1).

All the large states that existed at the beginning of the century have been cut down to size. The old Uttar Pradesh is now just Awadh, with three additional states of Poorvanchal, Rohilkhand and Harit Pradesh being carved out of it and a part of it merged with areas from Madhya Pradesh to form the state of Bundelkhand.

Non-Hindi speaking states had always been very reluctant to have more than one state with the same language, i.e. their formula was: one language-one state. But with the formation on Telangana, followed by Rayalaseema and Vizianagaram, this tradition was broken. Maharashtra has spawned three new states - Vidarbha, Konkan and Marathwada.

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In the same year (2047), the number of seats in the Lok Sabha was increased to 850 and those in the Rajya Sabha to 400. With a population of around 1.8 billion, there are nearly 1.45 billion voters. Thus, while in 2011, there were around 1.4 million voters per constituency, now there are around 1.7 million voters per constituency.

The Women's Reservation Bill was passed many years ago and, as a result, 25% of seats in the Lok Sabha are reserved for women. The reservation for Scheduled Castes and Scheduled Tribes, due to last only until 1960, still continues but it is now 12.5% for Scheduled Castes and 2.5% for Scheduled Tribes.

With the increase in the number of seats, two questions arose: One, would there be enough places to sit in the chambers for our netas? Two, how would these additional seats be allocated across the states?

A parliamentary committee was appointed to look into the possibility of constructing new, bigger chambers for the Lok Sabha and the Rajya Sabha. The committee's report was submitted on August 15, 2047. It recommended that,

in a time of austerity, instead of building the chambers anew, the chambers be remodelled to accommodate 700 Lok Sabha members and 325 Rajya Sabha members. When this recommendation was challenged, the chairman of the committee pointed out that the average attendance in the two Houses over the past five years was 23% and the peak attendance, during a vote on a motion of no-confidence, was 92%. The chairman also cited the example of the House of Commons chamber (re-built after the Second World War) where there are only 427 seats to accommodate around 650 members. In exceptionally important debates or during the Prime Minister's Question Hour or the Budget Speech, the chairman suggested, those who could not find seats would have to squeeze alongside their colleagues or stand in the aisles, as their counterparts do in the Commons. There would be no 'reserved' seats for members as in the pre-2050 era, except for the front benches.

When the number of seats in the Lok Sabha was being increased, a number of states said that a new delimitation exercise should be carried out and the allocation should be based on the population of the states, as was the case in the first Lok Sabha (and also in the United States, where seats in the House of Representatives are "re-allocated" among states after each decadal Census). But this was strongly opposed by all states from south India and several other states. They made the same argument that they had made in the 1970s when this question first arose, i.e. the south Indian states had made sterling efforts to meet the population control targets and they should not be penalised for meeting that target by getting fewer seats and the north Indian states should not be rewarded for failing to meet the target; thus, the share of the seats should remain unchanged. After many acrimonious debates, this view was finally accepted. Consequently, in the current (2061) Lok Sabha, the average number of voters in a constituency in south India states is 1.5 million, while the size is around 2 million in north Indian states.

And the political parties?

The fragmentation of parties continues unabated. After the 1980s, almost all political parties were formed on the principle of "politics as a business" as distinct from "politics as a profession." Thus, parties have become businesses and, as the late Devi Lal (Chief Minister of Haryana in the 1970s and 1980s and the Deputy Prime Minister of India from 1989-1991) is believed to have remarked: "If I am not to favour my sons, whose sons am I supposed to favour?"

The first 2-3 decades of India's Independence saw the formation of political parties that represented competing ideologies and interests. For instance, there was the Congress, the Praja Socialist Party, the Communist Party of India, the Hindu Mahasabha, the Swantantra Party, the Bharatiya Jan Sangh, the Peasants and Workers Party, the Muslim League, the DMK, the Akali Dal, etc. As these parties represented different ideologies or interests, the first 3-4 general elections post-Independence were fought on planks that were ideological.

Over the years, some of these parties, such as the Praja Socialist Party, the Swantantra Party and the Hindu Mahasabha, found little support and vanished from the political scene; others, such as the Congress, the DMK and some others broke up and became family fiefdoms. The post-Emergency era saw an almost complete switch over from ideology-driven parties to personality-driven parties.

Probably the only major ideology-driven party to be formed in India post-1977, and that survived for at least 50 years, is the Bharatiya Janata Party (formed in 1980). Other so-called ideology-driven parties soon fell prey to factionalism or caste-considerations.

The increase in the number of states has brought about an increase in the number of regional parties. The old regional parties, like the SP and the BSP in the 'old' Uttar Pradesh, do not hold sway in the entire area of the 'old' state. Thus, the SP has

> *A point worth noting about family parties is that very few of them have been able to survive without a major split for more than three generations.................................*

become a party dominant in what used to be western UP and weakened over the decades in states like Awadh and Poorvanchal. The BSP found it difficult to find a post-Mayawati leader who could hold the party together. The DMK splintered into two several decades ago and, after the departure of Jayalalitha from the political scene in 2025, the AIADMK broke into three separate factions, each confined to a part of the old Tamil Nadu state. Many new parties have come up in the newer states and, like the older regional parties, they are mainly family parties. As in the past, the influence of the new parties has been confined to the

'state of origin' and, to a lesser extent, to a couple of neighbouring states. The main cause of the proliferation of regional parties is exactly what it used to be. Anyone outside the family had no chance of ascending to the top - so the only option available to him was to separate and form another party.

A point worth noting about family parties is that very few of them have been able to survive without a major split for more than three generations. This has been so for a variety of reasons - the main ones being a split in the family itself or the lack of charisma of the second or third generation leader which has led to the party either being taken over by an 'outsider' or being so weakened that it soon ceased to exist. In a few cases, the leader had no heirs and the 'departure' of the leader with no clear successor has led to multiple splits in the party.

Some of the 'old' national parties still survive

The Congress is still the Nehru-Gandhi Congress, with Jawaharlal Nehru's great, great, great, granddaughter elected President of the party with great fanfare last year. There are two major reasons why the Congress has been able to survive for over 100 years after Independence. First, it has been able to call upon the sacrifices of several members of the family and keep on reiterating the role played by various members of the family in the struggle for Independence. Secondly, it is a quasi-national party and most Congress leaders are regional leaders, who have been unable and/or unwilling to 'take on' the First Family.

The CPI (M) and the CPI finally merged about 40 years ago. The merged CP is still a non-family front and is confined to the states of North Bengal, Tripura and Travancore-Cochin. It is ideologically still a party of the 1960s and has enjoyed power in North Bengal for only 15 of the last 50 years and for somewhat longer in Travancore-Cochin.

The BJP has become a sort of hybrid. It is more like the Democratic or Republican Party of the US. It has been partly affected by the "family" disease, as has happened in the US as well but, more importantly, its state leaders function fairly autonomously. In a way, it has become a sort of commonwealth run by regional leaders; a party with a weak High Command and strong state satraps. This trend began in the first decade of the 21st century and has accelerated in the past 20 years. Another major change occurred in the late 2030s when a section of the party revolted against the Nagpur-based RSS. Today, the writ of the RSS runs only in the party units of what used to be the states of Maharashtra and Gujarat.

TABLE 1: LIST OF STATES AND UNION TERRITORIES IN 2061			
South	**East**	**North**	**West**
Telangana	Arunachal Pradesh	Haryana	Goa
Rayalaseema	Assam	Himachal Pradesh	Gujarat
Vizianagaram	Manipur	Kashmir	Saurashtra & Kutch
Dakshin Karnataka	Meghalaya	Jammu and Ladakh	Dadra & Nagar Haveli
Uttar Karnataka	Mizoram	Madhya Pradesh	Daman & Diu
Malabar	Nagaland	Bundelkhand	Maharashtra
Travancore/Cochin	Tripura	Vindhya Pradesh	Vidarbha
Pallavanad	Mithila	Rohilkhand	Marathwada
Cholanad	Magadh	Avadh	Konkan
Pandyanad	Tirhut	Harit Pradesh	
Pondicherry	Jharkhand	Poorvanchal	
Andaman & Nicobar	Orissa	Uttarakhand	
Lakshadweep	Dakshin Bangla	Chhattisgarh	
	Uttar Bangla	Punjab	
	Gorkhaland	Rajputana	
	Sikkim	Marwar	
		Delhi	
		Chandigarh	

The electoral system

While the Lok Sabha election is likely to take place in a few months, this election will not take place under the first-past-the post system.

In June 2059, a commission was appointed to work out an electoral system that would result in more stable governments in a multi-party system. The commission considered a range of systems from the presidential system to various forms of parliamentary systems. The commission presented its unanimous report 12 months later in June 2060.

Despite a fractious polity, the report was accepted by the vast majority of political parties and the 348th constitutional amendment was passed in December 2060. All future elections to the Lok Sabha will be held under the proportional representation 'list' system. In the case of the Vidhan Sabhas, the proportional system (with slightly different rules) would be applicable from 2062.

In brief, under this system, a party gets seats in proportion to the votes it gets. To give a simple example: Each party sets out a list of candidate in each state where it

contests. For instance, if there are 25 seats in Rohilkhand, each contesting party sets out a list of 25 contestants. If party A gets 20% of the votes, it gets 5 seats (20% of the seats) and first 5 on the list of 25 by that party would be elected to the Lok Sabha. This is the simple list system but, round the world, it has rarely been used in its pure form as it has led to a lot of fragmentation of parties.

In several places where the 'list' system has been used, it is used with a cut-off. In other words, any party that does not get more than x% of the votes nationally will not be represented in the legislature. As per the recent constitutional amendment, any party that does not get 15% of the votes nationally will not be represented in the Lok Sabha. There will, of course, be many parties who score less than 15%. Their votes will be re-allocated to other parties based on the d'Hondt system (for details, please see the commission's report). As is admitted in the commission's report, the new system may be a bit complicated to work at the beginning but the commission felt that it would force parties to form new federal political parties to beat the minimum cut off of 15%. Thus, a party in Bundelkhand could tie up with state parties in Rohilkhand, Rajputana, Marathwada, Konkan, Uttar Karnataka, Pallavanad, Vizianagaram, Dakshin Bangla and Tirhut to form, say, the Bharat party. These kinds of federal parties would be similar to pre-poll alliances of the past but would be more cohesive and stable as the anti-defection law would apply to the entire alliance and not to each of its erstwhile constituents. A study by the commission indicated that this would result in no more than 5-6 parties in the Lok Sabha.

India has lived with political instability since the 2030s. The 348th constitutional amendment brings hopes of a new dawn of political stability.

Geet Sethi

Geet Sethi is a nine times world cue sports champion, founder of Olympic Gold Quest and author of 'Success vs. Joy', an inspirational book on mind control. He is also a motivational speaker, much in demand in corporate circles.

OLYMPICS AND OTHER SPORTS

"Prediction is very difficult, especially if it's about the future."- Niels Bohr, Nobel laureate in Physics.

Projecting trends to predict how different aspects of society will change and grow over the next half century might well be the point where valour merges with foolhardiness. And yet it is far better to foresee even without certainty than not to foresee at all. Far better to identify constructive patterns so we may strengthen them, than to squander opportunities and watch myriad chances trickle from our hands like grains of sand.

Let me begin, then, with a prediction that may appear both audacious and ambitious.

Olympics 2060: India's medal tally will be between 60-70 medals. We will get these medals in disciplines as wide ranging as boxing, wrestling, track & field, archery, badminton, shooting, martial arts, cycling. This tally, coupled with world championships in non-Olympic sports like Chess, Billiards, Squash etc. will place India in the top three sporting nations of the world.

That may sound like an impossible dream but I consider it a realistic projection. A projection based on current emerging trends, one based on a judicious use of our resources.

The last few years have seen positive trends emerge in Indian sports. In contrast, the two decades before that were the bleakest for Indian sports or at least for all Indian sports except Cricket. These years were marked by official apathy, a lack of public support for non-cricketing sports and thus these years were marked by the seeding of hopelessness in the attitude of the average Indian sportsperson. Merit

was sidelined and our athletes were treated with contempt, receiving neither proper training and equipment, nor the mental conditioning that marks winners.

Political games reduced sporting organizations to arenas where petty egos battled and athletes suffered. We have all heard the stories about the neglect suffered by our medal winners and champions of the yesteryears. The stories about families of the champions sacrificing little and big comforts to afford another piece of equipment, a better coach have been repeated often enough over the last few years too. I will not

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repeat them here but I will point out that such an overwhelming lack of support is enough to sap the morale and the spirit of most. And if this weren't enough, sports was not even considered to be a viable career option. The rewards were few and future career options even fewer.

The sporting victories that still accrued to India in this period are testaments to individual courage and stubbornness. They speak of an obstinate refusal to give up on dreams even in the face of seemingly endless hurdles. These victories mark our trailblazers, the ones who led the way and contributed more than victories to the nation. They inspired others to dream and they enlarged the sphere of possibilities. For it is my experience that it is subconscious self-belief that fuels the cycle of victory. Each time the nation notches a victory, this subconscious self-belief gets reinforced. We believe that we can win.

I have always maintained that my victories are not mine alone. I have always maintained that the bedrock of my accomplishments are the laurels won by Wilson Jones and Michael Ferreira. They were the pathbreakers, the ones who proved it could be done. And their deeds fostered a deep belief that it can be done. Similarly, the victories of Saina Nehwal are not hers alone - they build on the ground conquered by a Prakash Padukone, a P. Gopichand. And they build the ground on which P. V. Sindhu and other youngsters will construct

their own edifice of success. Each successive victory adds to the momentum.

The changes the original trailblazers ushered in through their magnificent obsession are today obvious for all to see. London 2012 saw India gather its largest haul of medals ever: six individual medals in the world's biggest, most prestigious sporting extravaganza. Critics point out that it is a tiny number, dismal perhaps when considered in terms of India's teeming population. In my perspective, these medals represent an improvement of magnitudes when compared to what was. And the story goes beyond the medals and the 6 athletes who did us proud.

London 2012 was a watershed moment in the history of Indian sports. For the first time I can recall, sports other than cricket had the public enthused. People talked of Mary Kom's bouts and Sushil Kumar's feats, of Yogeshwar Dutt, Vijay Kumar, Saina Nehwal and Gagan Narang, of Vijender Singh's chances and the women's archery team. The media attention was unprecedented and what it revealed about our contingent was even more unusual - the Indian contingent in London had expected to win more medals. This confidence, where athletes of every discipline thought it possible to win a couple of medals in their sports, this confidence is the best reflection of the change that has affected Indian sports.

Gone is the diffident youngster who was happy to just be selected to represent the nation in international sporting meets. Occupying the centrestage are confident young men and women who consider victory at the global levels to be more than within reach - they consider it their due.

This is the change we need to nurture. This is the change we need to build upon.

What lies behind this change?

Political will and meaningful state intervention are perhaps the first causative factors. A series of interrelated measures have had a cumulative effect. An increased outlay in Sports budget has meant that more resources are devoted to infrastructure as well as to provide training to aspiring athletes. A Sports Bill that holds out the promise of equity and dignity is in the offing. Financial and institutional support to our sporting heroes has brought sports closer to the mainstream of our society. Especially noteworthy is the effect of state level policies to recognize Indian sporting heroes through cash awards and land endowments. State recruitment policies linked to sporting prowess have let emerging athletes (and their parents) be secure in the knowledge that their future is assured, freeing them to focus on their

training. Measures like harnessing the experience and exposure of our contingent members to train future aspirants add more bricks to this edifice of support.

Media support cannot be underestimated either. From relentless coverage of Olympics for the first time to the feting of the heroes, media acted as a partner in the cause of

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bringing non-cricketing sport heroes to the forefront of public consciousness. Tied into this upsurge of attention are endorsement deals, better financial opportunities and thus an enhanced confidence in oneself and one's future.

Completing the troika of change effectors are private initiatives that bolster the efforts of the state and bridge the gap between intent and delivery. Be it the Mittal Champion Trust endowed with a massive corpus or the Olympic Gold Quest where a diverse team of achievers has come together, Indian business and Indian citizens have stepped up over the last few years to provide what the behemoth of governmental machinery cannot - quick, precise and timely intervention to aid the training of our best medal prospects.

In these private initiatives, our strategy has been multi-pronged and the aim has been singular: to ensure that the athlete is left free to focus on the best possible training regimen. In practical terms, that has meant facilitating increased exposure to top level competition through increased participation in domestic and international tournaments. It has meant organizing training and coaching camps with world's best coaches and footing the bill for best quality sporting and fitness equipment. Best personnel were identified to put together a high quality support team of physiotherapists and mental trainers, personal trainers and sparring partners - no effort has been spared to ensure constant facilitation of the pursuit of excellence. While it would be impossible to quantify the effect of these interventions separately, that they bridge an existing gap is undeniable. The results of London 2012 proved that beyond all doubt.

These then are the trends we need to strengthen. The process has been put into motion, it has started showing results but it is not yet a self-sustaining cycle. The seeds of change are not yet deep-rooted enough to survive a resumption of neglect.

Our primary challenge over the next three decades would be to ensure that this cycle of change is nurtured and strengthened. At the governmental level, it would mean sustained investment in India's sporting infrastructure. The thrust of this investment will now need to target Tier II and Tier III cities across the nation, reducing the geographical distances between the Indian youth and sporting facilities. The basics are already in place across a majority of districts - the investment required to upgrade these basic facilities will not be heavy.

A crucial adjunct to this investment would be a proportionate investment in the creation and maintenance of quality training and support staff - coaches, trainers, scouts - we need to continue with the practice of harnessing the experience of our athletes, to spread them far and wide across the nation, to place in their hands the training of the next generation of our athletes. Passionate, dedicated and responsive teachers are the first requirement for sustaining our course. Knowledge and experience distilled and passed on, each successive generation building on the strengths of its predecessors.

As I have already noted above, non-cricketing sports have finally started impacting public consciousness. I see this trend continuing and expanding over the coming years. Cricket, one of our defining national obsessions today, is slowly losing its

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popularity. A surfeit of cricket has already started affecting public interest in the sport. Ennui has set in - matches are played to half empty stadiums and sponsors are looking at youth icons from other sports. As the continued cricketing oversell bears its own fruit, the mindspace for other sports will expand at a steady pace. The list of heroes and legends from different sports will grow and it will fuel further growth and greater investment in varied sports.

Continued investment by the GOI will deepen the penetration of sporting facilities, an efficient network of coaches and scouts will ensure that talent doesn't languish unnoticed, economic forces will ensure that more and more athletes and parents view sports as a viable career choice and private initiatives will continue to hone and support the best and the brightest of each lot. If we can sustain this momentum for the next decade, then there will be no turning back. The sporting strength of India will grow by leaps and bounds and our children will soon forget that we ever were a nation starved for sporting glory.

If a missing link remains in the bridge from here to there, it is one that must be addressed by us all. All of us acting together, in concert. For that is the only way we will ever create a sports culture in our society. We need to make sports a part of our life and social culture. Not just as spectators but as players, not just competitive sport at international level but recreational sports at every level. Families out to play together, informal matches, sports as an intrinsic part of life.

We also need to integrate sports into the academic system. As the years go by, strong domestic leagues for different sports will emerge as a result of this integration. And they will provide students another good incentive to follow a career in sports. More importantly, this cycle will lead to a development of a quality pool of athletes, to pervasive quality competition that will motivate our athletes to constantly aim for improvement. The benefits to the country are many.

I would argue that at stake here is more than India's sporting health. And I would submit that the benefits go beyond even the therapeutic role of sports in reducing

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incidence of many physical and mental lifestyle diseases like obesity, cardiovascular disease, anxiety, stress and depression.

As the next five decades unfold, the nature of challenges we face as a society and country will change. The peaking density of urban population, with a majority of

India's population living in cities by 2060, will bring with it attendant problems of stress and strain, both on individuals and on institutions. And as we face social and political changes over these years, some of our most urgent challenges will be innovative and effective ways of tackling issues like community development and integration, promotion of active citizenship and combating crime and anti-social behaviour.

I do not contend that sports alone will solve our problems. But there is ample research evidence to show that when used with other policy measures, sports has potential to aid community development and foster social inclusion; it is a crucial component of preventive and early intervention strategies aimed at bringing down juvenile crime; it provides an alternative to educational underachievement and blocked aspirations and it provides an outlet for disruptive energy. Sports, in short, offers many benefits to the society as a whole and the creation of a sports culture will enable us to make best use of this particular aspect of sports.

There is, and there always has been, a wealth of talent in this nation of ours. We have tasted the sweetness of victory lately. Many more victories beckon. All we have to do is to step up and seize the moment. Do our little bit.

The rest will follow.

Hasit Joshipura

Hasit Joshipura is Senior Vice President South Asia & Managing Director, India of Glaxosmithkline Pharmaceuticals Ltd.

HEALTHCARE ENVIRONMENT

In 1962, President Kennedy made a pronouncement that by the end of the decade, America would put a man on the moon. That pronouncement culminated in a small step for Neil Armstrong and a giant leap for mankind. A different race got underway in the 90s in the area of healthcare. It was a race between the private initiative of J Craig Venter and the teams from the US Public laboratories; that of unravelling the human genome. The search culminated in the unravelling of the human genome by the end of the millennium. One of the defining trends in healthcare, the implications of which will be studied and will spawn a myriad of healthcare solutions from customized medicine to drugs targeting specific malfunctioning genes to predictive diagnostics. Already, it is possible to get a mapping of one's individual gene map for less than US$300 with predictions of disease susceptibility.

The second defining trend in healthcare which will play out over the next few decades relates to stem cell technology. Essentially, this relates to using one's own stem cell for generating organs or repairing dead tissue such as cardiac tissue after an attack. This is a field of medicine, known as Regenerative medicine. We all possess stem cells.

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Stem cells are precursors to developed specific cells. Of particular importance are Pleuripotent stem cells which have the capacity to transform into any tissue or organ

whose site they are injected into resulting in regeneration at the site. These are easily extracted from cord blood and placental tissue. Research in pleuripotent stem cells was not approved by President Bush because of the potential misuse. It is more difficult to extract stem cells from one's own blood although it is a matter of time before technologies to do the same will be the order of the day. Laboratory experiments have already demonstrated regeneration of missing teeth, parts of the body such as the food pipe, lung tissue on an inert scaffolding. Experiments also suggest improvement for patients suffering age related cognitive decline and Parkinson's disease. Again a long-term trend which in the not too distant future will make it possible to create organs in the laboratory from one's own stem cells and have a faulty organ replaced pretty much the same way as a faulty car part is replaced. The possibilities of the technology when perfected will be only limited by one's imagination.

The third defining trend in healthcare is in the area of preventive medicine. Vaccines have long been known for their ability to activate the immune system and prevent diseases. Largely considered for use in paediatric applications, much work is underway in development of new vaccine technology resulting in both preventive vaccines as well as therapeutic vaccines. Vaccines which improve outcomes of existing standard of care and time to progression in Melanoma (skin cancer) and lung cancer are in advanced stages of clinical trials. Vaccines for Alzheimer's are also under development. Vaccines for prevention of cervical cancer are already in the market. Bill Gates was one of the earliest supporters of vaccines for preventive healthcare and has made significant investments in development and distribution of vaccines for vaccine preventable deaths.

The fourth developing trend which will play out over the next several decades in healthcare relates to congruence of devices and medicine. Prosthetic implants and drug eluting stents in coronary artery disease were early examples of this. More recently, the creation of the bionic eye is an example. Patients with a genetic retinal disease, the end result of which is complete loss of vision have been provided with vision which makes them relatively self sufficient. The process involves the mounting of a minute video camera which feeds into a chip implanted in the retina and the signals are deciphered using the neuro plasticity of the brain through a chip implanted at the back of the brain. The technology has been approved by the US FDA. Early work is underway in using similar chip implants in the brain which convert electrical signals created by thought waves which are then interpreted using a computer which allows patients who are completely paralysed to communicate using

this technology. This is just the beginning and the real impact of this technology will play out over the next several decades. Use of nano technology for diagnostics using nano cameras ingested into the body are bringing to life the science fiction depicted in a movie called Fantastic Voyage released in the early 60s. Nano particles impregnated with potent cancer drugs are being targeted to disease sites making for targeted therapies without the collateral damage to healthy tissue which occurs in chemotherapy today.

Finally, the most promising trend relates to the area of the final frontier in healthcare which is the brain. Recently, President Obama has announced an investment of US$100 Mn in research on the functioning of the brain. Unlike the space race, this does not define outcomes but has the promise of being even more impactful on human life than putting a man on the moon. This research will hopefully provide answers not just to an understanding of the brain and its functions but also provide answers to some of humanity's most fundamental questions which in neurology is called the "hard problem" and which is, does consciousness precede the brain or vice versa?

Given the breathtaking potential of some of these technologies on human health, it is instructive to look at healthcare in India before looking through the crystal ball fifty years down the road. Sadly, India does not have much to show despite having a history of pioneering systems of medicine by Susruta or preventive health such as the system of Astanga Yoga of Sage Patanjali. If immortality is the holy grail of healthcare, then the Indians supposedly stumbled unto it centuries ago. However, today

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our public health outcomes are not even commensurate with our stage of economic development. Our statistics on infant and maternal mortality are worse than some of our less developed neighbours despite these deaths being vaccine preventable. Industry anecdotal evidence suggests that less than 50% of the population has access to modern medicine. In a country which prides itself on being the "pharmacy to the

world", the government's report on Macroeconomic & Health of 2005 suggest that even today "there are parts of the country where one has to travel 2 kms to buy a tablet of paracetamol, 6 kms for a blood test and 20 kms to a hospital bed." Public investment in healthcare is at an incredibly low of 1.2% of GDP. For a population of 1.2 Bn people, we have a doctor population of 600,000 and similar inadequacies with respect to hospital beds. Besides 80% of these capacities are urban-centric whereas 65% of the population is rural. Even if there is capacity available in urban at no cost, people in many instances do not have the money to undertake the journey to get treated. A major illness which includes hospitalization often drags people to poverty in the absence of a reimbursement system.

However, there are signs that this is changing. In the 12th Five Year Plan, the Planning Commission has announced an increase in expenditure on healthcare to 2.5% of GDP. Besides, this plan period has been called the Plan period of healthcare. The Health Ministry has mooted a creation of a cadre of rural doctors which would involve a three-year programme and would create a cadre which would have limited powers to diagnose, prescribe and refer. Creation of additional hospital capacity is also under plan. Plans to provide free or low cost medicines have been unveiled in a number of states. Hopefully, this will just be the beginning of a virtuous cycle which will not just be restricted to creating healthcare capacities. The Chinese government

> *There are parts of the country where one has to travel 2 kms to buy a tablet of paracetamol, 6 kms for a blood test and 20 kms to a hospital bed.....................*

makes significant investments in research into traditional Chinese medicine to validate and data mine by modern standards many of the traditional therapies used for decades. The Dalai Lama has been having a conclave for leading group of neurologists, neuro psychiatrists and allied experts to facilitate research into Tibetan Buddhist systems of meditation and impact on brain function in particular and health in general using modern techniques of research and instruments. Hopefully, once the fundamentals of healthcare for the nation are in place, resources will be freed up to invest in serious research into some of our traditional systems of medicine in collaboration with western institutions or on our own. This should

validate many of the therapies which people have adopted around the world to their benefit and be India's contribution to healthcare technologies for the benefit of human kind apart from being the "pharmacy to the world". In the next several decades, India will not only be the recipient of the technologies and the outcomes of the research trends in the West outlined earlier, but will also be the contributor of its own insights and knowledge to the world. A combination of the two will hopefully create a golden age for healthcare in India for the generations to follow.

Malini V Shankar

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WATER RESOURCES

"Water, water everywhere, Nor any drop to drink."
('The Rime of the Ancient Mariner', Samuel Taylor Coleridge)

India is fast emerging as a developed nation, in the economic sense. The indicators for social development for a significant segment of our population are however not inspiring. As we make confident strides towards becoming one of the top 3 economies in the world by 2061, we must accelerate our efforts to meet the social and health needs which are supported by the availability of water.

A key component of quality of life is universal access to water. Likewise, growth in agriculture calls for reaching water to the farmsteads. We witness sharp

> ❝ *The annual per capita availability of renewable fresh water has fallen by over 50% between 1955 and 1990. At the current pace of development, this is estimated to further reduce by another 50% by 2025...........* ❞

regional disparity and urban-rural divide in these aspects. Access is not equitable or inclusive. Rapid urbanization, rising population and high economic growth in India have accentuated the competing demands on water - agriculture, industry, household, municipal and recreational needs. The annual per capita availability of renewable fresh water has fallen by over 50% between 1955 and 1990. At the current pace of development, this is estimated to further reduce by another 50%

by 2025 . Given the trends of increasing demand and limited water resources, the tipping point of demand exceeding available supply of water would be reached by around 2035.

The demand for drinking water is forecast to more than double from the present level by 2061, according to the projections by the National Council for Integrated Water Resource and Development (NCIWRD). The demand for irrigation water is expected to go up by 50% during this period. Irrigation needs and drinking water account for 80-85% of all water needs, this trend will continue.

To meet the demand for water as a component of quality of life for the citizens, flora and fauna, we have to address the many casse-têtes in the march to being a developed nation.

Augmentation

Freshwater is a limited resource, constituting 0.01% of all water on Earth. The per capita availability of water in India is below global average. The efficiency of water supply and use is of course obligatory. Besides, projects to tap the available water resources to meet rising urban demands are of long-term gestation and need to be planned for.

Desalination technologies can offer a solution for tapping the abundant sea water in coastal areas for potable use. The capital costs and maintenance costs are formidable and will be viable only in areas with very low rainfall and relatively high affordability.

Irrigation is the lifeline for India's agriculture. The identified irrigation potential has to be met. The last mile canal connectivity needs to be completed on an urgent basis. Irrigation Water Management has to be more cost and resource efficient.

The linking of rivers needs to be re-evaluated. This should be a possibility in some parts of the country.

