IT for the Common Man: Lessons from India

M.N. Srinivas Memorial Lecture
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I am honored by the invitation to deliver the Second M.N. Srinivas Memorial Lecture. It would be inappropriate for me to try to speak about the qualities of Prof. Srinivas, when so many of you in this audience knew him better, longer, and in greater depth.

But I cannot resist one comment. It is unusual when a distinguished scholar in his 80s dies peacefully, a man acknowledged throughout the world not only as the father of Indian anthropology, but in the words of one of my colleagues "the world's greatest anthropologist", a man who has been intellectual father, teacher, guide, and as James Manor put it, "my only guru" to so many, a man whose life has brought him honors from every corner of the world - it is unusual, I say, to feel that he died prematurely.

But this is precisely what I and many others felt. Prof. Srinivas remained a young man in heart and in mind - open, perceptive, interested in the modern world, deeply committed. I remember his last talk, "Obituary for the Caste System". It was the work of a brilliant 25 year old - original, committed, creative, controversial, passionate. I remember especially his daring conclusion that the caste system was indeed dying, but that it would not die without violence and a bloody struggle. Whether we agree or disagree, these are the words of a man in his prime. May we all live to retain such a youthful heart and mind!

The Basic Question

My topic is one Prof. Srinivas encouraged me to pursue, namely the role, if any, that information technology might play for the common man. I am tempted to begin with apologies. I am not Indian, I am no expert on computer science and technology, I speak no Indian languages, I rely entirely on the generosity of Indian colleagues, friends, and workers in the field. I am an neither an orientalist nor an unqualified admirer of all that is Indian: I have spent too much time in hungry villages not to recognize the problems as well as the potentials of this, the largest and most diverse of all democracies. That said, I will proceed to the topic.

In brief, and put oversimply, I want to argue that India does - or could - lead the world in creating both the technologies for reaching ordinary people and the grass-roots social experiments that could teach both India and other nations how to use those technologies for the common good.

Any discussion of what a recent Government of India report called "IT for the Masses", however, must begin with the most fundamental question of all. It is well stated by Subhash Bhatnagar of IIM-Ahmedabad, in his introduction to a recent book on rural IT in India. How can we justify the expense of IT in a rural India where so many basic needs are unmet and so many basic rights are violated? Bhatnagar's question is profound. To visit a village where 70 per cent of all men, women and children are below the poverty line, where children's hair is gray and red from malnutrition, where there is no work, no school, no medical care – to say nothing of no infrastructure needed for modern IT – is necessarily to wonder whether, when, and how information technology can help. Surely other priorities: food, education, medical care, basic rights, social justice, freedom from corruption – meeting these priorities must be the core criteria for any use of modern information technologies.

That said, the question is not <u>how</u> to use information technologies, or even whether to use them, but <u>under which circumstances</u>, <u>if</u> <u>any</u>, <u>information technologies can be a means</u> - the most cost-effective means - <u>of helping ordinary Indians,</u> especially those in the weaker sectors of the society, <u>meet their fundamental needs and achieve their basic rights.</u> Put this way, the question is not only a philosophical but an empirical one: it requires examining on-going efforts in India to achieve just those purposes, to see if and how they work.

Technical Requirements

When we speak of modern "IT for the Masses", we generally mean something like computers. The first fact, then, is that IT for the common man has technological prerequisites. These are not to be confused with successful projects, but they are necessary conditions for successful projects.

At least three technical elements are necessary: connectivity, computers or other similar devices, and software. To discuss any one of these would require a lecture in itself. Let me therefore be brief and dogmatic. I will state in advance my conclusion: that India leads the world, or could easily lead the world, especially the developing world, in all three of these areas.

Take the question of connectivity. Here, I think of Prof. Ashok Jhunjhunwala and the creative people and companies that surround his research at IIT-Madras. Jhunjhunwala notes that the average cost of what is called "the last mile" is, in the wealthy countries, between 800 to 1000 dollars. Translated into rupees, this means that connectivity is within the reach of only two-three per cent of the Indian population, which is almost exactly the percentage - 30 million - who are currently "wired". But if the cost of the last mile could be brought down to 200 dollars or less, and if the quality and bandwidth for connectivity could be improved, then connection

- telephonic and/or internet - would be within the reach of 200 million Indians, and perhaps a billion citizens in other developing nations.

What Jhunjhunwala and his group have began to demonstrate, using highly sophisticated indigenous technologies, is that it is possible to bring the cost of connectivity far down toward this level of $200 per line and, in certain urban situations, to even less than $100 per line. This technology exists, it is in use, and it works. To be sure, the story is not over: there are competing technologies; there are Government of India regulations which make simultaneous telephone and internet connections illegal; there are multi-nationals fighting for a piece of the market; there is the unwillingness of BSNL to allow the Chennai wireless local loop solution to enter rural areas, even though these areas are loss leaders for BSNL. My point, however, is that the there is no other group in the world that has produced the results of the Chennai group. If widely adopted, these results could revolutionize access to telephone, email, and Internet in every urban and rural community in India – and the world.

