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Keynote Address

HUMAN DIMENSIONS IN THE INFORMATION AGE

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W*E* are living in the information age. More precisely we can say we are living in the age of information technology. The synthesis of computers and communication has added a totally new dimension to the way information is processed and thanks to development like Internet, the way business transactions are being done is also undergoing dramatic changes. The issue before us in this conference is what are the human dimensions in the information age?

When the industrial revolution started in the eighteenth century, machines became more dominant and there have been questions in the past whether human life is worth it in the age of material prosperity and where machines were dominant. The poet Sahir Ludhianvi penned the words *mitti ka bhi hai kuch mol magar insan ki kimat kuch bhi nahin*. But this is changing dramatically in the information age. So the first impact of the information age or the age of information technology is that human beings are being brought to the centre of attention. After all in the technologies of the past, we found that materials accounted for a greater part of the price of a product. One kilogram of steel is 90 per cent iron, cobalt, nickel, manganese, chromium and 10 per cent steel technology. On the other hand, today's modern software whether it is Lotus 123 or Java is 95 per cent technology and only 5 per cent material. Technology is congealed knowledge and knowledge is in the brains of the people. Therefore people become important in the information age. We find increasingly that instead of using the words human resources which we were using in the past comparing human's as resources like natural resources, one of inputs needed for the machine or the industry, today we are using the words human capital. This is an important aspect to be realised.

The significance of this for a country like India is immense, because we have a large population. We used to talk about the population problem. But in the information age, because of the human capital we have, we can talk about our population advantage. Even from a crude sense of market, India with its billion strong population becomes attractive. India is a country and not a market. Today if we are not able to attract a much larger investment the blame can be placed on our policies which are still being framed under the influence of the fifty year old legacy of the permit licence raj.

Corruption is another factor that is eating into our system. When you talk about the human dimension in the information age, if we are able to upgrade our human skills, we can really leapforward.

It will be worthwhile to examine at this stage why India is today considered as a strong presence in the information technology. What is the secret of India's IT strength? India's exciting success in information technology (IT), particularly software exports has been realised even by our political leaders. The Prime Minister says: "IT is India's Tomorrow". Have you ever wondered what is the secret behind India's success in IT? Prof. C K Prahlad, in a talk delivered a few years ago gave away

the secret casually. He said the IT industry in India is not burdened by the baggage of the traditional old industries. I am afraid that this fact is not fully realised and all sorts of reasons are attributed for the success of India in IT, especially in terms of software exports.

The first important fact to be appreciated is that in IT, merit and merit alone, counts. It is true that in our country the policies after independence have been very much geared towards social justice, reservation, affirmative action and so on. While they might have brought a lot of social benefit, the net result is that India is not fully utilizing the brain power it has in the communities which are not favoured under the affirmative action programme. Software which is open to global competition is based on the iron rule that ultimately success depends only on merit. This has provided an opportunity for India's brainpower to assert itself. India's tradition in abstract thinking in mathematics, familiarity with English and the Indian's multilingual ability have provided the competitive edge in terms of merit. The fact is that India has merit and this merit was not suppressed so far as software is concerned.

The second reason is that even if people are willing to work, our labour laws and the trade unions have ensured that maximum remuneration is got with minimum effort. Productivity based incentives in our industries have mostly been an exercise in consistently reducing the standards of performance required so that while one can on paper show that we have performance based incentives, in reality, our productivity is way below the global standards. That is why, when it comes to global competitiveness, we are almost at all the tail end, ranking 50 out of 53 countries, according to the World Competitiveness Index.

In software, fortunately, the dead hand of trade unions and the militant labour culture has not penetrated. In an interview in Times of India on 13.7.2000, Shri N R Narayanamoorthy, the current icon for success in the new economy spelt out the philosophy of the software engineers beautifully. He said software experts will have to live, dream and breathe software. "Certainly I live, dream and breathe strategies for making a software company more and more successful. Our offices are open 24 hours a day, you get breakfast, lunch and dinner. We have created an environment where it is possible to live, breathe and dream software all the time. A few generations will have to work 20 hour days and 18 hour days. That is a small sacrifice that we have to make so that our children and our grand children will get a better quality of life, so that no child in India will be without access to education, shelter and food."