Sustainability

Water stress due to overdrawal of groundwater - increasingly from deep aquifers - is of serious concern, as groundwater provides over 80% of the drinking water and much of the irrigation needs. More than 75% of the assessed watershed units in Punjab, 48% in Haryana and 37% of the units in Karnataka, for instance, are reported to be overexploited. India faces the looming peril of desertification of large tracts of land, as a consequence. An acute sense of desperation for irrigating cash crops blinds the awareness of the impending crisis.

The regulation of groundwater extraction is a sine qua non for ensuring sustainable water supply in the future. All states of the Indian Union ought to introduce strong groundwater regulation with emphasis on development initiatives through community participation.

Operational Efficiencies and Equitable Access

With rising urbanization, water is being increasingly transported to large cities from reservoirs that are located hundreds of kilometres away. This entails huge costs on power bills and chemical treatment. Yet, water remains an emotive legacy issue with a presumed right of the citizen to be provided potable water free of cost.

The focus of government departments and local bodies responsible for domestic water must shift from the mere logistics of water supply to an emphasis on integrated water management that includes prudence in financial management, enhanced operational efficiencies and attention to water quality issues. As urban

> *Equity of water access, as a commitment to inclusive growth, is a key challenge in the operations of waterworks. In the pursuit of efficiency, we can ill afford to ignore equity ....*

centres demand higher quantum and quality of water, water management will be all about sustained attention to tracking unaccounted for water (UfW), pricing of water with a view to cover O&M costs, and plugging the technical and commercial losses. If the dream of India to be a developed nation is to be realized in an inclusive way, rural water supply works too will have to adopt efficient management practices.

Equity of water access, as a commitment to inclusive growth, is a key challenge in the operations of waterworks. In the pursuit of efficiency, we can ill afford to ignore equity. We know for instance that urban slum dwellers have limited access to water and actually pay more for it. Efficiency improvements should aim at assuring reliable water supply at affordable rates to the weaker sections.

Water Quality

The quality of water being supplied in terms of microbiological and chemical purity leaves much to be desired, and is in a downward trend. This ought to be reversed, if we are to ensure that the population of a developed India are healthy and safe from diseases.

The big task is to manage untreated sewage and its consequent havoc through the pollution of surface water as well as groundwater. Effective legislation and implementation are necessary for preventing untreated sewage, chemical discharges, oil leaks and spills, dumping in old mines and pits, and agricultural chemicals seeping from farms into water sources.

Over exploitation of groundwater has serious repercussions on the quality of water. While the sub-soil strata of certain regions of the country are endemically fraught with chemical contamination such as fluoride and iron, an increasing tract of groundwater is being detected with other elements like Cadmium, Zinc and Lead as water exploitation reaches deep aquifers in mineral-rich rock strata. Traces of toxic elements like Arsenic and Mercury have been detected. With the enactment of the Food Safety Act and prescription of standards for all food and beverages, water quality concerns are a priority.

Defluoridation technologies have been used with varying degree of success. The development of user-friendly and maintenance-friendly techniques of fluoride removal and treatment merits attention.

A Water Quality Mission should be established in quick time to devote attention to sustained quality - rationalizing norms, assessing water supply quality and guiding the local municipalities and water providers.

Sanitation

Access to hygienic sanitation facilities is a big challenge in both rural and urban areas. To ensure universal coverage by 2025, we face the mammoth task of providing hygienic sanitation facilities for about 53% of India's households who do not have this access. Add to that, the new demands that will accrue till 2061 through population growth. Past trends reveal that between 2001 and 2011, we could improve access by only 13%. The need to accelerate universal coverage cannot be overemphasized, if we are to tackle water pollution, and improve health and socio-economic indices. A strong communication campaign, along with sustained awareness inputs at the primary and middle school level are an imperative.

Sewage Systems

The Central Pollution Control Board (CPCB) estimates that only about one-third of waste water generated in the country is treated before being let out into the streams, rivers and the sea. This indicates an urgency for improving sewage management.

The treatment of sewage in Indian urban centres vary from an indifferent level of 2.5% to a more acceptable 89%. Treatment plants where they exist need to be much better utilized. Massive capital investments are required over the next 30 years to achieve 100% treatment of effluents.

"Water is a finite resource. Demand management of water will play an all-important role in meeting the challenge of universal water access.........................

Demand Management

Water is a finite resource. Demand management of water will play an all-important role in meeting the challenge of universal water access.

Introduction of water audits and volumetric and telescopic pricing will be the foundation for effective demand management. Water conservation measures such as de-silting of lakes, construction of bunds and weirs and afforestation must be pursued vigorously. Rainwater harvesting, to conserve water at the local level, must be mandated.

For non-potable purposes, recycling and reuse of water will mean a significant reduction in demand. This will entail costs toward the laying of dual pipes - for potable and non-potable use - in housing projects and industrial estates.

As with energy efficiency, industry needs to rate appliances based on water efficiency. Water saving appliances need to be made obligatory through law.

The large scale shift towards western water closets for example has led to high volumes of treated water literally going down the drain. This trend needs to be reversed through appropriate water-saving innovations.

Water Reuse and Recycling

India has adopted, in significant measure, the global developments in water technology. However, the availability and affordability of the capital investment as well as the maintenance outlays remain a huge constraint.

Membrane-based interventions entail very large investments, beyond the scope of the urban local bodies or of governments. Research in alternative methodologies (biochemical, microbiological) is sparse. Investment in R&D will be required for arriving at appropriate technology as well as scaling up of technology to improve sanitation and sewage coverage at an affordable cost.

A Technology Mission for Water will contribute in finding solutions for water quality, wastewater treatment, sewage and sullage treatment for universal safe water access.

Procurement Process and Private Participation

The Operations & Maintenance (O&M) of waterworks offers attractive potential for private sector investment. Yet, how is private sector participation to be incentivized - given the difficulties in land acquisition, tendency of opportunistic behaviour and uncertainty of contract enforcement? We need to explore alternative bidding procedures for water supply. A shift from traditional 'cost-plus' bidding to 'performance parameters' based bidding and viability gap funding would prove to be a game-changer.

Regulation

There will be increased need for regulating pricing of water, stipulation and enforcement of water quality norms, protection of groundwater and prevention of its over exploitation. Many states have groundwater legislation in place, but the implementation has faced resistance. These issues call for a water sector regulator that arbitrates between consumer benefits and operators' interests.

Policy Matters

Policy initiatives in other sectors need to effectively consider the cross-linkages with water and water resources.

Water pollution arising from agricultural field effluents are on the rise, largely due to indiscriminate or intensive use of fertilizers. The presence of nitrates in water, although not conclusively proven to be deleterious, is of concern as removal of nitrate is scientifically not yet a feasible option. Parts of India face chronic quality problems

in groundwater due to excessive water logging and the continuous cultivation of non-nitrogen fixing crops.

Long-term policy in Agriculture sector must take into consideration the linkages between farm field practices and water quality. If the application of chemicals for cultivation continues at the present pace, access to safe drinking water will be jeopardized. Fertilizer and pesticide use has to be regulated and rationalized through laws, incentives and education.

The mismatch between availability of water and the utilization of water for irrigation (the largest consumer of water) deserves critical attention. The rise in cultivation of water intensive crops, particularly in water-stressed regions of the country, needs to be curtailed and even reversed. The present legislation pertaining to groundwater extraction has enabling provisions for regulating water extraction and transforming cropping patterns; the implementation needs to be strengthened. The use of micro-irrigation should be stipulated in critical watershed areas. Financial and material incentives need to be introduced for encouraging low water intensity crops in overexploited watershed regions.

Public Distribution Systems should include supply of coarse grains such as maize, millets and jowar that require less water for cultivation while adding to the nutrition content.

The conservation of water is impaired by uncontrolled increase in construction and reckless blocking of natural waterways and waste water drains. Building regulations and enforcement should be made more stringent and allied to the cause of water conservation.

Industries should be required to meet substantial water needs from recycled grey water.

Policies and implementation require the support of strong, qualified, trained and committed stakeholders, institutions and workforce in the water and sanitation sector. The gap in this regard is stark. The water engineer is an agent of social change, and this calls for a combination of attributes - technical knowledge with emphasis on its effective application, commitment to the cause of providing water, humanistic view of the end-user and a skill to dialogue with the community.

A pronounced shift is required in their roles from that of a water engineer to being a water manager. The technical curriculum should be modified to emphasise industry requirements and include social sensitization and soft skill development.

Water 2061

The next major wars could well be fought over water, much before 2061. The impounding of water by the upper riparian nations and states are an increasing threat to peaceful coexistence of people. The demand growth is steep, and the availability of water finite. Wastages and ineffective systems and technologies can be a further drain. Pragmatic action towards the major challenges can carve out for India a safe and sustainable Water Future.

"We never know the worth of water till the well is dry." (Thomas Fuller)

Pavan Sukhdev

Pavan Sukhdev is a banker-turned-environmental-economist who led the UN's 'Green Economy Initiative' & recently wrote 'Corporation 2020: transforming today's corporation for tomorrow's world'.

ECOLOGY & THE ENVIRONMENT

Constitutional law in India assures our citizens of a clean & healthy environment as part of the fundamental right to life (Article 21). However, not only has this fundamental right not been well secured by successive governments, we have not really evolved our thinking, policies, or planning processes to reflect an evolving understanding of the increasingly broad and interconnected ambit of issues and problems that "environment" means today.

The environmentalism of the 70's, in India as in the US and elsewhere, was a passionate environmentalism of activists and nature-lovers. However, "ecology and the environment" for India today is not only about natural and human heritage, although these themes are of course important. Ecology and the environment now almost define the entire economic and social landscape of both opportunities and risks that will determine our survival and success into the next half-century. They weave the very fabric of our future.

Ecology, the Environment, & "Sustainability"
In this chapter I shall explore two broad themes: what ecology and the environment means for India, and why and how we must position India much earlier than 2061 - I argue by 2021 - to overcome our main ecological and environmental hurdles and convert them into opportunities for our survival and success.

Environmental problems today are also "sustainability" problems and "development" problems in one breath. They include important global concerns: from freshwater scarcity to desertification; from climate change to energy scarcity; from soil health and agricultural productivity to adequate food production for a growing population, to the sustainability of small-holder farming and the challenges of providing enough employment; from the conservation of forest ecosystems to land rights for the poor. It includes the energy and resource efficiency of our industries, and the impacts of

their pollution and waste on citizens' health. And it also includes issues from healthy and humane living conditions in our exploding cities, to transportation, proper waste management, and green building technologies. All of these issues are labelled "environmental" or "ecological", and the list goes on. The environment today has truly become an all-pervasive watchword for how we live on earth, our only home.

In its landmark report "Towards a Green Economy" (see www.unep.org/greeneconomy) in 2011, UNEP recognized the breadth and interconnectedness of environmental issues and presented a wide menu of economy-wide designs for

> *UNEP's report defined 'green economy' as one which increases human well-being and social equity without increasing environmental risks or ecological scarcities....*

"sustainable development". UNEP's report defined 'green economy' as one which increases human well-being and social equity without increasing environmental risks or ecological scarcities. This definition acknowledges that "the environment" today is very much about the economy. Achieving "sustainability"- a planet we can still call "home" a few generations from now - becomes about changing economic direction and resource use in the economy. And as the second largest country by population and among its largest in terms of GDP [adjusted for Purchasing Power Parity (PPP)], India's ecological footprint and environmental challenges are indeed global concerns.

What does "business as usual" mean for the future of India?

Recent research suggests that planetary boundaries (the safe operating limits that we must observe worldwide to avoid global ecological scarcities and environmental disasters) are being approached across many fronts: not only greenhouse gas (GHG) emissions, but across several others such as excess nitrogen use from fertilizers, shortages of rock phosphorus and potash (both also key fertilizers), freshwater scarcity, soil fertility losses, ocean acidification, and so on. Scientists associated with the 'Planetary Boundaries' working at the Stockholm Resilience Centre believe that these limits might already have been crossed in the areas of GHG emissions, nitrogen cycling and biodiversity loss. And there are many events that indicate the onset of large-scale changes, including the death of coral reefs, widespread desertification, and extreme weather events.

It is becoming increasingly clear, as I have also argued in my recent book "Corporation 2020" that the year 2020 is about as long as we have to embark on a wave of reforms that collectively can bring the economy and its footprint back on a safe trajectory. As a result of our dominant economic model, we are simultaneously hurtling towards or past planetary boundaries, or safe operating limits for a stable biosphere, our planet's living surface. And we are testing the resilience of earth's systems: their ability to resist climate change, repair bleached coral reefs, neutralize ocean acidification, restore freshwater tables, prevent desertification, fix nitrogen, provide phosphorus, and so on.

We cannot manage what we do not measure, and a quarter century since the term "sustainable development" was introduced by the Brundtland Commission (1987) we still do not measure national sustainability. Economists have traditionally concerned themselves with forecasts of national economic growth (usually GDP growth), which they produce authoritatively as measures of progress. The truth is we have had it wrong for some time now. Progress is not defined by a sustained increase in Gross Domestic Product (GDP) - it is a combination of so much more, including the quality of the environment, the extent of education, the quality of citizens' health, and so on. We have failed to measure, account for, value these changes year on year, and therefore failed to achieve proper management of environmental and social externalities (third party impacts) resulting from the way we do business, the way we produce our food, and the way we consume. Furthermore, the economic invisibility of natural and social capital in our current measurement frameworks has repeatedly contributed to our inability to recognize and value and optimize public wealth as against optimizing private profits. As a result, economies worldwide, including our own, are still headed in the wrong direction and are causing resource exhaustion, social disparities, and persistent poverty. We are testing the tolerance of our finite world and a discussion about what 2061 will look like becomes almost academic if we do not ensure changes at high speed driven by bold leaders - before 2021!

Assuming a "business as usual" pathway, the future does not present a pretty picture. Most places in the world will suffer from frightening climate instability, extreme increases in commodity & food prices, and continuing demand recession. In India, food and water scarcity will top the list of our concerns, the loss or degradation of ecosystems are related concerns, and all three connect with the persistence of rural poverty. Problems on all four crucial fronts - freshwater, food, ecosystems and rural poverty - will be exacerbated by India's population growth, projected to be 1,387

million by 2021 and 1,718 million by 2061 resulting in increased demand for both freshwater and food.

A second and related dimension of India's environmental challenges relates to urbanization. We are in an Urban Age, and we shall face severe challenges related to building living capacity for our growing urban population. Not only is India's population going to increase, but it is estimated that, at the same time, a demographic shift from villages to towns and cities will increase as well, according to a McKinsey study, and urban population will grow from its present levels of around 340 million to 590 million.

Planning an increase in living capacity for a quarter billion people is a significant challenge. It will stress our existing metropolises where reconfiguration of roads, open spaces and city infrastructure such as sanitation and waste management is already a big problem. But it will also create opportunity for planned urban development using a model that focusses access rather than mobility, and recognizes that clustering of human capital in cities is in fact the main engine for economic growth. This means achieving city development that is 'green', localized, and light, with more density and clustering of infrastructure such as schools, hospitals and shopping complexes into neighbourhoods, and less urban sprawl. It also means striking a healthy balance between a largely laissez-faire approach to urban growth which uses private space efficiently (the Gurgaon model) but can lead to serious infrastructural logjams, and a rigid space-inefficient approach (the Chandigarh model) that provides infrastructure and public spaces well but does so with large transportation footprints and without creating the opportunity for 'clustering'. Creating clustering in human capital around a few themes or professions (industry; offshoring; information technology; entertainment; etc.) is a key driver for successful city development, and includes a strong focus on building educational capacity, especially universities. I believe our urban planners have not yet absorbed the importance of these nuances of city development, however, time is not far when they will do so and will enable the massive (private and public) investment required to create the additional urban capacity to allow India to enter the Urban Age and go from its current 30% to 40%-50% urbanization, and simultaneously increase GDP growth.

Ironically, the "tertiary sector" environmental stressors around creating adequate urban infrastructure for our next fifty years are large but, in my opinion, more likely to be managed well than the "primary sector" environmental stressors we shall face, namely freshwater and food scarcity and destruction of ecological infrastructure.

These issues are less in the limelight today perhaps because these are perceived as 'rural' problems, which they are, but we are failing to see their wider ramifications for the future of India as a nation. I shall comment now on these issues.

Freshwater

Considering that we are currently unable to meet our water needs, the challenge of whether we will be able to do so in 2021 or 2031 or 2061 is palpable, and ought to be an overriding concern for national and state policymakers. The Water Resources Group conducted a global study that projects global water demand in 2030 to be 6,900 billion m³, which is 40% above current water supply. In addition, and perhaps what is even more worrisome is that one-third of the world's population, most likely concentrated in developing countries, including India, will have to manage a 50% deficit in water supply. The main driver of this deficit is the agricultural sector, which accounts for around 71% of water withdrawals today. Agricultural water demand is expected to increase because of the pressures of population growth and income growth on food production, and by 2030, agriculture is still projected to account for 65% of global water withdrawals. This is also at the heart of a vicious cycle of demand for natural resources and persistent poverty, driven by increased demand for basic amenities like water and food which embattled nature is unable to sustain and provide for free to large populations especially in vulnerable lands.

India is projected to see significant increases in agricultural water demand by 2030 if we continue doing "business as usual". Together with China, Brazil and South Africa, India will account for 30% of the world's GDP by 2030 and 42% of global water demand. In India alone the deficit between projected demand and current supply is frightening - by 2030, demand for water will increase to 1.5 trillion m³ compared with India's current water supply which is half of that, around 740 billion m³. To be able to bridge this massive gap, we shall have to change the way we carry out economic activities and align these with many technological and administrative improvements that increase water supply (e.g.: rehabilitation of existing irrigation districts and infrastructure, irrigation scheduling, and ecosystem restoration), and improvements that target higher water use efficiency (e.g.: drip and sprinkler irrigation, as in the system of rice intensification discussed below.)

It has been estimated that to bridge the gap of 756 billion m³, the annual cost will be US$ 6 billion, which is only 0.1% of India's projected GDP in 2030. However, the implementation of these technologies and changes will not be easy. They require market-based incentives, changes in the subsidy regime, willing

regulators, and perhaps most importantly of all, ideological shifts and a change in the conventional discourse on agriculture, which in India is still strongly influenced by our 'green revolution' history and fertilizer subsidies within the conventional 'industrialized' farming model. And it should also be noted that the demand side of freshwater is only half the problem, the supply side represents the other half. There too, we have significant challenges, related to losses of ecological infrastructure that delivers water to our villages and towns.

Ecosystems

In order to secure freshwater supply, the key is preservation of productive ecosystems, especially the catchment areas for India's river systems. Our forests provide numerous public benefits, including food and fuel, ecological services such as freshwater cycling,

> *Over the last 50 years, the country has lost over 50% of its forests, 40% of its mangroves and a significant part of its wetlands. How does this translate into costs? According to one set of studies, the annual costs of air pollution, contaminated water, soil degradation, and deforestation were estimated to be close to 10% of India's GDP...*

recharging soil fertility, increased flood control and mitigation of flood damage, pollination of crops and local micro-climate regulation that are crucial to both agricultural activity and environmental stability. Considering our dependence on biodiversity and ecosystems for primary productivity, especially for rural subsistence agriculture, our national and state policies in adjacent policy areas as well as our enforcement of regulations for natural areas seem woefully inadequate. While 4.8 percent of India's geographical area is deemed protected, we continue to face losses of natural habitats. Over the last 50 years, the country has lost over 50% of its forests, 40% of its mangroves and a significant part of its wetlands. How does this translate into costs? According to one set of studies, the annual costs of air pollution, contaminated water, soil degradation, and deforestation were estimated to be close to 10% of India's GDP. This is only going to get worse and costs are only going to increase if a "business as usual" pathway is adopted. Policy reflection of the economic values of our ecosystems is a must, including through "green accounting",

and determined enforcement of our conservation laws is equally vital for preserving the "ecological infrastructure" (our forests, wetlands, reservoirs, river systems) that deliver such crucial ecosystem services as water and nutrient cycling.

Food

This brings me to the second crucial potential scarcity connected with population growth and consumption growth, interwoven with water scarcity, and that is our food production. With population growth remaining high, and increasing middle-income wealth and changing consumption with more meat consumed per capita, demand for food produce is expected to increase, driving food prices upwards. Food imports have again become a significant part of our supply, but there is inherent unsustainability in any country with sizeable dependence on imports, as more and more countries realize that exporting foodgrains is about importing water shortage. Domestic food production and markets will become the norm well within the next half century as freshwater gets scarce and the so-called "virtual water" in foodgrain export is recognized. Presently, we are distorting our markets in India with agricultural subsidies that prevent the market from properly signalling scarcity. India's urban population is buying subsidised food due to the availability of subsidised pesticides and fertilizers to rural farmers. The ramification of using pesticides and chemical fertilizers are substantial, and usage patterns are further distorted by differential subsidy rates (e.g.: urea subsidies are heavier than for other nutrients). The effects of misuse of subsidies include soil fertility losses, which in turn affects future yields, especially in smallholder and subsistence farming contexts. This exacerbates both their income potential and food scarcities in a vicious cycle.

With ongoing and rapid shifts to a services based economy, it is likely that India may once again turn to importing food, after decades of food surpluses. As a result, we could further reduce the extent of employment in and household incomes from small-holder farming, although farming and animal husbandry are still the cornerstone of many village economies. The benefits of sustainable small scale farming and enhanced yield include less overall land usage, thus less land use change at the cost of productive ecosystems.

The oft-quoted global challenge of 'feeding 9 billion people in 2050' is too often represented as a challenge of land-use change, underplaying the role of yield enhancement, especially in lands owned or leased in small parcels by poor farmers. In fact, of the half-billion small farms worldwide covering 60% of arable land, 404

million are less than 2 hectares, representing mostly poor subsistence farmers in developing countries.

Sustainable, ecologically friendly farming practices have been shown to increase yields, especially on small farms, between 79% (Pretty et al., 2006) and 180% (FAO, 2009). The results of the statistical survey by Pretty et al., 2006 are all the more remarkable because they pertain to 286 'best practice' initiatives in 57 developing countries covering 37 million hectares (3% of cultivated area in developing countries) across 12.6 million farms. By any account, these are statistically significant results! Unfortunately, the results of this study, or the FAO study that followed, are perhaps the most important unknown results of any current research, so deeply steeped is the current agricultural discourse and rhetoric in the tenets of intensive farming supported by large-scale application of standard fertilizers and pesticides. As a result, sustainable small-holder farming does not get the public or private investment that it needs, and more and more public money is poured into the intensive farming model, despite its known negative externalities and unsustainability.

Worldwide, approximately 2.6 billion people rely on agricultural production systems for their livelihood and the links between improvements in small-scale farming and poverty eradication are known to be strong. Studies show that a 10% increase in farm yields implies 7% reduction in poverty in Africa and 5% poverty reduction in Asia (UNEP, 2011). This reinforces the importance of the evidence above that sustainable, ecologically-friendly farming practices has delivered average yield increases from 79% to 180%. Improved yields in small farms must be targeted, quite simply, as a combined solution to alleviate both poverty and hunger.

A year ago, India's agriculture minister bemoaned our inability to achieve the mere 4% increase in agricultural yields budgeted by the Government of India. Contrast that to the yield increases being achieved around the world in small farms that use sustainable methods, and we have the answers we need. The key question is: will our corrupted political and administrative processes allow common-sense and public interest to prevail, instead of the usual relentless pursuit of private profits and illegal rent-seeking?

Freshwater, Ecosystems, Food & Rural Poverty: Combined Solutions
Nowadays, it is fair to say that there is considerable evidence (both on damage impacts such as lost soil fertility, eutrophication, health impacts and also alternative sustainable farming techniques) which suggests that the conventional model which is too dependent on chemical fertilizers and pesticides (the baggage of India's

"Green Revolution" history of 1967-78), is not what we should seek to promote

> **"** *Sustainable productivity in small farms ought to become our single biggest policy target, as it brings together and potentially solves the connected problems of freshwater scarcity, ecosystem degradation, food shortages, and rural poverty...* **"**

to small farms. In fact, sustainable productivity in small farms ought to become our single biggest policy target, as it brings together and potentially solves the connected problems of freshwater scarcity, ecosystem degradation, food shortages, and rural poverty. I illustrate this point with a couple of examples, and both are Indian success-stories which are replicable and scalable.

A recent success story of sustainable farming that illustrates all the points raised above is that of the System of Rice Intensification ("SRI") tried by a group of four farmers in Nalanda district, Bihar, for the kharif season 2011. One of their plots achieved a world record yield of 22.4 tonnes/hectare, beating the previous record of 19.0 tonnes/hectare from China. This example of SRI consists of a set of practices which include using less seed, water and fertilizer to grow more rice. Less inputs and fewer process steps result in lower costs. Seedlings are planted further apart, and grown with the minimum water required, and no water-logging is permitted. SRI fields are served by sprinkler irrigation, & crops receive about one-third as much water during the growing season as with flood irrigation. No chemical crop protection measures are used, and fertilizers are largely natural too: farmyard manure & vermin-compost is applied to SRI fields. The opportunity to scale and replicate is indeed tempting, but it will need outreach, education, and ideological change away from over-reliance on "more fertilizers" as the usual way forward.

The village of Hiware Bazaar is in the drought-prone district of Ahmednagar in Maharashtra. Until 1990, it was trapped in a familiar 'vicious cycle' of poverty and environmental degradation. The village 'sarpanch' then took the initiative and educated and led his village to recovery by reversing this cycle - through water harvesting, building small percolation tanks and check dams and village reservoirs. Such was their success that the village per capita income increased

over twenty-fold from 1995 to 2010, and Hiware Bazaar is now referred to as a 'millionaires village' (over 50 of the families have annual incomes over 1 million INR), since their new-age 'green revolution'. As a local NGO comments, "the greatest environmental planners are the villagers themselves".

These are powerful examples, and nothing suggests they are not replicable or scalable. Both are examples of "Green Economy" in action, but to this day, such examples do not get the investment they deserve from a policy perspective. This leads to my final topic and to the key question: "what needs to change for a Green Economy?"

What Needs to Change for a Green Economy?

For the developed world, the challenge of sustainable development and the model of "Green Economy" is about lowering their ecological footprints, which can only

> *Companies need to move away from being of profit-fixated machines and transform into responsible, stakeholder engaging, sustainable, learning institutions - they need to transform into what I call 'Corporation 2020'.........*

be done by either substantially reducing their materials and energy intensity or by substantially reducing consumption, or a reasonable combination of both. However, ecological footprints in most of the developing world are acceptably low, including in India, and their "sustainability" challenge can be best described by what I call "green development". This means improving human well-being, social equity and working for human development whilst not increasing human ecological footprint. The challenge is not only one of direction, however, but one of speed. In my opinion, the decisions India makes before the end of this decade will determine her position on the sustainability spectrum in 2061.

Our private sector is an increasingly dominant part of our economy, and the concerns and impacts that India will face in the coming decades can be mitigated and some even avoided if the private sector does things differently. Companies need to move away from being profit-fixated machines and transform into responsible, stakeholder engaging, sustainable, learning institutions - they need to transform into what I call 'Corporation 2020'.

Worldwide, corporations account for 60% of Global GDP and 70% of jobs, and if they are not at the centre of global change then a sustainable pathway is not achievable. Corporations drive resource use and determine economic direction. Their advertising influences consumer behaviour, their production services global demand and fuels economic growth. Their own growth in terms of assets and capital and profits attracts global investment flows. And still, their global externalities or costs to society and the environment remain unaccounted for. The cost of corporate externalities is estimated as $2.15 trillion or 3.5% of global GDP measured across just the top 3,000 listed companies. Consumerism was created by the corporation, through advertising that converts insecurities into wants, needs, and then demand, thereby increasing production. The consequences of this are that humanity's demands have crossed our planet's bio-capacity or threshold of production by 50%. We are eating into our planet's natural capital, and not living off the interest.

The free market has not failed, because a truly free market has not existed to begin with, it is instead distorted with around $1 trillion a year worth of harmful subsidies including $650 billion of price and production subsidies for fossil fuels, thus keeping our current "brown economy" alive. These subsidies persist because there are influential vested interests that demand their continuance and that succeed in lobbying for them: today's corporations. It is therefore vital that change begins with corporations and that their thirst for profits undergoes a reality check, replacing narrow "shareholder capitalism" with "stakeholder capitalism". A new corporate model known as Corporation 2020 needs to emerge and be in place by 2020 in order to ensure sustainability. This involves 4 planks of change driven through micro-policies (policies changing the operating model of corporations) relating to accounting, taxation, advertising and financial leverage:

- **Resource Taxation:** Transforming taxes and subsidies to tax the "bad" (such as resource extraction and fossil fuel use), and support the "good" (such as wages and profits) rather than the other way around, as is the case today.
- **Limiting Leverage:** Introducing rules & limits set by financial regulators to better govern financial leverage, especially if the borrower is considered "too big to fail."
- **Accountable Advertising:** Introducing norms and standards so that advertising is made responsible and accountable, informing rather than persuading.
- **Accounting for Externalities:** Evolving & implementing standards for measuring and valuing all major corporate externalities - both positive and negative - and reporting them as 'disclosures' in the annual report & accounts of companies.

How will we achieve change in India?

Corporate leaders will need to emerge, demonstrate the new model, and their followers will need to be grown. Coalitions will need to form such that industrywide standards are created for each of these planks of change. Regulators will need to read the signals sent by the private sector and ensure regulatory compliance with these sector-wise developments. And finally, behavioural change will need to be instigated at the consumer level, stimulated by accountable advertising. Ideological shifts are needed, and these are more likely to be successful in India than in the western world, because India still has a strong culture of 'community' and a recognition of its importance.