The second requirement is a computer or other similar device available at low cost, accessible to India's millions, and if possible to the 50 per cent or so who cannot read and write. Here, again, I believe that Indian innovations, specifically the "Simputer" pioneered by Prof. Vijay Chandru, Swami Manohar and others here at the Indian Institute of Science is ahead of any other device being created in any other country. The Simputer, in fact a highly sophisticated computer running on open-source software, has remarkable features: text to speech capabilities in five languages, including Kannada, Hindi, Tamil, and Telugu, smart card capabilities, potential to receive down-loaded satellite radio communications, operability for eight hours with three pen-light batteries, a touch screen accessible to those who cannot read and write, a case hardened to rain, dust, heat and cold, and many other innovative features. Equally innovative is the concept behind the Simputer, namely, not only open-source software but open-source hardware: i.e., the capacity to modify, change, and improve the hardware with the sole condition that such improvements become universally

4

available. The Simputer is now being produced in volume, and field trials are under way in six areas. Despite promises in countries like Brazil, no other nation has produced a device of this sophistication, complexity, durability, and flexibility. In this area, too, India leads the world.

The third requirement is software. Here, India faces one of the most difficult problems of any nation. There are eighteen official Indian languages; linguists list 32 distinct Indian languages each of which is spoken by more than one million people. Unlike the United States, where 97 per cent of the population speak, write, and read English, in India even basic literacy in one mother tongue (defined as the ability to write one's name), is available only to slightly more than half of the population, including less than half of the female population. For the 50 or so million Indians who speak, read, and write fluent English, there is of course no problem: Microsoft takes care of everything, although at a price which for most Indians is equivalent to at least a year's income. But for the average Indian, to say nothing of those in the lower income groups, flexible, available, inexpensive local language software is essential.

Once again, volumes have been written on this topic and it would be wrong to say the problem is anywhere near solution. On the contrary, the absence of standardized code, agreed upon fonts, usable operating systems in local languages, etc. continues to bedevil the most brilliant efforts of Indian linguists and computer scientists. It would be possible to spend hours discussing these problems.

Instead, however, I will point to another outstanding success, namely the work of Prof. Rajeev Sangal and his group at the International Institute of Information Technology in Hyderabad. Prof. Sangal's group is now achieving close to 95% accuracy in the machine translation of the northern Indian languages, using a common-core artificial language closely related to and built upon Paninian grammar and Sanskrit. The Sangal group also finds that the South Indian (so called Dravidian) languages, with two or three core grammatical changes, also lend themselves to the same approach. The Hyderabad group's work is not finished, but the results being

achieved are, I think, at the forefront of others working, for example, in machine translations for the North-European or Latin-based languages. In this area, too, India is at the head of the pack.

Jhunjhunwala, Chandru, and Sangal know each other and each other's work; indeed, I was told that some decades ago they were all studying at Kanpur. It is difficult for groups working on disparate technological problems to join hands to merge efforts, to make modifications, so that their creations will become more mutually useful. But to a foreign observer like myself, one dream is that, given what I perceive as Indian supremacy in these critical technological fields, there might eventually result a joining of hands, a merger of efforts, a technological collaboration that would produce what software service exporters call "a complete solution" at the technological level.

By singling out these three remarkable groups, I do not mean to minimize other creative efforts. But I do want to try to dispel that technological imperialism to which people in my nation as well as Indians sometimes fall prey. This holds that the process of human and social advance occurs by means of something called "technology transfer" whereby the "developed nations" of the world create "innovative technologies", which they in turn export to the "developing nations", which in turn use these imported technologies to solve the "problems of development". My point here is that technologies now being developed in India are superior to those that have been developed in other countries, including my own, and that the concept of technology transfer must give way to the concept of partnership and collaboration.

The Mantra of the Season

Let me now turn to actual efforts to use modern information and communication technologies to meet the needs and rights of ordinary people. Over the last two or three years, I have located at least 50 sites in India which are attempting to use IT's in

the service of ordinary people, and often, the poorest sections of the population. I have been able to visit approximately 20 of these projects, some of them well known, others virtually unheard of. Given the enormous emphasis throughout the world on "bridging the digital divide" and "IT for the masses" one might expect that this rich Indian experience would have been studied, that sites with similar objectives would be in touch with each other, that the lessons of each project would be shared with others, and that the whole world could benefit from the creativity of dedicated Indians in this area.

One example may indicate the scope of the problem. Just before this lecture, I entered into the search engine "Google", two phases: "digital multiply", and "digital divide". "Digital multiply" gave me 22 hits, having to do with multiplication using binary numbers. "Digital divide", on the other hand, gave me 250,000 hits. I looked at only the first two or three hundred. All of them have to do with the hope that the gap between the digerati, the wired, the digitally "empowered" on the one hand, and the other 98 per cent of the world's population on the other, can somehow be closed by making information and communication technologies available to those who currently lack access.

The fact is, however, that there are (to my knowledge) no comparative studies, no efforts to draw lessons, virtually no communication between projects with similar goals, but only, in some cases, "stories" – invariably stories of success - from which any trustworthy generalizations are impossible. Yet every major international group and organization, including the G8 at Okinawa, the United Nations, the World Bank, and the International Monetary Fund at the international level, major national and international foundations, virtually every national and state government in the world, and countless philanthropists and new organizations, are now dedicated to using "IT for Development". It is the Flavor of the Season, the Mantra of the Year. It is stimulating countless conferences throughout the world, innumerable plans by national and state governments, endless projects, hopes, and dreams. But all of this

occurs in the absence of any empirically-based knowledge of what works, what does not work, what is wasted time and effort, what is worth doing.

