



Knowledge-based Industries

Synergizing for Growth

**Address by Mr Saurabh Srivastav,
Chairman, FICCIIT Committee**

Well, let me introduce myself to those of you who don't know who I am. My name is Saurabh Srivastav. I am a software entrepreneur. I chair a group of software companies and I am also a venture capitalist. That's been my field. I have been the co-founder and past Chairman of NASSCOM and I currently chair FICCI's IT committee.

To my right is Rajiv Ratanshah. He is Secretary, Department. of Information Technology in the Ministry of Communications & IT. He is a true convergence person because before that he was CEO of Prasar Bharati. He was looking after Information and Broadcasting Ministry.

We have on his right Kiran Karnik, again a convergence man. He is the President of NASSCOM. Before that he was heading the Discovery Channel. Before that he has been in R&D in Science and Technology.

To his right is Mr Ravindra Gupta who was formerly Secretary, Department. of Information Technology, and while he was there we had several initiatives including the one on Venture Capital.

So, you have a very impressive set of people on the dais. But there is an equally impressive set of people who are our panellists sitting here today.

So, just to kick it off, the way we will do it is I will be inviting Mr Shah to share his views and thoughts in a short presentation and then Kiran Karnik and then we will go into inviting members of the panel and then the audience.

But just to kick it off, I thought knowledge-based industry is really going to be the key to how we do as a country. So, this is truly an important session and we may not be far away from the time when people will not talk of GNP or GDP, but GKP for gross knowledge product.

And if you look at that I thought perhaps one of the things I might do is to share the route that in some way got taken by the IT or in particular the software industry to success. Because that should give us a lot of pointers to what could happen in all knowledge-based industries. Because if you know, 10 or 15 years ago we almost had no software industry. When it did start, it just started by many of us sending people overseas on contracting assignments. So, very often it is said that software in India was bodyshopping.

Most people don't realize that 10 or 15 years ago there was absolutely nothing else that you could do. There was a time when all you could carry if you are travelling out was 8 dollars. There was no telecommunications, 150 per cent import duty. It took years to get the right licences to bring in. It was an inhospitable environment and there was no domestic market. So, entrepreneurs came up and what they did is just the business they could do. There was no capital, no venture capital. You did a business, which was possible to do with less capital, which did need telecommunications, which did need infrastructure, which needed no permissions, no clearances, and we were in business. But our people were so good. The quality of our talent was so good that it created the brand. They did a great job in the companies they worked for, thought a lot about India

and IT professionals. Many of them became part of the brain-drain. They didn't come back.

Now, that was not all that bad. There was a mixed blessing because all of these people then became senior managers, vice-presidents and guess what they did? They knew what could be done back in India. They began to move more and more work to India. This is how the industry grew in its earlier stages. The good thing about this industry was that we didn't just trade in bodies and just pocket the profits. What all the companies did is this, they continued to improve and as things became easier, as telecommunications came in, as the government policies became more and more supportive, people went into doing full projects, bringing them offshore, building infrastructure and making investments. So, profits were not taken out, they were reinvested back in the industry. Ten years ago, we did not have a single company in the software industry in India that had international quality certification.

Today, we have more internationally quality certified companies than any country in the world and the highest certification level, which is CMM55; two-thirds of those companies reside in India. It is over time by gradually increasing confidence in ourselves, gradually reinvesting back in an industry that we believed in, we have built an industry, which even in the last 10-12 years has grown from just a 100-million dollars to 10-billion dollars. We are now looking at growing to 80-billion dollars in 2008. We are no longer a potential player in this area. We are a big player in this area. When we first did a World Bank study, we had Israel, Ireland and all these countries which were ahead of us. Today, there isn't anyone even near us.

The lesson to learn in this also comes from how we dealt with Government. When we started out, we had a very inhospitable environment and all of us would sit back and say, well, the Government doesn't do this and the Government doesn't do that. But as we began to engage, we found that actually Government did want to help, it didn't know how. And we realized that even among ourselves there will be sort of an organization of software companies. So, we started to sit together and talk as NASSCOM that we ourselves didn't know enough about what we wanted. And I will just give you an idea. In 1990 we thought we should have high-speed telecommunication links. And we got together and we said and we were fighting the Ministry of Telecom to give us those links. And when we got together and said how many lines of 64K should we ask the Government for. And across all our companies we said we will think in the next 5-10 years we might need 18-20 of them. That's about as much as we knew. I don't know how many of them there are today. We have lost the count. Its probably 100,000-fold what we thought.

So, we didn't know ourselves and obviously the Government didn't know. But when we began to engage with Government, when we went into an education process, we found tremendous support. And that partnership is today a role model for just about any other industry. Today, industry and Government in this area, the Ministry of IT and the software industry are absolutely in partnership. We completely understand each other's requirements, constraints, what has to be done. And that is one huge reason why when we first did the study ten years ago, Philippines was a little ahead of us. They are not even on the horizon, because they didn't get their act together and we actually did.

And why I am saying this is not really to just brag about an industry of which Kiran and I now are a part but because it has very interesting potency for all other knowledge-based industries and indeed service-based industries. Because what this demonstrates is that if we put our hearts and minds to it then we, companies in India, can compete globally and we can win on quality. That success is now being leveraged into other industries, business process outsourcing, IT-enabled services. All of them can leverage it because the value proposition in the success of software was not high technology.



But essentially it was providing a world-class service at a very competitive price. Any area in which we can do it, that's where we will win.

So, whether it is life sciences, biotechnology, R&D, BPO, ITES, I think I would just say that the vision in some ways that Prof C K Prahlad talked about at the TiE conference a couple of days ago, was about India Inside, just like Intel Inside, to say in the world of this any product that has used knowledge, a piece of that should actually have been done in India. That really needs to be our vision. But with those few words, may I now request Mr Rajiv Shah to take the stage.

Address by Mr Rajiv Ratan Shah, Secretary, Department of Information Technology in the Ministry of Communication & IT

The Distinguished Analysts on the dais, Ladies and Gentlemen: For hundreds of years, maybe thousands of years, we have been invoking the blessings of Goddess Saraswati. We have been saying Veenavadini varade and we have been blessed by that now. We now have a global knowledge society in which India can truly establish its dominance, its influence and its ascendancy because that is exactly the kind of thing which we can do the best and that's there we have our core competence.

In Greece, the goddess of knowledge is called Episteme and you know the word epistemology is from episteme. You also have another word for knowledge society and that is epistemic society. So, we are living in an epistemic society, and in an epistemic society we need to understand that there is a continuum of data information and knowledge. Data through analysis, marshalling and computation becomes information visual and communicated, goes through a cognate process and they come to knowledge.

The difference between the old economy and the new economy is that the old economy was a capitalist society. And capital diminishes with sharing. The new economy is information society and knowledge increases with sharing. Capital is a limited and scarce resource, knowledge is inexhaustible. Therefore, in the old economy competition used to be the key. In the new economy, collaboration and sharing is going to be the key. And this is this nuance that we must grasp if the Indian industry wants to grow apace with the developments in the knowledge world.

There are two ways of seeing as to how can the Indian industry achieve net sales to the challenges of the knowledge economy. One way is to look at the one billion population of India as not just a digital challenge, but also as a digital opportunity. If we start looking at it as a digital opportunity, then we can really think in terms of taking emerging technologies straight to the masses and take them in a manner that they are affordable. And we can convert them into mass markets, product markets, software markets whatever, and that is where the true drive would come to the Indian industry. This would involve bridging the digital divide, using information and communication technology to bridge the digital divide and bridge the social and economic divides also.

Here, I would like to quote our Prime Minister whose vision on 15th August, 2001 was: "Our objective is freedom from distance. We are determined to link all villages of India not only with good roads, but also with good telecom and Internet services. And you must have noticed that during the course of the last one year India has made major strides in the direction of connectivity."

To be able to bring about a digital unite, we have established Media Lab Asia, which can take emerging technologies straight to the masses. We have done this in collaboration with MIT, Media Lab in Boston and the Media Lab Asia has three major programmes- World Computer, Bits for All and Tools for Tomorrow. Where the three circles converge that area is called the Digital Village, which is their fourth and the most focussed programme.

This videograph shows the various programmes and under each programme various projects are there. Let us start with the programme called World Computer. The World Computer aims at creating low-cost computing devices, devices which would be of the order of 50 dollars or less, as far as PDAs are concerned and total 100 to 200 dollars, as far as desktop devices are concerned. They would immediately become much more affordable and a much larger number of people could have access to them. These would also be touch-activated, voice-activated devices, which could break the illiteracy barrier. The World Computer also deals with the upgrading systems and languages and these are interlinked via a common platform on which you can deliver software through a common platform.

Bits for All is the other programme, which aims at delivering broadband connectivity to an average rural citizen. The basic idea is that the normal telecom paradigm in which we have been living trying to deliver voice telephony is not going to resolve the situation. What we really need to do is give broadband connectivity so that you can give data connectivity. We can take images for health applications and things, image transfer should take place. There would be other image-related applications. Entertainment could also reach the rural masses and take all these along with IP telephony and this is impossible by application of Y5 networks, wireless technologies, 802.11B, 802.11A and Media Lab Asia is doing a major work. In fact, it has established the largest test bed in the world for 802.11B technology. And for the first time somewhere we have been able to establish that by using directional antenna 802.11B can be used to carry voice for 37 kms.