India has the potential today to define new global direction through its private sector corporate leaders, and through the actions of well informed and supportive regulators. We are at a crucial juncture in our history, and we need to make a critical choice within the next decade, by 2021. If we take the right fork in the road before us, the path less trodden, then we shall achieve not just survival, but success and global leadership by 2061. If we continue with "business as usual", oblivious of our risks and ignoring our responsibilities, then we shall consign our beloved country to the dustbin of history.

Punit Goenka

Punit Goenka is the Managing Director and CEO of Zee Entertainment Enterprises Ltd. Under his leadership, ZEE retained its ranking at the top in the M&E sector in India and the ZEE brand achieved global recognition. As a board member of the Indian Broadcasting Foundation, Punit played a vital role in the Industry's shift towards digitization.

FUTURE OF TELEVISION

Circa 2061 - Television in its new form and shape, as a personalized medium will not just continue to exist and will be 130 years old, but would actually wield a true global power.

I truly believe that Television will continue to play a critical role for India to emerge as a developed country and one of the top three economies of the world. It is

> *Two aspects are unlikely to change - human beings will continue to bear the same thirst for entertainment and content will continue its reign as the real King...........*

not easy to visualize where technology will take us in the future - but two aspects are unlikely to change - human beings will continue to bear the same thirst for entertainment and content will continue its reign as the real King.

ZEE will be a leading brand for entertainment, education and a medium for prosperous growth for every Indian. Burt Manning, founder of J Walter Thomson said forty years ago when he founded Media Lab at MIT, that the 21st century will all be about personalized segmentation of the media. We are heading towards relevant, curated content consumption. We will move from semantic web (web 2.0) to intuitive web (3.0) and finally to machine to machine talks (web 4.0).

At ZEE, our global focus is to connect to every household, and offer relevant content, to keep them engaged. Having entertained over 670 million viewers worldwide, ZEE is now marching towards reaching one billion viewers. We also

aim at multiplying our productivity by many folds, in order to re-conquer our achievements in the last 20 years in merely 8 years. With the swift pace, at which ZEE as a brand is growing worldwide, it makes me extremely confident to state that by 2061, we would be amongst the top global media conglomerate, entertaining more than half of the total television viewers across the globe.

ZEE is a pure family entertainment company. Three generations of a family can sit together and watch our programmes. We will continue in our endeavour for freedom, dignity and prosperity of our viewers and shareholders in the future. ZEE as a brand, has achieved global recognition today, and has grown exponentially over the years, establishing a strong connect in the minds and hearts of its audiences globally and has gained a top of the mind recall in the media & entertainment space. ZEE has been able to achieve all this through its people-centric programming and keeping its audience at the core of all its offerings.

Our pioneering vision, has led to the formation of a US$ 7 billion Industry in India, and has set a foundation for not just Indian, but many International Media companies. ZEE being an Indian company, has ventured into the international markets and has earned a global recognition, unlike the international media brands which have ventured in Indian markets. This strong penetration in the global markets, and the immense high brand equity earned in the last 20 years, has taken ZEE to the cadre of an emerging multinational. Leveraging its core expertise of a sharp insight in the audience pulse, ZEE will continue with its string of innovations & industry firsts, enhancing the media & entertainment landscape by many folds.

ZEE has been a social catalyst in TV programming and dramas, in less than 20 years. Although it surely happens at a subconscious level. When viewers watch middle class people achieve higher boundaries, they appreciate the quality of life. When they witness the rags to riches stories, they celebrate their belief in dreams and destiny.

In another decade or so, I still expect consumers to catch up with the linear TV content. Although there would be trends of short form content in terms of news, sports, entertainment, etc., but these would never fall in high content consumption patterns. The reason being that, largely depends on the consumers' moods, their information seeking thirst and their desire to express on social media platforms. These traits are extremely high in the mornings and also in the later part of the evening time bands. Both these activities create a leap in short consumption of

content. Even today, the specially created content on new media platforms is largely following traditional media content approach.

Introspecting the world of Television:

Television is all about content - irrespective of the advancements from a technology perspective. It has surely transformed India in the last two decades and has effectively brought about changes to hearts and minds of millions. ZEE would continue with the same zeal to play a catalyst in the transformation that not just India, but the rest of the world, will witness in the coming decades.

May be a decade later, i.e. 2020 onwards, we could expect consumers to express new moods and tastes, even when they are on the go, provided the mode of transport gets more comfortable. The content formats would also enjoy a deep paradigm shift, considering the change in consumption patterns. Just to cite some of the experimental content formats, which surely would evolve in the near future on the Non TV Screens - we could expect 5 to 15-minute comedy films, 5-minute exposure slots (back to back new film promos), 30-minute documentaries and factual entertainment for students and business travellers, 5-10 minute amateur content - short films, 60-second public service campaigns or 5-10 minute highlights of sports, etc.

TV programmes are benefiting today from the consumer habits, values and lifestyles, and at the same time they are also power feeding new lifestlyes to the consumers.

> *Going forward, programming would be more inclined towards relevant issues and concerns, segmenting would be the way forward...*

They need to evolve to a stage where they are able to predict modern India, or modern Indian lifestyles and possibly taking a position on almost all issues that affect society. Whether masses favour your position or stance, would not be that important, but a strong stance/positions will have to be taken. As of now, TV is aiming at making consumers happy with one set of generic content for all the viewers. However, going forward, when programming would be more inclined towards relevant issues and concerns, segmenting would be the way forward. So we might have a channel which only showcases modern value content, or a channel which showcases only non-fiction content, or a channel which showcases only current issues, and so on.

As television companies adapt to the Internet by deciding which shows to offer for free online, internet users accustomed to free content, and the rhetoric that promotes it, have protested that shows should be supported with advertising alone. The problem is that in a world with a hundred channels - let alone a thousand websites - there may not be enough advertising to go around. That's why, over the course of the 1990s, cable channels that once relied mostly on advertising tried to create hit shows or buy sports rights that would let them demand higher fees from cable companies. When cable channels started to invest in original shows, they did so very differently from traditional networks. Since networks only made money on advertising, they chose shows that would reach as large of an audience as possible, whether or not individual viewers felt strongly about them. Carriage fees gave cable channels a very different incentive: to develop programmes, some viewers cared about so much that they might cancel their subscriptions without them. Not only could channels show more adventurous fare - their success depended on it.

As we stand, we are on a brink of a revolution and convergence of television and new media platforms. We are heading towards people getting what they want, when they want, and how they want. Although it goes without saying that top quality content will be the king in the new world of TV convergence.

In my view, TV will woo audiences to interact with the programming. And viewers will not be satisfied on the one way communication and interact with TV. Unlike the

> *A basic social media integration on the content distribution platform will bring in a whole new perspective to the viewing experience..*

pre-digitization era, wherein there was just a monologue between the consumer and broadcaster, a more circular relationship is expected with real time communication, enabling consumers to express their feedback instantaneously. Also a basic social media integration on the content distribution platform will bring in a whole new perspective to the viewing experience.

Reality shows shall become more and more real and would almost touch the nature of a sports event. From the current era of scripted and fictionalized content formats,

there would be a huge paradigm shift to much realistic shows. The only way they can sustain the attention of viewers is by revealing real pacer content and hence as much closer to something like sports content.

The industry is changing before our eyes and this kind of innovation creates winners and losers. No longer will consumers be forced to overpay for a one-size-fits-all bundle of channels and services.

As rightly put forth by Robert Levine, "In the digital world, television will be revolutionized once again". Already, more viewers than ever are using their laptops to download and to watch shows they once saw on a TV screen. The problem is that even legal online services only generate a fraction of the revenue that cable does. Like newspapers, television channels are now reaching more viewers than ever before, but in a medium where they don't like to pay for content and aren't worth much to advertisers. And if more viewers begin "cord-cutting"-cancelling their cable subscriptions in favour of online options - it's hard to see how television producers could avoid the same kinds of cost reductions that are killing newspapers.

We will be able to watch LIVE or On-Demand stations, either as merely stations or individual shows on home television sets, tablets, desktops or mobile phones.

> *Some screens may discontinue along the way, but there will be other screens that will emerge as life continues to evolve..*

The rise of the DVR gave access to shows on the viewer's timetable, and the explosion of apps are putting control in consumers' hands - who can now watch anything, anytime, anywhere. Speaking of control, a number of new TV sets-turn viewers into a remote. A remote has a touch-sensitive track pad on one side, and a Qwerty keyboard on the other. An advanced version of the same remote functions like a magic wand, allowing TV watchers to move a pointer on the screen. On the other hand, some just function based on the movements of the viewers hands. Some very advanced sets, now have an in-built voice recognition intelligence, enabling the viewers to literally dictate their search preference.

To summarize, I truly believe that TV will not die. At ZEE, we no longer term ourselves as merely broadcasters, but "Content Creators" and will focus on reaching out to audiences at the end of any screen that they are available on. Some screens may discontinue along the way, but there will be other screens that will emerge as life continues to evolve.

I think there will be several technologies and platforms that are going to emerge that we have to consider and migrate. Ditto TV, which is ZEE's yet another pioneering step in the Over the Top Television space, is something that we have foreseen and we do believe that it is going to be a big opportunity for us, in the years to come.

The future of television is all about viewers experiencing entertainment and information content on their preferred devices, time and place.

R. S. Sodhi

R. S. Sodhi, 53, Managing Director of Gujarat Cooperative Milk Marketing Federation Ltd., (GCMMF Ltd.), is a first-batch alumnus from IRMA, Anand and obtained his B.E. (Ag) degree from CTAE, Udaipur. He joined GCMMF in the year 1982 directly from IRMA and rose to the present level of Managing Director in 2010. Shri Sodhi has 31 years of rich experience in Marketing and Sales function within the dairy industry, having served GCMMF in several capacities. He has been instrumental in taking brand 'Amul' to dizzying heights that it has scaled today, enabling GCMMF to retain its dominance in the Indian Food Industry.

DAIRY SECTOR: CHALLENGES AND OPPORTUNITIES

By 2061, India will continue to lead the global dairy sector with Milk production of 590 Million MTs per annum and the centre of gravity of the world dairy industry will lie within India. In fact, Anand, Gujarat will emerge as the centre-point of the global dairy map, since Amul (Gujarat Cooperative Milk Marketing Federation) will be the largest dairy organization in the entire world with annual turnover of ₹25 Lakh Crores, handling 1350 Lakh Kgs of milk every day. Indian Dairy sector led by Amul will play a significant role in addressing the problem of food security, the biggest global challenge that human race will face by 2061.

Food Security: The Biggest Global Challenge by 2061

By 2061, as the world population reaches 9.5 billion, 'global food security' will actually be the biggest challenge facing our human race. In fact, due to the growing rate of urbanization, across the world, urban population will be double that of rural population by 2061, implying that there will be fewer hands to produce food and more hungry mouths to consume food.
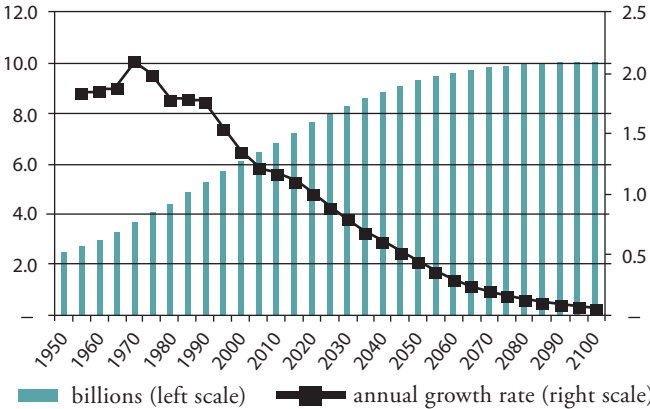
Fig. 1: World Population Projections till 2100: Source – IDF Conference

> *Urban population will be double that of rural population by 2061, implying that there will be fewer hands to produce food and more hungry mouths to consume food...*

Growth in world population combined with growth in global income levels implies that demand for food will increase by more than 200% by 2050 and even further by 2061.

With rising income levels across the world, per capita calorie consumption is also increasing in all regions. The sharpest rise in per capita calorie consumption is projected to take place in developing countries especially in East Asia, South Asia and Sub-Saharan Africa. In the developed, industrial countries where even currently per capita calorie consumption is high, rise in per capita calorie consumption will obviously be much more gradual. Combination of rising population and increasing per capita consumption levels will ensure 200% increase in global food demand.

The issue gets more complex in South Asia, because this region hardly has any scope for further cropland expansion. As per Global Hunger Index Report 2012, 19 countries including India can be classified in 'alarming state' on Global Hunger Index. In fact, FAO data for 2010-12 reports that currently 852 million human beings on this planet can be classified as under-nourished. Competing directly with food production is the growing demand for agricultural commodities as inputs for animal feeds and bio-fuels. Per capita availability of arable land has been constantly declining from 2.2 acres to 1.2 acres in the last 50 years. Currently, only 39% of global agricultural land is irrigated.

> *As per Global Hunger Index report 2012, 19 countries including India can be classified in 'alarming state' on Global Hunger Index...*
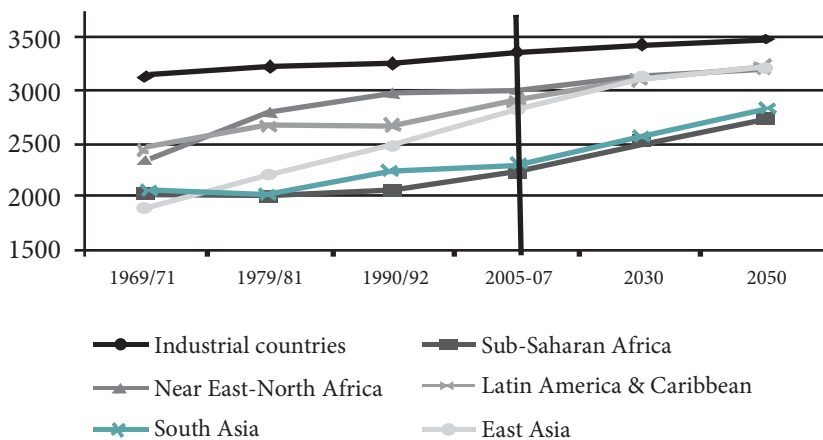
Fig. 2: Food Consumption: Actual and Projected (Kcal/person/day)

Diet Diversity : Increasing Demand for Animal Source Proteins with Rising Income

For the next 50 years, growth in global agri-food demand will be led by Asia, especially India and China. Apart from increase in per capita calorie consumption, diets have also become more diverse worldwide in the last 20 years. While relative contribution of cereals, roots and tubers in daily diets have generally declined across the world, contribution of animal-source food has increased. In most countries, with rapid economic growth, diet is converging towards higher share of animal source foods. As income level grows, consumption of fat and protein has increased and there is distinct reduction in dependence on cereals for carbohydrates.

In the last 20 years, as global population has increased from 5.4 billion to 7 billion at a CAGR of 1%, global consumption of protein has increased from 3.7 lakh tonnes per day to 5.4 lakh tonnes per day at a CAGR of 2%. A large part of this growth is contributed by higher consumption of animal proteins. During this period, the highest growth in protein consumption was from Asia (4.8% CAGR), Africa (2.3% CAGR) and South America (0.6% CAGR). On the contrary, in the developed countries of North America and Europe, protein consumption has actually declined (Source: FICCI report on Dairy 360 / FAOSTAT / PwC analysis).

130

It is therefore no surprise that the highest increase in dairy consumption during the last 20 years was also from Asia, Africa and Latin America. In fact, Asia (led by India and China) has witnessed 3% CAGR in per capita dairy consumption during this period, which is much higher than the global growth of 0.8% CAGR in dairy consumption.

Trends in Global Demand for Dairy Products : Next 50 Years

At least for the next 50 years, we anticipate high global growth in demand for dairy products. Apart from total consumption, even per capita consumption of milk and milk products will grow both in developed and in developing countries. In fact, increase in per capita demand for Milk and Dairy products will be much higher than that of any other food category. However, developing countries with lower per capita GDP have to spend higher proportion of their per capita income on food.
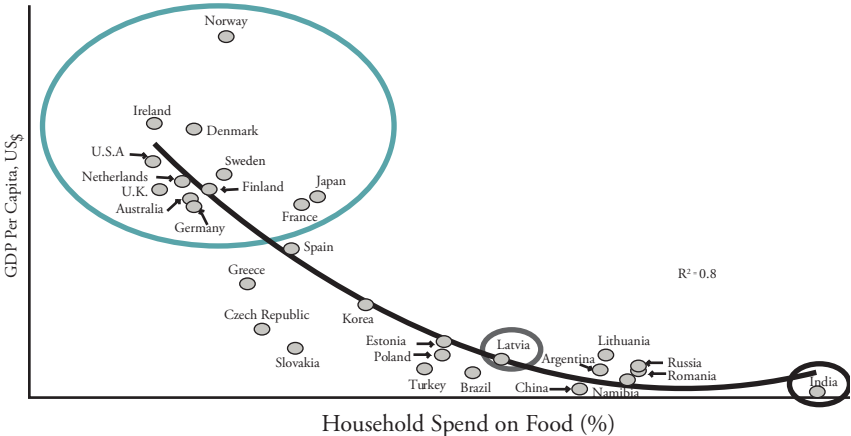
Sources: UN; International Labour Organization; allcountries.org;
National Bureau of Statistics of The Peoples Republic of China; swivel.com;
World Resources Institute; International Finance Corporation

Fig. 3: GDP per capita vs Household spend on food

Indian Economy: Next 50 Years

Just 250 years ago, India and China used to account for almost 50% of world GDP, however, their combined share declined sharply till it was reduced to less than 17% of world GDP at the beginning of 21st century. However, in the next 40 years, India will have the 3rd highest rate of per capita GDP growth in the entire world. By 2061, India's GDP in PPP terms will exceed that of United States and we will be the 2nd largest economy in the world after China

(PPP basis). In fact, by 2030 itself, our GDP will exceed that of Germany and Japan.

In terms of sheer population, before 2025, India will exceed China to become the most populous country in the world.
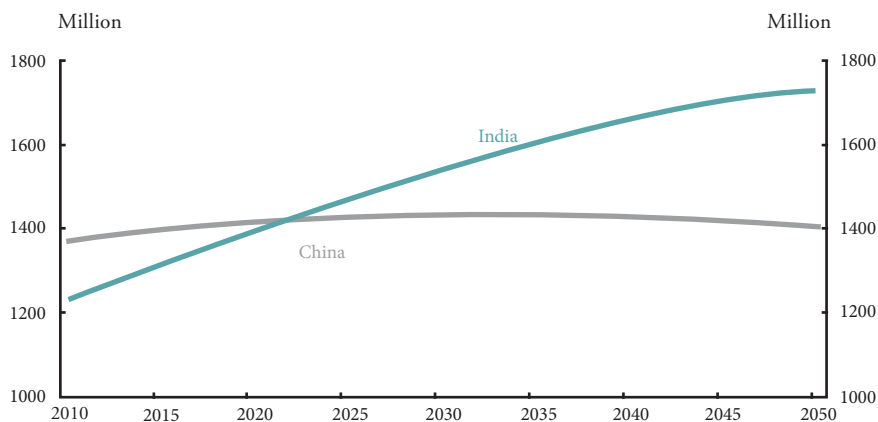
Million   Million

Fig. 4: India-China - Population projections

India will take full advantage of its demographic dividend, as proportion of working age population in our total population will increase to 65% by 2061, proportion of working age population in China will decline from 72% (2010) to around 55% in the next 50 years. By 2061, India's contribution to world GDP will match that of China and G7 countries.

Food Security Issues in India

In order to realize this demographic dividend, we first need appropriate policy and technological interventions to ensure adequate food availability to feed our growing population. As an illustration, in case of foodgrains, it is estimated that if the 'business as usual' scenario continues for the next 50 years (without appropriate interventions), we may end up with 30% deficit between supply and demand by 2061.

Within Asia, India is still among the most alarming countries as per Global Hunger Index 2012. We are still behind Sri Lanka and almost at par with Bangladesh on Global Hunger Index. While our GHI score may have improved in last 20 years, yet 18% of our population can be classified as undernourished. Malnutrition among our children remains at a fairly high level.

It is estimated that Indians born in 2009 consume 13 times more than Indians born in 1960, in value terms (Source: $10 Trillion Prize: Silverstein, Singh, Liao & Michael: HBS Press). We can easily estimate how much more Indians born in 2061 will consume as compared to our current generation.

Dairy Industry : Critical for Global Food Security

Food still accounts for highest share of monthly household expenditure in India at 31%. Within food, Milk and Dairy products account for the highest share of expenditure (after cereals) for an average Indian household.

Global milk production has been increasing at 1.9% over the last 15 years and today stands at 207 crore litres per day.
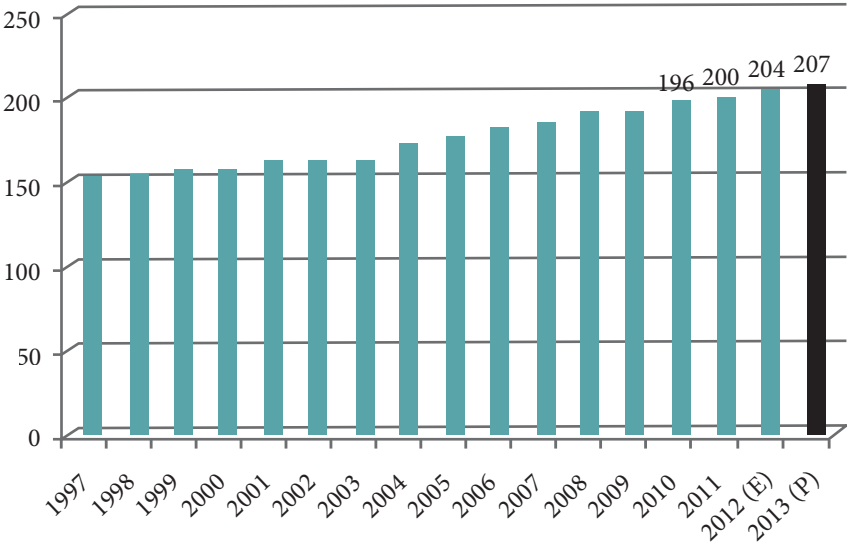
Fig. 5: World Milk Production (in Crore Litres per day)

While per capita milk availability in developing countries has increased, per-capita milk availability across the world has actually declined by 9% over the last 10 years, largely because of falling growth in milk production of developed countries. In fact, production share of developing countries has increased from 40% to 48% over the last 10 years.

Milk : The Largest Agricultural Crop of India

Milk with production of 127 Million MTs per annum is the largest agricultural

crop of India, far ahead of Wheat (92 MMT/annum), Rice (102 MMT/annum), Maize (22 MMT/annum) and Pulses (18 MMT/annum). India with 35 crore litres of milk production every day, is the highest milk producing nation in the world and accounts for 17% of global milk production (Fig. 6 below).
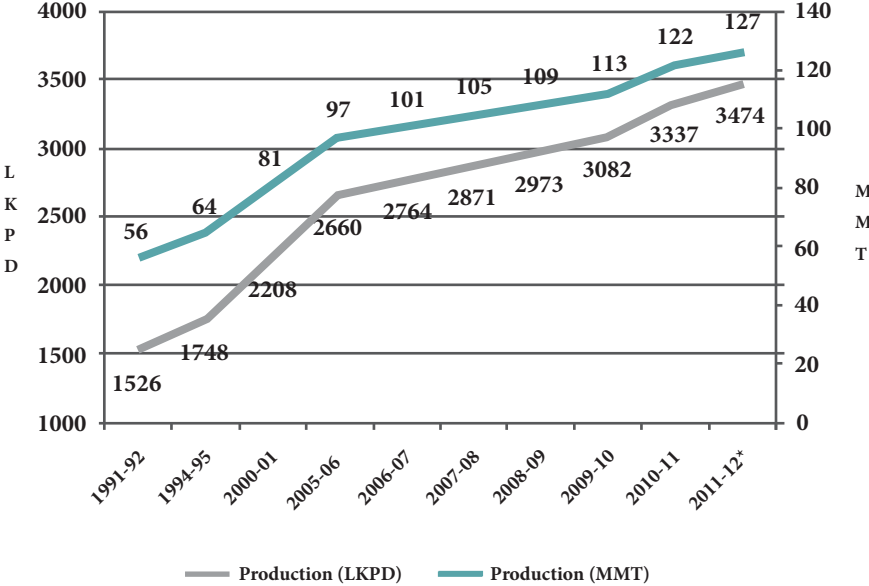
Fig. 6: Milk Production in India

Apart from being the largest milk producing nation in the world, India is also the largest milk consuming country in the world. Market value of total milk produced in India is ₹3.6 lakh crores. Dairy industry contributes 26% to the agricultural GDP of India. India is also blessed with the largest bovine population in the world: 276 million giving us a natural advantage in global dairy industry.

Milk production in India has been growing at the rate of 4% per annum in recent years. From a level of 127 MMT per annum currently, demand for milk in India is expected to increase to 190 MMT per annum by 2020. Per capita milk availability in India has crossed WHO recommended level of 276 gm/day from a level of 132 gm/day in 1950s, despite 3 times population growth during last 6 decades. Currently, per capita milk availability in India stands at 290 gm/day.

The chart shows per capita milk availability in India with the following values:

Year	Value
1950	132
1960	127
1968	113
1973	111
1980	128
1990	178
1995	199
1996	208
1997	214
2000	217
2002	225
2004	235
2008	245
2010	262
2011	276
2012	290
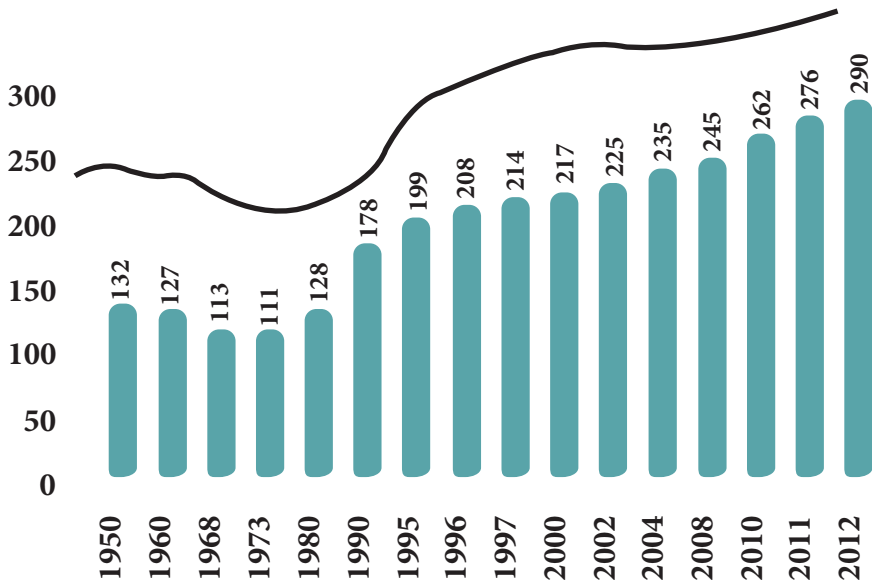
Fig. 7: Increase in per capita milk availability in India

Thanks partly to higher per capita milk availability, the life expectancy of Indians has increased from just 32 years in 1947 to 67.1 years today. In addition, death rate in India has fallen from 22 per 1000 in 1960s to almost 8 per 1000 today, partly due to better nutrition from milk. In fact, prevalence of malnutrition in children has also fallen sharply in recent decades partly due to the same reason.

White Revolution led by Amul

While milk and dairying are central to Indian culture and tradition since thousands of years, by 1940's Indian dairy industry was not in a healthy state. Till the '40s, farmers had to suffer economic exploitation at the hands of long chain of unscrupulous agents, middlemen and private dairies. In fact, farmers were marginalized to a remote corner of dairy value chain. India was dependant on import of dairy commodities to fulfil demand for milk in urban areas. That era was characterized by milk rationing and scarcity and consumers had to struggle with quality and hygiene issues related to milk.

Only when farmers of Kaira district in Gujarat, inspired by Sardar Vallabhbhai Patel, organized themselves into a cooperative in 1946 to protect themselves from economic exploitation and to control a large part of the value chain of dairy business, did the dramatic turnaround begin in the Indian dairy industry. Amul

cooperative movement under the visionary leadership of Dr. Verghese Kurien and Shri Tribhuvandas Patel, revolutionized rural economy and transformed Indian dairy industry. Late Shri Lal Bahadur Shastri, Prime Minister of India in 1964 persuaded Dr. Kurien to replicate the Amul model across the entire country. 'Operation Flood' which was based on replicating Amul model in other states of India, outside Gujarat created 'White Revolution' propelling India to its eminent position as the largest milk producing nation in the world.

Indian Dairy Industry : 2061

By 2061, 56% of Indian population will reside in urban areas and only 44% in rural areas. No. of urban households will grow 3 times from 7.2 crore urban households today to 24.3 crore urban households by 2061. From current 53 million+ cities, India will have 143 million+ cities by 2061. On the other hand, number of villages will only witness marginal increase in the next 50 years, from 6.4 lakh villages in 2012 to just 6.75 lakh villages in 2061.

This clearly indicates that India will face the problem of 'mouths to feed' growing much faster than 'hands to produce'.