Contrast this with the attitude of the traditional industrialists of the old economy. They have thrived in the four decades of permit licence raj by wheeling and dealing. Nearly $100 billion of India's black money is in foreign banks. The old economy leaders would like to enjoy holidays abroad, and the employees would like to enjoy the benefit brought to them through the labour aristocracy's demand.

That brings me to the third reason for India's strength in IT. Software is focused on creating wealth, whereas all the political rhetoric since independence has focused on eradication of poverty. In this age of globalisation perhaps, having failed in our socialist strategies to eradicate poverty, we should give an opportunity to the opposite philosophy of creating wealth. Software is a classic industry where wealth is created with enterprise and merit alone without having to depend on family background or contacts. In the old economy, bankers would look for safety in investment, whereas in the new economy, venture capitalists and angel funds, rush where the old bankers would fear to tread.

There are some who consider that the Indian IT industry succeeded because government did not mess up with it. In fact, one of the jokes going around is that our Indian girls are beating the world hollow in the beauty contests for Miss World and Miss Universe because the Government of India does not have a Ministry of Beauty! Fortunately, this argument is not valid for IT. The Minister of

Information Technology (MIT) in its earlier avatar as Department of Electronics had struck a strategic alliance with the industry and provided critical infrastructure like earth stations for high speed communication and the right policy package. Everyone in the IT industry is aware of this fact though those outside this sector may not be aware of the critical role played by the Department of Electronics.

Finally is there a danger that the new economy and India's IT strength also will ultimately become a victim of politics and trade union movement? Fortunately thanks to the liberating effect of IT and concepts like Small Office Home Office (SOHO) operations, this danger can be avoided. Software and IT are primarily designed to give full opportunities for individuals to flourish. When the individuals have got opportunity to flourish, I do not think they will succumb to the charms of the herd mentality or mob psychology which underlies much of politics or the trade union movement.

The challenge before us is that while we can think of applying IT in the old economy in a purely technical sense of computerising manufacturing operations in the old industries or applying IT in management of the old industries, can we also bring some of the unspoken but very real factors or merit, commitment and a vision of creating wealth, which are driving the success of IT to the old economy?

This will mean that if we have to build on our human capital, we must be able to upgrade the skills of the people and we cannot afford to be a half illiterate country carrying perhaps the largest illiterate population in the world. Here again the information age and information technology gives us an opportunity to provide what I will call a free launch in the knowledge economy so that our people can learn the skills and become literate.

The condemnation of the decision of the government to give rent-free telephones to the employees of the Department of Telecom attracted was based on the current conventional wisdom of the liberalised economy that when it comes to economic activities, there is no free lunch. Subsidies are passe.

Even though free lunch belongs to the unfashionable past, a little reflection will show that in the knowledge economy that we are entering, free lunch has a very important role to play. One cannot tar with the same black brush any decision which smacks of giving something free. Education perhaps is the best way of enhancing human capital. The critical role played by scholarships in the life of many eminent people who distinguished themselves in science, politics, law and so on had the benefit of a critical financial assistance by way of scholarship at certain stage in their lives. The significance of the free lunch of scholarship is well recognised so far as the "knowledge" part of the knowledge economy is concerned.

When it comes to the "economy" part also, the freebie element has a critical role to play. Look at the cable TV revolution in our country. This would not have been possible but for the fact that a lot of good quality content by way of entertainment, education, and news programmes were available through a number of free channels like CNN, STAR and BBC as well as the Discovery Channel at certain stage of development. As the content was freely available from the air, entrepreneurs practically in every street corner could string the cables and bring the cable TV revolution to the 30 million homes in the country.

The freebie element is even more true of the life blood of the emerging world of e-commerce, namely the Internet. In a fascinating book called. "A Brief History of the Future", John Naughton has highlighted how ultimately the Internet grew based on values. "What are they?" The first, is, it is better to be open than closed. Lessig makes the point that there have been electronic networks since late 19th century but there were predominantly proprietary built on the idea that protocol should be private property. As a result, they 'chunked along at a tiny growth rate'. He contrasts

this with the web where the source code of every single page is open – for anyone to copy, steal or modify simply by using the view: Source button on their browser – and which is the fastest growing in human history. Non-proprietary, public domain, dedicated to the commons indeed some might think attacking the very idea of property yet generating the greatest growth of our economy has seen. It is the ultimate paradox of the knowledge economy.