Just the other day, I happened to be in a village Saroha where you had to go by bullock-carts and I was able to access Internet on my PDA. I was able to do videoconferencing with IIT, Kanpur, which is about 50 kms from the village. I was able to talk to Delhi, Bombay and Calcutta and Madras. I did make any number of calls through voice telephony and IP telephony. This was all absolutely so clear, the picture quality was also very clear. So, these are some of the things that are being done.

The Tools for Tomorrow basically aim at improving the artisan's productivity and his earning power and ameliorating his living environment. It will involve projects relating to interfaces, sensors, tools, pneumatic interfaces, power sensors and Gram Kshetriya is GPS-based GIS system and then you have Digital Village where all various applications will then be concentrated to turn them into usable applications for rural masses.

Now, the other way of looking is to what industry can do for growing further. It has to look as to where is the world going, what are the future opportunities, how can we fine-tune ourselves with those opportunities. The building blocks for the 21st century are going to be basically atoms, bits, genes and neurons. Just see what has happened during the 21st century. In the 19th and 20th centuries, most of science and technology was concentrating on understanding the natural phenomenon and working in the macro world. What we are doing is we are transiting to a very deep India to a study of the micro world. So, what we are really doing is we have moved from a vishool jagath to a sushma jagath. And what this does is that it immediately brings you in contact with such a very large volume of data that unless you have supercomputing power, unless you have IT you cannot open the portals of knowledge in those areas. So, whether it is a narrow technology that is into atoms or it is an information and communication technology that is varied into bits and bytes or it is genetic engineering and biotechnology through bioinformatics or it is neural networks, everywhere you would need supercomputing power and you will need IT to open the doors of the knowledge in these areas.

So, it comes to it that supercomputing is holding the key. We are one of the very few nations which have our own supercomputing system available to us. We have



Param as our supercomputer, which we have, in fact, sold to seven countries outside India also in various configurations. And we have one terra flop machine, which I am going to talk about.

Supercomputing is synonymous with technologies which help in achieving high computation and storage capability for mission critical and grand challenge problems in scientific engineering and business computing domains. It is also called advance computing or high performance computing and it includes cluster computing, parallel processing and vector processing.

Now, Param Padma is the facility that we have created. It is a one teraflop machine. One teraflop peak computing power with 100 gigaflops or sustained power on International benchmarks. It has 5-terabytes primary storage and 10-terabytes secondary storage. It is an interconnect of 2.5 gbps and it has flexible and scalable programme development Systems Engineering and Systems Management tool.

As far as supercomputers are concerned, the supercomputing applications would be many and there are many areas of science, which would be serviced by supercomputing. In biotechnology and biocomputation, it would be required for molecular modelling and genomic sequencing and many other applications, which you will see subsequently. In nanotechnology and nanocomputation, it will be required for atmospheric and oceanic, which will lead to weather forecasting and climate modelling. It will be required for computational fluid dynamics in the space sector and it will be required for seismic data processing as well as for structural mechanics.

Now having talked about supercomputing and how it holds the key with the different areas of knowledge, how industry would need to take the cost of supercomputing if it needs to advance in those areas of knowledge and create intellectual property in those areas of knowledge. Let us now talk for a while on bioinformatics and nanotechnology and nanoinformatics.

Bioinformatics has been defined as a discipline that generates computational tools, databases, methods and procedures to support genomic and post-genomic research. Bioinformatics has also been described as a graceful blending of computer science and biotechnology. Biotechnology per se is experimentation "in vivo", i.e., in real life. It is experimentation "in vitro", which is in test tubes and what bioinformatics does is bioinformatics goes a step further and does "in silico" experimentation in support of "in vivo" and "in vitro".

Why is that you need "in silico" computation to support biotechnology. You need it now because of the stupendous size of genomic data. Genome sequencing at the moment that is taking place the world over is for about 100 organisms and if you take just one organism, i.e., a human genome, you have 3.2 billion pairs of DNA sequences. Human genome has been mapped. Data is exploding at the rate of 5,000 DNA sequences or 2 million nucleotides a day. To refine this data, to review this data, to reclassify the data and to annotate the above data if this is the major knowledge management challenge which can be achieved only by supercomputing and therefore you need ICT to deal with this. And this is the importance of ICT as the door-opener or the key to the locks of knowledge.

This videograph shows the same point, but a little more illustratively. You have two hierarchical structures. On the left-hand side is the hierarchical structure or "in vitro" and "in vivo" experimentation. On the right-hand side is the hierarchical structure, which is on the computational support to this kind of experimentation. And you would see how important the computational part is for the success of achieving what you are achieving in this hierarchical structure.

This videograph shows how some of the major activities on biotechnology side like sequence assembly, binary sequence comparison, multiple sequence comparison, gene modelling, phylogeny and protein family classification, etc. are already using supercomputing power which is of the order of teraflops, gigaflops to teraflops and by 2010 it is expected that you have so much data that you will need terra flop to petaflop range of capacity and that is the direction of movement. Now do we have the capability to handle this in India? Yes, we do have. We have already shown the Param Padam, which is one teraflop. Over the next three years, it is going to become a 10 teraflop processing capacity in an I grade which will be established nationwide and which can be accessed from seven major cities, i.e., Bombay, Calcutta, Chennai, Bangalore, Hyderabad, Pune, Delhi and a few others. Wherever there is an IIT, that will also have an access to this.

These are some of the areas in which you need supercomputational support in the realm of biotechnology, particularly in drug research and “in silico” drug target identification, drug design, toxicity testing for drugs and drug modelling you do need to use supercomputation.

Now, what is that makes us feel that we have the potential of bringing about this revolution. The first is that we have a vibrant pharmaceutical industry, which is a rapidly emerging biotech industry. Our pharmaceutical industry is creative and it is capable of innovation and it is capable of creating intellectual property. The second is the high international profile of our software industry and we think that on the wings of the international exposure of the software industry the drugs and pharmaceutical industry can really take off and can really fly and bring about a second layer of IT revolution. Then, we have a world-class network of education and research institutions. We are rich in biodiversity. We have a large population, which means we have a reservoir of diagnostic and clinical data. And we have normal strings in mathematics and logic and computational skills.

The road ahead therefore in bioinformatics is to come up with a cohesion policy framework to give a fillip to bioinformatics industry in India. We will show subsequently how this can be done. Bioinformatics is inextricably linked to the fortunes of new drug research and new crop research also. And that is another area where bioinformatics will have great relevance for India because we are also an agricultural country.

The way to do it, in my opinion, on the policy side would be that the fiscal regime, the foreign direct investment regime, the import-export policy regime should be brought in at par with and bioinformatics sector and biotechnology sector, they should be brought at par with the software industry sector. And if this is done, this one action is going to have a major impact on the future of bioinformatics in India. The Industry should also be given access to clinical data and to data relating to human genetic diversity. This is another very important point. At the moment, the industry does not have access to clinical data and diagnostic data in the measure that this is required. This needs to be established and India should position and here is the key. Learning from our experience of the software industry, we don't want to make the same mistakes. We do not want to become just a solution or a service provider, to begin with. From the very beginning, we must position ourselves as a knowledge partner, and not just as a source of genetic material or a solution provider or a service provider. We should become solution providers and we should also become content providers.

Technology is concerned with the design and manufacture of molecular scale devices by manipulation and placement of individual atoms and molecules with precision on the atomic scale as opposed to the top-down fabrication techniques employed in today's microelectronics technology.

This gives you an idea of what on the scale how big is the nanometre. If you have 1 cm,



that is, the head of a pin is 1-2 mm you can see how small the head of the pin is and 1-2 mm is much less than a cm. Then, if you look at the human hair, it is 60 to 100 micrometres, which is one-thousandth of a millimetre, and the red blood cells are 2.5 micrometres. And then you have DNA, which is 2.5 nanometre, and a nanometre is 1000th of a micrometre. So one-thousandth of a micrometre and one-thousandth of a micrometre is the nanometre. In this scale this is the area, which is the nano world.

Now, think of the possibilities that can happen if you acquire the capacity to manipulate matter at submolecular level. If you can manipulate molecular structures and sub-molecular structures, there may be a day when you could even change atomic structure and if that happens the results could be mind-boggling. Today, on the Mendeleeff's periodic table, you might have 103 or 106 elements. This could probably become 206 elements and you could have just as many natural elements as man-made elements. And you could even create materials depending upon your requirements. You could introduce a nano-robot in your capillary and remove a block and create surgeries of the kind, which you are not able to do today. The mind-boggling can be the applications of this.

Basically, on the nano scene we are talking about nano materials, nano actuators, nano electronics, nano systems and nano sensors. And a whole lot of applications we are talking about here, which I am not going into details right now.

Basically what we need to see is worldwide. The world is putting in a large amount of money. Western Europe is putting in about 225 billion dollars, Japan about 500 billion dollars and USA about 422 billion dollars. All told, this is the order of investment that is going into it. This is what the world thinks is going to be the future of industry and that's why we need to work in this area and we don't want to be left behind and this should become the third layer of IT revolution.

As far as MCA, IT-proposed initiative in this is concerned, it is in a very preliminary stage right now. But we are thinking in terms of setting up a core national facility for nano sciences, which will have several centres of excellence.

Now, basically, all I can say is that if the cognitive scientist can think it, if the nano scientist can build it, and if bioinformatics and biotechnology can really create it the ICT people can enable it, can monitor it and can control it.