The comments that follow, then, are based on site visits to Indian projects, but equally importantly on the observations of friends and colleagues, on the comments of ordinary people, and on a critical reading of the few studies of individual projects available in print or online. I will state my conclusions dogmatically, recognizing that they need modification and further work, especially by Indians whose access to this work can be superior to my own. If my comments seem at times critical, it is either from ignorance or out of frustration that so many creative energies and resources are not being more adequately used.

Talk versus Action

Not surprisingly, in discussions of IT for the common man, there is a great deal more talk than action. Examples abound. For example, I was recently privileged to attend a meeting of the IT Secretaries of almost all of the States of India. With few exceptions, every State has a plan with two seamlessly related components: first, stimulation of the IT industry (every State wishes to create its own Bangalore); second "IT for the common man". Looking at the second half of these programs is a moving experience: good ideas, grand plans, hundreds of infokiosks dedicated to the needs of peasants, etc. But a more careful reading, to say nothing of visits to the sites themselves, indicates that in such plans, the operative verbs are not "is" and "does", but rather "will" and "would". These are plans, wishes, dreams, promises. In only a few cases do they have any on-the-ground reality.

Another example of the prevalence of rhetoric over reality can be found in descriptions, writings, articles or websites of allegedly successful projects. In at least one case where dozens of rural infokiosks are described, a site visit indicated that in fact there were none, that the villages indicated had neither electricity nor solar panels

nor working connections to computers, but instead, grinding poverty and almost complete illiteracy. Of the need for poverty alleviation there could be no doubt; but the claim that infokiosks were helping to alleviate poverty was a hope, not an actuality.

Yet another example comes from the visit of former American President Clinton to Rajasthan. He expressed his desire to visit a village. A village near Jaipur was chosen, the road was repaired, beggars and stalls in the streets were removed. A VSAT was connected, an infokiosk was installed with local women trained to operate it. Clinton and his group drove down the freshly paved road to the recently painted village, and at the infokiosk, he marveled aloud at the power of modern technology to connect even so remote a village to the vast treasures of knowledge available on the Internet (of course, in English rather than Hindi). The event was widely publicized, photographs were taken, newspaper articles were written, and the Government of Rajasthan announced plans to create dozens more infokiosks throughout the State.

To my knowledge, no one went back - until The Hindu some months later sent a reporter to observe the functioning of the infokiosk. The road again had pot holes, the beggars were back, the stalls were in the village as usual, the VSAT had stopped working a day after President Clinton's visit, and the operators asked why the village needed an Internet connection when their families were so hungry.

The Trickle Down Theory

I have mentioned the IT plans of a number of Indian States, which usually combine seamlessly the dream of Software Technology Parks and a booming software industry with the dream of improving the conditions of the ordinary man - and woman - through the use of IT's, as if the first led automatically to the second. This view is often referred to as the "trickle down" theory of economic development.

With regard to both India and America, there is cause for skepticism about this view. In America, from about 1970 on, government economic policy was dominated by the view that if taxes were cut for the rich, and if incentives were provided for those in upper income groups, then all would benefit. As it was sometimes put, "A rising tide raises all ships". Others referred to this as "supply side economics".

But as American income statistics from 1970-1987 now show, during those years the rich indeed became richer, by perhaps 70-80% for those in the top 10%. But if one examines the poor - e.g., those in the bottom 10% - their position remained unchanged or they lost ground, especially as government programs of entitlement were defunded. In other words, the rich got richer but the poor stayed poor. The experience of developing nations like Brazil indicates that the same phenomenon may be observed elsewhere.

Turning to the IT industry in America, the boom in Silicon Valley, in the Route 128 area outside Boston or in the Austin-Texas area in the United States, has not brought any obvious direct benefits to the migrant workers who pick lettuce in Silicon Valley, to the Mexican-American braceros who act as servants to the prosperous in Austin, or to the Americans of Caribbean origin who live in the poorest areas of Boston.

Similarly, I believe it would be very hard to demonstrate that the 100,000 information technology engineers and workers in this city of Bangalore, along with the travel agents, boutique owners, drivers, and others who meet their needs, have had an appreciable effect upon the more than 40 million Kannadigas who live outside this metropolitan area. With Bangalore subtracted, Karnataka is one of the poorer states in India. Similarly, critics of Chief Minister Naidu argue that his successful development of Hyderabad and Secunderabad as IT centers has had little effect on poverty - and social unrest - in other parts of Andhra Pradesh.

None of this is to deny that the wealth created by a successful software industry could be shared by other sectors of the population. But so-called "market forces" are not

adequate to ensure this outcome. Required instead are government policies, actions, and plans, along with the dedication of individuals and enterprises that benefit from the IT boom, to make sure that the wealth created through software exports aids those who live ordinary lives. It is of course an excellent plan to encourage the growth of exports of the Indian software industry. But without a clear policy of affirmative action to spread the resulting wealth, the profitability of a rapidly expanding software industry will do little to alleviate the poverty of surrounding areas. This lesson is implicit in the comments of Narayana Murthy, who once said that the most distressing fact to him was the contrast between the comfort and affluence of those who work for the software industry and the surrounding poverty in the rest of India.

I am not an economist, and cannot say what is required to change this situation. I do believe, however, that government action, and equally important, action on the part of the successful profit-making IT firms, is of great importance. Perhaps one example lies in the work of the Infosys Foundation, which does not emphasize information technology but rather literacy, health, books, and libraries for the less privileged parts of the State. Another answer may lie in efforts like those of Tata Consultancy and its founder, F.C. Kohli, to use the resources of that powerful firm to develop innovative programs of adult literacy that build upon the potential of information technologies. Whatever the answer, the transfer of wealth from the information technology industry to ordinary people is not automatic.

