

# India will show the Way Forward

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## Introduction

In 1981, I returned to India and joined as a faculty member at IIT Madras. Madras was then the third largest city in the country. Yet, when I booked a telephone line for my home, it took 8 years to come through. I was surprised. But this situation was not confined to telephones alone and found the same when I went to purchase a two wheeler. While I showed my interest for Bajaj Chetak I was told that it would only be delivered after four years of my making them the payment! I wanted to get a cooking gas connection and was asked to produce papers of my old connection. When I said that I never had one before, I was told that in that case there was no provision even to put my name in the waiting list. One of the best marriage gifts I got was when a friend of mine walked in with a gas cylinder with all the papers transferred to my name. In 1984, I wanted to get a Personal Computer for my department. As I was told that it would not be easy to buy one, I got some of our alumni to donate it. A PC was purchased in USA and sent to India. It took us one year to get it released from the customs. Then to buy a microprocessor chip, costing only Rs 150, again took a year and tons and tons of paperwork. A round trip flight from Madras to Delhi would then cost about four months of my take home pay.

Many people used to wonder and ask me why I had come back to India from USA. India was very different then.

## The New Emerging India

Most youngsters today would not believe in what I am saying, for it was indeed a different India then. Now 26 years later, it has changed significantly, at least its urban part. Urban India today, is growing in confidence. We add over 150 million telephone lines in a year and are one of the fastest growing telecom markets in the world. Our tariffs are by far the lowest and affordable to even the lower classes in India. People from middle class families can now buy their own two-wheeler and with Tata's Nano, can even buy a car with ease. They can fly all over the country on the low cost no frill airlines. According to the report *Foresight* of the Economic Intelligence unit of *The Economist* in 2006, India will contribute 12.2% of the world's economic Growth from 2006 to 2020 and will generate 142.4 million new jobs.

The confidence amongst urban Indians is evident in all walks of life. India has made this leap forward by using innovation. Our knowledge and skills with Information and Communication Technology (ICT) has been used very innovatively in the past thirty years. We had skilled and hard working people with us. Instead of allowing them to just leave India and work elsewhere, we started using the limited number of computers that we had and the meager connectivity to Europe and USA that we could then obtain, to do work from India for the West. It was difficult in the beginning. Most Western clients were very suspicious of what we could deliver from India. They were concerned about the security of their data and the quality of the work. But we

did not give up against this initial reluctance. Soon our efforts paid off and we started delivering global standard work to the western countries. Orders went on multiplying. We used innovative methods to do more outsourced work remotely. Developments in Computer and IT technology helped us. Now all kind of designs could be done on computers and we made use of every opportunity that came our way. Not only did we start getting recognized as the IT services center of the world, we also went ahead to become the design house for the world. We not only generated wealth for ourselves; but also created huge confidence in ourselves.

We no longer considered ourselves as inferior to anyone else in the world. As the political process in India started liberalizing and freeing up the markets in the nation, we began to innovate more. We learned that India has a very large market, but only at the right price point. We innovated to build better and buy better products and started providing services to our people at affordable price. Telecom and airline travel are two examples. But we did much more. We now have the fastest growing wind power company in the world. Five of the twelve most energy efficient cement plants in the world are in India. We have started to become the auto component capital of the world. With the development of the Nano car (and before that with Tata Indica and Tata Indigo and Mahindra's Scorpio and Bolero) in India, we have time and again proven our capability to innovate and make the best products in the world. India is on the move. We have excelled in media and our film and music has started making an impact throughout the world. Similarly, we are very quickly acquiring leadership in the area of bio-technology and pharmaceutical research. In wireless Communications, we may soon be amongst the technology leaders in the world. Our banking industry is amongst the stronger ones in the world. We are still weak in infrastructure, but are starting to focus on it. Our economic growth is quickly changing India to be a powerful force in the world.