With these words, I would like to thank you very much for being the very patient listeners. Thank you.

Address by Mr Kiran Karnik, President, NASSCOM

Good afternoon, ladies and gentlemen.

I know there are many speakers. So, I will be brief. I start right away and go on to the next slide. Mr Shah gave us an excellent overview of what the future looks like and I think it is very promising, very exciting, tremendous potential of where we are. I want to step back a little bit and take you first to an earlier period and speak specifically of the IT industry.

Two years back, we made a projection about where we might be. I know at that time a lot of people were very, very seepical that here is an industry doing hardly 3 billion dollars of exports. Not bad for India, but minuscule by world standards. And we wanted to get to 77-billion dollars industry by 2008, in less than ten years, we were thought rather foolish. It required a compounded annual growth rate of over 38 per cent, seemed very tough, seemed undoable, which was not done in the past. But if I look at

where we are today we have been able to do a 46 per cent compounded annual growth from that period and so we are well on track to getting where we wanted to be.

A quick look at what the potential is and where it was. We just completed an update, but I would say a newer study, which we finished a few months ago. NASSCOM-McKinsey study, done in 2002, looked at what we have done earlier and where we stand today. We are yet very confident based on historical growth. As it is, the last three years of what we might do and where we are. We are yet holding the same projections. There has been a little change in the mix of what we do. You can see that very briefly put up there. I won't run you through the details. The only point I want to mention here is that one particular area where we had mentioned possible exports of 17 billion dollars by 2008 which is IT-Enabled Services or Business Process Outsourcing. We are far more bullish on that today. We feel that it can be somewhere between 21-24 billion dollars. It is going on very well. I think we should possibly be able to achieve this higher target and that should take us to somewhere between 70 and 80 billion dollars in all as an industry.

What's driving this growth? What gives us the confidence to be sure we can be there. We see three major factors. First and most important till quite recently was cost. Most people came in here, most of the companies that in India started off basically on what you might call a brain arbitrage. The cost differential between here and the major markets in the US and Europe. Many people from abroad came here, started outsourcing to India, and out-located to India on a cost basis. But I am very happy that in the last two years we have been able to firmly establish what many of us knew to be true over here. And that is the advantage of India is not just cost. Certainly, that's one and it is an important one in today's very competitive world.

But equally important are two other facets of value proposition of India for IT and that's productivity and quality. We have got some good data now that indicates how much more productive we are than competing countries and how much more we are able to produce by way of productivity of our people here than others.

Reasons are fairly obvious in terms of the kind of human resource that works in this industry, not that we are necessarily inherently smarter. We might be, but I wouldn't say that. It is just a kind of quality we are able to attract into this industry and the kind of motivation and commitment they work with. And, again, I won't dwell on that, but I want to emphasize that our value proposition today is based on going beyond cost and really includes a cost and quality, quality and productivity facets which make it a sort of treble whammy for those who come in here.

I mentioned where we are and some of you may have very quickly seen in my change-over of that slide rather fast. That one area in which we have dropped compared to what we projected earlier is the domestic market. In fact, a point of big concern because I feel that why we Indians are very good at yoga and standing on one foot is one of the standard yoga asanas. It is not the most comfortable posture for most of us. If you want to stand on two feet, then you have got to do your domestic market and your exports, not just exports.

So, the drop in the domestic market that we have projected is very worrisome. We are hoping that it will trigger those concerned including industry, but certainly the Government should move quickly on that. Some positive steps have been taken in the last year or so, year and a half and we are hoping that it will fructify to get us out of lower projections for domestic market. But at the moment we are yet to see the domestic market at being smaller than what we had projected two or three years ago. Despite that we meet the overall projections, but the domestic market is not being as big as we thought it would be is a cause for concern. I do want to reiterate that.

So, what is going to propel us there. I mentioned cost, quality, and productivity. What are the other factors that we are looking at in terms of getting there? First we are looking at the big increase in people who presently outsource to India. We have seen that happening. We are very happy because that's a certification, which nothing else can give. Somebody, who has come, worked here, seen what India is like and is willing to grow, expand, put more money in that. That's the best part of the story. But that's not going to be enough.

The second one is getting new customers. You have got to get new people who are not here today. And that is something we are working on in terms of getting more customers, creating the India IT brand more powerfully, and going to new geographies. The third is a greater penetration in the existing service lines. We are looking at that. Today, we are working on a limited number of service lines, but we see the potential for doing more in those areas has been substantial.

And finally, looking at completely new service lines. Just an example, we are not doing very much in the area of systems integration. Tremendous possibility is there. We see that as one of newer areas, among others. Embedded software, R&D services, and a whole host of newer ones where we see potential.

Now, to give you some perspective at the macro level, where does the software industry stand and how important it is for the country. Most of you may be familiar with the broad aspects of it, but not the details. Some may not be familiar with it. I want to tell you that today we are at roughly 2 per cent of India's GDP. We want to see that growing to 10 per cent by 2008 and our projections as we meet that will see us there assuming the country grows at 6 per cent. I will be happier if that 10 per cent is lowered to lower not because we did badly, but because the country as a whole did better. But today's projection of an average of 6 to 7 per cent GDP growth for the country as a whole will make the software industry a contributor to as much as 10 per cent of India's GDP. This is just software, it is not IT as a whole. So, you can see how important this industry is going to be for the country. It already is in other ways in qualitative terms, in quantitative terms we see it as being tremendously important.

So, what is that going to mean in terms of foreign exchange? There were years not too far back in the past when foreign exchange was a major worry. Today, the country is sitting on 70 billion dollars worth of reserves compared to just a few billion in 1991 and if some of you might recall we had to ship our gold across to make payments which we have never defaulted, India has kept the word. Today, we have got 70 billion dollars worth of reserves and I can say with some sense of satisfaction that the IT industry has been a major contributor to this. If you look at 2008 we will be contributing as much as 30 per cent of the foreign exchange that comes into this country and I think that again reinforces the story of GDP growing, how important this sector is going to be for the economy.

It is also going to be an employer of about two million people in direct employment, again an important part of consideration for a country like India where employment is important. This is the direct employment of 2.1–2.2 million, indirect employment will probably be two or three times that number. So, clearly again in terms of employment it is important or it is the kind of people we employ who are not getting jobs elsewhere today as most places downsizing. It's the white-collared, intelligent graduate who is not terribly skilled, that are the large part of our employment. Then, of course, the substantial part is also the highly-skilled computer professional.

So, what are the opportunities if you look ahead. Just want to look ahead before we end on where we might go. This is mentioned and people keep mentioning this. Yes, we did start with brain arbitrage, a cruder word or a better word for bodyshopping as you might say. It was necessary, as Saurabh said, but we quickly moved to becoming a

service provider and is now considered the service hub of the world. But we need to move on from there and the opportunity is to move from being a service hub to being a knowledge centre to being a thought leader and I think that's where we have got to pin our ambitions. Not just being a knowledge centre but being a thought leader may determine what is thought in the world tomorrow.

We certainly should be a dominant software power in the years to come. We are already a very, very major player in the world trade. We should be a dominant player in the years ahead. We are also looking at how this would reengineer the India brand. I am not talking about the India IT brand, I am talking about the India brand which already is happening as people around the world are beginning to locate India not as a basket case, not as a poverty-stricken land, but as something which is different, has tremendous knowledge capabilities and the ability to take that forward.

And finally what's that going to do. That's is going to create tremendous strategic space for us. Again, I am not talking of IT, I am not talking of the economy, and I am talking at a much broader level. The fact that a lot of countries will come to India with mission critical software requirements, the fact that they are going to be providing a great deal of the software for them. It is going to give us tremendous leverage in world councils and I think that's something very important when you look at what the IT industry is doing. It is not just an image exercise for the country. It is also actually being able to exercise strategic manoeuvrability and power on that.

Finally, the last slide. To do all these what are the challenges? What are the difficulties? What might inhibit us? Just put some of them here. Again, I am not going to dwell on them. Infrastructure, is a point of concern, Many of our competitors, certainly one of them, are way ahead of us. We need to quickly bootstrap ourselves in infrastructure, particularly the physical infrastructure, roads-transport, power, and like that.

Secondly, the policy and regulatory environment, as Saurabh said at the outset, has been very good for us. The Government has been tremendously supportive of this. We need to ensure that the regulatory environment continues to be positive and spur growth. We have got to also look at procedures, the red tape, the things that cause turnaround times in India to be five, six, ten times what they are in the best benchmark countries, in a country like Singapore. No reason why we can't emulate that no reason to say, oh that's Singapore. Why shouldn't we do it in India? We need to move on that quickly.

The third facet is human resources. Numbers are not a worry. Numbers of even qualified, well-qualified people. But you got to look at quality. How do we upgrade quality? How do we upgrade skills? How do we move on to a higher plane in the human resources?

The fourth is something which has been worrying us over the last one year, the geopolitical situation and the perception of risk. And the last one is the concern about job loss, security, and privacy issues in our customer countries, countries from outside. And I mentioned that too in particular in the context of the audience here. Many of you are from outside the country, many of you particularly from the US. I think I would urge you to help us to work on these last two in particular where the perception sometimes, thanks to media coverage, thanks to other facets, tends to overtake the reality. Just as we are a country that has problems, we do face them and overcome them. But sometimes the media tends to overhype these, particularly in the Western world where the media necessarily needs the news of the day to put something on. And I would request for help from friends in the west to see that this is put in the proper perspective and also that concerns about job loss and data security don't overwhelm us. We had experience of this a round the world in other industries and other facets where jobs tend to move, industries tend to move from one place to other. They make the country concerned more competitive because they are able to outsource.