Financial Sustainability, Cost Recovery, Scalability and Business Plans

As I have said, India abounds with "pilot projects" intended to demonstrate the usefulness of ICTs for ordinary people, and especially for those who live in poverty. Typically, these projects are demonstration projects funded by international, national, and local governments, or by non-governmental organizations, often from outside India. In some cases, with enormous resources, they succeed brilliantly in showing that IT can be of use to ordinary people, especially in poverty-stricken areas.

Such projects, however, almost never form part of any larger plan that includes thoughts about how they might be replicated on a larger scale. Externally-funded projects which cost Rs. 2.5 crore, or another case about $400,000, or another, $200,000 per year, are clearly justified and useful. The danger, however, is that they become Indian Potemkin Villages -the village especially established in Czarist Russia to demonstrate to foreign visitors how contented were the Russian serfs. The problem was, of course, that there was only one Potemkin Village, and tens of millions of oppressed and discontented serfs.

The larger issue is the pragmatic issue of how expensive pilot projects might be extended to benefit not only their initial beneficiaries, but larger groups of citizens. Questions of "scalability", cost recovery, sustainability, and maintenance rear their ugly heads. But rarely if ever are these issues addressed in realistic business plans. Only in the case of a few commercially-motivated sites (discussed later) and in the Gyandoot-Dhar project (and its sequels now being developed in Chhattisgarh) have the organizers of ICT projects realistically assessed the actual costs and benefits of constructing and maintaining ICT sites, especially in areas characterized by poverty, hunger, illiteracy, absence of schooling, sickness and joblessness. In one case, it is said, the reduction of funding from a foreign donor of a successful IT project resulted in changes in personnel in the project, and in an as yet unsuccessful search for sources of support in the local community.

The ideal is what any reasonable venture capitalist would require: a business plan that included, among other things, realistic estimates of the initial costs of hardware, transportation and installation, costs of training personnel, costs of developing, testing, modifying software, costs of operating and above all maintaining sites, costs of retraining and replacing operators, plans for maintenance of equipment, costs of security and replacement of stolen equipment, costs of repair and breakdowns or "crashes" and malfunctions, legal costs associated with allegations of abuse or

corruption, prevention of piracy, abuse, and theft, extension and modification of software after initial trials, organizational involvement of local communities to ensure utilization of ICTs, etc. etc. In addition, any business plan for a private enterprise would include target dates for beginning of operations, for full deployment of the program, for break-even points, and for recovery of initial investments. Criteria for evaluation of the project success or failure should be defined. And finally, in the case of projects which do not succeed, there should be clear exit strategies, including efforts to recover as much as possible of the initial investment.

This may seem a tall order, but in its absence, IT Potemkin Villages are likely to flourish, as indeed they do. Indeed, with the sharp recent downturn of venture capital firms in India, one useful service which underemployed venture capitalists might perform today would be to work with public or private advocates of IT projects to develop precisely such business plans. Equally, those many non-resident Indians with an interest in promoting the productive use of IT in India could use their success abroad not only to provide funding, but to offer concrete advice about the financial planning of information technology for the common man. The help that TIE (The Indus Entrepreneurs) today provides for young entrepreneurs of Indian origin abroad might be extended to help those planning grass-root IT projects in India.   But whatever the agents, unless sustainability is addressed on a realistic basis, most high visibility pilot projects will simply fail in their purpose of showing the way to multiply their work for ordinary people.

Lest I conclude on a negative note, there are remarkable exceptions. The Gyandoot project in Dhar, Madhya Pradesh, was planned from the beginning for sustainability. Several commercially-based projects are organized by their sponsors with an eye to the ultimate bottom line. The technological achievements I mentioned earlier all began with a notion of financial responsibility and scalability in mind. Sustainability is elusive but not impossible to achieve.

Local Language, Local Content, Local Consultation, and "Customization"

I earlier mentioned the problem of local language software, coding, and fonts in India, and I suggested that part of this problem is inherent in a diverse multilingual nation. Part of it remains to be addressed by TDIL and CDAC. For even in 2001, virtually every local project must begin by developing, modifying, or revising the basic coding of the language in which the local software is to be written. Often, this process takes months, and yields solutions, however creative and imaginative, that are inconsistent with the solutions developed by other equally brilliant operators developing similar projects in the same language.

More needs to be said on the subject of local language standardization, and more needs to be done. But it worth recalling that in my own country, more than two decades ago, similar chaos prevailed, with multiple systems of coding and multiple fonts for the English language. It was finally resolved when half a dozen companies (perhaps united by mistrust of IBM), came together to develop, through intensive interactions and over a long period of time, the coding of the English language known as ASCII. ASCII eventually prevailed to the point that even IBM, then the moral equivalent of today's Microsoft, was forced to use ASCII when it introduced its personal computer. One could imagine similar ventures in India for many of the major Indian languages, some of which, like Hindi, are the mother tongue to more individuals than live in all of Europe. (As a side point, more people on the subcontinent speak Bengali then the combined populations of England, France, and Italy; more people speak Telugu as their first language than speak German.)