We expect 2.1% CAGR growth in per capita milk consumption in India for the next 50 years. This implies that the per capita milk consumption in India will increase to 800 gm/day, as compared to the current level of 288 gm/day per person
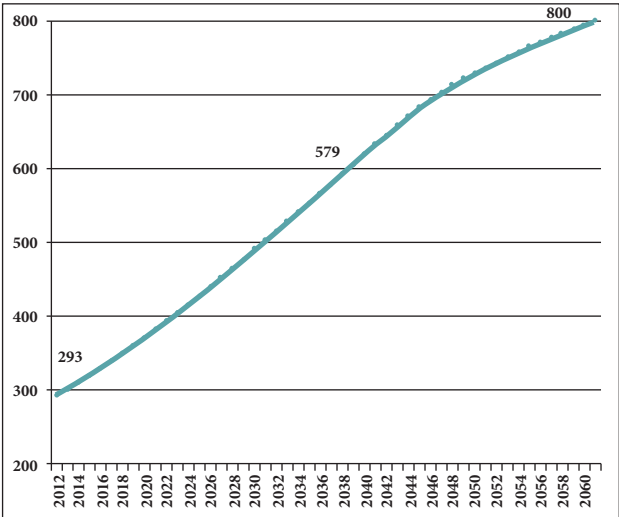
Fig. 8: Projections till 2061 for per capita milk consumption in gm/day

in 2012. Just for comparison, current level of per capita milk consumption in Europe is 821 gm/day and in North America the current level is 657 gm/day.
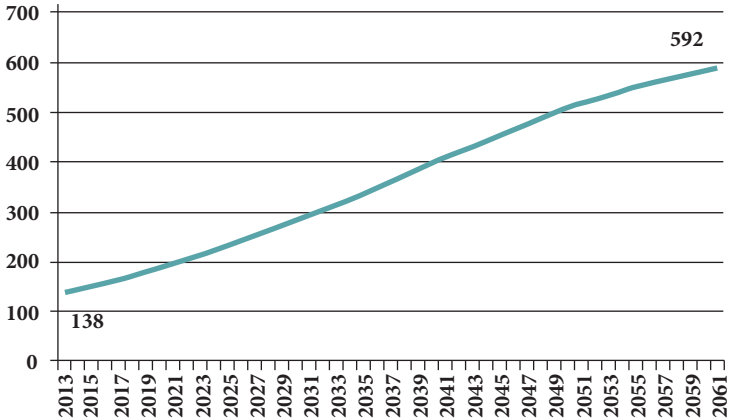

Fig. 9: Milk Production in India: Projections till 2061 in Million MTs per annum

On the production side, milk production in India has been growing at the rate of 4.4% CAGR during the last 20 years. In the next 50 years, we expect milk production in India to grow at CAGR of 3.2% and will reach 590 MTs per annum by 2061. This also implies that India will be a milk surplus country by 2061 and will have to access global markets to sell surplus 90 million MTs per annum.

What will be the Price of Milk to Consumers in 2061?

For the last 9 years, since 2004, MRP of Amul Taaza Milk (toned milk) in Mumbai has increased from ₹15 per litre to ₹32 per litre in 2013 at CAGR of 8.8%. In view of expected increase in cost of milk production and input costs during the next 5 decades, we expect MRP of Amul Taaza milk to increase to ₹330 per litre in 2061, at CAGR of 5%.
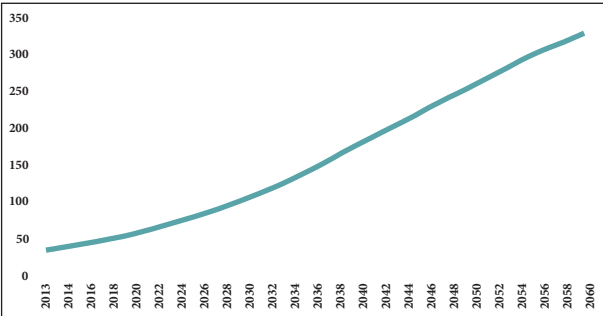
Fig. 10: MRP in ₹ per litre of Amul Taaza Milk in Mumbai over the next 50 years

137

Milk Procurement Price to Farmers in 2061

For the last 16 years, average milk procurement price paid to farmers (in terms of ₹per kg fat) has increased by CAGR of 9.2%. Last year, average milk procurement price was approximately ₹515 per kg fat and by 2061, we expect the milk procurement price to increase to ₹8500 per kg fat to farmers at CAGR of 6%.

GCMMF Turnover in 2061

For the last 16 years, our turnover has been increasing at CAGR of 16%. With rising income levels and awareness levels among consumers, demand for branded, packaged milk products will definitely continue to increase. Share of the organized dairy sector which is approximately 20% currently will also increase rapidly in the next decade and thereafter. Amul which is the undisputed leader in the Indian dairy industry will continue to play a leading role during the next 50 years and will definitely emerge as the largest dairy organization in the entire world.

GCMMF with a turnover of ₹13,750 crores in 2013, will continue to grow at CAGR of 11.3% and achieve turnover of ₹25 lakh crores by 2061.
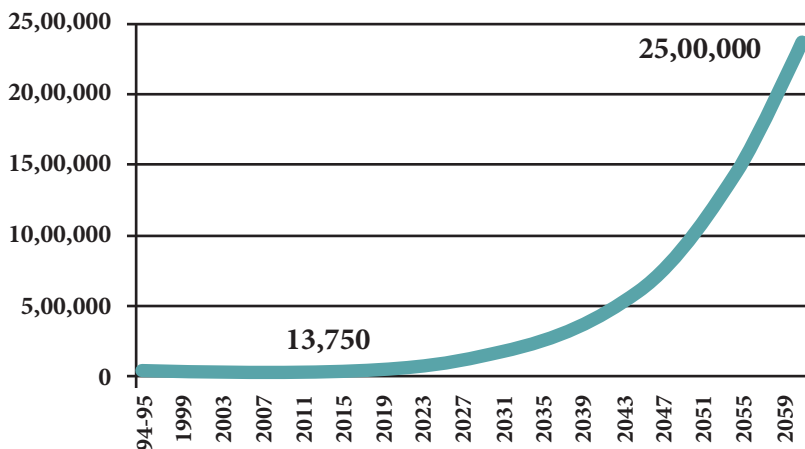
Fig. 11: Turnover in ₹crores

Milk Procurement of GCMMF by 2061

During the last 15 years, milk procurement of GCMMF has grown at a CAGR of 8.8% and is currently 133 lakh kg of milk per day. Over the next 50 years, we expect milk procurement of GCMMF to grow at 5% CAGR to 1350 lakh kg per day by 2061.

Which New Products will be available to Consumers in 2061?

With number of urban households growing by more than three times in the next 50 years, we anticipate sharp rise in demand for food products which offer convenience and save both time as well as effort in preparation. Consumers' kitchens will only have facilities for heating and chilling with no crockery or cutlery as most packaging will be in ready-to-serve formats. Cooking at home with ingredients will probably be a dying, if not extinct art by 2061.

Ready-to-eat dairy products will gain prominence with consumers demanding pre-prepared, value-added food products. Technology to preserve ready-to-eat food & impart long shelf life will gain significance. Dairy organizations will definitely move up the value-chain and start manufacturing dairy-based food preparations such as pizzas, sandwiches, paranthas, baked dishes etc.

Dairy-based ethnic desserts such as kheer, puddings, paysam, laddoos, mithai will be available in long-life packaging on the shelves and traditional sweet shops as they exist today will probably go out of existence.

Wellness, convenience and taste will define new product development in food category. Functional foods based on wellness and lifestyle trends will grow in popularity and Indian consumers will favour brand options which provide maximum health benefits along with taste. Protein-enriched, vitamin-fortified, micronutrient-enriched, fat-reducing, cholesterol-reducing are some of the wellness-based functional benefits that consumers will give importance to. Globalization of tastes and confluence of cultures will ensure that while dairy products from across the world will enter Indian market, Indian ethnic dairy products will also gain popularity in foreign markets.

Ravi Kant

Ravi Kant is the Vice Chairman of Tata Motors group and has been associated with Philips, LML and Titan in the past. He is on the Board of several companies, international not-for-profit organizations, NID Ahmedabad and the Chairman of IIM Rohtak.

AUTOMOTIVE MARKET

Introduction

Indian economy took a decisive turn in the year 1991 with liberalization unleashing the hidden potential of the nation after a long era of protectionist posture. The Indian economy, which was modestly growing at its "Hindu rate" of 3-4%, witnessed high levels of growth of 8-9% in the first decade of the 21st century. This consequently brought rise in GDP per capita and discretionary purchasing power in the hands of the Indian consumer leading to greater consumption of goods and services beyond the essential needs. The rise in affordable mobile telephony and cable television brought the much required connectivity across India, but more importantly, it induced urbanization in the mindset of rural population by getting them exposed to the urban lifestyle. What also boosted a greater intensity of economic activities in India was huge investments in road infrastructure, both in highways and rural connectivity leading to emergence of hub and spoke transportation model within the country helping in faster movement of goods and services unto the last mile. Rising consumerism got further boost with availability of credit at low cost coupled with disproportionate increase in discretionary income of about 40% of population.

Indian Automotive industry witnessed a phenomenal growth post 1991, especially in the first decade of the 21st century. The passenger car market grew from 176 thousand units in 1991 to 2 million units in 2010. Similarly, the commercial vehicle market grew from 131 thousand units in 1991 to 530 thousand units in 2010.

Just like the Indian economy, the auto industry also was in a prolonged phase of protectionism with quantitative restrictions. However, deregulation in the '80s brought some directional shifts and dynamism in the industry witnessing the emergence of Maruti and entry of Japanese players in the light commercial

vehicle space. Liberalization brought forth opportunities and challenges for different entities in the automotive value chain. This became the inflexion point for major shifts in the Indian Auto space, which saw entry of global players starting from 1995, aggressive and adaptive strategies by the local incumbents, proliferation of new models, rising sophistication of customers, availability of affordable vehicle finance, fast transition from primitive and dated models to more contemporary ones, especially in cars. Price sensitivity and demand for basic vehicles in commercial vehicles still continues due to rising operating costs, low rise in freight rates and high level of fragmentation in transporters and logistics industry. But now, because of emergence of better road infrastructure, short-supply of drivers and more organized logistics operators entering the market, one can see a rising demand for high performance, reliable trucks with more comfort features.

> *Indian Auto industry today stands well poised to be in the top list, both in terms of market size and hub for global automotive production....................................*

Indian Auto industry today stands well poised to be in the top list, both in terms of market size and hub for global automotive production. In the next 50 years, there will be several megatrends which will shape the texture of the Indian Automotive industry. We will discuss each of them and how they would redefine the industry in 2061.

Indian Automotive Industry in 2061

Fifty years from now, the Indian Automotive industry will have undergone several transitions. It will witness paradigm shifts in automotive technologies and business models which at this point in time would seem far-fetched. It will be more pronounced in India, driven by the greater focus it is getting - only next to China - and due to convergence of global practices and technologies supported by communication, networking and rising sophistication of consumers.

Megatrends and their impact on Indian Auto Industry

Radical changes in Indian Automotive Industry will be driven by megatrends emanating from economic, social, regulatory and technological changes within the Indian context and globally. Out of several such megatrends, we will focus

on understanding the impact of key ones which will shape the future of Indian Automotive Industry by the year 2061.

Emergence of Indian Economy as one of the largest economies in the world will lead to a greater propensity for purchase of vehicles. According to Wealth Report 2012 by Knight Frank & Citi Private Bank, China will overtake the US to become world's largest economy by 2020, which in turn will be overtaken by India in 2050. As per the report, Indian economy will reach $86 trillion size in terms of purchasing power parity by 2050, while the Chinese GDP would be $80 trillion during the same period.

The above estimations have several underlying assumptions which may or may not hold true in such an uncertain world. But that the Indian Economy will be among the largest is a given. If this is so, it is bound to attract foreign investments over the next 50 years. Also, coupled with progressive policy interventions at right intervals, it will not be wrong to say that India can achieve a sustained average GDP growth of 5-6% in the next 50 years. So, by 2061, GDP per capita can be extrapolated to rise to anywhere between $20,000 and $25,000. This will mean an affluent society with

> *Road infrastructure can be expected to be amongst the best in the world. Urban and rural lifestyles will become homogenous..*

a very small section of poor population. Road infrastructure can be expected to be amongst the best in the world. Urban and rural lifestyles will become homogenous.

Automotive industry in such a scenario will mainly be impacted by greater affluence (GDP per capita) and better road infrastructure in the country. Correlation study shows a much higher penetration in car ownership at $20,000 GDP per capita (Fig. 1). So by 2061, we can expect car penetration anywhere between 300-400 cars per thousand people as compared to current low of 12 per thousand. It would depend on several factors including distribution of income, infrastructure development, fuel/ energy price. A similar study of commercial vehicle penetration with development of road infrastructure shows exponential correlation (Fig. 2), especially in the initial stages of road development.
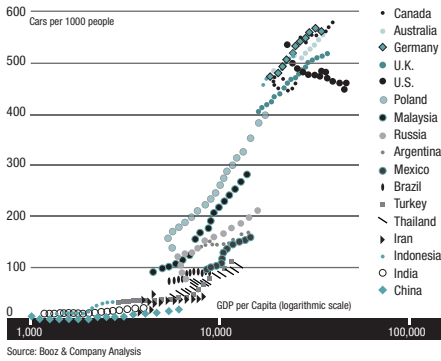
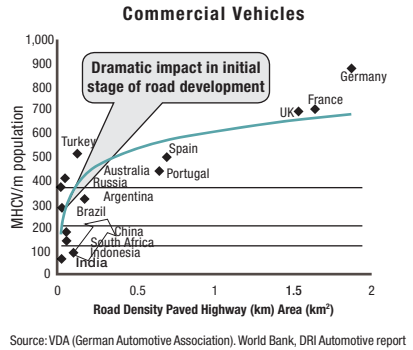Fig. 1   Fig. 2

Presently, cars in India are skewed predominantly towards mini and small segment. Over the next 50 years, mini cars like Nano, will continue to witness high growth in demand owing to a large number of people graduating from base of the pyramid to middle class. On the other hand, there will also be a significant population of high networth individuals who will make India an attractive destination for luxury car makers.

Commercial vehicle industry will also have shifted from basic vehicles today to a greater mix of high performance vehicles, high on reliability and loaded with more comfort, safety and connectivity features. There will be proliferation of product applications with emergence of need-specific products. Logistics industry will have evolved and would be characterized by predominantly organized players as compared to fragmented industry existing today.

Issue of Global Warming and Energy crisis will create new mix of powertrain options in automobiles. Although, global warming and energy crisis are more global than India specific issue, but both these megatrends have great repercussions for India and therefore they will play a big role in shaping the future of Indian automotive industry.

Considering that globally, automotive industry contributes to 15-20% of carbon dioxide emissions, a prominent constituent of greenhouse gases causing global warming, efforts are already underway to look for alternate energy sources other than fossil fuels currently powering 95% of the automobiles worldwide. Another

144

concern is the depletion of oil reserves reaching alarmingly low levels. Automobiles contribute to 45% of oil consumption, which makes the fact imminent that sources other than fossil fuels will be required to power the automobiles in future. At the same time, fuel efficiency improvement will continue to be a major focus in light of the above two issues over the next 50 years and it would not be wrong to imagine that all the vehicles running on fossil fuels will be highly fuel efficient.

In the Indian context, the issue becomes even more concerning, considering that India is already the 5th largest consumer of oil in the world and currently it is dependent on imports for three-quarters of its requirement. If we couple this situation with the exponential growth of automobiles and energy requirement projected over the next 50 years, we can imagine the gravity of situation that the country will face.

It is natural that regulators will play a major role in shaping accelerated development of alternate technologies and fuel efficient vehicles over the next fifty years. This will be done through stringent policies to curb emissions and penalizing high fuel consuming vehicles, at the same time incentivizing green technologies and fuel efficient vehicles.

> *Over the next 50 years, we can expect major breakthroughs which will enable technologies like batteries and fuel cells to become economically comparable to fossil fuels...*

There are various technologies already being explored to replace fossil fuel as the energy source for automobiles. These include electric, hybrid, fuel cells, etc. Over the next 50 years, we can expect major breakthroughs which will enable technologies like batteries and fuel cells to become economically comparable to fossil fuels. It is quite plausible given the intensity of research being directed towards these technologies which are also being well supported by governmental incentives and green technology policy roadmaps. So by 2061, one can project that there will be a more balanced mix of different technologies which will power the automotive drivetrains versus today's heavy skew towards fossil fuels.

The mix may vary for different regions, including India, depending on what makes more economic sense in that region and which technology is promoted by the regulators.

However, there can be a plausible contrarian scenario too. We are already hearing of shale gas impacting the energy situation in a big way. It is said that US has up to a hundred years of supply of natural gas, and with the advent of hydraulic fracturing technology (fracking), shale gas is well poised for mass scale production. This can potentially lead to a situation where fossil fuel prices may fall drastically in the future. This fact, when seen together with evolutionary improvements in fuel efficiency, can still keep the mix skewed in favour of fossil fuel based vehicles or slow down the transition to alternate technologies.

Rising urbanization and problems underlying it will redefine city transportation. Over the next 50 years, various estimates say that about 50-55% of Indian population will be living in urban areas in comparison to today's 30%. We

> *The high cost of parking and traffic snarls may lead to disenchantment in a significant section of society over vehicle ownership. This will lead to emergence of services and solutions redefining personal mobility....................................*

can therefore imagine emergence of more than hundred big cities and at least 30-40 megacities (like today's Mumbai and Delhi) with maximum population density. Megacities (Tier1) will face several issues as the infrastructure gets constrained with rising population and intensity of movement, which will bring rational changes in transportation driven by changing customer preferences and regulatory restrictions.

One issue that high population density megacities will face is the issue of parking space. In South Mumbai, if you want to buy a car parking space today, it can cost you anywhere between ₹3 million to 7 million. This is multiple times more than the average car price today. So, only if one can afford a car worth ₹10 million or so, he/she will be able to justify purchasing parking lot for a car. In future, this problem will keep aggravating in all megacities as urbanization

146

in the country keeps rising. Congestion and traffic snarls will progressively become bad to worse. The high cost of parking and traffic snarls may lead to disenchantment in a significant section of society over vehicle ownership. This will lead to emergence of services and solutions redefining personal mobility.

One can imagine services which will offer point-to-point multi-modal transport solution and greater flexibility in types of car one would like to drive for different usages. For example, one such solution may offer a larger luxury vehicle during weekends and small efficient vehicle for daily commute. This kind of flexibility may get bundled in the pricing offer of such purchase or leasing contract. Some services may offer seamless mobility experience offering multiple transportation modes including usage of public and alternative transportation options. We are already seeing early signs of emergence of such trends in some cities in the developed nations.

The trend of aversion against car ownership will mean lower than projected car penetration of 300-400 per thousand by 2061. However, car usage per thousand will increase to levels more than 300-400 per thousand with the emergence of business models like car sharing as no (or relatively much lower) fixed costs will be associated with it. Otherwise, a car user would have to bear high fixed cost if he/she owned a car.

Also because of high commute time, costs and hassles associated with owning or even using a car, there will be huge investments in various modes of public transportation - metro, monorail, Bus Rapid Transportation System (BRTS). Two wheelers running on zero emission technologies will also prove to be a practical alternative for a large section of people. For short lead distances of less than five kilometres, people may resort to walking and cycling driven by rising consciousness for fitness and global warming abatement apart from abovementioned reasons.

The other issues that these megacities will face are air and noise pollution. Noise pollution is already seen as a major source of nuisance and health concern by city-dwellers, while air pollution is known to cause several respiratory problems. Because of these reasons, only silent and vehicles with zero emissions may be allowed to enter the city limits. Rest of the vehicles may only be allowed in suburban areas or for inter-city and highway use.

Tier 2 and Tier 3 cities will also progressively move towards the same situation as megacities with a time lag of eight to ten years. However, fraction of personal vehicles in these cities will be much more as compared to Tier 1 megacities. Only few modes of public transport facility would be available and mobility solutions/ services will be less pronounced there.

Youth who are supposed to be one of the prime admirers of automobiles and have shown tremendous passion over the past years also seem to be losing charm when it comes to utilitarian usage of automobiles. A recent survey done by General Motors in the US hinted loss of interest amongst the teenagers for owning cars. While primarily it is because of the problems in big cities that we discussed but also as a result of rise of social networking making the need to commute less important if it was only for the sake of meeting friends. However, usage of automobiles for thrill will never die. So, in 2061, we can expect youth to use or own a vehicle only to vent out their thrill-seeking desire.

Digitization and Connectivity

Digital devices and connectivity have already changed the way people live and how businesses are done. Going forward, technological changes in digitization and connectivity will keep happening at rapid pace and it is likely to have far-reaching impact on automobile industry in the next 50 years.

Sensing capabilities, software and wireless communications will enable vehicles to detect road conditions, recognize other vehicles and pedestrians near its space

> *Vehicle-to-vehicle connectivity enabling real-time traffic monitoring would also be a standard feature by 2061...*

and sense environmental changes. It will provide capability to either self correct or communicate information back to the driver. Connectivity will allow vehicles to respond to developing traffic situations, find alternate routes and anticipate impending collisions. These developments are already underway; they would have evolved and improved over the next 50 years and become hygiene features.

Telematics would be playing a big role for logistics service providers in gaining full and real-time visibility about their fleet, their routes, load tracking, load availability, etc. which will enable them to optimize their cost by maximizing utilization. Remote diagnostics will give early warning indicator of potential breakdown, thus minimizing average downtime of fleets. Vehicle-to-vehicle connectivity enabling real-time traffic monitoring would also be a standard feature by 2061.

Challenges for Indian Automotive Industry

Growth of Indian economy and its auto industry will face several challenges in becoming the top global economy by 2061. Indian auto industry growth will be dependent on India's economic growth, wealth distribution and attractiveness of the industry, sustained over a period of next 50 years. It will depend on how the government tackles various bottlenecks, without which the projections we talked about would prove wrong.

Effective management of infrastructure in the country would be the topmost challenge. It would mean sustained investments in developing world class highways, flyovers and ring roads within cities, adequate and multiple modes of urban public

> *The current way of planning in which development only happens when the infrastructure gets stretched, will be a big deterrent to Indian economy and automotive industry growth. There is a dire need for more proactive infrastructure planning and strict adherence to it...*

transportation and good road connectivity of all the habitats in the country. The current way of planning in which development only happens when the infrastructure gets stretched, will be a big deterrent to Indian economy and automotive industry growth. There is a dire need for more proactive infrastructure planning and strict adherence to it.

The second challenge would be the issue of global warming and energy crisis. Huge dependence on external sources for India's energy requirement will remain a big

strain on handling various deficits. Subsidies for the sake of populism will have to be done away with and resources will have to be directed towards promoting greener and more fuel efficient vehicles. Alternate energy sources which makes India less dependent externally, will have to be given major attention and infrastructure network supporting the same needs to be built in a planned manner. Solar, tidal, wind etc. will require much greater attention in the next 50 years.

The third challenge would be to enhance the competitiveness of Indian auto industry through development of eco-system which promotes innovation and productivity improvement. This will require significant investment and planning in vocational and higher education focussing more on research and development of quality human resources. It will also require policy interventions which support innovation including partial funding by the government. The success will hinge on how well industry-academia and government collaborate.

Conclusion

Indian economy is well poised to emerge as one of the largest economies in the world by the year 2061. With sustained average GDP growth of 5-6% in the next 50 years, India may reach a GDP per capita of anywhere between $20,000 and $25,000. Increased affluence and sustained infrastructure development will enable high penetration levels of cars and commercial vehicles. There will be a significant market for luxury cars and commercial vehicles which would be high on performance and loaded with more comfort, safety and connectivity features. Global warming and energy crisis would have led to a greater share of alternate energy vehicles and highly efficient fossil fuel based vehicles. However, contrarian scenario is very much possible if alternate reserves like shale gas pick up in a big way leading to massive drop in fossil fuel prices. Issue of parking, traffic snarls and pollution due to rising urbanization would force the regulators to allow only zero-emission and silent vehicles within the city limits. It would also lead to emergence of services and solutions which would redefine personal mobility owing to a significant section of urban population becoming averse to the idea of owning a car due to aggravated situation of congestion, parking and associated costs. Public transportation will play a major role in big cities with a strong multi-modal network laid across the city. Digitization and connectivity would have far-reaching impact and vehicles will be loaded with sensing capabilities and wireless communication enabling them to respond to developing traffic

situations, find alternate routes and anticipate collisions. Telematics would bring full real-time visibility of fleet for organized logistics providers enabling them to optimize their operations.

However, there will be underlying challenges which will have to be addressed. This would include effective management of infrastructure in the country, addressing the issue of global warming and energy crisis and enhancing the competitiveness of Indian auto industry through development of ecosystem which supports innovation and productivity improvement.

S. Ramadorai

As the former CEO and current Vice Chairman of Tata Consultancy Services, S. Ramadorai has been a key part of Indian IT journey from a mere idea in 1960's to a mature industry today. He was awarded the Padma Bhushan in 2006 and the CBE (Commander of the Order of the British Empire) by Her Majesty Queen Elizabeth II in 2009. In February 2011, he was appointed as the Adviser to the Prime Minister in the National Council on Skill Development, in the rank of a Cabinet Minister.

INFORMATION TECHNOLOGY: PRODUCTS & SERVICES

The most basic instinct that drives the human race is its own preservation and prosperity through a never ending quest for knowledge. This is how we evolved and this has kept us progressing and will continue well into the future. Science and technology and especially information technology will enable invention, discovery and innovation in the areas that most threaten our existence - disease, the environmental threat and self-destruction through war.

In this journey of exploration, Indians are already contributing through their exemplary work in the world's best hospitals and universities. The fact that global

> *The India of today, represents two worlds, one which walks shoulder to shoulder with the western world, the other that is still playing catch-up.............................*

companies are choosing to position their research groups in India only emphasises the growing respect for India's intellect. The India of today, represents two worlds, one which walks shoulder to shoulder with the western world, the other that is still playing catch-up. Poverty, lack of access to education, poor health - the very basic fundamental rights in our constitution still elude millions of poor Indians. When these two worlds become ONE, the true power of India as a nation will be unleashed.

Therefore, what challenges do we face as we build our future? A future interdependent with the rest of the world, a future that is intertwined with other nations - our neighbours just as much as those distant from us.

OECD's projections for 2060 (at constant purchasing-power parities) show the impact of fast catch-up growth in underdeveloped countries with big populations. They predict that "economic power will tilt even more decisively away from the rich world than many realise. In 2011, the current membership of the OECD made up 65% of global output, compared with a combined 24% for China and India. By 2060, the two Asian giants will have a 46% share of world GDP, the OECD members a shrunken 42%. India's economy will be a bit bigger than America's, China's a lot. Even so, the Chinese and Indians will still be much less well-off than Americans, the same forecasts show GDP per person in China at 59% of that in America; in India, it will be only 27%."

The global fulcrum of economic prosperity will undoubtedly shift to Asia. Already we are witnessing signs of this shift. According to Wealth Report 2012 by Knight Frank & Citi Private Bank India, for the first time, the number of Asians with at least $100 million in disposable assets has overtaken those in North America. There are now 18,000 centa-millionaires in the region covering South-East Asia, China and Japan. This is more than North America, which has 17,000, and Western Europe with 14,000. The report adds that fast economic growth will lead to vast wealth creation. However, the distribution of that wealth will be dictated by political factors as much as the economic process itself, but there will be high returns from investment in skills and education.

The leaders of India in 2061 are those who are under 16 years of age today. How well they lead this nation depends on how well we nurture them today. By 2061, the global population is expected to reach 9.6 billion with the prospect of almost 2 billion of these people living in India. The greatest predictor of our country's future is how well we make these 2 billion people healthy, productive citizens.

Assigning a score card for India today, it is clear that we should have invested a great deal more on primary education and primary health. After sixty years since Independence, our gross enrolment ratio is only 16%. If we continue the same approach, we will be struggling through the next sixty years as well, we need disruptive change, we need to discard the old order and welcome a bold new approach to deal with our challenges. Einstein said, "The significant problems we face cannot be solved at the same level of thinking we were at when we created them."

This is where I believe that Information Technology must be leveraged, as the disruptive new way to problem-solving. Any strategy that aims to address issues of requiring immense scale, immense reach and ease of replicability, must have at its

core an IT strategy that integrates well into the overall plan. India is the home to talent in IT and we must unleash this talent to innovate for our own issues.

> *India is the home to talent in IT and we must unleash this talent to innovate for our own issues..........*

Technology at the hands of policemen on the roads will help identify law breakers and will ensure laws are respected, technology being made available to doctors and hospitals will ensure timely and quality health services to all, most importantly technology in the hands of people can enable access to citizen services and education thus empowering the average citizen. If we embrace this path, if we show political will, if we demand this for ourselves, India can be the superpower that today's gurus predict.

It is pertinent to ask ourselves that as we race onwards through the next few decades, what new discoveries will technology bring? How will we leverage these to address the major challenges that India faces – health, education, sustainability and security?

Healthwise

One of the big challenges for the future is how to improve and standardize the quality of healthcare provided. Harnessing technologies like 3G/4G wireless and other future technologies that will no doubt evolve and linking them to community health centres and expert doctors and pharmacists in hospitals is definitely the most obvious route. For instance, India needs 74,150 community health centres for every million of its population, but has less than half that number.

Under the circumstances, it would be wise from India's perspective to adopt distance medicine or telemedicine. In fact, rising population will put pressure on current health systems and increasingly, we will move towards adoption of these models. While this will be led initially by the government, commercialisation will soon become a reality, instances of which are already being seen today. For example, VISICU is a company that already provides hospital intensive care units with telemedicine. Using a hub and spoke model that relies on videoconferencing links, a large medical centre supports rural healthcare facilities to perform

diagnosis and treatment. A specialist can monitor the patient remotely with the help of a general practitioner or nurse who is actually examining the patient. Similar technologies allows an ICU specialist at a distant site to observe in real time multiple patients in multiple ICUs, reviewing physiologic parameters, laboratory data and even seeing and talking to the patient via tele-technology. India will innovate on these models and create commercially viable hybrid models, bringing down costs.

Patients will carry medical records on a smart card making patients more mobile when accessing medical advice. By then, Indian cities will start expanding to become megacities, small towns will become cities and many villages will

> *World-class educational system, advanced healthcare facilities, better connectivity, and technology-enabled gadgets will improve the lifestyle of all Indians..............*

transform into towns. We will score better on poverty alleviation, malnutrition led health problems will be drastically reduced, bringing down infant mortality rates. Much of this will happen because Information Technology will not be limited to only cities and major industry sectors, but its penetration in rural areas and in all sectors will influence the lives of all Indians by 2061. World-class educational system, advanced healthcare facilities, better connectivity, and technology-enabled gadgets will improve the lifestyle of all Indians.