There is a lot of focus on protecting intellectual property rights but while they are important, spectacular growth has been achieved in the knowledge economy because certain invaluable assets were free. So we should not underestimate the critical role of the free lunch in ensuring economic development in the knowledge economy. It is fashionable these days to talk about a target of $87 billion for the Indian software industry by the year 2008 based on McKenzie study organised by NASSCOM from the present level of about $5 billion. The basic issue is how are we going to achieve this target unless we are able to produce a very large number of software engineers and technocrats? We need three million software experts per year. We produce only 65000 and there is shortage of 2.35 million experts.

The approach to producing software manpower is based on glamourous and highly capital intensive strategies like the Indian Institute of Information Technology in Hyderabad and Bangalore. These will produce high-end software engineers. Prof. Narasimham, one of the eminent computer experts has recently identified four different levels of expertise needed for developing human capital for software. We need Generals and Brigadiers for our IT army, and we also need a lot of foot soldiers. Where are they to come from? We are witnessing the growth of a lot of hole-in-the-wall teaching shops. But what about the quality of training? It is here, I think we should systematically provide for a free lunch on the lines of the contents of satellite television broadcasts. NASSCOM or for that matter anybody else concerned with the growth of the human capital in software should come up with free teaching material in multimedia format for different levels of software training courses.

Prof Narasimham's report can be taken as a starting point. Leading professors and experts should grade the contents into lessons and teach them. These must be recorded on video tapes and CDs and even put on the web site of NASSCOM. Just as the cable TV operators downloaded the contents from the satellites and served the customers, a massive number of training institutions could be built on the excellent quality, graded training material which should be available free in the multimedia from the NASSCOM web site. Throughout the country, our young boys and girls can then get the best of training. The challenges of developing the human capital to meet the demands of the emerging knowledge economy can be effectively met.

The basic fact is that while everybody would like to go to IIM or IIT, undertake a course and then jump on to the high paying jobs in the Indian software industry or the multinationals, how many are willing to go and teach there? This is the great weakness and a dark area which is never highlighted in all the current hype about the India's information technology industry. If we can only provide the free lunch of excellent course content which will be readily available through the Web or other media for the aspiring youngsters of India, we would have resolved the catch 22 situation arising out of lack of good course content and quality teachers in adequate numbers. Will NASSCOM and the drum beaters for the IT rise to this challenge?

Yet another human dimension in the information age is the enormous significance and the value attached to the intellectual property rights. We must be able to capitalise on this and I would suggest for your consideration the following strategy to build on the human capital in India especially when it comes to generation of technology and capitalising on that strength.

The frustration of the developers of technology in Indian laboratories who have come with good products but who face a stone wall when it comes to marketing has to be seen to be believed. For

example, the Central Scientific Instruments Organisation (CSIO) came up with the pulse oxymeter which costs only Rs 30,000 against the imported variety which is double the price. Still there are no takers. This is a product that will be needed practically in all the primary health centres and hospitals. Another product which has been developed by CSIO is the Linear Accelerator for radiation treatment for cancer patients. The CSIO provides back up service but still the hospital administrators will prefer imported machines which do not have the service back up. The glamour of the foreign brand enchants on the minds of the decision-makers.

Swadeshi is not a very fashionable or popular concept these days. These are the days of globalisation. If at all we want to talk in favour of things local, we will have to make it a part of the slogan "Think global act local". When it comes to Indian or swadeshi technology, I think we have to take this slogan seriously to ensure that the Indian scientific talent and India's capability for research do not meet an untimely death.