The first requisite, then, is a major effort to transform the local spoken and written languages into a universally used set of computer codes, fonts, and so on. But this is only a beginning. The second need is for operating systems and for useful software - so-called applications - that are relevant to and that speak to the needs of local people.

In a word, this entails the laborious process of writing computer code, text, projects, pictures, icons, etc. that speak to local needs.

But how does one ascertain these local needs? One attempted solution is so-called "generic" software. The model is, of course, Microsoft programs like Word, Excel, Outlook, or PowerPoint. But for local ICTs, such programs are of little use, even if they were fully available in local languages - which they are not. They are, in fact, useful frameworks rather than applications, whereas what local people need is content that is accessible, that speaks to their daily needs, which informs and enlightens them, which provides opportunities, which rectifies injustices. Lacking locally relevant content, we have what I have observed in several places: well equipped infokiosks, with good access to the World Wide Web, where virtually the only thing that literate (or illiterate) Indians can do is access the 80 per cent of all web sites in English, the 5 per cent respectively in German and Japanese, or the balance in languages like Spanish, Russian, Portuguese, etc. – but almost never in Telugu, Urdu, Tamil, Kannada, Gujarathi, Bengali, or Sindhi. Such computers are simply not used. Vijay Chandru once commented that the reason Indians had so few computers is because they are so smart: what could the average Indian do with a computer? His point is well taken in the absence of local software and content.

The problem is further complicated by the diversity of India, which is not only linguistic, but also regional, agricultural, cultural, climatic, religious, sociological, and political. There is, for example, remarkably good software in the Swaminathan-Pondicherry project, which is useful to local rice farmers in that region. But another site in another region in Tamil Nadu must provide very different information to paddy farmers, because in that region, where climate and water availability differ, rice can be planted at any time of the year and harvested continuously throughout the year. That software, in turn, is obviously useless to growers of sugarcane in the same region. Similarly, the climatic and agricultural conditions under which sugarcane is grown in Maharashtra differ dramatically from those in other Indian regions. The needs and interests of predominantly Muslim communities, including what is

permitted and what is not permitted, are different from the notions of acceptability and unacceptability in Hindu communities. The agriculture of soya farmers in Madhya Pradesh is distinct from that of the needs of coffee growers in Coorg or tea plantations in Dharamsala. Examples are legion.

The obvious point is that "generic" software, including efforts to create "generic" agricultural applications, is almost never applicable to local communities. What is needed is the skill for which Indian computer scientists, when operating in the international market, are famous: the ability to "customize" generic software to local conditions and local needs. Tens of thousands of Indians working for the export market have concentrated their intelligence on creating "customized" versions of generic software adapted to the needs of particular firms, businesses and governments abroad. Those same skills are needed domestically if IT for the common man is to be a reality.

What I have called "customization", however, is not a simple process. This is true for two reasons. First, because of diversity of needs, localities, outlooks, climates, origins, and social strata in India, all of which require some variation on "generic" application. Equally important is extensive local consultation, because human beings did not evolve with an instinctive affinity for keyboards, mouses, CD-Roms, and computer monitors. These are unfamiliar, strange, unnatural, always foreign and at times frightening devices for those who are not familiar with them. Acquiring familiarity and ease with a computer is undoubtedly best done in childhood. But for most people in the world, childhood is past. Instead, one can hope at least for a gradually developing sense of ownership, a slow process of learning whereby individuals may come to understand the workings of a computer and to view it as a potentially beneficial ally in the struggle for existence. The NIIT experiment in the "Computer in the Wall" in Delhi suggests that, for illiterate children in a Delhi slum, a computer, a monitor, and a mouse placed in a wall produces within a period of weeks considerable skill and learning in otherwise unlettered children. Something akin to

this process is needed in every community where "IT for the people" is planned. Rather than starting from the master plan, it is critical to start from the grassroots.

These comments indicate that there is no easy answer, and that "IT for the masses" requires time, devotion, intelligence, patience, and large numbers of committed individuals who possess both the social and the intellectual skills to do the necessary work. But in fact in India, such individuals abound: India has more NGOs than any other country in the world, and probably more than all the rest of the world combined. The challenge is to mobilize the energies of these dedicated individuals.

The Role of Dedicated Individuals

Until now, my comments have largely emphasized obstacles and problems. I now want to stress a few of the individuals who have overcome these problems.

I began by discussing three areas in which, I said, Indian technologies lead the world. In each case the projects are inspired and guided by a few people of unusual commitment and devotion to the wellbeing of their fellow citizens, high technical skills, perseverance, and what I can only call well-developed "political" skills. In America, and perhaps in India, the term "political" is often used in a pejorative sense. Here, however, I mean it positively: as the ability to influence others, to deal effectively with the variety of different kinds of people, to help others articulate their own needs, to organize and inspire a team of individuals who retain their individuality but work towards a common purpose. Similarly, turning to a few of the grassroots projects which, in my view, constitute models of success, it is striking how often they have been led by dedicated individuals like Prof. V. Balaji, Amit Agrawal, Anil Gupta – men who have forgone other more lucrative opportunities to pursue their goals of IT for the common man.