And I want to just end by telling you this is something which some of you might want to share with your colleagues in the west who have this concern. I think the choice for them, very starkly put, is not whether they lose jobs or not. The choice is whether they want to import people or export work. Many of the countries, particularly in Europe, are facing a demographic shift. They need people desperately. They need skilled people even more desperately. Their choice is to import them by the millions and face the social consequences or to export work to countries that can do it and that can facilitate by ICT. That's the perspective we might look at. Thank you.

Address by Mr Raj Shah, CEO, 123 Sign Up

I would like to make three points here based on what you have heard. The first area is what should be the channels for productizing a lot of the research and the scientific investment that is going on and that India is planning to do in the areas of biotech, supercomputing and nanotech. And the message that I would like to give is that India should really be working on trying to get entrepreneurship to really be the channel for productizing and generating business around the scientific investment that is going on. Stanford University has been doing exactly that for Silicon Valley. And with the kind of research that has been going on in the government labs in this biotech area, nanotech area and supercomputing, my feeling is that using similar policies what Stanford University uses, which is quick and easy licensing of technology and patterns to entrepreneurs, encouraging the professors, researchers, etc. to take the jump from an academic profession into an entrepreneurial profession, educating them through the TiE organization etc. is really the right channel for getting India to productize all that.

The second point that was made was how does India not just be a recipient of business or be something where we are dragged into a particular industry as we were in the bodyshopping area where people did arbitrage on the cost of labour etc. And the solution there is really understanding how to move up the value chain. And the key element there is how do you take control of the sales and marketing aspect of any business. And if you look at it, countries that ended up really putting in efforts into creating a brand name, and C K Prahlad is right on the money there, are the ones that ended up having their own identity after the cost of doing business went up in their respective countries. Japan is clearly a country that created a brand name for themselves of high quality, cost-effective products, and on the other hand Mexico, Thailand, Malaysia, Indonesia, etc. I don't see them creating a brand name for themselves. And for India the key challenge is to create a brand name right now by putting in efforts to move up the value chain by starting to take control of the sales and marketing channel for the industries that they have gotten into.

The third area that I want to quickly make a point on is that a number of questions that have been raised coming from Silicon Valley is how is the IT business in the US and abroad? Is that really going to be down? Is the tech industry down for a long time? And the message that I want to leave there is that entrepreneurship really flourishes in adversity. This is probably the best time to start companies, etc. At TiEcon, in Silicon Valley in May, we have really focussed on getting entrepreneurs to realize that succeeding with new realities is really the right way to look at the current situation. So, those were the three points that I wanted to make about. Thanks.

Address by Mr Om Singla, President, Automation Image, Inc, & President, TiE Dallas/Fortworth Chapter

I am Om Singla, President of Automation Image in Dallas, Texas and I am also the Dallas TiE Chapter President. And if you need to know more about TiE, here is a little bit advertising about TiE. Please look at TiE.Org, a very powerful organization.

So, I start by saying that one reason why we the Indians are successful in software and IT is that it is knowledge-based and labour-intensive. I wanted to throw in another opportunity in the same arena, that is, knowledge-based and labour-intensive education. Education has been important to humans since the eons and now it is becoming more and more important worldwide because of the speed of knowledge needed and competition growing. Just to make the point, I would like to mention President Bush's recent statement, "No child left behind." In other words, the US Administration has committed education for everybody. Since there has been a lot of numbers and figures thrown around, I would like to mention some. In K-12, i.e, the 12 grades up in high school, the US education system encompasses roughly 120,000 schools, 14,000 school districts, 3.1 million teachers, 53 million students and 23 million families. Well, recent estimates place the total demand for K-12 teachers in the US up to 2.5 million between 1998 and 2,008. That's the growth. So, that's over 2000 annually. This is a huge opportunity emerging and knocking at the door. I propose three models.

1. Tutoring over the Internet: We have a couple of advantages. We have a lot of teachers. We have very knowledgeable education system in Maths and Sciences. As regards the US, that's where the weakness is there is a shortage of teachers and tutors over there. Along with the knowledge this is a labour-intensive industry you cannot produce in a factory. So, I suggest this model should be tried over the Internet, at low cost and start tutoring students 24/7. Pilot studies have been done and it is successful.
2. Future for Overseas Jobs: Just like the IT professionals have gone very successfully overseas, I suggest government should have a system to educate teachers for overseas jobs.
3. Education Content: Billions are being earned, billions of US dollars, I mean, and being spent by families, children, schools for the education content, that is, the education over the Internet. So, India should and must look at this opportunity.

Thank you.

Address by Mr Naren Baxi, Chartered Member of Silicon Valley

My name is Naren Baxi and I am one of the Chartered Members of Silicon Valley. I would like to comment on the topic that Karnik and Shah mentioned that we are having a shortfall of the use of IT in India.

That is a very serious problem. This morning, Mr Advani said the reason we succeeded in IT was because Government stayed out of it and that is true. That was a very strong comment Mr Advani made and that may be true. But when it comes to domestic use, especially in India at this juncture, there are so many public sector units that are being controlled and run by Government. Government is in the business of e-governance. If Government does not take the lead, the domestic market will not develop. So, I don't see any serious initiatives. I have spent two or three months, every week, month, year for the last two years in Rajasthan and the situation is really pathetic. So Government and industry need to create some role models. I know some of this is happening in Hyderabad and other places, but a lot more needs to be done.

Mr Rajiv Ratan Shah, Secretary, Department of Information Technology, Ministry of Communications & IT

Since you have raised this point about the role of government, I must mention that the Home Minister was absolutely right when he said that the Government has stayed out of it. That was in the sense that in the IT sector the Government did not visualize itself as a regulator. It didn't see itself as a regulator. We saw ourselves as an enabler and



facilitator. But this is not to say that the Government didn't have a role to play. I think the Government has played a major role as a facilitator and as an enabler. And the most brightest example of public-private partnership is the fact that the STPIs are a living testimony to the work that has been done because whether it is Infosys or it is Wipro and or all major players, 70 per cent of the software out of India's 73-75 per cent software exports is taking place with STPI high-speed data connectivity. There are many more things in terms of creating and enabling environment for e-learning or e-commerce. There are a whole lot of things that the Government has done to enable the whole thing to happen.

Address by Ms Seema Chaturvedi, President & Founder of the Local Chapter of TiE in Michigan

Hello all. I am the President and Founder of the Local Chapter of TiE in Michigan, greatly influenced by Colonel Reggi. He is right here and he has actually motivated me to leave a cushy job and become an entrepreneur. So, thanks Colonel for that.

I just wanted to touch on a few issues. I am an Investment Banker by profession and our firm is involved in mergers and acquisitions and from the standpoint of my profession I wanted to comment on knowledge industries as it relates to India and in relationship to US. I want to touch upon three things.

1. The trends that I am seeing as we advise our clients.
2. The opportunities.
3. What would touch upon the issues and challenges.

I would touch upon very briefly on all of them. When I reached US, the trends were mainly a US company trying to acquire some sort of an operation in India. What I am seeing now is a total reversal and a lot of clients from India are coming to us and saying let us acquire a front end. Much to the point Mr Karnik made or somebody made of having a front end in US, but really having the control came from India. A lot of our clients are now looking to even move to India their corporate headquarters and use that as their base for the global market that they serve. So, that's a huge reversal of trends. The size of these acquisitions is becoming much bigger and we are noticing a tremendous VC community interest. As we raise capital for our clients, it is for them to even ask us this question of whether there is any leverage of the Indian connection. So, that is a huge positive. I don't want to get into the different areas that this is happening.

It is greatly an area to promote. That is why I am testimony to that, but also strengthening our educational system. I think all of us agree. We have a great educational system, but really parleying that into entrepreneurs is something we need to do.

On issues that we need to address, much to Mr Karnik's point, clearly security, privacy are issues that being faced in US. But the biggest issue now is something that the people in US have become very afraid and scared about after what has been broadly termed as enormities, are issues of corporate governance and that is really an area where India needs to convey to the world that it has the requisite accounting policies, practices, corporate governance issues in place. So that the people they are dealing with, be it in the capacity of a vendor, an investor, a partner or a strategic joint venture, they are dealing with ethical, upright, properly governed people. So, I think that is an area where we really need to brand ourselves as India Inc.

Thanks.



Address by Mr Rahul K Roy, President, Mirror Plus Technologies Inc, USA

Another area which is coming up in this IT-enabled services is BPO or call centres. In this area, I believe we are doing a pretty good job out there to brand India as a vibrant BPO solutions-providing country.

One of the areas where I am concerned, I visited six or seven major cities. Here, I met ITC, InfoTech, Spectramind, Wipro, and Infosys. These are big guns, but my concern is for the small call centres, people who have 250 seats, 500 seats or 700 seats. So, my suggestion to the people who have call centers here, is to become a part of a network. The network what we have provided in the concept industry for a lot of subcontractors in the name of Plan Well. We want to provide a network for all the small call centres to become a part of this vibrant network, so they can compete with the big guns and also in the front-end we are providing infrastructure out there for sales and marketing. In that way, India can play a lead role and become a leader in the BPO sector. Thanks.