The boom in the healthcare industry would see India as one of the major healthcare destination in the world by 2061. The market will drive the need for large number of medical staff including paramedics and highly skilled technicians, already in short supply today. Paramedics will emerge as a big growth sector to serve the needs of India's millions.

India will participate in and adopt the cutting edge findings of medical science across the world. One can predict with fair amount of certainty that nanotechnology will have an immense impact on medicine. Within this decade, Nanorobots or microscopic robots will deliver medicine precisely where it is needed destroying cancerous cells while leaving the healthy untouched, in the future these nanorobots will be able to take wireless instructions from

a computer host outside of the patient's body. It is entirely possible that as processing capabilities of chips get more sophisticated, it would be possible to release swarms of nanorobots into the human body working as a team to cure illnesses, conditions and diseases.

Gene therapy, regenerative medicine, organ replacement, brain-computer interfaces, personalized drugs, bioengineering, bionic organs which having normal biological performance enhanced by electromechanical devices will become a reality. However, the development of other areas of medical sciences such as human cloning and customized babies will be opposed on moral grounds and therefore progress may be stalled. Much of the research work in these areas will be happening in India.

Education for all - anywhere, everywhere
Enhanced health will have an impact on education, where India will reap the benefits of the policies being implemented today. Already, we are witnessing the shifting sands in this sector. The true impact of universalization of education

> *The true impact of universalization of education will be seen in the coming decade, combined with a variety of delivery models where cheap handheld devices will bring education to the learner..*

will be seen in the coming decade, combined with a variety of delivery models where cheap handheld devices will bring education to the learner. Content will increasingly become freely available, customised services around them will determine the values add. India's hardware industry will be on the upswing, all kinds of customised devices - for entertainment, education, training etc. would be prevalent across social classes. In fact, the class conscious Indian will be less so, as the really poor will form a very small section of society. The world will eye India's growing middle class as a huge consumer market, and every company with global ambition will aim for an India presence.

Learning will become more interesting, interactive and will be enabled through a variety of communication technologies. Traditional classrooms will compete

with learning studios and virtual worlds as learning places. Simulated worlds that model nature will become a norm, so will gaming with embedded assessment, open online courses will offer variety of choices to the learner, robot assisted language learning (RALL) which uses child friendly interactive robots will become pervasive, this is already being used to teach English to some young children in South Korea. Indians will leapfrog technologies to adapt these in hybrid inexpensive ways to reach our masses. Connectivity will not just mean getting online but will mean an interconnected society. This will promote integration of rural India into urban population more rapidly. Students currently in villages (we may not call them villages in 2061) will use their laptops and other handheld devices to hook onto the national IT backbone for learning content. The effort to skill our millions for future growth will leverage many of these new technologies, to create a powerhouse of global talent. There will be a huge surge in young workforce of this country, India will in fact become the resource pool of the world. Indians will be in Japan providing geriatric care, will be nurses in America and teaching Math in European schools. However, majority of jobs will be those that do not exist today.

Creating a sustainable future

With a burgeoning population, India will tread on the path of sustainability as a strategic national goal. Already water is becoming a scarce resource, demand is likely to increase by about 30% by 2050, from the present level of 680 billion cubic metres (bm³). Much of this demand will come from industrial and domestic sectors. India will adopt new technologies for recycling waste water. We won't need to desalinate the oceans or melt the polar ice, we just need to work smarter with using our abundant monsoons. This will need convergence of the indigenous with the high tech to create low cost solutions. Of course, we shall continue to remain a cost conscious nation! India will need to make the required investments in interventions in recharging groundwater, spreading water saving technologies and increasing crop productivity growth. This, along with higher irrigation efficiencies will help manage the water demand for irrigation over the next few decades.

Partnerships with countries like Singapore and Israel who are setting the standards in sustainable water management will lead to collaborative projects that bring these technologies into the country. While India will emerge as a major stakeholder in world affairs, the coming decades will be seen as an opportunity for shared prosperity as much as these years will be about interdependent markets

and accelerated innovation and advancement. This collaboration and cooperation will be most visible in the areas of sustainable development.

With only limited fossil fuel and coal available under the earth surface and with rising pollution, India will start using nuclear energy and renewable energy sources like Solar, Wind and Tidal for clean energy to bring a balance between the rise in pollution and rapid industrial growth. However, it is likely that Solar Energy will

> *It will not be unusual to see homes powering themselves through solar installations on rooftops or to see energy efficient electric run automobiles on our streets or even data modelling and satellite imagery to manage deforestation.............*

take centrestage for India. India gets plenty of sunlight due to its proximity to the equator, receiving an annual average of 4-7kWh per day for every square metre. The country receives a lot more sunlight than what it can use in a year, making it an abundant source of power. In a decade or so, innovations will lead to a steep fall in the prices of solar panels and solar power will match pooled electricity on cost. The growing potential of solar power generation has already attracted several large players into this business. This trend will continue with smaller players also joining the bandwagon, investments in research will grow giving a big boost to make the technology cheaper. This, in turn, will make solar energy accessible to the common man. It will not be unusual to see homes powering themselves through solar installations on rooftops or to see energy efficient electric run automobiles on our streets or even data modelling and satellite imagery to manage deforestation. 'Green' businesses will be a huge growing sector in the coming decades.

In the context of agriculture in India, Information Technology has a great potential to be used as a tool for direct contribution to the agricultural productivity and also as an indirect tool in empowering rural farmers with information to make timely decisions that have a positive impact on their agricultural activities. Impact of monsoon on Indian agriculture has been significant. Use of technology to build supercomputer models that will allow us to predict the movements of erratic monsoons weeks in advance will drastically alter economic outcomes for hundreds of millions of people. IBM's "Deep Thunder project" has tried to achieve something similar in New York region. Precision farming is normally followed

in the developed countries, leverages IT extensively to make direct contribution to the agricultural productivity. The technique of remote sensing using satellite technologies, geographical information systems, and agronomy and soil sciences can be used for high agricultural output. For example, the use of agricultural biotechnology or gene technology in developing drought and herbicide resistant crops. Indian farmers have also started growing varieties of crops that yields higher than the conventional varieties and hence are profitable.

Technology and Security: not just stronger, but smarter security

Technology provides a powerful foundation for tackling many of the problems that we face in the 21st century and of course one of them is the threat to security. Technology is not just about making it easier to connect our society, it is also a tool to make our society safer. India is no stranger to security threats from outside as well as inside. We have witnessed them very well in terms of war, infiltration across border, terrorist attacks, naxalism menace in states and uprisings against the sovereignty of our country in north eastern states. This has been attributed to the substantial increase in the defence budget every fiscal year.

It has taken the recent Mumbai terror attacks and the tragic loss of lives to bring to the forefront once again the concern on both physical and data security. This is unfortunately the flip side of easy access to technology. Sociologists and

> *Psychology will see the emergence of gene expression mapping that will help us understand more about how our genes and environment work together to make us think and behave in particular ways..*

psychologists are taking up the study of these new challenges of war and terror. As Universities will offer courses, research will be conducted using sophisticated tools for computation and analysis. Psychology will see the emergence of gene expression mapping that will help us understand more about how our genes and environment work together to make us think and behave in particular ways. Today, technologies enable the collection and storage of huge amounts of data. The growth of mathematics and mathematical modelling allows this data to be mined for effective decision-making. This has a huge implication in the areas

of national security and crime detection. Mathematicians, computer scientists, sociologists and psychologists will need to collaborate to address this issue.

India could leverage its strength in Information and Communication Technology (ICT) to build supercomputer models for intelligence gathering, analysis and sharing of real-time inputs to various security agencies. For instance, India's recent advanced communication satellites for armed forces will facilitate better connect of all its warships, submarines and aircraft among themselves as well as with operational centres ashore through high-speed data-links. Hence, threats can be detected and shared in real-time to ensure swift reaction. This will be error-free, accurate and would help in mitigating several internal and external security threats. India's potential to contribute to the domestic and international intelligence gathering is yet to be recognised.

Conclusion

Most of us reading this will no longer be here when 2061 reaches. But God willing our children will be and certainly our grandchildren will be. The choices we make, the risks we take and the courage shown today will predict what is possible tomorrow. India is a nation on the brink of greatness. What holds us back can be overcome. What risks are we willing to take to create our India for 2061? An India where the inevitability of urbanization does not destroy our cities, but rather enhances them, where the shortage of water and food becomes an opportunity for new technology to emerge not for people to go hungry, where the ability to educate 1.7 billion people becomes not only possible but probable, where our national security is preserved and protected and our culture and history passed down to the next generation. Technology will not make this happen without India's greatest resource both today and in 2061: our people.

Sanjeev Aga

Sanjeev Aga is an alumni of St. Stephen's College, Delhi, and IIM Calcutta. In a business career commencing 1973, he held senior positions in Asian Paints, and Jenson & Nicholson. A former Managing Director of erstwhile BlowPlast, then Aditya Birla Nuvo, and finally Idea Cellular, since 2011 Sanjeev Aga engages in advisory roles for corporate and not-for-profit organizations. He is based in Mumbai.

TELECOM SECTOR

2061 is a convenient half century away. And given the accelerating pace of change, a half century is indeed very far. After taking the trouble of writing this piece, I do hope several people will read it. But almost certainly you, dear reader, who are reading the piece right now, are doing so close to the year of my writing it in 2013. That then is the delicious irony! My writing will be judged by you, who cannot know now whether what I have forecasted will ever come true. And on the off-chance that you or someone does read this piece in 2061, I will be long since done and gone. That thought provides me the bravado. I, who am challenged enough figuring telecom in 2013, am sticking my neck out to figure telecom in 2061.

Your Number is Your Name

So, let me start with a safe wager that if there is one thing that is certain, it is that the change from a fixed impersonal number to an anytime, anywhere, personal number,

> *Long before 2061, perhaps even before 2031, every human being in this world will have his or her unique number reserved before birth, and allocated upon birth, symbolically embedded under the skin.................*

is irreversible. As the punch line of the 2007 ad of the Indian telco, Idea Cellular, metaphorically translates ' You are no longer your name : starting today, your number is your name'. Which really means that your personal number is your second skin. Long before 2061, perhaps even before 2031, every human being in this world will have his or her unique number reserved before birth, and allocated upon birth,

symbolically embedded under the skin. Why only human beings? Many pet animals, and certainly swathes of mechanical objects, will have their unique number, always on, always connected.

Telephony is the First Application; the Underlying Technology is Deeper

I advisedly used the term number, not telephone number. Because the telephone is the outcome of the experiments of Alexander Graham Bell. Telephone derives from phonetics, meaning sound. Bell was tinkering to configure a device that transmits and receives sound. Telephony was invented, which has since advanced from one-on-one capability, to the switch-board operator-assisted fixed-line full-directory capability, to the marvel of today's mobile telephony. But marvellous as mobile telephony may be, it is merely the first application riding on an underlying technology which is immensely more powerful, and as we will read on, immensely more pervasive.

> " *Telephony is merely the first new born application of an underlying technology which is far deeper and game-changing..*"

No Expressways for Technology

The way of technology is no expressway. The quest for one application leads to an insight, to a technology, and that technology then becomes the under-layer upon which other unimagined and unimaginable applications ride into the future. Legend attributes a question posed to Michael Faraday, the pioneer of electro-magnetism, by a visiting government dignitary, about what possible use his new electric motor may be. To which Faraday famously replied 'What is the use of a new born baby?' Much the same way, telephony is merely the first new born application of an underlying technology which is far deeper and game-changing. A technology which will virtually replicate what is happening here and now, to happen anywhere else, instantly! The power of this new born baby to revolutionize the telecom sector is itself work-in-progress; its power to uproot and transform other sectors is even less grasped. But such is the way of technology. It lurks, it hides, it waits, for the human imagination to cope, for the ecosystem to develop, for the moment to be ripe, and then it leaps.

Will Radio Waves Matter in 2061? Will the Binary System Prevail?

Mobile Telephony and the Internet are today about three decades old. Mobile signals travel on radio waves, also called spectrum. Human ingenuity has coaxed the signals to travel longer and longer, and the finite spectrum provided by nature to carry ever more traffic. Almost certainly, this trend will continue, similar to Moore's law, in response to the ceaselessly rising demand from existing and new applications. But, whether spectrum will be altogether superseded by another medium before 2061 is a secret hidden in the recesses of the future (an attractive thought, pity our poor politicians with no spectrum to play!). Whether the binary code language of 0 and 1 would have served its term by 2061, is another intriguing though impossible question to answer with available knowledge. But almost certainly, children in 2061 will be puzzled when they sight a keyboard, just as our generation looks at an abacus with amusement.

First Hear, then See, next Touch, Taste, and Smell

A human being has five known senses, unless a sixth and further senses are surfaced by 2061. What we know as telecom technology started by interfacing only with the sense of sound. It then turned to interfacing with the sense of sight, as camera and video applications became mainstream. There is every chance that telecom technology, by 2061, will interface with the other three known senses of touch, taste, and smell. That would truly bring humankind to the doorstep of the touted death of distance.

(Even as I was writing this, I chanced upon a Mail Today article which reproduced a Daily Mail report of 2008 where IBM anticipates a phone with all five senses. Infra-red

> *There is every chance that telecom technology, by 2061, will interface with the other three known senses of touch, taste, and smell. That would truly bring humankind to the doorstep of the touted death of distance……….*

and haptic technologies will enable smartphone touchscreen technology and vibration capabilities to simulate the physical sensation of touch. Instead of relying upon the description of some copywriter, you could experience for yourself the silkiness of Egyptian cotton sheets displayed in a catalogue, through your phone. Applications for the sense of sight will be much advanced compared

to today. Pixel recognition systems will pinpoint a particular face in a crowd, or pinpoint any other anomaly in a huge mass of data, with dramatic possibilities in the fields of medical diagnostics, agriculture, retail, what have you? Similarly, applications dealing with the sense of sound will become unrecognizably sophisticated compared to today. The handset will pick up sound and frequency patterns, illustratively predicting the weakness in a bridge before it collapses, or the deeper meanings of the different crying sounds of a baby. Welcome also to the world of digital taste buds. You could have algorithms which will design recipes just for you, combining your favourite flavours with your optimal nutrition requirements. Not to be left behind, will be the sense of smell. Sensors will detect smells and odours which can enhance a feel-good factor, as also troubleshoot in hospital hygiene and city sanitation systems. The more intriguing possibility is that telecom technology may mimic some capabilities of the right side of the brain. The devices will be more rational and analytic. They may well provide judgement, empathy, and creativity. In the era of cognitive systems, humans and

> *As villages get virtually connected, the divide between urban and rural areas will mutate............*

machines will collaborate to produce better results. And IBM and other scientists are not talking of 2061. They are talking of time horizons of a decade or two from today)

Death of Distance will Re-Arrange Society

The impact of the *here to anywhere* replication via virtual reality, and the death of distance, are events of far-reaching importance. We already see the emergence of virtual offices, instead of brick and mortar workplaces. The difference between work and leisure will blur, between work days and vacation days will blur. The organizations of city between city centres and business districts and suburbs will change. As villages get virtually connected, the divide between urban and rural areas will mutate. The migration patterns of rural populations to urban centres will also change, with profound consequences for societies like India.

Schumpeter and Creative Destruction, across Non-Telecom Sectors

The question therefore is not what happens to telecom alone. Telecom 2061 is

the topic given to me to write upon, and I must comply and restrict myself from wandering. However, as emphasized, telecom is merely the first application of an underlying technology that will virtually replicate what is happening in one place, instantly to another place, not just dealing with the sense of sound, but with all five senses, in some measure. This revolutionary capability will transform every sector ranging from banking to administration, from medicine to education, from travel to sports to meditation. The Austrian-American thinker Joseph Schumpeter in the early half of the twentieth century popularized the term 'creative destruction', a description of societies where old ways of doing things are endogenously destroyed, and are replaced by newer ways. Consider photography! George Eastman founded Kodak, headquartered in Rochester near New York in 1889. The company practically defined photography, achieving a near 90% market share in film photography in North America in the 1970s. A Kodak Moment still is common lexicon for capturing a moment for posterity. But the mobile phone, a device originally intended for speaking on the move, ended up sounding the death knell of the totally unrelated sector of film based photography. While undoubtedly the mobile device and its underlying digital technology have enormously enriched the life of billions of people across the world through superior, instant, and cheaper photography, Rochester today is a pale shadow of the boom town it used to be. And the proud institution of Kodak had to file for Chapter 11 bankruptcy protection in January 2012. Progress comes at a cost.

Now consider banking! The banking industry is almost as old as the invention of money. The big banks are household names in the world, as they are in India. Despite that, as on the date of writing this piece, no more than 41% of Indian adults have a bank account. In this day and age, it still takes several days for a bank cheque to clear and reflect in accounts settlement. The banking system deploys technology which may have been contemporary once, but today creaks like ageing bones. A migrant labourer in Mumbai, India usually carries wads of bank notes with him when he travels annually to his native village. Not because he enjoys doing so, but because either his family is unbanked, or bank transfers are slow, or that money orders are expensive and unreliable. The poorest, who need financial services the most, have little or no access to financial services. Meanwhile, the IN technology running a pre-paid mobile operation, can transfer money safely, instantly, and practically without cost. Mobile technology already accesses a far greater percentage of the population than the 41% penetration of banking, and provides error-free secure real time settlement. What is holding back the deployment of this new technology in the banking sector is partly the

conservatism innate in central bankers, but chiefly the huge investments in the existing ecosystem which would be painful to disrupt. Had that not been so, in the 2012 Indian Spectrum Auction, it could have been the banks that would have been bidding for spectrum, and the telcos watching the fun. That said, it is just a matter of time before the banking sector embraces the new technology, because it is impossible to resist for long an idea whose time has come.

The photography and the banking sector were elaborated upon merely as two illustrative examples. In the photography sector, the new technology has already wreaked 'creative destruction'. In the banking sector, this is yet to happen, but unstoppably will happen, well ahead of 2061. We have seen only a glimpse of the revolution which the deadly twins, Telecom and the Internet, will change our world. In using terms like 'deadly' and 'wreak' and 'destruction', in no way do I intend to undermine the dramatic positive impact of the change. But the change does come in convulsions, impacting one sector and then another, in turn causing waves in other interfacing sectors.

Major Technologies are Harbingers of the Rise and Ebb of Civilizations

The impact of change does not stop at sectors. Telecom technology could well influence the rising and ebbing of civilizations. What would Genghis Khan have

> *Societies which leverage this emerging technology substantively would go from strength to further strength. The laggards will be left behind............................*

been without the technology of harnessing the Mongolian steed, what would England have been without the Industrial Revolution, what would the Middle East be without the technology to tap hydrocarbons? Presently, the benefits of telecom technology are widely available and could be the great leveller as they offer leapfrogging opportunities to the less developed societies. Conversely, societies which leverage this emerging technology substantively would go from strength to further strength. The laggards will be left behind.

Lest we have another False Dawn

A hundred years ago, around 1913, the world was agog with optimism. Gigantic

leaps in the fields of physics, chemistry and the life sciences held the promise that progress was a straight line. It was believed that in just one more generation, modern science would rid the world of hunger, want, and many diseases. Humankind hoped too soon! Just a year later, the guns of World War I boomed in the slaughter houses of Europe. Alas, even a hundred years on, hunger and famine shame our world.

Oppenheimer Recites the Bhagavad Gita

No new force is an unmixed blessing. Like any new born baby, it comes with potential for good, along with a potential for evil. Remember J. Robert Oppenheimer, considered along with Enrico Fermi, as the father of the atomic bomb. After the first atomic bomb was tested in New Mexico on July 16, 1945, Oppenheimer is said to have been reminded of the line from the Bhagavad Gita 'If the radiance of a thousand suns were to burn at once, it would be like the splendour of the mighty one'. Later, the very same detonation was said to bring to Oppenheimer's mind an altogether different and antithetical line from the Gita 'Now I am become death, the destroyer of the worlds'. Telecom technology is also one such new force. Its potential to enhance the life of every human on this planet has few equals. Equally, in the wrong hands, and in an inter-connected inter-dependent world, the power of this technology to inflict damage, by way of exploitation or by way of terrorism, is immense.

As always, that is the intersection of science and ethics, and that is one dynamic, no society has been able to sidestep. All scientific progress will come to naught if scientific advancement does not walk in step with a deepening humanity.

Shiv Visvanathan

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SOCIETY: THE FUTURE AND ALL OF US

The future is always an invitation to dream, to test and to experiment with time. But yet all too often, the future becomes mere extrapolation of the present, a Rorschach of current anxieties and projections. The COGITO report represents one such narrowing of the mind. One must admit to its rigour, to its literacy in probing and burrowing through hundreds of sources, pursuing an 'archive fever' of reports. It represents also a constriction of the current categories of social science. What it presents is a bare frame and its sense of fifty years looks desperately skeletal. Instead of an invitation to the future, it appears as an encouragement to certain forms of markets and marketing.

Like most reports haunted by the Malthusian demiurge, it begins with news of demography. India predictably is going to be 'the largest country in the world by way of population.' But what the survey sees in demography is an explosion of market opportunities rather than a set of social challenges. It assumes a certain social stability. There are only two points of possible concern, the sex ratio and the religious ratio. COGITO recognizes that "several million me will remain bachelors due to the consistent gap in India's gender ratio". Yet strangely, it does not consider the missingness of women as a need, a market to be catered to. A few pages later, it adds that by 2061, "close to a quarter of India's population will be non-Hindu", with Muslims compromising 19% of the population.

These are two startling facts we have lived with and yet these have been two realms where we have been reluctant to face consequences. Somehow the materiality of the survey, its grounding in market logic, whittles down the sociological and semiotic implications that could be drawn from the survey. The facts are presented like bare haikus leaving the resonances to the reader. Thirdly and significantly the survey states that, in the next 50 years, India will primarily

be an urban society. The survey hints at a huge migration into the city and posits the possibility of "vertical cities" to cater to the influx of people. These three facts virtually alter the structure of our society creating new problems, new needs, new forms of violence and also new forms of problem-solving.

The market emerges at two levels; firstly as an instrument of problem-solving and secondly as a consequence of it. It challenges perceptions and imaginations asking us to visualize India in new ways. It prompts us to ask, will the sexual imbalance allow for new kinds of relationship? Will the increase in Muslims lead to innovations in unani medicine, new explorations in theology or new experiments in citizenship? Does the population influx lead to a new kind of city? These trends create not only new markets but new forms of the social. Will they lead to alternative ideas of identity and community? The mind boggles at the possibilities and the speculative experiments one could conduct. At this moment, the idea of the markets is an almost jesuitical force driven by need and convenience rather by desire. A P&G or Unilever salesman seems to be defining our universe fifty years hence. Secondly, market is defined as a space for tangibles, but one senses that in this emerging society there is a hierarchy of needs both in a semiotic and a Maslowian sense one needs to understand. There are also unconscious defining intangibles which create their own market. Knowledge and knowledge about goods, services, anxieties, in fact various forms of expertise, in both formal and informal economy would constitute an emerging network of demand. One senses that formal and informal markets five decades from now might need a deeper exploration. One also wonders whether a gender budgeting of such markets might give us a different ecology of need, convenience, anxiety and desire.

Cognitively, semiotically, politically, economically, the city and the governance of a city almost demands immediate attention. In fact, the very need for governance creates the demand for a whole array of public goods. Also, given the densities of the city, the relation between public and private, inside and outside will have to be reworked. Interestingly, the survey asks the question, what is the nature of markets for the needs for the city but not what is the nature of the city that these markets cater to. It visualizes bigger housing complexes, and public sanitation. In fact, the survey's asides are always interestingly playful. It suggests given the density of outer spaces, that the inside may become the domain of many

> *As government subsidizes and responds to urban realities, the decline of the rural politics would be an interesting scenario especially in electoral and ideological terms………………………………………………………….*

more activities. Suddenly, the play of opposites public-private, domestic-public, inside-outside, formal-informal provides not only insights into future markets but into a future city of markets. What is also clear according to the survey is the declining contribution of the rural GDP. As government subsidizes and responds to urban realities, the decline of the rural politics would be an interesting scenario especially in electoral and ideological terms.

The survey emphasizes another fascinating possibility. Unlike our present policy makers obsessed with the scenario of youth, it realizes that the demographic dividend is three-fold. Longevity has created three sets of markets for youth, middle age and most critically, old age. The old becomes citizens purely through their market demands for "nutritional supplements, pension plans, healthcare, and especially modified automobiles".

It celebrates the fact that India would have nearly 412 million senior citizens, a population larger than that of USA today. Old age now moves from benign neglect to becoming an assertive, mind-boggling market for health and lifestyle. In fact, the interplay of livelihood, lifestyle and lifecycle becomes more intricate and might lead to redefinition of health in terms of the internal relation of preventive to palliative health. The plurality of health markets, the redefinitions of the body, in fact knowledge about health, normalcy and old age might redefine community and expertise about old age. It creates a prospective shift of old age from backstage to front stage with interesting consequences for democracy, well-being and also our engagement with memory, pain, suffering and time. To the skeletal rigor of the survey, one wishes one could add a set of scenarios as speculative ethnography debating various themes from violence to old age.

The demographic impetus is read segmentally in the second half of the survey. It claims India's GDP is set to grow exponentially leading to higher levels of

income, education, and lifestyle. This result is good news for consumer companies

> *The changing nature of private consumption becomes critical here. Time and convenience become important as we move from the immediacy of livelihood to the surplus choices of lifestyle...*

and financial services industry. The changing nature of private consumption becomes critical here. Time and convenience become important as we move from the immediacy of livelihood to the surplus choices of lifestyle. Food changes in terms of processed foods and also in terms of the nature of online delivery. What increases along with it is everyday expenditures on clothing and footwear.

Increasing consumption calls for its own changes in governance. One is not only focussing on higher tax basket, but also a new generation of service industries. Consumption is also related to the changing nature of the workforce. The decline of agriculture's contribution to the GDP is predictable and so is the increase in service sector to 60% of the workforce. But it is the drop in the manufacturing sector that needs discussion. One wishes there was a discussion of the decline of manufacturing, trade unions and its impact on the city.

Literacy creates its own markets which consumes news, knowledge, and creates the need for education. India seems set to be a superpower in terms of the education it provides. The survey feels that we will slowly move towards global education. One wonders whether this is too generalized a trend. What one might see is a niching of pockets of world class institutions within a wider morass of literacy.

There are interesting vignettes on consumption and the city. The sociology of the airport as a micro-city becomes critical. It is the new "crossroads within the wall", not a non-place as Marc Auge argued becomes but a place which by its very order of commerce and the repetitive ritual of meetings. Airports become points of entry for new forms of consumers, like medical and adventure tourists. Airports create clusters of cities around themselves and as micro-cities they develop into large retail destinations. One can

even think of niche developments as customized airports for premium passengers and private jets.

One can think similarly of other forms of transport, for instance, automobiles. But the development here is not in terms of the ecology of the city, but in terms of new forms of energy. Electric cars seem to be a summons from the future. Electricity seems to be emerging as the fossil fuel of the future, but the process of transition is useless.

There are slivers of information about media that is interesting. Technology is seen as responding to the social. One senses a digitalization of retail as online space becomes a new network. Online increases in value as travel becomes expensive. TV continues as the favourite entertainment obsession, but print will hold its own. The need for localized information could help newspapers cater to the specific needs of a city.

The city for all its possibilities is along with technology a shadowy vector in the report. The fact of urbanization emerges clearly, but the nature of urbanism is not clear. There is a certain trend toward what I can call micro-cities of consumption. Many of these are electronic networks. The dotcom, the airport, the newspaper all mimic certain variants of the old city compressing it into miniaturized space. It is clear that the city as form of consumption-consuming services, information, commodities will be critical. However, there is an assumption of stability. My sense is that the pathologies of the city, its corruption and violence will create new markets emerging out of the informal economies of violence. Of course, Levers and P&G do not cater to these markets for violence and the pathologies of the city.

There is something about a movie trailer to the COGITO survey. It drops exaggerated hints, suggests the predictable and then offers new promises and connections. It telegraphs the future as a set of incomplete headlines and in doing so produces a set of reductionist acts. The citizen becomes a consumer, the city a system of services and the entire knowledge industry around expertise and city gets commoditized into materials and services. One senses that there is market for knowledge and the intangibles that the survey does not grasp. It locates itself in need and convenience ignoring desire, anxiety and the imaginary. It forgets the city is also an imaginary, a mental construct, a cognitive space but the semiotics of such a space is blank.

Methodologically for a futuristic study, the survey is thin on variables. It presents a demographic fait accompli but its numbers say little. One wishes, there was a qualitative appendix or an ethnographic double to the survey replete with thick descriptions of the future. The monosyllabic nature of number needs an ethnographic set of speculations. One would love a description of the markets built around anxiety or the search for new forms of knowing and knowledge.

There is a sense of technology, knowledge, urban space but the body and the history of the body so central to the grammar of advertising is missing. The body and the fate of the body fade except in the notes of old age. A set of speculative footnotes would have helped concretize the gossip of the future.

Shivakumar

Shivakumar's team's achievements at Nokia India have been case studies at Harvard, ISB and the Ivey School of Business. Shiv is an award winning CEO, writes regularly for business magazines and teaches at some of the best business schools around the world.

DIGITAL LANDSCAPE

India is a young country but an old civilization. Looking ahead into 2061 and predicting what India will look like is not easy and I will most possibly get most things wrong. However, I will still attempt an educated guess based on the data that Cogito Consulting has so painstakingly put together.