The corollary of the role played by dedicated individuals is the largely negative role played by bureaucrats, or more precisely by the bureaucratic mentality. To be sure, in any modern society bureaucratic organizations are necessary. Equally obvious is that they can provide support, resources, and encouragement to dedicated people. But the experience in India - as in the United States - of projects designed and executed by bureaucrats is largely negative. Partly this is because bureaucrats tend to stay close to home, and home is Washington, the United Nations, Delhi, or the Ford Foundation. The prerequisite of closeness to the people served is missing. Moreover, in every nation, the creativity of bureaucratic organizations tends to become focused on the maintenance of the bureaucracy itself, rather than in the projects for which the bureaucracy is intended. Finally, bureaucracies are often more accountable to higher levels of bureaucracies than they are to the people they serve.

None of this is intended to deny the essential role played by state and national governments, by international groups like UNDP, by major NGO's, the Canadian, Danish, Swedish and Swiss agencies, by the World Bank and other funding bureaucracies. Nor is it to deny the obvious requirement that bureaucracies evaluate and account for their expenditures. But it is to insist that bureaucratic organizations – from international bodies to private foundations to state and local governments – are most useful when they find ways of taking a gamble on committed individuals and dedicating their resources to the grassroots - in addition to, or perhaps instead of, international conferences, manifestos, annual reports, and other necessary but - to local people - largely irrelevant activities.

The Potential Role of Commercial Sites

In India today, there are several "ICT for the people" sites that are motivated by commercial interests. By this I mean that they are funded and/or maintained by cooperatives or private companies which, unlike NGOs, governments, and foundations, must attend to the bottom line and justify their work in terms of

profitability and cost effectiveness. Here, I think specifically of three Indian projects, namely the Warana sites currently maintained by the local sugar cooperatives in Southern Maharashtra, the soya, shrimp, and coffee sites maintained by Indian Tobacco Company -International Business Division, largely in Madhya Pradesh, Karnataka and Coorg, and the Nellikuppam (Tamil Nadu) site developed and maintained by EID Parry for sugarcane production.

In each of these cases, the firm in question is committed to ICT for ordinary people because it believes that information technologies provide a means of enhancing rewards to the producers and increasing profits to the firm. International Business Division of ITC - India's largest agricultural exporter - claims that the "chaupals" it sponsors reduce middleman costs by as much as fifteen per cent by enabling local agricultural producers to improve the quality of seeds, pool resources to obtain agricultural inputs at lower prices, sell directly to the companies rather than via middleman, rationalize and time planting, improve agricultural inputs on crops, harvesting, and sales. ITC-IBD claims that costs of agricultural production thus saved can be shared equally among producers and the firm itself. In the case of sugarcane – Warana and Nellikuppam – the special characteristics of cane planting, growing, harvesting and refining lend themselves to a high degree of rationalization through the use of computer based systems.

In such cases - and there are doubtless more - the initial goal is not social service but greater efficiency in agricultural production - an area where India, with its hundreds of millions of small producers, often lags behind the vast, vertically integrated firms of Europe, Argentina, United States, and Canada, with resulting Indian inefficiencies, higher costs, and losses in world markets.

The challenge for such commercial sites is to combine increased profitability with other more general benefits to agricultural producers and to the communities in which they operate. One commercial site, for example, provides useful information to producers about past deliveries, past payments, and current amounts owed. But apart

from this, little effort has yet been made to provide other services to the local community: educational opportunities, job opportunities, health information, access to government entitlements, forms, records and so on. If providing these additional services proves too costly for the firms to bear, commercial IT infrastructures might be used by state governments, by NGOs, or by international agencies as the basis for "add-on" services which would be financed by these external agencies. Another possibility is that if commercial IT sites indeed increase the profits and lower the costs of agricultural firms, these firms might devote a percentage of their increased profits to socially useful additions to the sites.

Whatever the outcome, commercial IT sites are of interest precisely because they are driven by the needs of an intensely competitive world agricultural market. They must, in the long run, plan for cost recovery, sustainability, payment for maintenance, and so on. If they achieve this objective, they may provide a model for other IT sites with less commercial objectives.

The Goal of Equity

One of the criticisms of the "IT for the masses" movement is that, in practice, it merely reproduces and even exaggerates existing social inequities. For example, I recall one IT kiosk located in the home of the head man of a relatively poor agricultural community. Already, this man of generous proportions and obvious self-confidence owned the only color TV in the village and the largest house in the village, while he and his extended family controlled a disproportionate amount of the best agricultural land in the area, employing many landless laborers for its cultivation. Placing the local infokiosk in his home made sense in many ways: he had access to the entire village; the devices and connections were secure; he already owned a telephone and a generator; he was of the highest caste; and he could deal more readily than most villagers with the organizers of the project. Now, he owns the only computer in the village.

But if one asks whether social equity, the empowerment of the poor and of women, will be promoted by this location of the infokiosk, the answer must surely be "no". In this case, existing inequities were simply confirmed by the IT project. Similar problems arise with regard to caste and gender inequalities. In another project, an infokiosk was placed in a village whose inhabitants found the presence of dalits, to say nothing of their use of the infokiosks, intolerable. A dalit community a few kilometers away found itself unable to use the agricultural and informational resources offered. The dalit response was admirable in this case - the dalit community organized itself to build a local infokiosk, to approach the infokiosk's provider, and to obtain training for some of the more educated women in the community. On the day I visited, it inaugurated with great ceremony an infokiosk of its own.

Similar issues arise with regard to gender inequalities, especially in those areas of India and other countries where women are less educated, poorer, harder-worked, and secluded from public gains. One of the positive results of the Grameen Bank cell phone experiment in Bangladesh (whatever its limitations), was that the use of female operators in a traditional Islamic community enabled women to escape at times from the prison of their homes, to obtain income of their own, and to improve their conditions vis-à-vis men.