As I see it, the scenario is grim. The only area of technology in which we can expect indigenous technology to flourish are the strategic areas like nuclear science, missile technology and space, where we will not be able to get foreign technologies for love or money. As regards all other commercial technologies, even though we have a huge network of CSIR labs there is a great danger that globalisation will take its toll. This is because the most Indian companies would prefer to go for foreign technology, which are proved and have a world market. When it comes to projects funded by international or bilateral agencies, the aid givers ensure that indigenous technology is not encouraged by imposing conditions that the technology must have been tested elsewhere. A classic example is the High Voltage Direct Current (HVDC) technology. We have spent more than Rs 100 crores to develop this technology through coordination between Departments of Electronics (now MIT) and Heavy Industry as well as BHEL. Nevertheless, still all the major HVDC projects so far have gone for imported technology. Thus the two major consumers of indigenous technology, the private sector and the major projects implemented by Government of India's public sector with international assistance, are heavily weighted against indigenous technology. India is a member of the WTO and has to respect the broad conditions under which the WTO operates to promote global trade by bringing down tariff barriers. Building arguments for swadeshi technology on the ground that we should not be technologically blackmailed will not find many takers.

It is here the idea of thinking global and acting local becomes important. I would suggest three specific strategies by which we can give a boost to indigenous technology by applying this idea. The first is systematically to take patents in the United States or countries like Germany or Britain for our indigenous technologies which have been developed in various laboratories and which are languishing like the sleeping beauty. Any day a US patent will have more market value than and Indian patent in the global market. Added to that is the fact that the average time taken for getting a patent in India is six years whereas it is 22 months in the United States. Government should therefore set up a Rs 100 crores fund whose main purpose will be to get US patents for indigenous technology. This can be a good starting point for marketing globally Indian technology. The second strategy is to amend our Patent Act to be completely in tune with the intellectual property rights regime approved by the WTO. This will give sufficient confidence to the foreign companies and multinationals to use the brains available in Indian labs to come up with joint development of technologies. The excellent work done by Dr Ashok Jhunjhunuwala in IIT Chennai in developing CORDECT Technology with Analog Devices of USA and an Indian private company is an example of thinking global and acting local in developing indigenous technology.

The third strategy is aimed at one of the unmentionable aspects of marketing indigenous technology in India. Many a time the decision-makers who select technology are attached by the glamour of foreign trips which the Indian labs and companies cannot provide. I would therefore suggest that as conscious marketing strategy the Indian developers of technology should throw in foreign trips

designed and designated as education trips as a part of the technology offer. After all the argument of education has been already advanced in some contracts in the past and this will meet one of the perennial problems faced by Indian developers of technology in marketing their products. Of course there is another unmentionable aspect of the decision making in selection of technology which involves kickbacks in terms of accounts in foreign banks. This must not be emulated by the Indian companies. There is a *lakshman rekha* for being global!

A fourth issue that is being raised in the context of information technology is the so called digital divide. The finance minister for example thinks that in India itself a digital divide is emerging between the states like Tamilnadu, Karnataka, Kerala, Andhra Pradesh, Gujarat and Maharashtra which are ahead in using IT and using e-governance. At the same time, the BIMARU states – Bihar, Madhya Pradesh, Uttar Pradesh and Rajasthan are lagging behind. I think we will have to soon make an exception for Madhya Pradesh because there they seem to have realised this and with a forward looking chief minister like Shri Digvijay Singh they are trying to fast catch up with the advanced states by using greater empowerment of the people.

The digital divide itself can be bridged by using information technology. In fact that brings me to the whole issue of e-governance. The dramatic impact of information technology (IT) has been felt worldwide. Nearly three decades ago, Alvin Toffler coined the expression "future shock" to place in a proper perspective how in the last three hundred years the industrial revolution and particularly technological advancement has brought dramatic changes in society. He drew attention to the pace of change taking place in such a manner that the human system which was designed perhaps for a slower pace of change and evolution experienced what he called the "future shock".

In this book "The Third Wave", Toffler looked at the process of development of societies and identified three waves of development. First came the agricultural wave, then the industrial wave and finally the third wave, the post-industrial wave. We are in the era of the post-industrial wave of information technology – the synthesis of computers and communications. Telecommunications has resulted in the death of distance and made the world a global village. Technology has always had an impact on society. When writing was invented, man was able to overcome the problem of distance and time and establish a process by which communication can not only be carried out beyond the physical human reach but even beyond time.