Address by Mr Arvindo Brara, Managing Director of Mantex Consultants

I am Arvindo Brara, Managing Director of Mantex Consultants. We have offices in the US, UK and in India.

I have some suggestions to make. I mean, what Mr Shah said and what Mr Karnik said is very much appreciated. There is a lot, which the government has done and we all have done, but we have got to see what more needs to be done. I am not wanting to be critical, but I would like to do some positive criticism, which can help.

You take the example of STPI. I have a unit in Noida and we are doing work of the US. I wanted to expand and have connectivity and STPI said, "Yes, sure we can now give you IPLC connectivity, no problem." To cut the story short, when it came to the last mile. The last mile is a terrible thing in India. Because the local telephone companies take pleasure in trying to cause disruption on Friday, so that you cannot work on Monday.

And then, when I said, fine we would like to have radio connectivity because that will get rid of the last mile. I was appalled. They said, yes, you can do it and then we went in to sign the contract. This is a general example; it is not a particular example. When we have to sign the contract, they said we do not have the authority of the government to give radio connectivity in the last mile. That came as a big shock. So, there are gaps.

So, one other point I would like to make. I would like to reinforce what Mr Roy said. I think the small and medium call centres need to be enabled like what he said. There is one other thing. There is a lot of apprehension on disaster management, war with Pakistan, and so on. So an alternate base, you know, I do not know whether it is Andaman's or whatever. It can be outside India or it can be in India. Some thought needs to be given to that.

Address by Mr Ranjini Iyengar, Head of Human Asset Development of Fortuna Technologies Inc, USA

I am Ranjini Iyengar and I just realized I hadn't provided a whole lot of information about myself other than the abstract.

I have spent a big part of my career in the IT consulting in Management Consulting industries. What I would like to propose, when you wrote up a list of challenges, to position India as a strategic partner as also to consider relationship management and I realize this comes out properly in the soft skills area.



But coming from the management consulting industry, there is a growing awareness that even to retain a competitive advantage in the fields of outsourcing, to move up the value chain, managing relationships in positioning yourself as a strategic partner can actually translate into tangible functional benefits.

I haven't heard about that. I am hoping to stimulate some kind of discussion about this. Because if you really scan buyer's values, you find that technical competence, technical expertise; it is a threshold capability. It is the bare minimum, which needs to be considered and Ireland has it, the Philippines has it, China has it.

I do believe in managing relationships effectively, thinking about the long-term relationship, not just going for the low hanging fruit now. Go moving past the commodities and services, taking a long-term perspective, sharing the risks and sharing a common agenda with your clients, could actually position India to where the expertise and the potential that is in India can actually make its way to the rest of the world.

Address by Manoj Kumar Saksaria

I am Manoj Kumar Saksaria. I am from the entertainment industry. I would like to know one thing. I would like to know what is the global perspective about the Life Sciences and how India can contribute to that. What is the future of Life Sciences and how India can contribute to that?

Another question is about the telecom competition. How it is going to affect India in relation to IT industry.

Thank You.

Address by Mr Sunil Tomar, CEO of Birlas

Yeah. About the last mile Internet access. I am Sunil Tomar, CEO of Birlas. We are doing fixed wireless, broadband access using Y5 as the underlying technology for VAN networks. And as you pointed out, Mr Shah that in villages it is available. That is a very powerful technology and can solve your last mile problems.

What the government needs to do is to license off the frequencies that are licensed off by other countries. So, you can utilize the economies of scale. For example, 3.5 GHz is a great frequency to license. Don't try to go off the scale and license off something else. Because then an equipment provider like me will have to design special equipment and that could be expensive. Here, I am to leverage the Y5 technology at a low cost and really provide a solution. That was one point.

The second point: in the US the venture capitalists do not have a good perception about India. I went to them and said, "I want to make India as my base market." My customers will be there. And they said, "I am sorry. I can't fund you because I think that about the deals that are done in India, we are not sure how they are done." So I think we need to change their perception. I had a hard time convincing them. I do not know what government can do, but this is a very important point.

Mr Saurabh Srivastav

This is not a government job. This is more a job of a venture capital industry and others to do and a lot of that is being done. There are VCs who are interested in India. What you need to do is to connect with some of them. Many are not. So I guess that.

Participant

On the spectrum part of it., My response would be that we have already delicensed 2.4 to 2.48 GHz of the spectrum for the rollout of wireless technologies. This is the 802.11 A, B and other wireless technologies. This is, of course, at the moment campus specific. It is limited to contiguous campuses. But we are now pressing for delicensing of this part of the spectrum for rural connectivity.

Particularly after the assurance that we have from the Kanpur-Lucknow corridor test bed that this is very durable. I have no doubt that this has unleashed so much of energy and there will be so much work that will be done on this. Thank You.

Address by Mr Alok Rustogi

Hi. This is Alok Rustogi and I am from the USA. This particular question is going to be directed to Mr Kiran, Saurabh and a visionary like Kamal.

We are seeing in the US that obviously there is a downward trend towards IT spending. The big are getting bigger. There is a consolidation going on and we see the similar trend here in India. While the big companies seem to be gaining a momentum and continuously what you call getting the big contracts.

On the other hand, the smaller are really, really getting squeezed out. On a long haul, if anybody could indicate as to what is going to be the future for the small companies if this trend continues. If there are any statistics available as to how much these smaller companies have grown in the period of the last 18 months vis-à-vis the bigger companies who are located in India.

Participant

You know there is a bias in India that has been large. The Indian software industry is large around 10 billion dollars, but just to let you know, IBM Global Services is a 31 billion dollar corporation and one corporation. None of the Indian companies can compete with that global services.

We have to develop companies, which are up that stair. In a free market, you end up developing three to four varieties of gorillas of that size and then several market specialists who specialize in a driven market. Maybe, a fortress in China, a fortress in Japan, geographical market and then several specialized in niche parts. So, you end up having several gorillas, a few chimpanzees, and lots of monkeys. That is the law of the jungle. But if you don't let it happen, you will end up being the monkeys in India and the gorillas will be in the US.

Address by Mr Anil Agnihotri, Honorary Adviser to the State Government of Chhattisgarh

My name is Anil Agnihotri. I am Honorary Adviser to the State Government of Chhattisgarh. I am based in Atlanta. I have a small firm we call it Third Millennium, working in the biotech area. I would like to address synergizing for growth of our second sublime.

The first point I would like to mention is that we have to have a strong partnership of government, academic institutions and industry, and also find ways to commercialize it.

The second point is that we need to have a proactive regulation policy. Kiran mentioned



perception. The perception outside is that we don't know how to protect our IPRs. Companies are not confident about coming to India, especially in the biotech side.

The third one and I would like to disagree with the Hon'ble Secretary Sahib here that biotech and bioinformatics is not IT. It takes almost a billion dollars to find a drug. We are very poor in R&D. We don't have R&D infrastructure. Our number one company like Ranbaxy probably has some molecules. And most of the time we are trying to make bulk drugs or trying to copy the drugs, which are coming off patent.

In agriculture which is about 70 per cent of our economy, we don't have any biotech initiative. In animal husbandry, we don't have anything going on. So, these are the areas where India as a country needs to talk. We need to address, as Mr Sam Pitroda mentioned in the morning, the bullock cart of the country, which is like 80 per cent of our population is based on that. I believe biotech would be great in helping our problems in food, technologies, in terms of pharmaceuticals. What we need to do is leverage on our manpower, IT and also areas something like stem cell research, high throughput genomic and DNA fingerprinting.

Thank You.

Address by Rani Swaminathan, IT Consultant, Australia

I am Rani Swaminathan and I am from Sydney, Australia, IT consultant. While in my experience in Sydney in the past 20 years, I have interviewed a number of people of Indian origin over there. Of course, when I sit on the interviewer panels, my heart always goes to the people of Indian origin.

What I do find? While for any question, there is always a technical answer from most candidates, there is never a practical answer. Maybe that is something that, especially from IIT in particular, I have interviewed a number of people. So, perhaps what IIT should do is, give them some kind of education on how to interview and how to put into practice the technology they have into practical solutions. That's one thing.

The second one is: Yes, while India is very good in software production industry, we should always concentrate on the IT consulting arena, especially in IT security. By that, I don't mean how to go about technically introducing IT security, but how do you consult an IT security into practical areas, also IT, disaster-stricken IT, business continuity planning.

No one ever mentions these areas, but what is unique about these areas is, you got to have a local knowledge of the local culture in order to be successful in this IT consulting and either what India should do is leverage the knowledge of the local IT consultants in order to get that information from them so that they can prosper in that area also.

Address by Mr Prithipal Singh

I have been in the healthcare industry for too long. I am tempted to speak a few words. I will keep it very short, five minutes.

I agree with Mr Agnihotri that the biotech is not IT. If biotech is anything, it is part of healthcare industry. If India wants to do anything we should understand what healthcare industry is.

For information, the health care industry right now is 1.2 trillion dollars in the US. 50 per cent plus drugs in the US are going out of patent and it is costing over a billion

dollars to develop a new drug. If you are lucky you will have it; if you are not, you won't. The whole Indian pharmaceutical industry, as you call, Dr Reddy's Labs or Ranbaxy or any of those Ciplas if you add them together, they are not even equal to one single company in the US.