Obviously, not all problems can be solved at a single stroke, much less with the single technology. Inequalities exist in every nation, often to unbearable degree. One critic of the idea of the "digital divide" gap noted that there is also a "Mercedes Benz" gap, which is to be expected, which is normal, and which should not be of great social or political concern. But other things being equal, the empowerment of the excluded and disadvantaged, and the reduction of social inequities, will surely rank among the goals that any valid IT project should seek to obtain.

The Promise of eGovernance

In the last year, an optimistic and well informed book entitled "Government@net. New Governance Opportunities for India" was published by three Indian officials. It proposes, that e-governance promises "a new governance and a new politics", "redefining the vision and the scope of the entire gamut of relationships between citizens and government". The authors reflect a widespread belief that information technology does, can, or could produce transparency, accountability, responsiveness, citizen empowerment, freedom from corruption, and a host of other benefits.

I have no wish to undermine these hopes. But in this as in other areas, much work remains to be done. There is, for example, nothing automatic about a computer that prevents corruption: it is quite possible - indeed the work of a child - to program a computer so that an additional bribe of 20 per cent is to be paid to every bureaucrat for every transaction. Moreover, in any possible deployment of information technology for governance, there are inevitably areas that are not computerized, where government can be or remain inefficient, unresponsive, and corrupt.

The government of Andhra Pradesh has undoubtedly been the most persuasive proponent of e-governance. And a visit to Hyderabad shows impressive projects, like the Computer Assisted Registration of Deeds (CARD), widely used in the principal metropolitan areas, or others like e-SEVA pilot project which, when finally implemented, will provide a coordination of services, payments, and government entitlements, registers, and records which has no equal in any other nation in the world. E-governance, then, is indeed a promising area for the constructive and creative use of information technology.

Broadly there are two meanings of the term. The first is the computerization, for the benefit of government officials, of the functions of government itself: e.g., computerization of government bureaucracies or of district and municipal officers, in

order to render them more rapidly responsive and more efficient. The government of India, for example, some years ago undertook to connect all of the district offices of this diverse nation. Similarly, the Ministry of Information and Communication Technology in Hyderabad is about to undertake the computerization of its own internal operations. But such projects need to be examined closely: one study, for example, found that NICNET – the network of interconnected district offices with Delhi – was, at least in some regions, either inoperative or unused. But the hope is there and the project deserves to be advanced.

The second meaning of e-governance is even more promising, involving the facilitation of communication between citizens and government and vice versa. In the early stages of the Dhar Gyandoot project, as in other projects like the Pondicherry sites, up to a dozen government services, licenses, certificates, and records were available from local infokiosks. In Dhar, some of these had legal validity. Villagers paid a fee of between five and twenty rupees to the local soochaks or operators, a pittance compared to the cost, time, and "commissions" that would have been necessary for them to obtain such records from the district headquarters or from more distant cities like Indore and Bhopal. In Andhra Pradesh, especially in several pilot projects, a number of government records are - or will be - directly available from local infokiosks, especially in the twin cities of Hyderabad-Secunderabad. Finally, in the case of Dhar, citizens could lodge complaints at the infokiosks, which the District Collector promised to reply to within two weeks. In emergencies like the drying up of the local well, next-day service of a tanker truck could be provided.

Such G2C and C2G services are, of course, no panacea to the problems of inefficiency, middlemen, and corruption. But they make citizens' relationships to government more transparent by providing a digital record of transactions, help eliminate the expenses of middlemen, and, given good will and responsiveness on the part of higher authorities, provide for more rapid responses to citizens' complaints.

The problem, of course, is that creating the infrastructure – the "backend" – for such services is extremely difficult, time-consuming and expensive. I especially note the difficulties in the way of digitizing land records, which are undoubtedly the single most vital document in any agricultural economy. Similarly, for other certificates and records to be online and available locally, they must first be digitized at government offices, the records must then be connected through flexible software to local infokiosks, legal structures that guarantee the security and validity of documents delivered to local infokiosks must be put in place, and local operators must be trained in the means of accessing, providing, and charging for such documents. The complexity and expense of digitizing land records now mostly available in large bound volumes in state or district offices boggles the mind. In most cases, all that local operators today can do is to inform citizens of the legal requirements for acquiring necessary documents (e.g., pension certificates, caste records, and so on), but they cannot provide online the necessary documents.

Creating interfaces, then, between public records and individual citizens is a daunting task, which has only been achieved in a few localities. Nor is such access common in the so-called "developed" countries: my son's recent experience in registering and then selling a used automobile involved countless hours at a variety of offices in the city of Boston. To be sure, pilot projects like e-SEVA in Hyderabad anticipate the day when everything from bank accounts to electricity payments to government records will be available at a single infokiosk; but on enquiry many of these services are not yet available.

Yet for all of its difficulties, expenses and obstacles, e-governance remains one of the most promising potential uses of IT for ordinary people. The fact that this was possible in at least one location, Dhar, indicates that it can be done in other areas as well, given strong leadership not only in the local area, but in municipal, district, and state levels. "E-governance" is no guarantee of "good governance", but it makes it a lot more likely.

The Promise of e-Commerce

Many writers on IT for the masses have looked toward e-commerce as a solution to such problems as poverty alleviation, the rationalization of business transactions, and the elimination of costs due to middlemen.