### **But is the growth inclusive?**

The development and the increase in confidence have been confined, unfortunately, to the urban India and the villages close to the towns. Rural India, where 700 million Indians live, is not a part of this rapid economic and attitudinal shift. It is not that no change has taken place in rural India. When the world economy slowed down over the last two years, and India followed, it is now known that it was India's rural economy that enabled India to be amongst the first nation to bounce back. According to June 30, 2009 report of Enam Securities India Research titled "Rural Opportunities from Resurgence," rural markets now comprise of nearly 45% of India's GDP, of which nearly half is agricultural related. Rural India, consisting of nearly 70% of India's household, accounts for nearly 40% of India's total consumption (in certain categories it is larger than the urban market). Significant part of this growth is very recent, and is a result of rural focus of the Government in recent times. Yet the growth, even in rural India is much skewed. Leaving larger villages and villages near the towns and highways, the situation is dismal.

Fortunately, our media is flourishing and reaching (especially TV) most of the 637,000 villages; knowingly or unknowingly (most of the characters in its soap-operas reflect urban upper middle-class life-style), it exposes this urban - rural disparity every day to those who are being denied the benefits of the 'new India'. Further, our democracy is strong and the 700 million rural voters have opportunity every couple of years to vote out Governments, which fail to include them to

be a part of this economic boom. Such a situation is politically unstable. The economic growth without being inclusive is froth with dangers and not socially viable. One would see more and more of distortions like the events in "Singrur" or the "Naxalite menace" in coming days.

Unfortunately, in the post-industrial revolution era, there are no viable models in the world for simultaneous rapid development of both urban and rural areas. Whether it was in Europe, or in United States or more recently in Coastal China, the growth was initially confined to smaller urban centers first, before its impact was extended to rural areas (even as these areas were depopulated). The rural areas were thus designated as "back-ward", "under-developed" and "undesirable region" to be transformed. However, these developed areas always needed these "undeveloped" areas, either rural areas or colonies, for resources and cheap labour or even markets to continue to thrive. Being asked whether India could "develop" like Britain one day, father of the Indian nation remarked: "Britain needed to colonise the whole world to develop as a nation. With much higher population, how many earths will we have to colonise to get there?" This reflects the dilemma that India would face if its rural areas have to follow the urban areas. With 700 million people living in rural India and with over-populated urban India, it will be wonder if it can ever succeed in this endeavor.

At the same time, India does not have an option to ignore its rural people. The democratic India would not allow this to happen. We have to do what has not been done in recent times. While urban India thrives, we will have to find innovative ways to take our rural people along. The government, in recent times, has recognized this. Its focus has been on "inclusive growth". It is only in the last decade, as India's economy grew, that government of India started getting substantial revenue in its coffers (in China it happened a decade earlier). It had two choices. The first was, to focus on developing urban infrastructure (as China did), accelerating the economic growth. The second choice was to focus on those who have been left behind. It was a difficult decision. Fortunately, the Government of India chose the latter. The "inclusive" growth became the first priority for Government's investment. The fixing of urban infrastructure will only follow that or will be left for private sector to develop under private - public initiatives.

Thus we have seen India come up with some of the biggest social programs in recent times. National Rural Employment Guarantee Scheme (NREGS) is perhaps the largest; it guarantees 100 days a year employment to one member of every rural family as a constitutional right. In many states, it has taken off well, though implementation is somewhat patchy in some others. Another major program is Bharat Nirman, a plan to build rural infrastructure, including irrigation, road, rural housing, rural water supply, rural electrification and rural telecommunication connectivity. National Rural Health Mission is a recent program, focussing on rural health delivery. Similarly, there is a program focused on Universalisation of Elementary Education (UEE); the recently released report "District Information System for Education (DISE) Flash Statistics 2008-09" shows reasonably good progress in building elementary and middle schools in villages. Ministry of Rural Development has recently started a program "National Rural Livelihood Mission (NRLM)" aimed at mobilising all the rural BPL (Below Poverty Line) households under self-help groups (SHGs) and enhance their capacity for gainful self-employment on a sustainable basis. The Prime Ministers Scientific Advisory Committee

(SAC-PM) has helped initiate a "Council for S&T for Rural India (CSTRI)" to get a S&T focus on rural India.

Some of these programs have started yielding results, and have contributed to rural growth that was apparent in India's economic recovery recently. This however is not enough. Social programs supported by the Government would only go some distance. If rural areas have to not fall behind, what is needed is innovative technologies and business models and entrepreneurship. We need to innovate to take rural India along in this process of wealth and confidence generation. Fortunately Information and Communication Technology (ICT), bridging distances, can help. But let us never forget that ICT is a mere tool. It has to be used effectively to fulfill the principal felt needs of rural India: improved access to quality education, improved access to quality health care and better livelihoods. A large number of innovations would be needed to help us achieve these goals.