While technological changes may be taking place rapidly, more so in the advanced and developed countries, the developing countries are also fast catching up. A large country like India is like a large snake, whose head is in the 21st century and the tail still in the 19th century. Here we can see all the three waves of Alvin Toffler – the agricultural wave, the industrial wave and the post industrial wave – existing together. The dynamics of the impact of technology on such a country has many dimensions. In a world which has shrunk to a global village, and where ideas and technologies move very fast, the impact of technology on a developing country like India can be many times totally different from that of the developed countries. Technology, in turn also provides excellent opportunities for the developing countries to make innovative use of it and also catch up with the developed countries.

Dr Vikram Sarabhai who was responsible for launching India's space programmes and develop space technology used to say that a developing country like India, which was a late comer to technology had an advantage over the developed countries who were the pioneers. This is because India and other developing countries can leap frog through intermediate stages of growth. They also can avoid the mistake of the pioneers.

Late comers in technology like India have a cost advantage also. In the context of IT revolution, for example, highly wired countries like the United States which have well developed wireline communication, may find that going in for wireless technology or optic fibers may have a cost

implication which may not make a substitution of the existing copper wireline by optic fibre financially attractive every time. On the other hand, India, which hardly has a telephone density of two can go in for modern wireless communications as well as go for optic fibre which provide enormous bandwidth without looking too much into the cost aspects. Again thanks to the still operating Moore's law, the cost of information technology equipment and services is coming down all the time. This is eminently suitable for India because cost effective solutions can be found.

In the context of a country like India catching up with progress in information technology, I have been highlighting a 6-C formula. We must focus on six C's namely Computer Density, Communication, Connectivity, Cyber Laws, Cost, and Common Sense.

Having been connected for more than ten years with information technology scene in India, I have seen how India has been able to internalise and use innovative solutions also to take advantage of this technology to meet its problems and purposes. In other words, today the importance of information technology is recognised not only by technocrats and the business but even by the political leaders. The Prime Minister of India has gone on record to say that IT is "India's Tomorrow".

In the seventies and eighties there was a debate about the so called appropriate technologies which may be suitable for developing countries. This was the time when Schumacher's concept "small is beautiful" was fashionable. But then any discussion about appropriate technology has also left a lingering doubt in the minds of some policy makers in developing countries whether this was an attempt being made by the developed countries to keep them perpetually at an arms length from the latest technologies and thereby deny them the benefits of advanced technology. Fortunately the globalisation process has made any talk about appropriate technology irrelevant in today's context. Globalisation means that four elements of the economy – physical capital in terms of plant and machinery, financial capital, labour and technology move across borders very fast. I am not denying for a moment that in under developed countries where for example power may not be available, a computer which is based on the concept of mechanical winding of springs may be still workable. But coming from India, I think we should take advantage of the process of globalisation for making the best use of information technology in particular and other technologies in general to solve our problems whether in nation building or services.

Imagination can be the lever to enhance the impact of technology to solve problems of a developing country. Telecommunication is a very vital part of information technology today. A country like India which had in the eighties hardly a telephone density of 1 against the world average of 10, had to find a solution about how to improve accessibility to those who cannot afford to pay for a separate phone. On mid eighties, thanks to the visionary spirit of Sam Pitroda who became the Telecom Czar of India at the time of Rajiv Gandhi, the most technocratic minded Prime Minister India had, the concept of public call offices with long distance facilities in the form of STD/ISD booths, was born. As a result today in India there are thousands of public call booths from where long distance calls and international calls could be made. Even people who cannot afford to have their own telephones can have access to the telephones. A spin off benefit of these booths is the vast employment opportunities they have provided.

The innovative use of technology finds many expressions. Recently in the Time Magazine there was an interesting story of a slow travel from Sapporo in Japan to Surabaya in Indonesia. One of the interesting thing they reported was that in South Korea, a simple concept of taking a bus fitted with an antenna and computers to go around the fields in the rural parts of Korea so that the farmers can have access to Internet has been implemented. The article in Time dated 8/21/2000 called *Wired Farmers* says:

To quicken this trend, the Korean government is bringing computer training to the hinterland. It has outfitted a bus with a server, a satellite dish and 15 notebook computers. The bus travels

around the countryside giving two-day seminars for farmers. "All we need is a parking space", says the Ministry of Agriculture and Forestry's Kim. The vehicle should teach 1000 farmers basic computer skills by the end of the year, and more buses will be added next year.