In terms of demographics, India will have the world's largest population at about 1.7 billion people. However, in that population, the ratio of men to women will favour men at 52.2 to 47.8% women. This is the most skewed male to female ratio we will see in India. In 1961, the ratio was female skewed!! While this is a national average, there will be pockets where the ratio could be as high as 60:40. I worry for those states and cities as I feel that society balance will not be there with such a skewed male-female ratio.

> " *Digitally, the web from India is English-led. By 2061, the language web will dominate India. The digital space will almost mirror what's happened with movies and the entertainment industry. So, expect the language web to be big for Hindi, Telugu, Tamil, Bengali, Malayalam, Punjabi, and Bhojpuri........* "

India will have 433 million households with an average family size of 4. The family size is a significant drop from the 5 plus family size we have now. These households will have universal penetration in television, mobile technology and the internet. Television and the internet will possibly merge into a virtual screen device that

will work with gestures by 2061. Internet availability in every household will be powerful as information will be freely available to the entire population, something that hasn't been so in India for the last fifty years.

As the average household size drops, we will see more single income and double income households. This will mean a huge market for digital products and convenience products. The likes of digital microwave, the convenient packaged foods, the home delivery precooked meals etc. It will also mean a big market for digital security services.

India will have the biggest Muslim population in the world, close to 340 million, products and services aimed at the unique needs of this population will be viable and profitable in 2061. I believe, we will see the birth of a few brands in products, services, entertainment to serve this significant market.

Digitally, the web from India is English-led. By 2061, the language web will dominate India. The digital space will almost mirror what's happened with movies and the entertainment industry. So, expect the language web to be big for Hindi, Telugu, Tamil, Bengali, Malayalam, Punjabi, and Bhojpuri.

The country will essentially be urban; with 56% of the population in urban centres. We will see a doubling of the number of cities to 143. The number of big cities, i.e. cities with more than 5 million population will quadruple from 9 today to 36.

> *Digital security could be a very big opportunity in managing crime and ensuring safety.................................*

The big shift will be in construction of dwellings to accommodate the significant number of single and double income households. We have seen the concept of gated communities, we will see the concept of self-contained apartment blocks that will be housing plus shopping plus medical plus education facilities rolled into one. The future community will try to either be self-contained or be spread out in the countryside. Being spread out in the countryside will need the society to be more vehicle mobile, more cars, more services like household help delivered to the doorstep. This will bring its own challenges and its own set of opportunities.

The 2061 Urban challenges will be basic amenities like water, infrastructure, electricity, public transport, parking, garbage disposal, and security. The opportunities will be in leveraging technology to solve a number of these challenges.

I feel that digital security could be a very big opportunity in managing crime and ensuring safety. The concept of the current policeman and woman and the police station will cease to exist. I feel that the big cities will be run like countries with strong councils and mayors, with their own tax collection systems. Big Indian cities could end up following the current American large city model of governance. They will have the size and scale to be self dependent and run each city as a corporation if they have the will. The rise of large cities coupled with an ageing population will see the demand for services for the aged. All gates and local transport will be digitally managed with superior technologies to the existing NFC (Near Field Communication).

In 2061, India will be a middle-aged plus senior citizen society. India will have about 350 million people over 60 years and another 550 million people between 35 and 59 years. Care services for the old, lifestyle services for the middle-aged and nurturing services for the young will be in demand. We will see the growth of many services industries catering to these three diverse segments. And many of the personal care services will come at a significant premium.

In terms of economy, India will be a richer country, with an average per capita income of $18,000 in 2061 vs. the current $1800. That level of income will see a huge boom in travel, luxury services, and financial products. New brands will come through to serve clusters of segments in a large market. India will be a services economy. The impact and uptake of technology will be huge and the backbone will be mobile technology and the internet. We will see digital cities,

> *Digital privacy will become a big issue as most lives will seem to be in the public domain. Digital crime will reach huge proportions and to counter it, we will see the boom of digital security firms..*

digital homes, driverless cars, electric cars, connected homes and connected

everyday things. Digital technology will help Indian citizens of 2061 see and map on screens almost everything that is happening around them in society and to their families. Digital privacy will become a big issue as most lives will seem to be in the public domain. Digital crime will reach huge proportions and to counter it, we will see the boom of digital security firms.

We will have a fully literate society and I suspect a fully digitally aware society. Politics, debates in public life will take a new meaning because of the digital spread of information. I predict a dramatic rise in digital activism. Every issue will be debated tooth and nail and every issue will draw the line between the opinionated, the interested and the affected. Digital activism will give rise to individual digital stars that express themselves succinctly and fluidly. It will also give rise to regulatory bodies that will be forced to monitor the vile in the digital space. There will be higher responsibility on politicians and leaders in every sphere to adhere to rules and be better role models.

Governance will be both a challenge and an opportunity. At one level, digital technology in 2061 will allow government to reach out to its citizens and communicate all policies in an open, transparent manner. The concept of RTI has affected decision-making in government and India as a society in 2061 will need to show better maturity in dealing with openness and transparency tools in a digital world. Digital openness should lead to speed in decision-making as opposed to slowing down decisions and stalling progress. While one part of the government, the executive goes digital, I also predict that the justice system will be forced to go digital, or else they will be at a clock speed that's way behind in 2061. I think the legal aspects of going digital will lead to better management of disputes and timelines. I also think that libel and suing will become big in a digital 2061 India. This downside is because everyone will have a view on everything and it will take enormous patience and skill to move forward on any issue. Leadership in 2061 will be a challenging day job.

India will have a big base of engineers and technology graduates. This will augur well for India as we could become one of the biggest centres for R&D. I see a mushrooming of many small and medium sector companies. We will see a few Silicon Valley's bloom in India. Intellectual capital, especially in the digital space will be valued.

In terms of sectors that India could dominate, the small car sector and the

motorcycle sector come to mind. All cars will be more digital with large virtual screens and more electronic than today. India could become the dominant force in small cars and build truly different manufacturing and distribution models for low cost cars.

Banking will see a doubling of physical branches. However, the bigger play in banking will be mobile banking. With universal mobile and internet penetration, mobile banking in India could be a trendsetter and be the most innovative sector in the decades to come. The ecosystem for this is currently developing and can expand rapidly with favourable legislation.

India will need a lot of electricity to meet the needs of such a large growing society; equally the backup industry to electricity will also be big, like the battery packs and invertors or new technology filling that need. I feel India in 2061 will have a large substitute market for every fundamental infrastructure challenge, since the country will most likely not be infrastructure complete.

In a digital world, I believe that gesture technology will be dominant by 2061 and the physical keyboard, touchscreen etc., will be replaced by signs and gestures. The PC in its current form will be an archaic instrument.

Digital technology will impact the way education is imparted, we could see teacherless classrooms and doctorless hospitals. The services of the teacher and doctor will be needed for the most critical issues and most basic issues in education and health could be handled in a digital way.

Entertainment will continue to be big; India will produce more movies even in 2061. The basic nature of consuming movies and entertainment will be digital. The whole entertainment world will be digital in 2061. A new movie can be beamed direct to a home on premiere day and the consumer need not have to go to a theatre. Technology will allow that.

The Indian digital consumer of 2061 will be impatient and will expect a big step jump in resolution of consumer problems. The concept of customer service will get redefined and brands that provide poor customer service will be dumped with digital commentary.

Digital commentary will place a premium on reputation of brands, corporations and leaders. It will be quick and easy to build short term reputation, but difficult

to maintain it longer term because in a digital world every reputation will be questioned, challenged and commented upon.

When India became independent, many people said that nothing united India. In 2061, I feel that a digital framework will unite India like nothing else has done so far. I predict the birth of many digital brands, especially in the services area. I predict that we will see digital literacy reach new levels; we will see stronger digital communities than physical communities. The expression of ideas and thoughts will move society to act. Every industry that has a physical business model now will be forced to adopt and adapt to a digital business model over and above the physical business model. The physical model will be enhanced with digital inputs. Mobile technology and digital technology will help India solve many of the problems we experienced in the first sixty years.

Digital technology in India will fuel individualism. Is this a good or a bad thing? I don't know. The India of 2061 will be more individual than collective. This will challenge society and how society functions as a unit. Digital and electronic relationships will be the norm and the sheer pleasure of a face to face community will be rare but celebrated.

So, in 2061, India will be richer, more male skewed, will be older, will have smaller families, and will be connected digitally like every other country. India would have more than arrived in 2061!!

Thomas Mathew T.

Thomas Mathew is the Managing Director of Life Insurance Corporation of India. He has over 35 years of experience in Life Insurance industry in India.

LIFE INSURANCE

"So long as the maintenance of a family depends on the earning power of the breadwinner; so long as earning power can be destroyed by death, old age or disability; just so long will Life Insurance continue to be the keystone of the individual and those who are dependent upon him…"

The concept of Life Insurance has traversed from thousands of years till today. The ancient texts like "Rigveda" has the word "Yogakshema" which has definite connotation to Life Insurance. Although, Life Insurance, as it is understood now has roots in England in sixteenth century, there are references in the history of ancient Babylonia 4500 years back of following the law of spreading risk with fellow traders in the trade convoy. Centuries have passed but the concept of Life Insurance remains and will be there, whether it is 2060 or after. Depending upon the social fabric, life styles & other technological developments, the concept has the strength to manifest itself in different form.

Visualizing India 50 years from now and visualizing India's insurance industry, 50 years from now, is like crystal gazing or may be like writing a science fiction story. It cannot be like a Harry Potter story, which is based on fantasy, unbelievable and unrealistic. Science fiction is realistic speculation about possible future events, based solidly on adequate knowledge of the real world, past and present, and on a thorough understanding of the nature and significance of the scientific method.

If one wishes to realistically speculate the state of India's Life Insurance industry in 2061, then it is pertinent that the past and present knowledge of the world is taken into account and a thorough understanding of significant changes expected in demographic, economic, social, technological, life sciences and other relevant arena is developed. The impact of these factors on the Life Insurance industry will decide its future 50 years from now.

Future is uncertain. The business of insurance originates for this very reason. If everyone knew what was going to happen tomorrow, there would be no uncertainty, no risk and no space for insurance. It is the risk involved with the uncertain-tomorrow that makes people adopt measures like insurance to mitigate the risk. Tomorrow belongs to those who prepare for it today. This belief prompts people to insure themselves against tomorrow's uncertainty. Visualizing India 50 years from now is a way to prepare India for 2061.

Before we wonder about the future of Indian Life Insurance industry in 2061, let's take a brief look at the present state of our industry and a quick analysis of where we stand when compared to global numbers. Life Insurance penetration in India was 2.15% in the 2001-02. In the year 2010, India's Life Insurance penetration crossed the world average of 4% and stood at 4.6%. LIC alone had contributed over 3.2% towards insurance penetration in 2010. The year 2011 witnessed a fall in World Average penetration level to 3.8%. India's penetration level of 3.4% in 2011 fell below the world average. Though we may not look very far from the world average in penetration and have the best penetration level among BRIC nations, we are far behind countries like Japan and UK that have penetration level of about 9%, or Hong Kong and South Africa, that have insurance penetration above 10% of GDP.

In terms of insurance density, on one hand, where we see countries like UK, Japan and Hong Kong with insurance density above $3000 and World Average of $378, India stands at a very lower level of only $49 per capita. Another significant perspective to benchmark level of insurance in India is the Mortality Protection Gap. The industry's basic role is to spread the coverage of insurance. Spread of coverage is measured in terms of Sum Assured and not in terms of Premium Income. If a breadwinner dies, what protection his family has, to maintain the same standard of living? Can the savings of the family take care of this? The gap between the savings of the family

and the funds required to maintain the same standard of living even in absence of the breadwinner is the Mortality Protection Gap. According to a protection gap study conducted by Swiss Re for the Asia-Pacific region, it comes to light that even though sum insured per working person has grown by CAGR of 24% during the last 10 years, mortality protection gap in India has grown at 13% over the same period. In the year 2000, the actual sum insured per working person was only ₹12,400 as against the required sum insured per person of ₹5 lakh. At present, the actual sum insured per working person is about ₹1 lakh. However, the required sum insured to cover total mortality gap is ₹14 lakh per working person.

Life Insurance is about insuring human life. According to the World Resources Institute, average life expectancy of a newborn child will exceed 70 years in the year 2020 and 75 years in 2045. The world population aged 65 and more will exceed 1 billion in 2030. The changes in the Life Insurance industry in India will be greatly impacted by demographic changes expected in India in the next five decades. The population of India was 121 crores as per 2011 Census. Birth rate is expected to slow down and with better healthcare facilities, life expectancy is expected to improve in the years ahead. India is expected to be the most populated country in the world with the population number crossing 171 crores. Today, India is a young nation with more than half of the population aged below 25 years. As decades pass, birth rate slows down, longevity improves, the situation will reverse and we will have more than half of the population aged above 35 years. In fact, about 24% of the population would be aged above 60 years in 2061.

Trends and estimates show that by 2050, India is going to be the most populous country of the world, leaving China behind. But the estimates not only indicate growth in population; they also indicate a demographic transition. Demographic transition in terms of falling birth rate and slowing mortality will result in an increase in the number of elderly people. The drop in death rate is expected to be sharper than the fall in birth rate due to improved economic development. As a result, the proportion of 60+ population is expected to climb from 4.6% in 2000 to 9% in 2030. In absolute numbers, the number of people above the age of 60 will increase from 100.8 million and is expected to jump to 200 million by 2030. By 2050, it is expected to be over 320 million. Population growth and increase in number of the elderly have serious economic consequences. Unless we plan well, India too may face what the world today calls 'The Japan Syndrome' - as the number of retired people grows, a declining band of workers having to support rising social-security payments.

Life Insurance is about assessing and underwriting the risk of dying too soon or living too long. The development in the field of life sciences may change the way insurers underwrite life insurance risk today. Genetic underwriting is unacceptable at present even in the western world. Though every democratic nation wants to avoid discrimination based on birth, on which an individual has no control, advances in human genome based technologies have potential to have far-reaching impact on

> *Unless we plan well, India too may face what the world today calls 'The Japan Syndrome' - as the number of retired people grows, a declining band of workers having to support rising social-security payments.......................*

the business of life insurance. Correlation of specific genes and proteins with specific cancers, Alzheimer's, heart disease, and diabetes, will allow both physicians and patients to anticipate, plan for and mitigate, if not cure, DNA-based health challenges, development of pharmaceuticals that treat gene-based diseases, replacing surgeries and chemotherapy. Transhumanism, the movement that affirms the possibility and desirability of transforming fundamentally the human condition by developing and making widely available technologies to eliminate ageing and to greatly enhance human intellectual, physical, and psychological capacities will impact the way Life Insurance is priced today.

Ultimately, Life Insurance covers the risk of dying early and also the risk of living too long. One side is protected by basic risk cover and the other by payment of annuities. The impact that the abovementioned changes signify, points clearly towards increased longevity with the passage of time. It is this parameter that will attain critical significance in the future. Coupled with increasing material prosperity, higher educational levels, mechanization of work demanding hard physical labour and sedentary lifestyle, this paradigm shift will necessitate major changes in the way in which Life Insurance industry operates.

Increasing longevity has primarily two implications. One is that as mortality rate would decrease, the need of Life Insurance of the general populace apparently decreases. The corollary to that is that longevity has its own attendant problems and therefore demands newer solutions. While longevity improves, the quality

of life also has to improve simultaneously. But it is seen that the food habits, sedentary lifestyles, high pressure jobs, etc. lead to a stressed human being and consequential lifestyle diseases like heart problems, blood pressure, cholesterol, cancer, etc. may increase manifold.

> *The advent of newer forms and variants of diseases will demand solutions from the medical and insurance fraternity. Close and better liaison will be required from medical and insurance professionals to bridge the gaps emerging and provide solutions..*

Such a situation will necessitate and ensure that the need of health insurance will be felt far more by the populace. The advent of newer forms and variants of diseases will demand solutions from the medical and insurance fraternity. Close and better liaison will be required from medical and insurance professionals to bridge the gaps emerging and provide solutions.

As we advance towards 2061, some major discontinuities will shape the Life Insurance market as it goes forward.

1. The focus of the industry will be to develop long-term relationship and provide comprehensive life and healthcare coupled with annuity to the client policyholders. This will necessitate ensuring long-term protection and savings to the customers while ensuring sustainable growth to the companies. The market may see consolidation of the number of players operating, since a saturated world market signifies only incremental growth to match inflationary trends which also are likely to be very low in the perceived timeframe.

2. Regulatory changes of a radical sort will be a thing of the past due to the market reaching a saturation level. The scope of regulatory intervention to cover segments in the lower end of the value chain as seen now will be far less due to increased prosperity, heightened awareness and easy availability of insurance cover to all choosing to go for the same.

3. The digital revolution unfolding will also have a prominent role to play in the future. The tagging and mapping of every individual with an electronic

ID like Social Security Number in the US, Aadhaar card in India, etc. has the future potential to generate digital footprints of all activities the person is involved in from banking to medicine, and, education to entertainment. The 'Big Data' being available in future from both proprietary and public databases will make it possible to perform analytics and customise it to the level of individual customers and involve far more parameters than what it is presently based upon.

4. Demographics are a sure and clear driver of growth. The phenomenon that is being witnessed now will be reversed by the time our country enters the year 2061. From a country that is having a predominantly young population, we will change to a greyer one. What that implies is that the number of persons in the higher age groups will be proportionately higher than that seen now thereby generating a new relationship between the working population and the total population. This in turn will have its impact across the board as far as insurance solutions go. The need of health insurance and annuities will rise proportionately faster than of conventional life insurance. Within these changed demographics, we will witness a quantum jump in other demographic parameters like education, income, gender ratio, infant mortality, female maternal mortality, etc. This will have its corresponding impact on the birth rate which would be falling resulting in a shrinking population which is unimaginable today. In short, increasing life expectancy, better educational standards, lower fertility and higher incomes would contribute to the market of annuities and health insurance being a similar multiple to conventional life insurance as the reverse is now.

Some parameters mentioned above may seem uncertain now, but it is also to be understood that black swan events like a massive earthquake, tsunamis, hurricanes, biological warfare, atomic explosions and even things like the AIDS epidemic which wiped out large swathes of the population in some African countries can have an unforeseen impact.

The future may be uncertain per se, but, the financial markets are showing a trend of converging into a single entity offering varied services asked for by the client. People, in general, start with basic banking for parking their savings. As their savings grow over a period of time, various financial and physical products register in their mental radar. As people become more prosperous, they tend to go

beyond conventional banking to areas like bonds, shares, futures, options, swaps, conventional insurance, unit linked insurance, variable insurance, exchange traded funds, bill payment, concierge services, etc.

This convergence is seen in different forms like some banks offering some of the services mentioned, some financial institutions opting for banking licence, some banks opting for an insurance subsidiary, etc. A brave new world is opening up for those prepared to leverage the synergies of ventures different in their approach of managing the money of the customer, but, having the same objective of providing safety, liquidity, returns and taxation benefits primarily to the customers. Only time will tell, whether an organization will transform itself to a financial conglomerate from its earlier avatar of offering basic banking, or, insurance, or, mutual fund services, or, any other services.

Conclusion

Indian Life Insurance industry is poised for phenomenal growth in the short and medium term with a tapering effect in the long term as and when we near 2061. The growth and stabilisation will be driven by favourable demographics in the short to the medium term followed by structural and economic changes which will give a strong tailwind in the latter part of the period.

The present scenario is characterised by favourable demographics, but the other indices including education, health, nutrition, female literacy, infant mortality, etc. leave a lot to be desired. As the demographic parameters show improvement and align with global standards, we will see the maturity phase of Life Insurance industry. Growth rates will tend to taper off in the later part of the period envisaged and will move in tandem with and show strong correlation with other facets of the economy like GDP, inflation, etc. Newer forms of insurance with strong governmental support may emerge offering social security to the citizens as seen in some Scandinavian countries. The changes in population growth, per capita income, industrialization, education levels, rule of law and democracy will propel the insurance industry into a brave new world.

The convergence of the financial sector will throw open interesting possibilities. The time is not so far off that a person taking up an insurance policy will also be offered banking, mutual fund, general insurance, derivatives, housing

loan, reverse mortgage and a range of other products and services hitherto not thought off.

Ultimately, the industry and the government will have to necessarily harness the potential of the changing times to their advantage. And that will herald a new era !!

A data analytics view of India in the future

INDIA IN 2061

Broad Methodology & Sources

Draftfcb+Ulka's Cogito Consulting and Asterii Analytics teams adopted a three stage methodology for this study.

In Stage 1, the team accessed data from hundreds of sources either available in public domain or data bought by us, including UN, ADB, Government of India reports (Ministry of Finance, Education, Transport, etc.), NCAER, TERI, Planning Commission Projections, reports of various Industry bodies (ASSOCHAM, CII, SIAM, ACMA), Economic Surveys, BRIC Report, reports by various private and consulting companies and Industry White Papers. Most of the projections available from this data were for the next two decades at the most.

In Stage 2, the teams used various statistical techniques and tools to project the data to arrive at the picture for the future.

In the last Stage, the teams shared this data with a few economists, professors and consultants.

The purpose of this note is to highlight the rigour and amount of effort that has gone into this exercise. All the data, projections, hypotheses and implications in this report are purely that of the Cogito Consulting and Asterii Analytics teams and have been used for the limited purpose of projecting what the scenario would be in India in 2061.

POPULATION

1-A: Population of India (in millions)
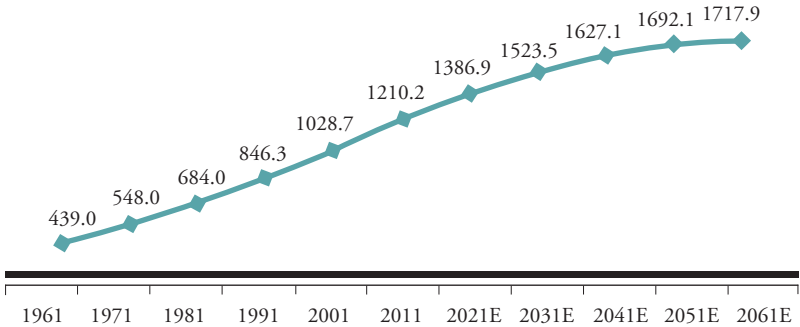
The good news is that India's population growth rate will be marginally slower than what it used to be in the last 50 years. The bad news is that this is not going to prevent India from becoming the largest country in the world by way of population. Not just that, but the definition of crowding will also get redefined from a population density of around 400/sq km, it is expected to go up to 530/ sq km. As compared to 170/sq km for the rest of Asia and 150/sq km for China!!

Demographic dividend or not, this is going to be the single biggest stresspoint not just for the economy but for social conditions and political system as well.

Implications -

- As population sees stable growth, there will be a rise in government run family planning programmes & added support for contraceptive products to control the growth of population
- As population grows and fertility rates improve, the need for diapers, baby soaps, kindergartens & nursing homes will become imminent

1-B: Gender-wise Population (in millions)
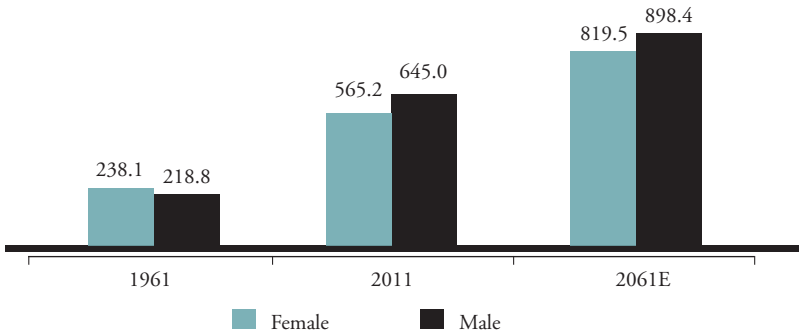
In 2061, several million men will remain bachelors due to the consistent gap in India's gender ratio.

1-C: No. of Households (in millions)

Year	Households
1961	84
1986	134
2011	231
2036E	332
2061E	433
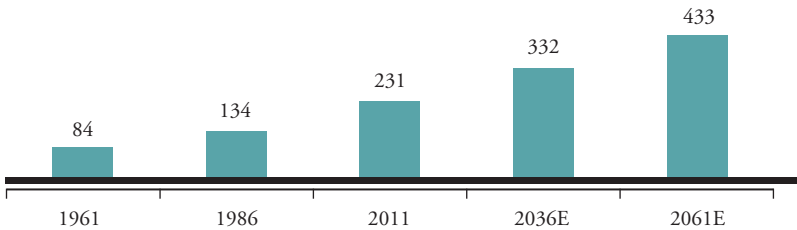
In 2061, the number of households in India would have doubled & will be more than that of China.

According to some experts, growth in households will slow down by 2040 to yield 380-400 million households.

This spells a boom for durable manufacturing companies in segments like kitchens, washing machines & home appliances. Dramatic rise in households will also result in a sustained boom in real estate.

1-D: Average Household Size - Total
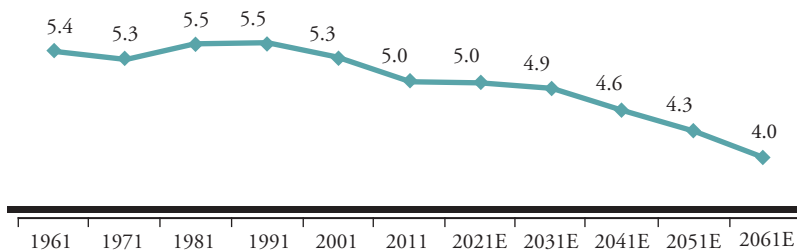
Country	Household Size (2010)
Korea	3.12
USA	2.63
Japan	2.46
Brazil	2.39
China	3.1

Average household size of 5.2 today is similar to what China had in 1995. Average household size continues moving southwards, but it will still be larger than most other key economies by 2061.

Implications -

- Families will seek gadgets which make life easier & comfortable as fewer people will be performing household chores

- Security devices will gain importance due to shrinking of household size and individualization of homes

1-E: Religion-wise Population Composition (%)

	1961	1971	1981	1991	2001	2011	2021E	2031E	2041E	2051E	2061E
Others	3.4	3.5	3.6	3.6	3.7	3.3	3.5	3.5	3.5	3.4	2.8
Christians	2.4	2.6	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.1	2.1
Muslims	10.7	11.2	11.4	12.1	13.4	14.6	15.2	16.0	17.0	18.0	19.3
Hindus	83.5	82.7	82.6	82	80.5	79.8	79.1	78.4	77.3	76.5	75.8

■ Hindus ■ Muslims ■ Christians ■ Others
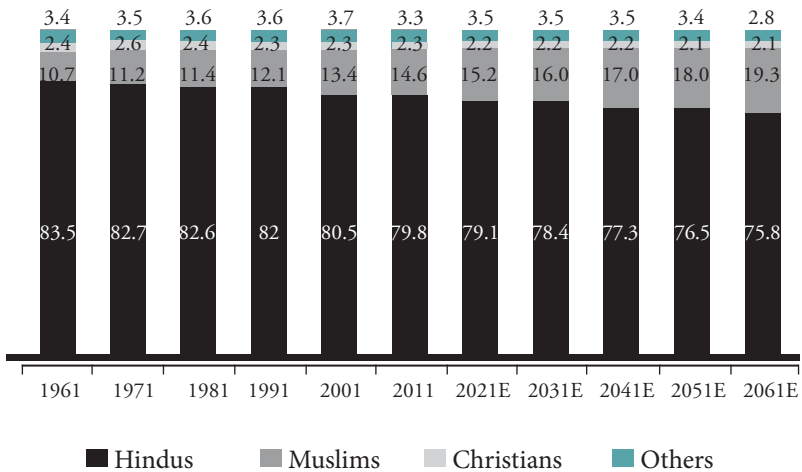
By 2061, close to a quarter of India's population will be non-Hindus.

Muslim population will comprise approximately 19% of India's population.

However, some demographers feel that as India's socio-economic conditions improve, the fertility rates of minority population will decline leading to stabilization in the religious composition of India.

200

URBAN & RURAL INDIA

2-A: Urban & Rural Population (% of Total Population)

	1961	2011	2061E
Urban	18	31	56
Rural	82	69	44

■ Rural   ■ Urban
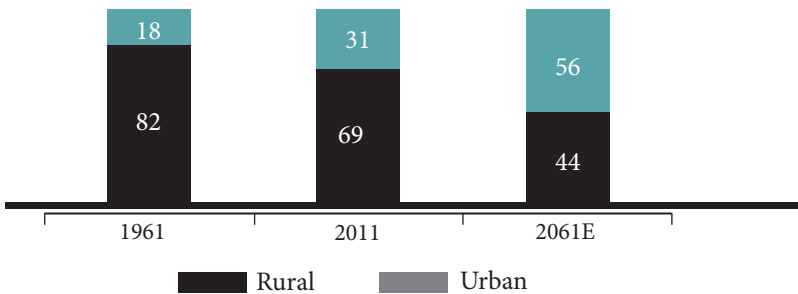
Current Urbanization in China – 48%

During the next 50 years, the big demographic shift is going to be in this area. India moves from being a primarily rural society to an urban one.

Urban population goes past rural India only around 30 years hence, however, its impact will be seen much earlier as the divide between rural and urban India start dissolving, villages become towns and towns become cities and expansion may be vertical as cities will try and accommodate the influx of people.

2-B: Urban/Rural Households (in millions)

	1961	2011	2061E
Rural Households	68	159	191
Urban Households	15	72	243

■ Rural Households   ■ Urban Households
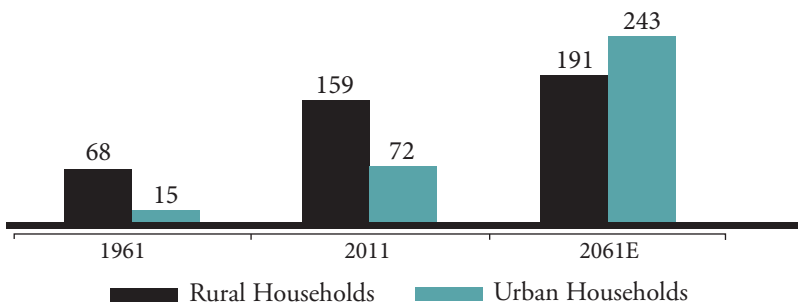
Number of urban households will grow by more than three times as it matches step with urbanization and declining household size.