### **Some possibilities and efforts**

About 15 million children become eligible for school every year in rural India. But there are very few good quality teachers. While we struggle to rectify this anomaly, ICT can help teach children remotely. Now, it is not an easy task. Just setting up computers and communication (as is considered by some) in rural areas will hardly help. Delivering quality education to children in villages, where any kind of infrastructure, including electricity is barely present, and where children just about get enough to eat, would indeed be a challenge. Careful experiments would need to be conducted before scaling such efforts. Unfortunately most of the experiments so far have been driven by an urban mind, rarely listening to people in rural India. A little time spent in rural India would get one to understand that elders in rural India want their children to pass Board exams like SSLC and HSC, so that they could go to college. They point out that the rural schools do not have quality teachers, especially in subjects like English and Mathematics. If they lived in towns, they would send their children for tuition classes to prepare for these board exams. But in rural areas, this is not possible. There is no reason, why ICT cannot be used to provide tuitions to rural India (after all there are companies which are now providing tuitions to children in USA from India using ICT). Rural Technology and Business Incubator (RTBI) at IIT Madras has focused effort in this direction.

The same is true for health care. Doctors hardly practice in Rural India. A recent report in Frontline (Vol. 27, Issue 4, Feb 13-26, 2010) called "Missing Doctors" by R. Ramachandran, points that public health in rural India is in a state of crisis. "India carries 20 per cent of the global disease burden. This includes 23 per cent of child deaths, 20 per cent of maternal deaths, 30 per cent of tuberculosis cases, 68 per cent of leprosy cases, 50 per cent of polio cases and 14 per cent of HIV infections. Targeting these diseases does not require high clinical expertise or expensive and high-tech diagnostic aids. The most significant aspect of the Indian public health system is the pronounced disparity between urban and rural areas. Three-fourths of 0.7 million graduate doctors legally permitted to practise as qualified doctors operate in and around urban areas, thus catering to just 28 percent of the country's population and leaving the rural folk underserved or totally neglected in terms of basic health care. As a result, primary health care for the rural poor is served largely by untrained, unlicensed and unregulated rural medical

practitioners (RMPs). In a study conducted in rural Uttar Pradesh in 1995, "only 3 percent of medical practitioners were MBBS graduates or allopathic practitioners, while 68 per cent had no training in any form of medicine." There have been several proposals to create a trained cadre, different from regular doctors, to provide health care in rural India; but it is vetoed by the Medical Council of India. Thus RMP are the only ones who provide care. It is possible to use ICT to train and monitor these RMPs and connect them to the doctors in urban areas (through voice or video) to strengthen delivery and quality of health care services in rural India. Some remote diagnostics would be possible, but it has to be within the means of the villagers and really make a difference to them. Again careful experiments rather than hype creation are required before scaling. Potential is certainly there.

Agriculture in India has stagnated over the last twenty years. The country has been calling for a second Green Revolution, but there are very few ideas. Use of Bio-technology, new seeds and cropping techniques have been one line of pursuit and there are voices for going back to organic farming and more wholesome food. But probably the most important intervention would be to enable more intensive agriculture on each piece of land. Traditionally a farmer not only understood the fertility of his / her land well, but also had the required knowledge of farming practices (including that of traditional seeds, fertilizers and pesticides), as well as that of the local market. The modern scientific farming has broken that. While he / she retains the knowledge of the farm, he /she has little understanding of the modern (or scientific) practice or that of the market. For these, he/she depends entirely on extension workers and / or vendors of seeds, fertilisers and pesticides. Extension workers are too few and therefore the farmer can rarely access them directly. Vendors are focused on selling their wares, even if it is not in the best interest of the farmers. Thus there is a huge information gap. It is here that ICT would help. RTBI is attempting to use ICT innovatively to overcome this gap. They are developing a concept of "call-centers" for small and medium farmers. The information about a farm, the crops grown on it (including photographs), inputs used and cropping practice followed is input by a farmer in a data base using a mobile phone and interactive voice technology. Weather sub-stations are installed in each village uploading local weather information on a database using SMS / GPRS. Similarly market information is input in database in partnership with commodity exchange. This information is used at the call center by the agricultural support personnel at the call center, when a farmer calls in. The farmers page pops out as the call is made and intensive support can be provided based on specifics of the farm. It would be possible to conference in a crop-disease expert or a market expert as and when needed. Thus the mature call center technology, so far used to provide support to individuals when they buy an appliance, would now be used to provide support to a farmer. It would require large number of experiments and plenty of technological innovations, especially in overcoming the risks associated with agricultural business today.