On a recent afternoon, the mobile computer bus was a Kongju City, 160 km south of Seoul. The first order of business was to put the students, mostly middle-aged farmers and their wives, at ease in the alien environment. The teachers emphasized that no one would be blamed if the computers were damaged. "Many farmers visibly shake while moving the mouse because they are so nervous", explains Hahm Tae Soo, a college student volunteering his time on the bus. "Some press down on keys until their wrists hurt. They believe that the buttons need a hard push to work".

By the end of the course, each student has a basic understanding of how to use a computer. Soh Byung Ho, a cucumber farmer, attended with his wife and laughed about their apprehensions on the first day. "We looked at this machine and wondered how to open it", he says. "The next challenge was starting it". Some of their neighbours are already wired up. Kim Myung Kwan, 32 says he checks online information on cucumber supplies in South Korea and now sells his cucumbers from 30 percent more than before. "In farming today", he says, "the first requirement is the computer, not the land".

The concept of using information technology right through government systems and thereby for e-governance is also gaining ground in India. In fact, today there is a healthy competition among the various states in India for e-governance. A quick look at the status of e-governance in the States of India will not be out of place here.

The beginning of the 21st century has been so much dominated by information technology (IT) that the joke is that in the dictionary all words will now start with the letter "e". Perhaps existence itself will now become e-existence. It is therefore not surprising that we are talking about e-governance. A little reflection however, will show that there is a lot common between information technology and government. Governance involves processing a lot of information and also ensuring that decisions taken are fair and objective. It is the need to ensure objectivity that results in red tape because government has to keep records and accessing of records become a problem. If the system is based on paper, as most of the systems now are, the time taken to access information is very high. It is possible to reduce the time taken by using intelligent systems but still so long as precedents have to be traced and access to information is based on files, there is bound to be delay.

IT, particularly computers and communication are designed for speedy processing of massive data. Information retrieval also becomes almost instantaneous. We have in governance, a very old function and in information technology, a very new technology, which seems to answer some of the perennial problems and complaints about government.

Andhra Pradesh has championed the concept of smart government. As I understand it, smart government stands for Small, Moral, Accountable, Responsive and Transparent government, The question before us is can the application of IT in government functions lead to not only e-governance but also smart governance? We may examine these issues systematically. We can have a small government through intelligent application of IT. Governments are known for the operation of the Parkinson's law. Professor Northcote Parkinson discovered the law when he found that the British Navy, after the end of Second World War employed more people than during the height of the war. Normally one would expect the navy to have large manpower when a war is on and not in peacetime. But Prof. Parkinson showed how the bureaucracy had a tendency to expand. This is because of the operation of the Parkinson's Law – "work expands to fill time available."

When we became independent in 1947, the whole of India was ruled by the British from the North Block and South Block in the Central Secretariat. Today Delhi is crawling with a lot of bhavans

and a lot of officials. The same has been repeated in also in different state governments. The questions is can IT applied in government lead to a small government? The Fifth Pay Commission recommended that at least the 2,30,000 jobs that were vacant should not be filled up and should be scrapped. But the government could not implement even that recommendation. Even today while in seminars recommendations are being made about downsizing the government, so far as actual action is to be taken, there is tremendous reluctance. It is in overcoming the impasse that IT can help.

We have however seen some healthy development in some government departments. The computerisation of railway reservation system is a case in point. Wish the same staff, nearly double the work is now handled. Here is a case where normally bureaucracy in terms of number of government servants would have increased to handle the increased workload but by using IT, the productivity of the government servants was enhanced. Thus the objective of small government can be achieved by intelligent use of IT.

We then come to the moral aspect of the government. A moral government is one, which is less corrupt. IT can help in checking corruption. We are in the age of information technology. We are also in the age where corruption has become a national menace. The Transparency International in its Report of 2000 mentions that so far as Corruption Perception Index is concerned India ranks 69 out of 90 countries. The Human Development Report 1999 published by Mahbub ul Haq Centre, Islamabad says that if corruption level in India can be brought down to that of Scandinavian countries, the foreign direct investment will go up by 12 per cent and the growth rate will go up by 1.5 per cent of the GDP.