In my view, however, many of these hopes are misplaced. In my own country, the exaggerated hopes placed on e-commerce have turned out to be just that - exaggerated. Most consumers, even in a rich country like America, prefer to go to the shop, to touch and handle the merchandise, to discuss and negotiate with the dealer, and to arrange for delivery from local sources. Many mistrust the accuracy of long-distance commercial transactions conducted over the internet and using credit cards as the basis for payments. Returns of unsatisfactory goods often turn out to be difficult. In short, with a few exceptions like books and records, e-commerce has not been the boon which may believed it would be.

In India, where most Indians do not have credit cards, where connectivity is low, where less than two tenths of one percent of the population has readily available internet connections, these problems are compounded. To put the conclusion in a few words, it seems to me that many years will pass before citizen to business e-commerce becomes an important economic reality in India.

A second, related hope is that information technology will provide Indians with a lucrative worldwide market for what are sometimes called "indigenous crafts", the local artisanal work with which India abounds. For example, one State government recently claimed that millions of local women are to be involved in the export of local crafts by using Internet and email.

Such promises, I fear, are illusory. The market for "indigenous crafts" in the richer nations of the world is, in the first place, a niche market confined to a relatively small

segment of the upper-middle class and upper class population. Furthermore, that market is close to saturation even today. For example, Indian goods of all kinds are currently available in my own hometown, Boston, from a great variety of shops and boutiques. None of them, unfortunately, are overwhelmed with customers. And the logistics of international trade in local crafts moving from local artisans to high end consumers in Stockholm, Zurich, Paris, Kyoto or San Francisco are simply enormous: how does one deal with payments? Deliveries? Returns? Guarantees? All of these problems must be solved before e-commerce in "indigenous crafts" becomes a reality. For the moment and probably for the foreseeable future, they will not be. Thus, while there will undoubtedly be admirable pockets in India and other developing nations where the export of indigenous products of quality and beauty constitutes a useful source of income to local citizens, these exports cannot be expected to seriously impact the problems of development. They are, at best, a drop in the bucket.

Conclusion: Hope and/or Hoax

I have already spoken at excessive length, from insufficient evidence, about matters which require a great deal of further study. Let me merely mention in capsule form a number of other points which may merit consideration.

1. It is probably a mistake to start with those termed "the poorest of the poor" in IT for the people. In India and in every other nation, "the poorest of the poor" have needs, problems, and disabilities whose resolution is so imperative that IT projects which aim to alleviate their needs take on a task which may be excessive. Given more than 700 million rural Indians, and perhaps 300 million Indians who live in daily hunger, it may be more judicious to begin with those who are "merely poor" – i.e., who possess some minimal education, whose first priority is not food, but knowledge, information, improvement, and education. I do not mean this to sound heartless, but I do believe that IT projects which direct their primary attention toward improving the condition of

"the poorest of the poor" allocate to information technology the solution of a problem which has so far eluded the dedication of millions of Indians over the past half century.

2. I have already noted the absence from the "IT for the masses" effort of most of the extremely successful Indian IT firms. There are major exceptions like the adult literacy work sponsored by the Tata Consultancy; and the Infosys Foundation, which also aims at adult literacy. One noble cause which the extraordinarily successful Indian information technology industry might well undertake is to lend some of its expertise to India itself. It was again Narayana Murthy who pointed out some of the obstacles in the way of this path: the Brahmin tradition with its aversion to potential contact with lower castes; what he called the "ambivalent love affair with English" which makes programming in that language prestigious while programming in vernacular languages is less so. The turning of the talents of the world's second largest scientific and technological work force toward the remediation of some of India's problems remains a critical if still unachieved goal.

3. Finally, I would note the "constant invention of the wheel". Both India and my own country are, in their different ways, disorganized, anarchic and chaotic. But it is striking to me that in both countries there is so little contact between excellent projects, that new work so often begins from scratch, that there is so little sharing of knowledge and experience, that there is no network of communication, to say nothing of coordination, that each project begins, as it were, anew, when often within a 100 kilometers there exists another project from which it might learn and borrow, and whose success it might imitate. I have tried to suggest that there are critical lessons to be learned from the creative Indian experiences of "IT for the masses", which has no equivalent in any other nation in the world. It is a pity - more than a pity, a shame – that better mechanisms for learning these lessons are not in place.

I have already discussed at excessive length the potentials, challenges and problems of IT for the ordinary man. While my comments have often been critical, it is because I hope to see the potentials of information technology used to better the conditions of Indians, and indeed of all the citizens of the world. But I trust that two conclusions are clear from these comments.

First, the technological and grassroots experience of India is, I believe, the richest in the world: it needs to be studied, analyzed, expanded and publicized not only for the benefit of India, but for the benefit of the other 98 per cent of the world's population who are not currently "wired".

Second, I am hopeful about the potentials of ITs for development, but I urge caution. I am not convinced that ITs are invariably, or even usually, the best answer to poverty, injustice, illness, inequality, discrimination, hunger, corruption and exploitation. Prof. Bhatnagar is right to ask whether investment in grassroots IT is justified or effective. But at the same time, I think that Bill Gates overstates his point when he says that poor people need medicine and not computers. The challenge is to learn whether, if, when, and how information technologies of all kinds can be the most cost-effective means to help ordinary people meet their basic needs and claim their fundamental rights.