Implications -

- As urban households increase, there will be a need for bigger housing complexes, better social services and more efficient healthcare systems
- Public sanitation and civic planning will be of utmost importance in accommodating such a level of increase in urban households

2-C: Cities having population of 1 million and above
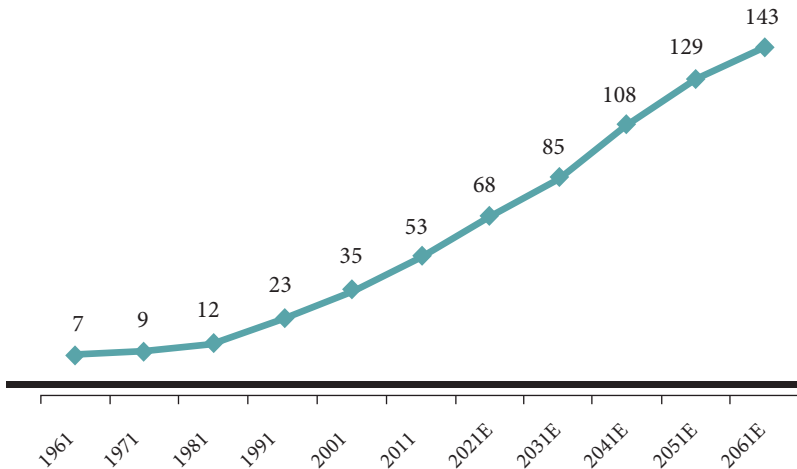
China, in 2010 had 124 cities with a population of 1 million & above

In the first 50 years of our republic, only 35 cities had crossed the one million mark, today this number is 53. In the next 50 years, a further 90-100 cities are expected to join the millionaires club. What is more interesting is that the number of cities with a population above five million will quadruple from just 9 today to 36 in the next 50 years, the largest number in the world.

Implications -

- Growing number of cities spells a boom period for realty and other construction companies as demand for housing rises

- Shrinking spaces may mean that many activities will shift indoors. Urbanization may also change the retail distribution of India, as distribution becomes easy and marketers reach large target populations easily

- Rising number of megacities may also create a trend of multiple corporations governing a single city

2-D: Number of Villages (in '000s)
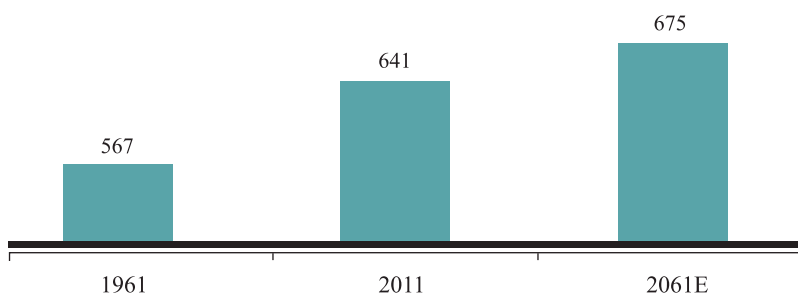
According to experts, the growth in the number of villages in India should plateau after 2040 as urbanization and unfavourable conditions will limit the growth of new villages.

Implications -

- As numbers of villages stagnate & agricultural contribution to GDP decreases (refer to GDP composition), today's political power structure will change as government subsidies and investments will be realigned with the urban reality

LIFE EXPECTANCY, POPULATION COMPOSITION

3-A: Life Expectancy
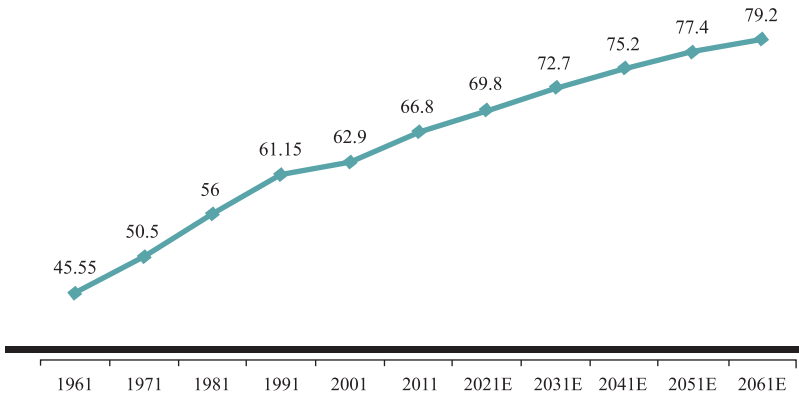
Country	Life Expectancy (in 2010)
China	73.06
USA	79.09
France	81.07

Better economic conditions, better hygiene and healthcare all contribute to a higher life expectancy, reaching the levels that China has achieved, in the next 20 years and matching those in the US by 2061.

Implications -

- A sizeable elderly population will imply a market for services which are friendly to this segment, which will also have a large affluent sub-section within it
- Products like nutritional supplements, pensions plans, automobiles with assist features & healthcare will become an important part of the economy
- Infrastructure suitable to this segment i.e. retirement homes, hospitals and recreation parks will have to gain momentum

3-B: Population Composition - by age brackets (%)

India moves from being young to middle-aged as average age rises from 28 years to 39 years. The proportion of young from being around a quarter of the population drops to around a fifth. And the most dramatic growth is in the number of senior citizens who move up from the current 8% to around 24%.

Effectively, nearly 412 million senior citizens, larger than the entire population of USA today, will be struggling to sustain their health and lifestyle. This will have a dramatic impact on healthcare, financial services, pharmaceuticals and foods industry.

Implications -

- With the number of people in the age bracket of 35-59 years increasing, the "earn and flaunt" group will form a considerable part of the population. Having already taken care of their basic needs, this segment will drive demand for luxury & lifestyle products
- Ageing population would result in more opportunities for healthcare service providers as well as self-medication and self-monitoring devices. Insurance companies will also benefit, however coverage plans will have to be realigned as consumer requirements change

ECONOMY

4-A: GDP at Constant Prices (in billion ₹)
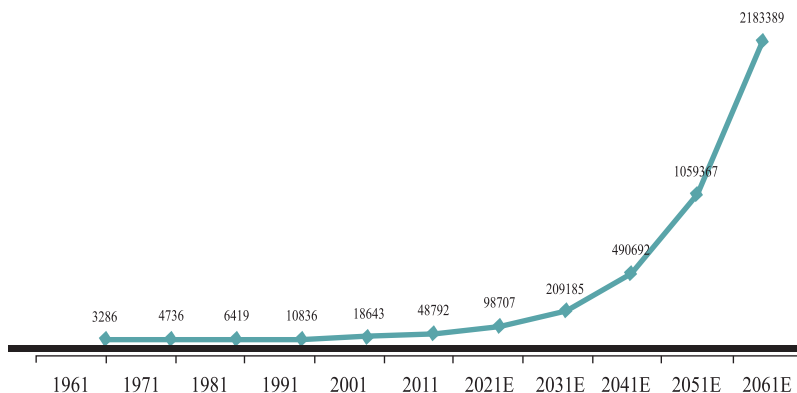
India's GDP will be US$ 57 trillion, almost 4 times USA's current GDP at US$ 14 trillion

India's GDP is set to grow exponentially, doubling every decade which would lead to much higher levels of prosperity & significantly better income, education and lifestyles.

4-B: Per Capita Income (in '000 ₹)
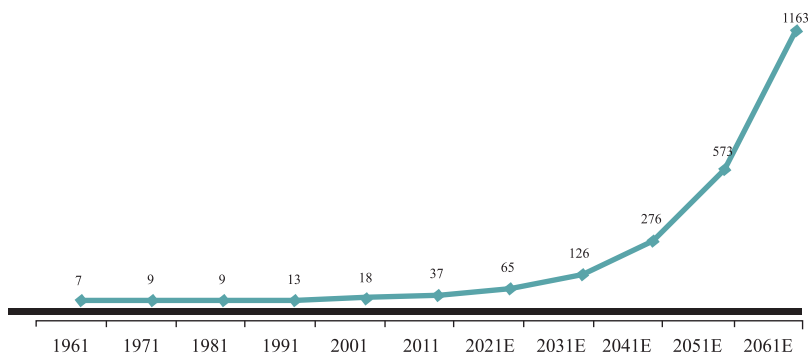
India's per capita income is expected to be ~US$ 18,000 by 2061, similar to the per capita income of Russia (US$ 17,000) in 2011(IMF).

Implications -

- As India joins the ranks of relatively more affluent nations, the consumption basket of the average Indian will change dramatically
- Consumer companies will experience strong growth as customers use a wider range of products & services and upgrade their lifestyles
- As income goes up, so will savings. This will result in opportunities for the financial services industry

4-C: Number of Tax Assessees (in millions)

Year	1961	1971	1981	1991	2001	2011	2021E	2031E	2041E	2051E	2061E
Value	2	3	5	6	29	35	71	137	244	440	678
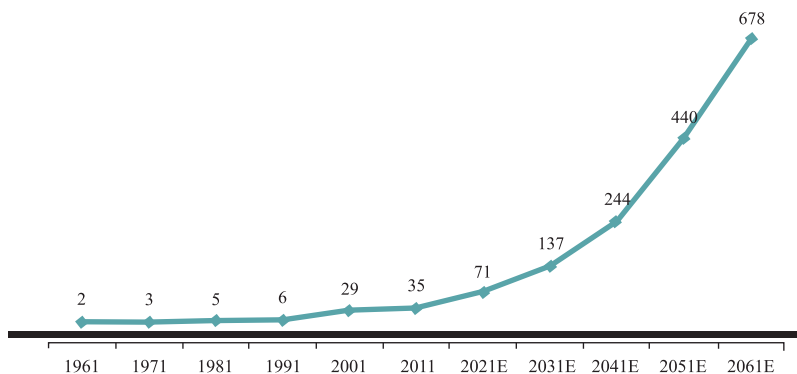
Assuming that taxation laws remain the same, tax payers will grow from a mere 35 million in 2011 to whopping 678 million in 2061. The government's ambitious programme to enrol taxpayers includes better system and services, a higher degree of pressure and structural changes like the Direct Tax Code.

Implications -

- Higher number of tax assessees would also result in the flourishing of tax advisory services further supporting the notion that India will develop as a services led economy

- Growing number of tax assessees shows higher revenue for the government. The question to be asked is whether income well-earned will be well spent?

4-D: Consumption Expenditure (as % of Total Expenditure)

	1961	1971	1981	1991	2001	2011
Others	17.5	18.9	24.2	31.4	43.7	53.8
Education	0.9	1.0	1.3	1.6		1.9
Medicine	1.5	1.8	2.9	2.4	1.8	4.0
Rent, Fuel, Power	24	17.5	13.3	11.2	4.4	8.5
Clothing & Footwear	4.7	4.8	6	5.7	7.5	5.1
Food & Beverages	51.4	56.0	52.3	47.7	37.8	26.7

■ Food & Beverages ■ Clothing & Footwear ■ Rent, Fuel, Power ■ Medicine ■ Education ■ Others
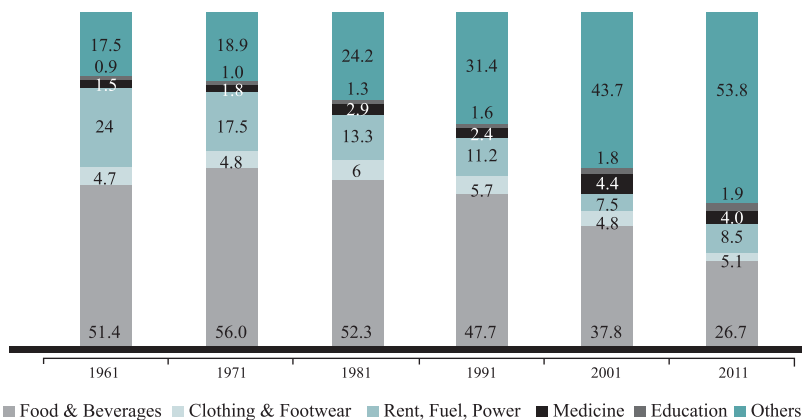
The composition of PCE has undergone a dramatic change from 1961 till today. Food has dropped considerably and 'others' (communication, transport, etc.) have risen dramatically to indicate increasing importance of lifestyle spending in everyday life, as also by expenditure on clothing and footwear.

As the country progresses, expense on basic items like food & beverages will reduce to levels similar to developed countries.

Implications -

- Food component of PCE has reduced but the absolute value of food expenditure has not reduced

- As lifestyles get busier due to higher working population and higher time allocation to travelling & communication, convenience items like ready-to-eat foods, online bill payments and home delivery will become more prominent

4-E: GDP Contribution from Sectors (%)

1961	2011	2061E
30 (Services)	58 (Services)	76 (Services)
19 (Industry)	26 (Industry)	19 (Industry)
51 (Agriculture)	16 (Agriculture)	5 (Agriculture)

■ Agriculture   ■ Industry   ■ Services
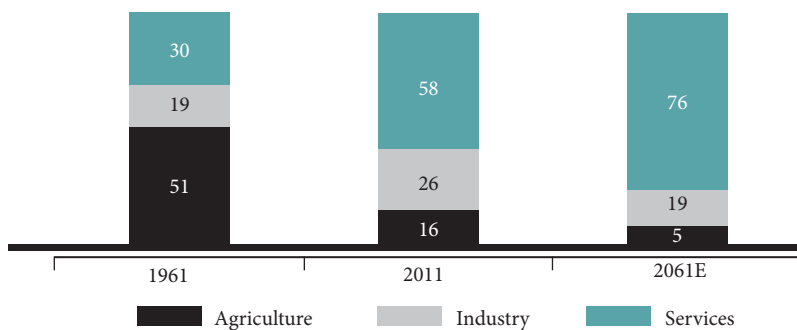
Country	Agriculture	Industry	Service
Japan	1.4	24.9	73.8
USA	1.1	22.1	76.8
Germany	0.9	27.8	71.3
France	2	18.5	79.5

Country	Agriculture	Industry	Service
Brazil	5.8	26.8	67.4
South Africa	2.5	30.8	66.8
China	10.2	46.9	43

Within just the next 10 years, agriculture's contribution to GDP drops below 10% and that of services crosses 60%. Over the next 40 years, agriculture contribution halves and becomes just 5% of GDP, however this is still double that of countries like Japan, USA, Germany and France, today.

The gap between services and manufacturing increases. In fact, if this trend is not altered, contribution of manufacturing would drop to a proportion which will be the lowest amongst important economies.

4-F: Total Workforce
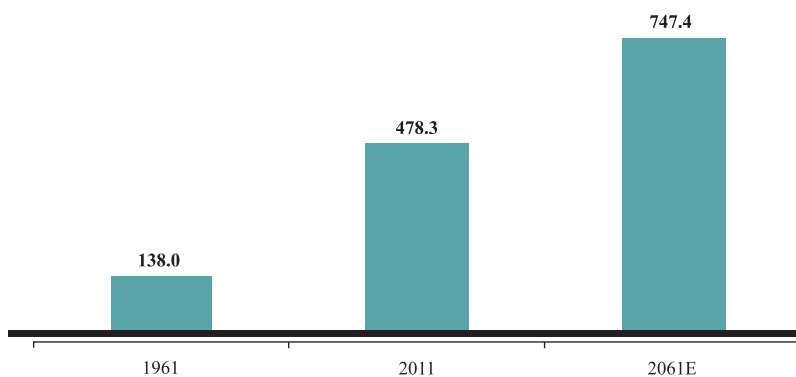
Total workforce in India rises to 747.4 million, comprising almost 44% of the population.

International Labour Organization (ILO) Workforce definition: Total number of a country's population employed in jobs, plus those unemployed people who are actually seeking paying work.
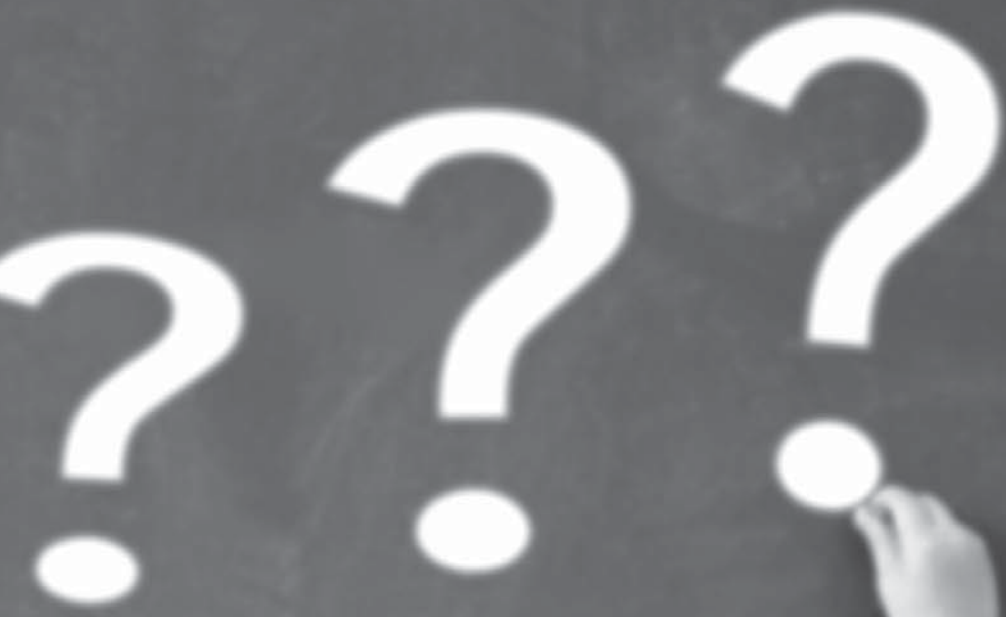
EDUCATION

5-A: Literacy Rates (in % of POP)

1961	1971	1981	1991	2001	2011	2021E	2031E	2041E	2051E
28.3	34.5	43.6	52.2	64.8	74.0	95.0	98.0	99.0	99.0

Literacy rates (in % of POP)
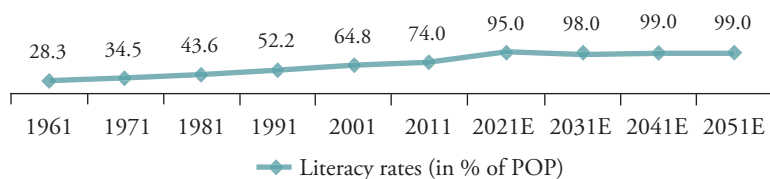
Literacy Rate - Male & Female

■ Males (in % of POP)   ■ Females (in % of POP)

	1961	2011	2051E
Males	40.4	82.1	99
Females	15.4	65.5	99
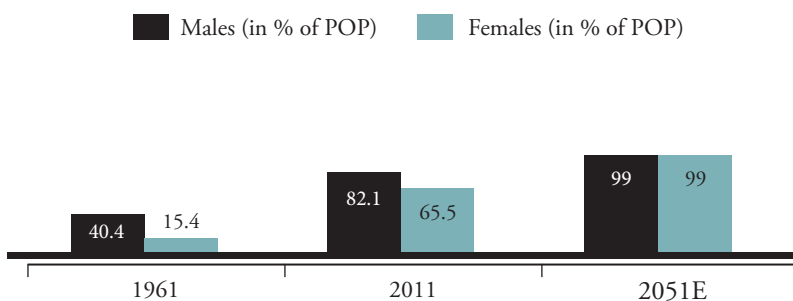
By 2030, India is expected to reach almost complete literacy levels

Some experts feel, the Planning Commission's forecast for 2020 is very optimistic. India's literacy rate is held up due to the high number of illiterates in the 60+ category. Its literacy rate will improve when this contingent of the population passes out. Experts predict, it will be 85% by 2020.

Overall literacy levels keep rising and some experts predict that this could be faster than even this prediction as a large base of illiterates in the 60+ age group pass away. But life gets even more interesting as women catch up with men, perhaps leading to not so subtle shifts in areas like women's health, social awareness as well as family structure or even as the social order!

Implications -

- Rising literacy levels could have a direct effect on internet usage & newspaper readership
- More literate people would also mean higher consumption levels, hence improving the total "marketable" population of the country

215

5-B: Enrolment into Higher Education (in '000s)
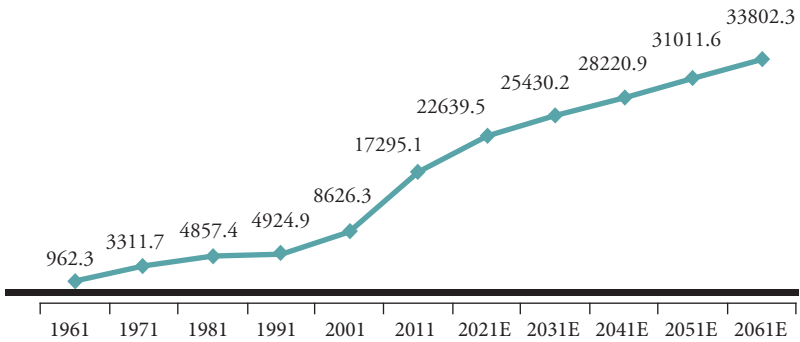
According to experts at IIPS, currently 15% of 15-24 years age group is enrolled in higher education. This percentage will reach 45-50% by 2060, resulting in a growth of 2.5 times over the current number.

Enrolment in higher education has nearly doubled in the last two decades. Going forward, it is not likely to grow at the same rate; however, number of people enrolled in higher education will continue to grow significantly.

Implications -

- Top international colleges are already eyeing partnerships with Indian colleges and with the number of graduates and post graduates on the rise, India is set to be an educational superpower that will keep growing

- India is to churn out unmatched number of engineers, doctors & professionals by 2061. These professionals will be in demand in the current developing countries who by then will have a fast ageing population

216

5-C: Sanctioned intake in Engineering/Technology & Polytechnics (in '000s)
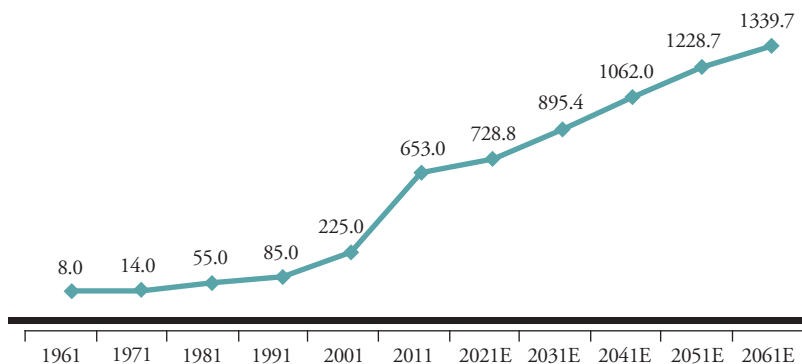
Sanctioned intake increased dramatically between 1991 & 2011 with a lot of private & public institutions getting into the fray. The thrust for vocational education will continue as economic growth keeps demanding higher and higher number of intakes.

Implications -

- As the number of technological graduates surge in India, India continues to grow to be an R&D centre for the world

- As foreign universities affiliate with their Indian counterparts, Indian education will slowly move towards achieving the standards of global education, and eventually a common standard for education may be established the world over

INFRASTRUCTURE

6-A: Air Traffic (in '000s)

Year	Value
1961	1.0
1971	2.6
1981	6.8
1991	10.3
2001	17.5
2011	55.0
2021E	101.5
2031E	199.6
2041E	392.7
2051E	639.6
2061E	859.6
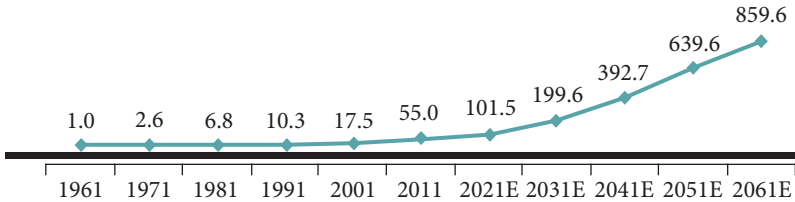
Passenger air traffic in USA to reach 1.3 billion by 2031 according to a report by Federal Aviation Administration (FAA)

Country	Total Air Traffic in 2010 (in Million Kms)
China	268.1
USA	737.4 (E for 2011)

Air traffic in terms of number of passengers carried is expected to nearly double every decade, whether passenger base grows at a similar pace or not is still a major question.

Implications -

- Air traffic would be spurred on by the rapid growth of the travel & tourism industry, as India is set to be a medical, adventure and off-beat tourism destination
- Growth in air traffic could lead to consolidation of airports. In the future, multiple cities in a close vicinity could share an airport with the capability to handle larger volumes of air traffic
- As airports consolidate, the need for rapid transportation to these airports will become imminent. As the distance between city centres and airports increase, an efficient and punctual transportation system will need to be developed to support such voluminous airports
- As more people take flights, airports themselves will develop into large retail destinations with every need served at the airport. This could lead to alternative income streams for airports, thus lowering airport taxes and making flight tickets cheaper
- As air travel penetration improves and incomes rise, "premium airports" may develop closer to city centres which provide customized services for private jets and premium airliners

6-B: Road Network (in '000 Kilometres)
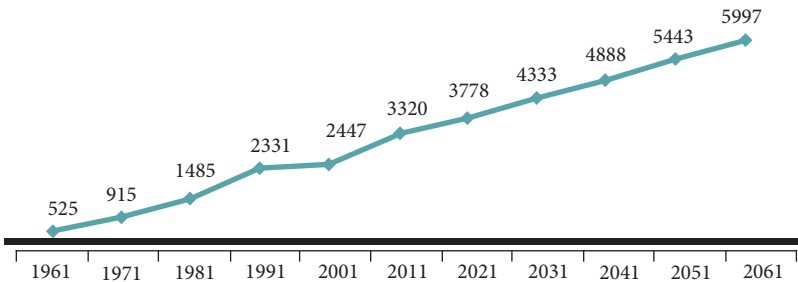
Country	Total Network in 2010 (in '000 Kms)
China	4008
USA	6506

The road network grows faster than the rail network (see Railway Network chart) growing to nearly double the size it is today.

Implications -

- A larger road network will be supported by an improvement in the load carrying capacity of roads. As manufacturing grows rapidly (see Manufacturing value added) the load carrying capacity needs be improved with the development of super highways with multiple lanes connecting various crucial transportation hubs

- With India set to see strong growth in passenger vehicle and two wheelers, expanded road networks will be the spine that will spur growth in this sector

6-C: Railway Network (in '000 Kilometres)
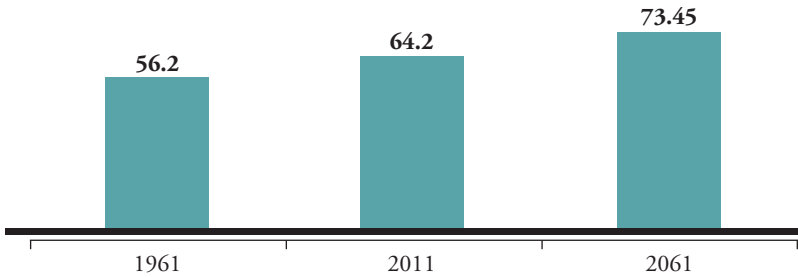
Rank	Country	Total Network in 2010 (in '000 Kms)
1	USA	224
2	China	91
3	India	73

The third largest railway network in the world remains firmly on the tracks of growth, but fails to overtake the number 2 even by 2061!

Implications -

- As technology improves, better locomotives & stronger rail tracks could result in higher load carrying capacity

- Railway's growth is slower than road network due to high penetration of air travel and wider road networks which provide faster connectivity and more accessibility, respectively, as compared to railways

- Poor growth in railways will lead to higher growth for road transport companies & air travel

AUTOMOBILES

7-A: Production of Indian Passenger Vehicles (in millions)
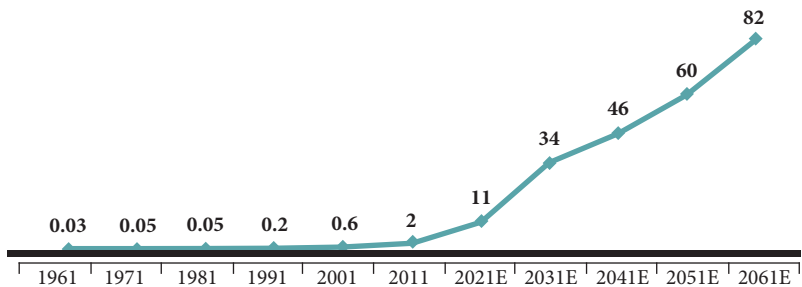
Implications -

- As production grows, the question arises as to where will India stand when it comes to global car manufacturing hubs

- Growth in production will also spur growth in auto ancillary industries and provide direct and indirect employment to many

- As transportation grows, it will create the demand for large ports and logistics companies

7-B: 4 Wheelers (in millions)
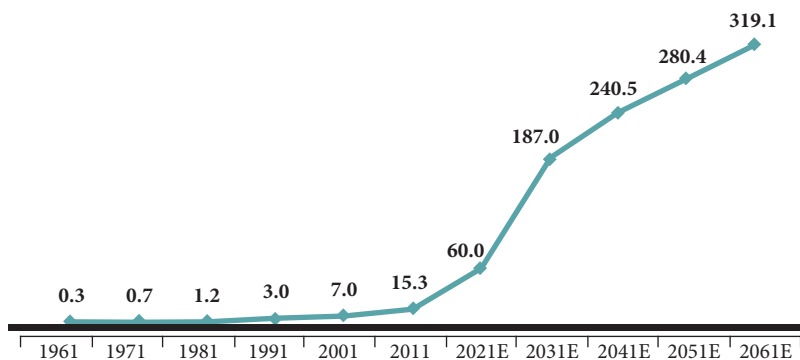
Country	Total 4 Wheelers in 2010 (in millions)
China	98.46
USA	137.07

According to Automotive Component Manufacturers Association (ACMA), India is expected to produce almost 10.8 million passenger vehicles in 2020.