Information technology is also making its presence felt in India. India is not only a corrupt country, it is also a country hoping to emerge as an IT superpower or a software superpower. The interesting point for consideration is can IT be used to help India become an economic superpower by checking corruption? To understand this, we must understand the dynamics of corruption and dynamics of the IT. So far as the dynamics of the corruption is concerned, corruption flourishes in our country because of the following five reasons:

- Scarcity of goods and services
- Lack of transparency
- Complicated rules and red tape which encourage corruption through speed money
- Legal cushions of safety created for the corrupt people under the very healthy assumption that everybody is innocent till proved guilty, and
- Tribalism or biradari between the corrupt. We talk about people being thick as thieves

It is therefore logical that if we can tackle each of these five causes of corruption, then to that extent we must be able to check corruption. The question therefore is whether information technology can help in tackling these causes of corruption and thereby help us to make our country an economic superpower or an IT superpower. Now, let us look at the features of information technology. The first feature of information technology is its capacity for processing information very fast. To use Bill Gates' expression, probably you can do business at the speed of thought, thanks to information technology! In fact, we know that delay in procedures and lack of speed in decision making is breeding grounds of corruption. This immediately leads to the conclusion that if we are able to use information technology, we must be able to speed up the processes and to that extent reduce corruption. For example, in Singapore, in 1989 they were taking three days to handle port proceedings/formalities. But, by using Electronic Data Interchange (EDI) the three-day time limit was brought to 15 minutes. Imagine the velocity of business going up in our government

systems by using IT extensively. Automatically, the present temptations for corruption and the scope for speed money will be greatly reduced.

There is yet another way by which the information technology can help in checking corruption. For instance, the legal cushions of safety which we have provided for the corrupt help the corrupt people to use the very legal system and engage the best legal brains to quibble their way out of their charges and laugh all the way to the bank. Many a time cases fail because documents cannot be produced in the courts. It is very obvious that sensitive case fails and the documents have a tendency to disappear or get destroyed. The information technology can help here in a peculiar way. If every office were to scan documents of a sensitive/secret nature and preserve it in memory, then it should be possible even in the absence of original document to produce confidence sensitive documents from the memory of the computer and prove the case in a court of law. Of course, this will also mean enacting cyber laws. Again there is a happy development that Government has already enacted the Information Technology Act 2000. So, even in effective punishment of corrupt, IT can bring a valuable input to bring the guilty to book.

Information technology can also help in building databases. The National Crime Records Bureau, for example, has got data about the corrupt elements and their modus operandi. The police normally use the manual system. If the police were to use the extensively computerised IT system, it should also help to bring the corrupt and the fraudsters to book much more effectively and much more speedily. These are some ideas about how information technology can help to fight corruption. What we need is a greater display of imagination in locating causes for corruption and seeing how, in each, IT can help.

We then come to accountability. Using IT can enhance accessibility of government and in turn lead to greater accountability. Combined with a Freedom of Information Act, it is possible to use IT, as probably Andhra Pradesh is doing, to put all the government orders on the web-site and also have information kiosks where government offices can be easily accessed. Not only this, but the services to the public also can be enhanced by access to the public.

The next issue is the responsive aspect of government. Responsiveness of the government automatically increases because greater accessibility and accountability goes with a greater sense of responsibility. We then come to transparency in government. We have already seen how for instance, greater access to information and the web site experience of CVC can help in ensuring that the public at large can know that the government is doing and how it is doing its jobs. In short therefore, SMART government is possible through e-governance.

Yet another human dimension of the information age is that it provides new opportunities for artisans and people in rural area to overcome the problem of space. They can access the latest information and also access new markets like the lady in Kutch who was given a massive order for ties by the American multinational TieRack. Similarly problems of education and health can also be effectively overcome by using information technology. So there are a lot of positive opportunities for development which should made the information age also a highly humane age.

Ultimately in information technology IC is important. In electronics IC means integrated circuits. In Silicon Valley it means Indians and Chinese who are very successful. But for the information age to become really a humane age, we need another type of IC – Imagination and Commitment. With this IC we can make the information age serve the benefits of all concerned and the old Hindu concept of *Sarve janah sukhino bhavantu* can be achieved.