Having said this thing, I want to come down to the bioinformatics and the biotechnology. So, I think there is an opportunity in biotechnology, but biotechnology as a supporting industry to decrease the cost of drug development is where the opportunity lies.

If you are going to bioinformatics, I think I have been watching this thing for a long time. I will say that this may turn out to be as it is already for dotcom industry. Bioinformatics in the US is gone. There were a number of companies formed, I don't see any company which survived. The only one company, which got sold for 17 million dollars after the investment of 68 million dollars, others all went for zero.

If India is going to embark upon the bioinformatics today, my dear friends, you are too late. I am with Kanwal in this chapter that if you always want to play monkeys let us be clever monkeys. Rather than follow with what things happened, we are behind and we are late.

Address by Mr Upendra Giri

My name is Upendra Giri. I come from a very small place, about 60 kms from here, Bullandshahr. Born there, spent about 11 years in a village, then moved to Delhi, spent 11 years here and who says Silicon Valley is not progressing, we are not doing good?

I grew 100 per cent last year as an entrepreneur. We are into a very specialized, focussed domain called Enterprise Project Management. I am sure all of you must be practising that. I am coming to the point. The point I am trying to make is if we really want to succeed, we really have to look at what is going wrong. We are talking about bringing a change. Change does not take place bottom up or down. The change comes from centre outwards. We need to bring about the change. We need to bring best practices of project management and that's what lacking big time. We have to learn from construction industries, other industries especially the IT and high-tech sectors have to learn from project management. So, to deliver a successful project, we really have to look at the help of PMI. So, you got to look at what needs to be done, you need to have the best practices in project management and that will really help us to get to the next level.

Address by Mr Avatar Singh Sandhu, CEO, Parksize Moore Investment Inc

My name is Avatar Singh Sandhu. I am President & CEO of Parksize Moore Investment Inc. I want to touch on the first point of Mr Kiran Karnik on infrastructure.

About 35 years ago, I brought in Engineers India Ltd., Bechtel, and Prodanial into India. Over these years, the biggest problem in India was a one-stop shop for permits. For, the real part of infrastructure is that people could come to a building, open an office and start.

There are thousands of applications that had to be made, and I am glad to say that, there has been a significant improvement in the process, but there is still a lot to do we have and very far to go. I am afraid lots of the politicians are involved in the change of land use, for IT industry and everybody wants a little packet of money. Until this thing goes away as a perception from India, we have difficulty in encouraging investment infrastructure.



About three years ago, at TiE conference at Los Angeles and also at a conference arranged by the High Commissioner in San Jose, I made a similar plea and I also am trying that we should promote IT where it should be a one-stop shop. That everything should be available there, uninterrupted power supply, the communication structure, the buildings and housing which is at one place and STPI has not functioned in that fashion.

Participant

You know one of the problems we have in India is that the IT industry is developing over there and the infrastructure they have is based for the American economy and American prices and all that. So, it is wonderful for us to develop stuff here and sell over there but if the stuff is developed there it is very hard to sell here.

You know when I was growing up as a student at IIT, all the books we are using were Americans, and we couldn't afford them. So, they had these cheaper versions being published in Japan for the Asian students and it used to say don't re-export back to the US.

What we need to do in India is to develop that technology here. You see the Indian market requirements as a starting point and develop those solutions. If you do that, you will have a task effective solutions for the Indian market and you can re-export them to the US but the other way it won't work. So, we have to go through this process of how we develop entrepreneurs in India for the Indian market place. Develop technologies at the prices point so that the Indian market place would bear. That process has not started yet only because it is very effective about us to sell in the US and get the US prices for now. That market will get saturated for us sooner or later. That's when the Indian entrepreneurs will turn to the Indian market place. Meanwhile, high value-added over there, it has not been serving the poor people when you can serve the rich people.

Address by Dr Zareen Karania Raus, President, Managing Across Cultures

I am Dr Zareen Karania Raus. I am President of Managing Across Cultures and I want to go back to a point that was made earlier and also add to that.

We deal with high-tech international collaborations and they call us in either to prepare them or troubleshoot the biggest issue when collaborations fail or when outsourcing fails. It is usually the cultural communication issues and the project management leadership issues, which don't jive with the cultures they are working with.

Now, the big question is whose responsibility it is. If companies realize, many of the Indian companies print a manual and think they give it to somebody and they can go to Japan and work clearly in Japan with them. It does not happen that way. I think it is critical that Indian IT and high-tech companies and biotech companies realize that if they want to be the country of first choice as they have been for outsourcing, and I speak at the national outsourcing conferences in the States and in Europe as well, then they will have to look at culture and adapt it and communication and adapt it, and learn something about the host corporate culture as well that they are working with. It is the responsibility of the host firm here to train them in that in a professional way. We are usually called in when joint ventures, collaborations fail.

And I think India will do our companies a tremendous service, if we look at some of these issues. What are the ways of dealing with one another that make work more productive rather than frustrating. People pulling their hair out saying, "we don't want to deal with these companies any longer."



Address by Mr Satish Tiwari, Chairman, Invite Group

My name is Satish Tiwari. I am the Chairman of Invite Group, a group promoting higher education in India. Prior to that, I was in the telecom industry for many years.

One of the things Mr Saurabh Srivastav mentioned, how to build upon this strength, which we have. If we go back and look where we have got the strength? Probably, we can find the answer. The strength in the IT industry is our resources, the software engineers. We train them here in our country and send them outside or do the consulting from here.

The same way, respect and strength we have earned in the defence industry by missile technology or nuclear technology by indigenous research. So, we need to look back what we need to do in order to build upon this strength. We are exploding in telecommunications industry in India, but majority of the technology is coming from outside.

Tomorrow's world is going to be a knowledge world, integrated circuit design, many education centres, centres of excellence. We have where we are getting patents for design or any other industry. If we want to become a developed nation by 2020, we cannot become a developed nation by borrowed technology. We need to develop our own technology. Whether it is bioinformatics or integrated design or telecommunications.

I appeal to the NRIs, PIOs from the USA and Europe that venture capital money can easily go to entrepreneurs developing a business for profit, but it is very hard for them to invest in education, higher education and research. So, I appeal to all of you that you look into this and come to India to develop this, so that we can have majority of the patents in the future from India.

Thank you.

Mr Saurabh Srivastav

Thank you. I should add that certainly the IIT's alumni overseas are doing quite a bit, quite a substantial amount in pumping money back into the system.

Address by Mr Rajiv Desai, CEO, 3DI Systems

Sir, my name is Rajiv Desai. I am the CEO of 3DI systems. I want to take up a point that Mr Karnik made, which was looking for new customers.

There is one customer that we have not done very well, that is the government. 37 per cent of the money spent on IT in the US has actually been spent by the government, and that's where all the gorillas live. That is where the IBM and EDS systems live. Surprisingly, some of the most successful companies in the government that are held by the Indians are not the big companies.

TCS has been in the Southern California area whose office I know. They do business worth about 50 million dollars or so in general business. They do about a half million dollars in government after 12 years of marketing. It's a very different marketing approach, it is very politically driven. Value proposition is not always cost driven and it's a huge opportunity and it is very good particularly on downtimes like now. The whole approach is very different than the one that we have been trying to do.



I think NASSCOM and others could really take heart from some of the companies that have very successfully built these businesses. How they have done it? It could almost become an objective to go after a percentage of that market and that is where the gorillas are created and that is where they live.

Address by Mr Pravin Maharaj, President & CEO of Oval International

Good afternoon. My name is Pravin Maharaj. I am President & CEO of Oval International. It is a computer education group and consultancy service in South Africa. I have been requested to say a few words this afternoon.

I would just like to stress that I have heard quite a bit as to what India wants, and I have seen the relationship with the US. May I also stress that Africa is a land of 860 million people. Just for your information, there are 20,000 or 20 million fixed telephone lines in Africa, about 5.9 million computers and about 5 million Internet users.

May I stress that a bulk of these of Internet facilities and the personal computers are in sub-Saharan and the bulk of that is in South Africa. May I also stress that the bulk of that is in the hands of one race group in South Africa. It is still very much in the hands of the white community.

South Africa is a huge giant in IT and technology. I am requesting that India plays a very crucial role in Africa. We have a population of about 1.2 billion Indians. There is focus on the primary sector, the secondary sector and the tertiary sector. For example, in Johannesburg, they announced the 500 million rand government online project where schools will be wired by a satellite technology. In a few years' time, you will find that the emerging community will really be a power and India can play a crucial role in insisting on transforming Africa into a giant. In the process India will see a massive growth in Africa.

Thank you very much.

Participant

Let me tell here. It might be heartwarming to know that the first step has already been taken. We have already setup Indo-Ghana Kofi Anan Institute of Excellence in Information Technology. This has been set up in Accra. This, I think, is going to be the beginning, but we plan to use this to service some of the countries in that area.

Probably, we would like to have a node somewhere in South Africa also, some institutional structure and we will be very happy to do that. We have also introduced another institute, which has already been launched. This one, the Accra thing is going to be launched, I think, in a matter of next two to three months; it is nearly ready. But this other one is somewhere in Central Asia. I think it is in Mongolia and that has already become functional.

Address by Mr Arvind Singh

My name is Arvind Singh. I am from Chicago. I have a brief observation and a couple of suggestions. I am actually an entrepreneur and not necessarily in IT business only. The sort of theme that I have been hearing for the last couple of days here, is that we have raw horsepower. We have raw power in IT and nobody disputes that.