In the nineteenth and twentieth century, poverty was combated by migration of people from poor regions to the places which showed opportunities. In the late twentieth century, ICT and inexpensive transportation opened up another possibility. Work from the developed regions could be transferred to the regions where the incomes were lower. Thus, manufacturing shifted from the West to the East. Later services started getting delivered using ICT and shifted to countries like India. Many countries used this work migration to initially create some wealth, but

soon innovated to become developed nations. Countries like Japan, Korea, Taiwan and China did this in the last century while one can see India is doing this at the turn of this new century. Can the same process be used to strengthen rural India? Can work be migrated from urban India to rural India?

There is no reason to think that with access to computers and communications, the young rural Indians cannot provide ICT based services to urban India and to the rest of the world. A rural BPO in each village, employing twenty to thirty people, would begin the process of transformation. Yes, there will be reluctance initially. Questions such as - Can the people in villages deliver? Is the infrastructure adequate? What about quality and security? Can we not get work done in more developed towns? – will arise. These are the same questions that were raised in the West before the services migrated to India. We just need to repeat this process again. RTBI has helped set up a company called "Desi-Crew" focused on such efforts.

Similarly, ICT can be used to migrate manufacturing to rural India; especially the jobs which do not require heavy machinery and large amount of electricity and depend more on usage of human skill and labor. Distributed outsourced production can thus become a reality. If a significant percent of the raw material for such manufacturing also comes from rural areas, there would be an even stronger reason for manufacturing in rural India. Agro-industry is therefore the most obvious candidate for this. RTBI has incubated companies called "ROPE" and "Vastra" towards this.

ICT can help build skills in rural India. Getting youngsters trained remotely and linked to growing requirement of people in urban economy, can considerably bridge the gap. RTBI has helped set up a company called "e-Jeevika" to fulfill this vision.

People in remote villages have a strong need for accessing banking and finance for personal and business needs. Unfortunately our banks do not reach there. In the past, people had to depend on local money lenders and interest rate could be very high ranging between 50 to 75%. Micro-finance has picked up in recent years and does provide finance at 24 to 36%. While it has been a great boon for small short-term loans, no business can afford such interest rates. With ICT bringing the costs down, it is possible to take banks to the rural India. The TeNeT group at IIT Madras and RTBI have been involved in two efforts in this direction. The first is to help a company called Vortex develop a rural ATM, powered by solar panel and costing about a fifth of the other commercial ATMs. The second effort is to provide voice based mobile banking in rural India, where a customer can do all the banking transactions by just talking to the bank's computer using in language. Voice print of the customer is used to authenticate the customer before transactions are carried out.

Electricity and Energy is a another major requirement of rural India. While the grid is indeed reaching most of the villages today, power supply through the grid is highly unreliable. Most villages may get power from 4 to 12 hours and in the hot summer, when the urban demand peaks, the supply is even more irregular. Further, one cannot predict any timing for availability of supply. Any kind of rural production would therefore be very difficult. There have been several efforts in recent times, towards decentralized power generation and distribution at the

village level. They include use of bio-mass, bio-fermentation and bio-diesel, but the technology and the commercial sustainability is still to be proven. There are some interesting efforts of using bullock power to generate electricity. Also, one is envisaging use of solar panels to provide power to individual homes, even though solar photovoltaic is too expensive. Some interesting efforts are being made to change the electricity usage in homes; dc motors are known to consume no more than 40% of power consumed by an ac motor for same traction and LED and fluorescent based light is known to consume much less power than filament bulbs. Use of dc motor based fan, grinder, washing machines and refrigerator and LED / fluorescent lights would consume much less power and could be easily powered by dc supply from solar panels.