4 Wheelers show a similarly strong growth rate achieving a penetration of close to 20%.

Implications -

- Rising affluence will result in higher demand for cars. But the question is whether cars of today and the ones available in 2061 will be the same

- Electric cars could be the driver for sales in the future

7-C: 2 Wheelers (in millions)

0.1	0.6	2.6	14.2	38.6	82.4	195.0	261.0	350.8	470.4	572.9
1961	1971	1981	1991	2001	2011	2021E	2031E	2041E	2051E	2061E
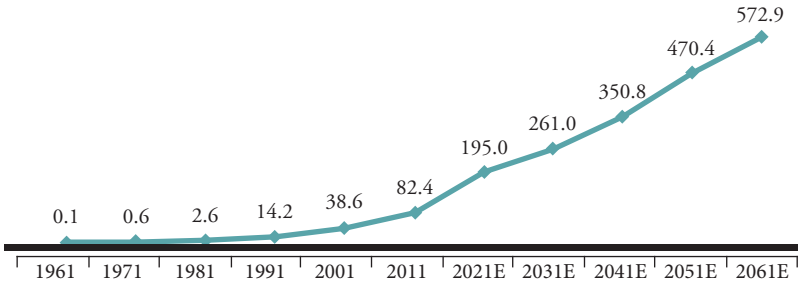
According to ACMA, India is expected to produce almost 36 million 2/3 Wheelers in 2020.

The numbers of 2 wheelers on the road are expected to triple in the next 2 decades and continue its march towards achieving a penetration level of 33% up from the current penetration of 10-12%.

Implications -

- Higher penetration of 2 Wheelers backed by a strong road network will make remote places easier to access and this could result in expanded and efficient distribution systems

- As installed power generation capacity rises, the infrastructure to support electric bikes will become better. The future of 2 Wheelers could be driven by the sale of electric bikes

SOCIAL PROGRESS

## 8-A: Number of Households owning a Television (in millions)
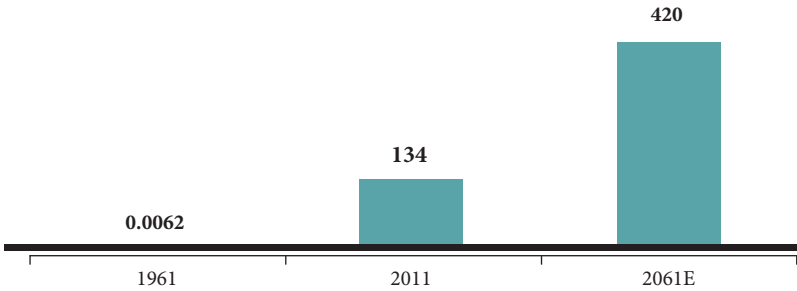
The number of households that own a television is set to increase to 420 million. Not only will TV achieve 97% penetration, but more than 50% of homes will have multiple TV sets.

Implications -

• The growth in television ownership proves that 30 second spot will still be the driver for mass communication and brand building, it might just evolve into a more interactive advertising format

8-B: Number of Telephone Lines (in millions)
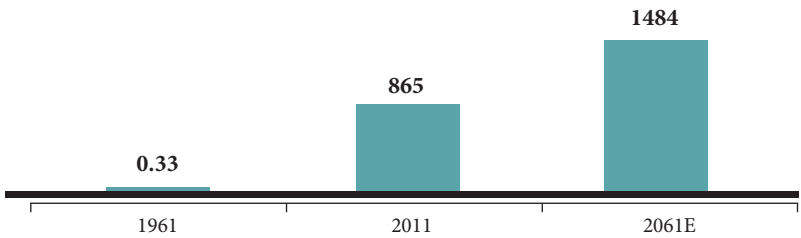
(Data includes mobile phone users)

Telecom is perhaps the one industry which has seen the maximum change and dynamic growth in the last decade. Telecom will continue its relentless march towards universal penetration.

Implications -

- As mobile phone users grow, the telecom industry will be judged not by the number of telephony devices but what these devices do

- The future may also combine all communication and information devices into one single device which would result in degrowth of many electronic goods but see a rapid rise in telecom subscriber base

## 8-C: Number of Commercial Bank Branches (in '000s)
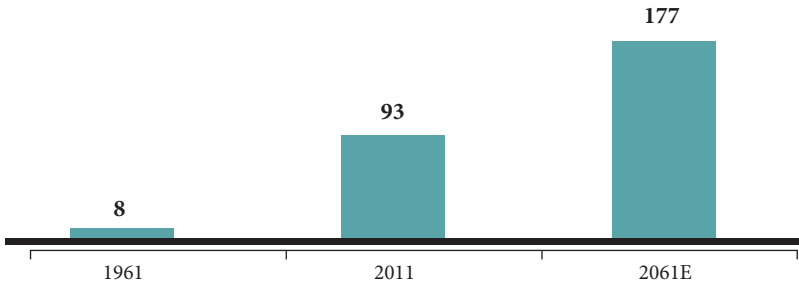
The number of commercial bank branches is expected to keep a steady growth trajectory. However, newer modes like ATM's, Remote Banking channels, Mobile banking etc. might increase the access manifold.

Implications -

- Bank Branches may grow relatively stagnant, but in the future, banks may transform into a "one-stop shop" for financial services. They may offer innovative services like car loan sanction and delivery on the same day

8-D: Hospital Beds (per 1000 population)

0.5	1.3	4.0	6.3	7.5
1961	2011	2021E	2041E	2061E
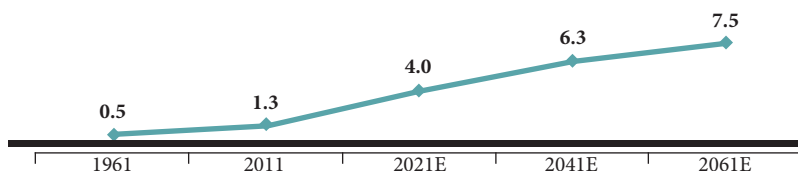
| Note: Planning Commission has given a target of 2 bed per 1000 population by 2020	
Country	Beds per 1000 Population (2010)
USA	4.0
China	3
Brazil	2.4
UK	3.9

Healthcare will emerge as one of the most important areas of growth in the Indian society. As incomes rise, age profiles rise & lifestyle diseases become more rampant; the bed count will only increase.

Although the Planning Commission has set a target of 2 beds per 1000 population, Assocham predicts the beds density to be 4 beds per 1000 population. Considering this happens, the beds density will only soar on the back of an ageing population and private investment to well over 7 beds per 1000 population.

Implications -

- An ageing population would need better healthcare infrastructure and this could translate into a strong growth in the hospital bed density by 2061
- An ageing population could also revolutionize the healthcare industry by improving demand for in-home health & life support
- For the bed density to reach the levels of 2061, huge amount of investments will be required and this could eventually make healthcare services one of the top service sectors contributing to the economy

## 8-E: No. of Factories Registered (in '000s)
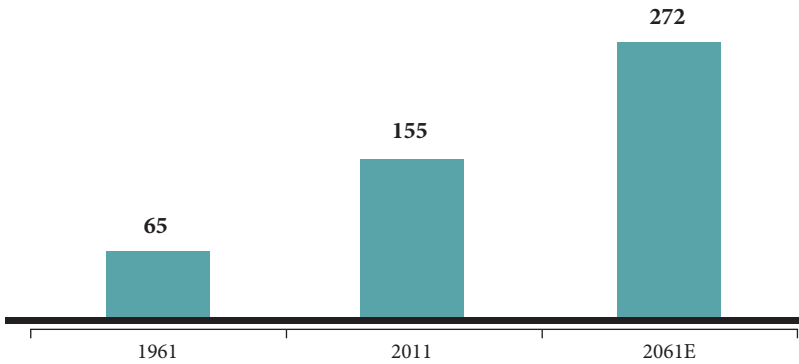
Implications -

- While the number of factories grow at a relatively slow pace, their capacities will only grow, which will lead to larger factories with huge production capacity forming manufacturing hubs around them

- This could also lead to higher mechanization as factories get larger and aim to be more efficient

ELECTRICITY

9-A: Installed Electricity Capacity (GW)
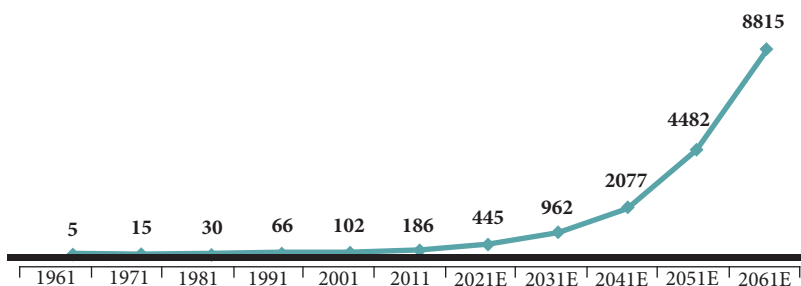
Country	Installed Electricity Capacity (GW)
USA	995
China	860
Brazil	100

By 2031, we should reach the levels achieved by USA today; subsequent growth could be driven by manufacturing and household consumption.

Implications -

- Frequent power cuts might be a thing of the past only if there is a rapid rise in power generation capacity

- The power industry could be revolutionized by the entry of many private players, and the industry could follow the path of mobile services industry. Intense competition could lead to consumers choosing the most efficient power company, just like mobile services today

- Higher installed capacity could also lead to electricity being sold in the form of futures and derivatives as energy becomes the currency of the future

9-B: Electricity Consumption (kWh)
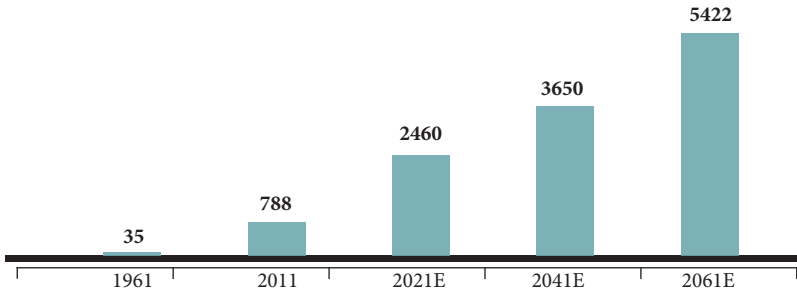
Country	Electricity Consumption (kWh)
USA	12606
Germany	6647
China	2568
Brazil	2034

Electricity consumption per capita registered a significant growth during the last decade. This is expected to continue, if the Planning Commission estimates work out to be true, then India's consumption should grow to the level of some of the developed countries by 2061.

Implications -

- Electricity may emerge as the fuel of the future replacing fossil fuels

- Increasing usage of gadgets & appliances will increase household consumption. Consumers may start choosing energy efficient gadgets and appliances. Energy efficiency may become the key selling point for gadgets just like mileage is for cars today

INTERNET & COMPUTERS

10-A: Internet Users in India
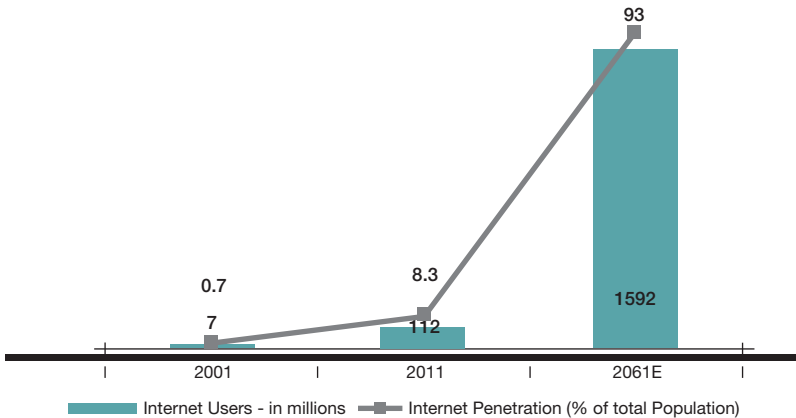
With smartphones, iPad's and many yet to be launched internet access devices, some of these numbers may have little meaning. However, it is interesting to look at data revealing sharp growth in internet access and acceptance. Given the nature of the technology and its ubiquity, perhaps the numbers are hugely underestimated. Perhaps, internet penetration should be actually modelled after electricity penetration rather than internet penetration data of the past.

Implications -

- High internet penetration would further drive the digitalization of the retail space with more goods being sold online than in retail stores

- As the internet evolves & transportation and communication becomes expensive, online consumption of services will rise. Many services would move to the online space and this would result in another dotcom boom

10-B: Personal Computers in Use (in millions)
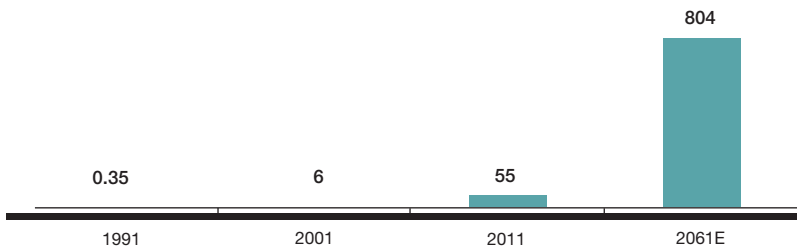
Will personal computers remain personal computers or will they morph into personal devices or will all of it morph into a voice activated, voice responsive, multi-functional device. What will it look like? Will conventional definitions last? Technology has a habit of making a monkey out of predictions. However, if one were to assume steady growth, computers will end up with almost 50% penetration by 2061.
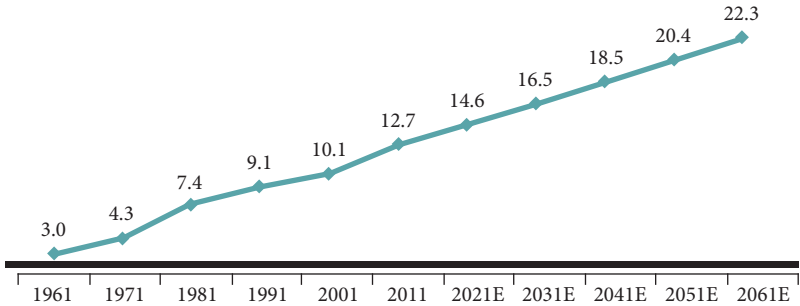
Implications -

• Higher penetration of computing devices will lead to the internet space being the next battlefield for consumer attention. This could lead to much higher proportion of marketing budgets moving to the digital space

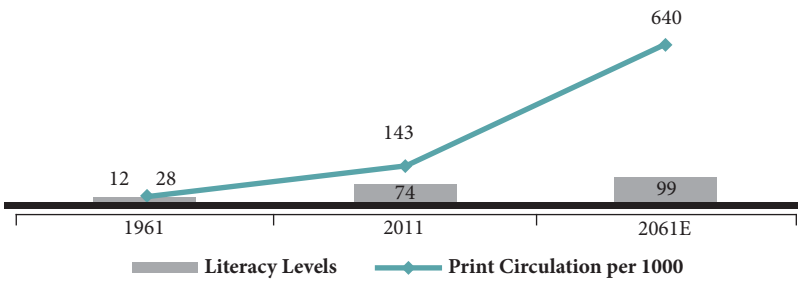# MEDIA

11-A: Films Produced in India (in '00s)

India's favourite entertainment option is expected to continue its relentless march. Already the highest producer of films in the world, it will be a tough act to beat. With higher TV penetration, explosive growth in multiplex along with advertisement of modern retail and higher degree of audience fragmentation will make this truly a thriller for all the xxxxxwoods.

More films are likely to be produced in 2061 than the so-called 'golden era' decades of 1961-1991 all put together!

Implications -

- As the hunger for entertainment rises, movie distribution could experience a sea change in operations. Movies could be launched simultaneously in the digital space as well as in theatres. Filmmakers could earn revenue through pay-per-view movies which would launch first in the digital medium

11-B: Print Circulation (per 1000)

1961	2011	2061E

Literacy Levels ■   Print Circulation per 1000 ◆

Values shown: 12, 28 (1961); 143, 74 (2011); 640, 99 (2061E)

Country	Print Circulation per 1000
USA	264
China	148
Brazil	458

Implications -

- Print circulation could be the driver for literacy as its reach and growth would put knowledge and information in the hands of many

- As travelling becomes a part of daily life, the need for localized information would also emerge. This could lead to newspaper that serve a specific community, a residential township or even a certain suburb

- Even though internet & digital medium expand at a rapid pace, the surge in literacy rates would result in the expansion of print circulation beyond the current levels enjoyed in Japan

11-C: No. of TV Channels
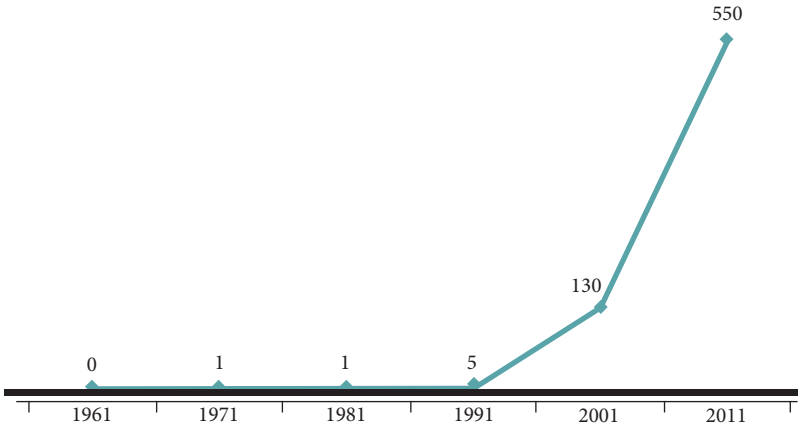
Last two decades have seen a dramatic increase in the number of channels. A simple trend extrapolation will lead to a humungous number in the next 50 years.

If one assures a significant growth in digital delivery, individual address ability and growth in content, there may actually be as many channels as there are households. Or it can eventually lead to consolidation and rationalization pushing to a degree of shrinking of the numbers. It may even lead to an unimaginable explosion of 10,000+ channels each accessed on demand via digital networks.

11-D: Advertising Spends (in ₹ billion)
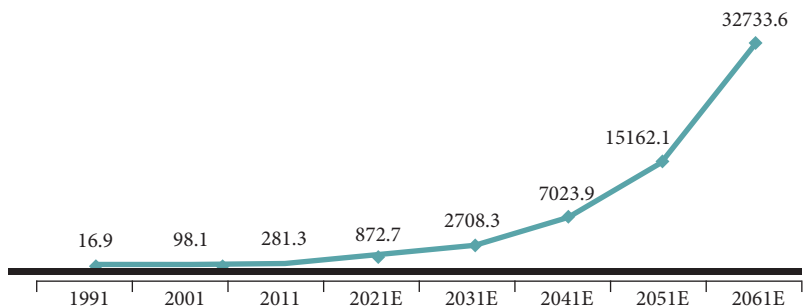
Implications -
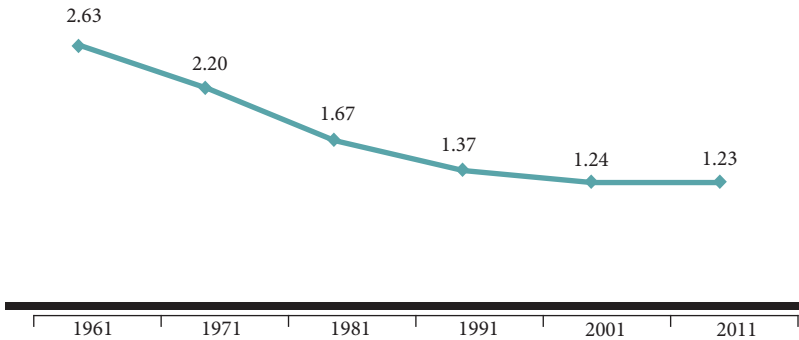
- Advertising is expected to be 1.5% of the GDP by 2061. This will be comparable to the current contribution to GDP of the consumer durables industry - 1.6% (data as of 2009)

MISCELLANEOUS DATA

12-A: Avg. Farmland Holding (in hectares)

Country	Avg. Farm Size (in hectares)
USA	169
China	2

The last two decades have fortunately witnessed a reduction in the steady slide in average farmland holding.

Agriculture's steady decline in terms of importance as a component of GDP and government policy is a matter of huge concern. Probably, all of us urbanites also need to start worrying too. Unless drastic reforms and policy measures are not taken up quickly, how are we going to feed an additional half a billion in 2061?

Implications -

- Farmland size may improve as growing migration will lead to consolidation of agricultural land

- Urban migration could lead to a much lower disguised unemployment rate in rural areas

- Hopefully land reforms will change the complexion of these numbers

12-B: Number of States

	1961	1971	1981	1991	2001	2011	2021E	2031E	2041E	2051E	2061E
No. of States	16	19	24	26	28	28	32	40	43	45	45
Population (in millions)	439	548	684	846	1029	1210	1387	1524	1627	1692	1718

Number of states has gone up significantly and if the 4 new states being sought to be carved out of UP and AP becomes a reality by 2013/14, the number of states would have doubled in the last 50+ years.

Implications -

- With 4 more states expected to form (split of UP into 4 & Telangana) within the next few years, the average population per state would come down to 38 million.

  Assuming that this number is the optimum number to ensure good governance, the growth of population would throw up 45 states by 2061

12-C: Lok Sabha Constituencies

	1961	1971	1981	1991	2001	2011	2021E	2031E	2041E	2051E	2061E
No. of Lok Sabha Constituencies	494	518	542	545	543	552	630	693	740	769	784
Population (in millions)	439	548	684	846	1029	1210	1387	1524	1627	1692	1718

Also, while the population went up by 43%, the number of Lok Sabha constituencies has remained frozen for the last 30 years. This creates a level of under representation which may have an impact on governance and democratic institutions of the country.

Implications -

- Assuming that the current population per MP i.e. 2.2 million is the optimum number & government regulation to freeze Lok Sabha seats is lifted, the growth of population would throw up a total of ***784 Lok Sabha constituencies*** by 2061

Country	No. of people per MP (in millions)
UK	0.95
USA	0.58
France	0.11
India	**2.1**

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DRAFTFCB+ULKA GROUP

COGITO CONSULTING

Cogito derives its name from 'cogito ergo sum', which in Latin means 'I think, therefore I am'. Cogito Consulting is the independent consulting division of the Draftfcb+Ulka Group. Cogito Consulting undertakes assignments for existing and independent clients in the area of Branding, Marketing, Corporate Identity and Competitive Strategy. The consulting unit has worked in diverse sectors, including automotive, FMCG, foods, retail, pharma, financial services, consumer durables and real estate.

ASTERII ANALYTICS

A marketing analytics company, Asterii Analytics recognizes that companies face innumerable challenges to grow, sustain and retain their businesses in an increasingly volatile, uncertain, complex and ambiguous "VUCA" world. Organizations are looking to their marketing partners for help in making the right decisions in driving bottomline impact. Asterii Analytics helps ensure that these decisions are based on analytically-grounded insights and innovations. As a result, the impact of the clients' marketing and media investments can be maximized. To ensure that this growth is sustainable, we have processes to continuously evaluate and optimize performance. And finally, recognizing the rapidly changing landscape in which clients are operating, Asterii Analytics helps orchestrate the digital marketing ecosystem to enable real-time marketing.

DRAFTFCB+ULKA ADVERTISING

One of the largest agencies in India, Draftfcb+Ulka has offices in 6 cities. With a strong strategic planning focus, the agency has helped build some of the most recognized names in sectors including FMCG, consumer durables, automotive, financial services, I.T., telecom, entertainment, etc.

DRAFTFCB+ULKA INTERACTIVE

As one of the first agencies to embrace the power of digital, Draftfcb+Ulka Interactive today offers the entire gamut of touch marketing in the online, mobile, mail, activation and CRM space. Staffed with over 50 people, who work with clients across various categories, including automotive, fashion, insurance, pharmaceuticals, healthcare, financial services, etc., Draftfcb+Ulka Interactive is a part of the global Draftfcb network and one of its key digital and database hubs.

DRAFTFCB+ULKA HEALTHCARE

Draftfcb+Ulka HealthCare brings to India the comprehensive knowledge of Draftfcb Healthcare, one of America's largest healthcare agencies and a multiple times winner of the Healthcare Agency of the Year award. In India, Draftfcb+Ulka HealthCare is seen as one of the key centres of expertise within the network. Comprising people with rich experience in the Indian pharmaceuticals sector, Draftfcb+Ulka HealthCare works with large and emerging OTC and ethical brands under the worldwide philosophy of "Bringing brands to dominance".

LODESTAR MEDIA

Lodestar is one of the largest media agencies in the country, built on a reputation of a strong strategic approach and innovative media solutions. This unique combination of strategic thinking and innovative media solutions has led to it winning numerous awards at the Emvies, Cannes, Spikes and Goafest. Lodestar has been the Media Agency of the Year across award functions now several times. To ensure that it is at the forefront of the thought leadership, Lodestar over the last 10 years has meticulously invested in research, tools and techniques. It has also created a robust infrastructure in OOH, customized content and the digital space where it has built the biggest solutions network in the industry, offering integrated end-to-end solutions for its clients.

LODESTAR OUT-OF-HOME

Out-of-Home is an integral part of our media solutions with recognition received by OAC. We have worked with clients across industries, providing some of the most innovative award winning campaigns. This division offers a range of advertising in trains, buses and taxis as well as digital advertising through mammoth screens at airports, malls and railway stations.

LODESTAR BRAND EXPERIENCE

The mandate is to create engagement, build emotional connect and start conversations. This has resulted in diverse platforms – from branded content to activation and events, sports and celebrity management to direct contact programmes. The team closely works with Bollywood and has created several in-film and co-branded partnerships amplifying it across media touch points. Advertiser-funded content creation on prime time TV and digital is the forte of this division. The sports brands associations with cricket World Cup, IPL

teams, Formula One racing and Football is part of the portfolio. The division also creates experiences like launch events, roadshows, music concerts for brands across categories and have also handled some of the biggest celebrities as brand ambassadors. The division is always among the top metal winners at the media award shows.

INTERFACE COMMUNICATIONS

Interface was founded in 1985 with a single office in Delhi. Today, Interface is a top ten agency with a presence across Mumbai, Delhi, Chennai. Interface offers the full range of services, from design to advertising solutions. It has proven expertise across verticals and has a well-established food and automotive practice. Interface has invested in strategic planning and over the years has helped build a range of brands into leadership positions. Interface has also built a strong capability in the rural advertising arena and has a special understanding of the small markets which are fuelling India's growth story. Over 150 professionals work with clients based on a very simple philosophy of partnership, which is that partners always have shared goals and that if our clients win, we win.

INTERFACE INTERACTIVE

A multiple award winning agency, Interface Interactive is possibly the only direct and digital solutions provider which is totally integrated into conventional advertising. Interface has integrated its creative and planning teams across media channels. This stems from a belief that consumers experience the brand through multiple touch points and a 360 degree experiential campaign has to be conceived ground up and has to be a part of the organization's DNA. Today the agency offers direct and digital solutions, ranging from CRM programmes, database management, web and mobile advertising to web design and Social Media programmes.

PINWHEEL INTEGRATED SOLUTIONS

Pinwheel, the third (and youngest) agency of Draftfcb+Ulka group, will offer a complete range of services ranging from design to brand planning to integrated advertising solutions. Pinwheel will leverage the nimbleness and tight teamwork of a lean, flat structure and the enthusiasm and boundlesss creative energy of a young team, as well as the Group's strong strategic orientation and proprietary techniques and processes - to truly bring to clients a unique combination of hunger, drive and expertise

AQUILA EXPERIENCE MARKETING

Aquila Experience provides strategic brand activation & experiential marketing solutions to clients. With a proven record, the team at Aquila Experience has run national programmes spanning services in Shopper Marketing, School & College Programmes, Roadshows, Social Media and Mall Promotions. It has created programmes that have dared to move beyond the brand, into lives of people.

NEBULA FILMS

The first truly successful production house set up by an agency. Nebula has produced over 200 ad films and videos over the last decade in a range of product categories, including food, cosmetics, paints, insurance, banking, etc. and has delivered some of the most memorable advertising on Indian television.

PROCYON GRAPHICS

Using the power of technology, the pre-press and the artwork studio of the Group, called Procyon Graphics, is today geared to serve global needs of clients. The unit works 24x7 to deliver material to the most discerning global customers in New York, Toronto and UK.

I O DESIGN

What would you expect from an agency that won its first industry award for its own logo? I O Design keeps alive the spirit embodied by its founding fathers. The unit has created some of the most recognised logos in the public and private sector, and has strong capabilities in packaging design and development of corporate identity manuals.

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INDIA
2061

Ulka Advertising was born in 1961 and in the year 2011, Ulka, now Draftfcb+Ulka group celebrated its 50th birthday. As part of the celebrations, Cogito Consulting and Asterii Analytics, divisions of the Draftfcb+Ulka group, put together a detailed analysis and projected India in 2061. They visualised how India would be in 2061 when the group would be celebrating its 100th year.

In addition to 50+ pages of detailed quantitative analysis, this book consists views of eminent thought leaders of India who have given their perspective of India in the year 2061. The topics covered include infrastructure areas like Power, Water, School Education, Management Education, Healthcare; new age industries like Retail, Telecom, Television, Automotive, Mobile and Information Technology; financial sectors like Capital Markets, Taxation and Fiscal Management and Insurance; sports categories like Cricket and Olympics; and other key areas like Economy, Ecology, Political System, Dairy and Society.