The challenge seems to be how do we organize the IT industry both within the country, as well as outside of India? I just happened to be returning from a two-week trip to Dubai. They have done something there which most of you are probably familiar with, the Dubai Internet City. It seemed like an interesting organizing concept.

I think what it does beyond publicity, and PR and all the nice stuff that comes along with it is that it focusses people on a mission.

There were questions earlier here about infrastructure. How to address infrastructure issues, policy issues, clearances, permits. It may be something worthwhile considering if that something that the government may want to set up.

The other suggestion I have to make is on how to get organized outside of India? I think we have had a lot of discussion about how we can cooperate with NRIs and folks in India. One thing we may want to consider doing is, setting up specific task forces outside of the country and enrolling NRIs outside of India to help promote the IT growth and the IT business in India.

Thank you.

Participant

The National Information Board, which is chaired by the Principal Secretary to the Prime Minister, has taken a major initiative in information and cyber security and network security. There are five groups which have been created which are now working on this.

One is on critical infrastructure protection plan for the country. That would be network security particularly. The other one is on encryption policy. What should be the encryption policy in E-commerce domain and E-learning domain? What it should be in the critical infrastructure sector? What it should be in the strategic and defence sectors? There would be different levels of encryption policies relating to each one of them.

There is a third group, which is working on information security assurance framework. The STQC is now evolving programmes for doing gap analysis in most of the areas, which have been identified as critical infrastructure. So, after the gap analysis, they can do the rectification.

There is yet another group which is working on cyber laws and cyber forensics. There is one more group. So, there are five groups and all have been chaired by the Ministry of Information Technology, but most of the government sector organizations and private sector organizations are working in tandem and we are working on this. This is one of the most important programmes today, which has been handled by the National Security Council.

Participant

I am from Australia. Just a brief comment. I think some of the speakers have already talked about the privacy and the security issue. Because I am looking for the compliance area, I would just like to know, have we taken any steps or are we looking at, in particular, I think if we wanted to have some collaboration with the public sector. It is an untapped area, as I think one of the speakers mentioned, 37 per cent IT money is spent on the IT in the public sector. So, I will be looking at some type of initiative from the Government of India.

Thank you.

Mr Sanjay, Telecom Consultant, Singapore

I am Sanjay, I am from Singapore. I am telecom consultant based there. I have to make two observations. The first is, Indian IT companies when they go abroad, they predominantly focus on the services and now they are talking about solutions. But if we say if we have taken a lead in the IT industry in the rest of the world, we have to make sure that we go for products. Unless we have products and branding and marketing, a key point of that, we won't get that high reputation in the world which is the key for selling and for our long-term competitiveness.

The second is, I am noting CII and FICCI organizing in Singapore a couple of events, where they are asking for investments, but they lack the sophistication that is required to bring in the private investors from those countries to come in here. So, I think a little bit more is done to network NRIs based in other countries. There is a need to increase the level of sophistication and frequency of interaction with the rich countries, especially those which can invest here. Predominantly, Singapore is one of them.

Participant

I think just want to clarify two points here. So, let me just do that. Moving from services to products is not moving up or down a value chain. These are two separate businesses. We have chosen the route for us in India, which is actually the best, it plays to our strength, which is services. Considering the constraints that we have, considering that we have a large number of people who have chosen something in which we are very strong.

EDS is a services company. So, it's not necessary that only products would give us a brand. We have a very strong brand, the number one brand. Outside of US, we are the biggest supplier of cross-border services in the IT industry. So, it's a very strong brand. We have developed the new knowhow.

If you had heard Professor C K Prahalad, offshore software development is an Indian invention. It did not exist before it came and the processes that we now have for delivery are more robust than any company in any country in the world. So, we have a big brand. We have sophistication in terms of attracting investment. Last year, which was a very bad year, we were amongst the top three recipients of Venture Capital in Asia. With Japan, Singapore and Australia and we are very, very similar, all about the 1 billion-dollar level. So, a lot has happened. So, I am afraid I don't quite share your pessimism. A lot more, of course needs to be done, which is what the industry is trying to move in. I just wanted to share that. This has been a good idea.

Participant

You know, about three years ago, I had the opportunity to host the Indo-Japanese delegation on behalf of the Government of Orissa, and the question that the Chief Minister of Orissa at that time asked the delegation leader was: "What is it that we should do so that we can attract foreign venture capital into India?" His one answer was: "Look around what your neighbours have done and follow that." He also explained that he was the President of Sony and that it takes him one month after his container arrives in Bombay to get it to Gurgaon. These are the obstacles. And he says: "I go to Singapore it takes hours, and not months."

Thank You.

Address by Ms Manju Sharma, Secretary, Department of Biotechnology

Thank you, Mr Chairman. I will just put a few points with regard to the biotechnology scenario in India today and what we expect out of joint partnerships, joint ventures, NRI investment and NRI collaboration with the Indian scientific community, as well as with the Indian industry.

All of you are aware that biotechnology today is a fiercely competitive field internationally, and the world over it is regarded as the frontline area for 21st century, both for research, for commercialization, for application and particularly for meeting the needs of the society. If you look at the current scenario and the market size of the conventional and modern biotechnology in this region, it is almost like US\$ 1.5 billion.

As for human healthcare products, they amount to about 60 per cent of the total market. Agro biotechnology, veterinary biotechnology products and animal healthcare, particularly diagnostics and vaccines, account for 25 per cent. Medical devices, biotech research, reagents and the supplies constitute 15 per cent. So, that is roughly the consumption pattern and how these products are in the market through various categories.

If we go to the relevant market for modern biotechnology products using the recombinant DNA technology, it is much smaller at the moment in India, in comparison to the many other countries in the west, particularly in the United States, some countries in Europe and Japan.

We are expected to grow from the current rate of 1.5 million US dollars to something like 35 to 40 per cent in the next five years. That is really a very exponential growth as has been targeted by the Indian industry. Certainly, some part of it comes through the help from government and also through joint ventures.

The Indian biotech industry now in the last five years has recognized that we need a large number of indigenous research leads, which need to be converted into products, technologies and processes. It is towards this that you would be amazed to know that in the last three years, with the publicly supported research, almost 46 new technologies and products have been transferred to Indian industries. From a small number of eight about six years ago, today the number of biotechnology industries, which are in the front-line areas of recombinant DNA technology, is more than 25.

Large enterprises in the country are engaged and these are not only going for the adaptation of technology or getting a technology from abroad, but what they are trying to do is to have a tie-up. An absolutely new synergy has come up with the indigenous research institutions and the industry, not only the large industrial players but also the SMEs, as we call them, the small and the medium enterprises. They have come up in a big way to have joint ventures with the scientists, with the universities and with research institutions. These are, of course, in the areas of, what I say, soft biotechnologies, softer options like tissue-cultured plants, floriculture, new types of bio-pesticides, and bio fertilizers, etc. They are not going into the high-technology areas of vaccines, diagnostics and new drugs.

One important point, which I would like to bring to the notice of this group, is that India today is very advanced in terms of research in modern biology. If you take this biotechnology sector out of the other areas of science and technology, both in terms of quality of publications, the citation index, the impact factor of the research publications, the individual status of a large number of very distinguished biologists in this country, the country has moved fast.

But we still have to catch up with the entrepreneur development and with the technology transfer and commercialization of biotechnologies. It is here that we are very keen to develop joint projects. Particularly, I seek the help of a large number of the scientists from abroad in terms of filling some of the critical gaps in our technology packaging, for clinical trials, for areas like bioinstrumentation.

We have a very major programme on nano-biotechnology, particularly relating to the drug delivery systems, the different types of biosensors. So, our interest is really not only to just attract, as the Hon'ble Prime Minister yesterday said, investment, but we are interested to attract an intellectual capital in this country, to get joint projects with Indian laboratories.

I have had a lot of consultations with the groups who have come here. Some of the groups have come and met me from very advanced centres of biotechnology in the world. There the scientists, the Indians are very keen to come and join and have research projects with us.

My department has a very unique feature that we have a Standing Advisory Committee overseas, which consists of about 12 non-resident Indian scientists, from the United States, from the UK and from Europe. They are very distinguished names like Inder Verma, Anand Chakraborty, and Gurudev Khush who are members of this committee.

This committee meets every year. Once in the department, two-three days we discuss all the large projects, we discuss collaboration, and I must say that it has been extremely helpful. In fact, one of the members of this committee I am sure the name is very familiar to this group, Anand Chakraborty. He was responsible for a new concept, which he introduced in India, which was the Biotechnology Consortium India Limited.

Now, this particular organization completely independent of the government is helping the publicly-supported and the privately-supported biotechnology research, on a common platform to bring it to an industry, to a product, to a new technology, etc. So, I would say that India is very well-poised in the present scenario to receive a lot of technological inputs, a lot of intellectual inputs through joint research collaborations as also through commercial ventures.

We are in very advanced stages. Probably, India is one country in this region where we have six or seven vaccines in very advanced stages of development. We are working on the malaria vaccine. Almost the first phase of the clinical trial is going to be there. The cholera vaccine recombinant strain, Phase II trial has been completed. In the next one year, we complete the phase III trials and put the vaccine in the market.