In other words, innovative use of technology can go a long way in making rural India a better and a preferred place to live.

### **Going Forward: But where would this development lead us to?**

However, inclusive growth and getting rural India to catch-up with urban India is a mere beginning. The task ahead is even more difficult. All this would just prepare us to take up more fundamental issues and challenges facing the humanity today. Rising conflicts in the world and Global climate change are two such global issues which are mere results of the path that the world has chosen since industrial revolution.

Today a country like India consumes less than one twentieth of per capita resource as compared to that by the West (as per International Energy Agency Statistics Division, India consumed 512.4 Kg of oil equivalent of energy per person as opposed to 7794 Kg of oil equivalent per person in USA in 2003). But urban India consumes far greater per capita resource as compared to rural India. In other words, urbanization significantly enhances per capita resource consumption. The post-industrial development paradigm has implied far larger per capita resource consumption as compared to that in the pre-industrial era. So far only a small fraction of the population in the world had such high consumption. Even then, there are enough warnings that the nature is retaliating as such larger consumption is making our eco-system unsustainable. What would happen if 1.4 billion people of China and 1.1 billion people of India become a part of this development and their per capita consumption starts matching that of the West?

The answer is obvious. We just cannot go there. At the same time, people in India and China cannot be asked to slow down their effort to emerge out of poverty and deprivation. The challenge is more fundamental.

The industrial revolution had three implied paradigms:

- First one is that, the more we consume, the better it is for the society, as it results in economic growth. Higher and higher consumption therefore makes a society developed. The lives and work is organised to drive higher and higher consumption. Individuals are caught in a life-style cycle and can barely deviate. That higher consumption makes one happier is a mere assumption.

- Second one is that of making urban areas not just centers of economic growth, but also that of education, culture and philosophy. Rural areas, being dispersed, are equated with backwardness that needs to be overcome. There is an implication that depopulating rural areas is development. As the economic process continues degeneration of the rural areas, the assumption becomes a truism.
- Third paradigm of industrial revolution involves “technological determinism” which recognizes the fact that enhancing consumption continuously would exhaust natural resources. But there is a strong underlying belief that technology would fix this and new technology would give us more immense resources to consume. While the assumption has been challenged in recent times, the underlying belief remains strong. It is because of this that those working on healing the climate, are primarily focusing on new technologies. Solar rather than coal would solve the problem. The consumption and the associated life-style need not be challenged.

It is here that the confident India has to take the lead. Its civilization has the moorings to challenge the paradigms of industrial revolution; starting with that as its foundation, India has to contribute for itself and the world the foundations of the post-industrial revolution era. Even when the challenges like climate change were not so prominent, Gandhiji had questioned each of these three paradigms. He had believed that the center of future India would be its villages, not cities. He refused to accept the ever-increasing consumption as basis of development. He challenged the distorted minds which believed that force would bring harmony.

Indian civilization looked at consumption beyond a certain point as ugly. It believed in worshipping nature and living in harmony with nature as its fundamental paradigm. It valued “goodness” over “greatness.” It certainly did not consider wealth or political power as the highest goals of humankind.

Today, the society focuses entirely on “knowledge to economic growth.” Rapid wealth generation has become the end-all of a society. Education is tailored entirely towards this and youth are trained to develop their abilities, not their maturity. On the other hand, Indian civilization considered education as elevation of thought, creating psychic delight and bringing in harmony. Recognising that family (rather than the state) provided the social security in India, it focused on enhancing family values.

We need to build on such a foundation and innovate to find viable alternative solutions. The biggest innovation today would be to redefine development, which would imply having a ‘better life’, with much less resource consumption. The knowledge economy of tomorrow has to leave behind philosophy of the industrial revolution and definition of progress which associates development with higher consumption. It has to bring back the importance of values in life and emphasise relationships as fundamental to the new economy. Our way of living and way of working may have to be re-thought out. Sharing has to be central. Compromising with ethical values in pursuit of science and development would no longer be acceptable. It certainly would not require moving people from rural India to urban areas. If education, health care and

livelihood opportunities, in addition to a basic infrastructure, are provided in rural India, quality of life may be better there than in urban India and people would prefer to live there. The dispersed population could become the center of economy, culture and philosophical thoughts. This will be the beginning of post-industrial revolution era.