DNA rabies vaccine, probably, will be the first vaccine to be out in India. You will be amazed that an institute like the Indian Institute of Science, Bangalore-many of you are very familiar with that institute - is the cradle of basic research in the country. They have developed this DNA rabies vaccine, which has undergone all the trials. We are working on HIV vaccine, tuberculosis, Japanese encephalitis and cholera. Roto viral diarrhoea is again in collaboration with the United States, which is now entering into the phase I trial.

So, India is now looking at vaccinology as a very, very new area for collaboration with scientists from abroad. Similarly, diagnostics development and new areas in genomics we have entered into. Particularly, in the whole area of proteomics, we are very involved about it, and developing therapeutic proteins from the plants prospecting of the new molecules and new genes from the biological resources of this country.

So, friends, what message I want to give to you today in this brief intervention is that the Indian scientific community, the biologists I am talking are very well poised with a

strong infrastructure of biotechnology. If you see the government investment in biotechnology today, every year there has been an increase from 20 to 40 per cent. This year we have almost doubled our allocation of the biotechnology research.

So, it will not be the money which is going to be a problem. It is really the intellectual capital, which we would like to attract to particularly train our younger scientific community and to set up some joint ventures with our companies. I would welcome any suggestion in this regard, and I must also tell you that the government has given many incentives to the industry in the area of biotechnology to promote its growth an accelerated pace including arrangements for fast-track clearance. The commercial people are always worried about the delays in clearances and procedures. I must share with you that we have a fast-track mechanism where foreign direct investments can be cleared very fast.

Thank you.

Participant

I know I have spoken before, but you ask for suggestions on collaborations. My husband is involved with biotech policy and we were in Nicaragua, where one of the biotech labs from Boston is funding a whole university department and using it as their research department for biotech. So, they give all the quality equipment, they fund it and use it. I was wondering why India cannot offer the same to some of the people in some of the biotech companies in the Boston area particularly.

Ms Manju Sharma

We will be very happy if we receive a proposal like this. As I said, I have already received a proposal. A group from Duke University from USA has met me with a similar proposal to have some joint collaborations and use some of our facilities for advanced research.

Participant

If I may just make one more point before I sit down and I can talk to you later, I have talked to a few companies in the Boston area, and their greatest issue was the issue of confidentiality and quality and timelines. So, I think we need to keep those in mind again.

Dr Ajay Singhal

My question is for the chip industry. For the chip design, there was a comment made earlier. My name is Dr Ajay Singhal visiting from Austin, Texas. I have been in the semiconductor industry for about seven years. Currently, we see programmes called Veda or Vedanta facilitating areas like chip design, which is quite exciting to see, but we don't see any programmes directed towards semiconductor technology and chip fabrication, which is where there is a lot of focus that we see in China. If we separate chip technology from chip design, which go hand in hand, I am wondering what the panel thinks about that.

Participant

You know in India, we do see that there are strengths, which we have in chip design. On the hardware side, we have a Catch-22 situation, where setting up a mega fab does not seem to be feasible in the near future, because there is overcapacity worldwide and nobody and no major mega fab provider is willing to do that.

It will probably take two more years for the existing capacity to be completely utilized before they would look for creation of new capacity. But where we can really make a difference, is on the chip design side. We are now launching a programme, which will eventually scale up to create 3,000 M.Tech. in VLSI design.

We do believe that we probably do not need all this manpower domestically. We are planning to have this manpower so that we could meet global requirements and our people would then be in very important positions in MNCs all over the world, in terms of chip design. In tomorrow's hardware prowess that we will create would be through the design route. We would then be able to get into intellectual property, and then fabrication could become only a contract operation.

Mr Navi Raju

My name is Navi Raju. I am a senior analyst at Forrester Research. I just noticed that actually someone from the National Security Council has been appointed to act as a key liaison between India and the US in what is known as Trinity Cooperation Areas, namely, space, energy and hi-tech. I just wondered maybe we should include our biotechnology along with those three areas, because I think that could be another area of major focus for cooperation at the national level between the US and India.

Ms Manju Sharma

Thank you for this suggestion. We have a very major programme with the United States for the vaccine research and development, which includes up to the commercialization stage. We also have a programme with the United States for contraception research and developing products for population control. But there is an Indo-US forum, which was signed, when Bill Clinton, the former President of the United States, visited India. In the joint communiqué issued by the Government of India, amongst the two areas, which have been listed, are both information and biotechnology.

So, it already figures under the Indo-US collaboration in a big way. We have been having discussions with a business group, which came from the United States prior to this meeting with regard to the business in biotechnology.

Address by Mr Anupam Govil, Director, Inventes Inc, USA, President, TiE Chapter, Austin

Hi everybody. I am Anupam Govil from Austin. I am in the venture capital industry and also the President of the TiE Chapter there.

Just a quick point about some of the concerns brought up about venture capital not being available in India, as well as opportunities not being there. I think both are myths. Venture capital is definitely available as Saurabh pointed out. I mean, India is the fourth-largest VC industry in Asia and growing pretty rapidly.

We actually have a fund called 2I Capital Resource, which is cross-regional investment in India and US. The problem that we see is that most entrepreneurs here don't think of innovation. They think of replicating the models which are still a hangover from the dotcom sort of boom that happened and even the BPO rush that we see right now is the manifestation of that.

However, I mean, there are certain impediments. There is not much of a domestic industry. So, entrepreneurs often have to market it outside and they are strapped for resources. But again there are opportunities, there are diamonds in the sand and in the coal that's out there. For example, somebody talked about last-mile problem. Why could not Birlas or Navini Network, which solves that through wireless accessibility, have been created here in India, because that is a real problem.

Similarly, there are many other local issues that have also global applications that entrepreneurs should look at and the other factor is also that in the US and Silicon Valley, for example, a lot of companies started through a confluence of collaborations between universities and research institutions. That is again something that does not exist, you know, as a strong force in India. I hope that is developed through the government's interaction and through some other IITs and other institutions taking a lead role in not just doing research but also focussing on commercializing the technology that is out there.

I think that could really take India to the next level and create a product industry, which is definitely separate from the services industry. In fact, any services company trying to do products often fails. So, there should not be confusion in that. And I think there is really a lot of scope for India in the years to come.

Thank you.

Participant

This question is to Ms Manju Sharma. Madam, I would like to know what is the Government of India's policy and plan to cope with educational infrastructure to meet with graduates in biotechnology. Especially, it has often been compared with the engineers and the graduates at the state level, not at the Institute of Science and IITs but at the state level.

Ms Manju Sharma

The Government of India started the systematic efforts in biotechnology way back in 1982, and since then till as on date now, we have almost 64 major programmes all over the country in universities and research laboratories in IITs running for M.Sc., postdoctoral biotechnology courses.

Every year, there are more than 900 to 1,200 scientists who are coming out of these programmes highly trained. You will be surprised to know that initially first four years, all these youngsters who got training, which is a very high quality training, most of them, 60 per cent of them went abroad for postdoctoral research.

Now, we have tried to reverse the trend because of the industrial interest in biotechnology, almost 22 to 25 per cent of the students out of this 1,000 students who come out every year, go to biotech industry. We are also starting a major initiative in the regional engineering colleges along with the Ministry of HRD for bioengineering, bioprocess technology, fermentation technology, courses particularly related to industrial aspects and downstream processing.



We have gone to the law schools to organize courses on IPR-related matters in biotechnology. So, the human resource development programme of the Government of India is a very strong programme. This is complemented with the very vast network of Bioinformatics Centre, 62 bioinformatics centres all over the country. These centres are also offering advanced courses in computing biology, structural biology, genomic, and data analysis, data annotation, comparative genomic, etc. So, the bioinformatics and biotechnology courses almost more than 200 all over the country are really catering to the requirements of the trained human resources.

Thank you.

Mr Ravi Mehra

Hello, my name is Ravi Mehra. I am from Iran. The theme, which I read out, is the India Diaspora.

Participant

I think one point, which we are going to have, the kind of association between the Non-Resident Indians and the Government along with FICCI or whosoever is active in this to address our problems and as to how we can jointly work out, strengthen the relations between the Non-Resident Indians and India within the time frame and, what you call, the accountability. I don't know how the Chairman is going to answer this question, or maybe this is, what you call, where you address the people and go home, no results, maybe come back next year, talk again and forget all about it.

May I ask this question from the Chairman, what have you done?

Mr Saurabh Srivastava

Firstly, all conferences and seminars have certain objectives. What results through the interaction of thoughts, interaction of communications and the networking. A seminar is not supposed to create joint ventures. People are supposed to do it.

Let me just explain. On NRIs, you asked me a question. Is networking happening absolutely? What is the TiE network about? It is 8,000 people. It is NRIs from across the world and from here those networks happen. So, what else would you expect a conference to do except try to catalyze, bring people together, try and connect them. Have thoughts shared and then it moves forward. Now, I am talking on behalf of the Pravasi Bharatiya Divas as an organization. I am only talking of this session, in this seminar, which is the one that we are co-chairing.

Participant

Our hope at this session is to have everybody come, present views, think around a common agenda, share and adhere with all of us whether from government, whether from venture capital industry, IT, biotech. We would have some more wisdom than we had when we came and hopefully try and make some connectivity. So, I would have thought if the answer to your question would be, that would be hope that we achieve. I don't know what else you would have expected.

With that, if you don't mind, I think we probably should close the session now because we are running a bit late. So, thank you very much for being here.