IT for Education, Health and Development

Akash Mittal¹, Tapas Kharbanda² and Pankaj Aggarwal³
¹,²,³University School of Information Technology, GGSIPU
¹akashmittal89@gmail.com, ²tapask7889@gmail.com and ³pankajaggarwal.usit@gmail.com

ABSTRACT

Technology affects almost all the aspects of our life. Not only our personal life has changed, it has left a deep impact on the business sector as well as other sectors like education, health and development. We focus on these sectors to show how Information Technology has helped in its growth and how it can be used as a driving force for substantial growth in these domains.

- With Information technology based learning we focus on how computer oriented teaching can have a positive impact on students and how does it impact factors like performance. How schools can provide adopt learning solutions and virtual schools for the students in remote villages of India. We try to show, what has been done and what more can be done in this field that would directly, or indirectly affect the various parameters like child better teachers, better textbooks, updated curricula and better accessibility to education for all.

- With Information technology’s effect on Health we try to show how Information Technology in human health care involves the widespread use of digitized products, online databases, and network infrastructures as the means of communication between hospitals, physicians, providers, insurers, patients and suppliers. This is a comparatively new field and we try to exploit all the technologies that can be implemented for better health facilities in a country like India.

- With Information Technology’s effect on Development we try to focus on how this IT can help in sustainable agriculture, how IT has helped in Telecommunications and Internet, a change we can feel. We have also tried to cover the aspects like Software industry and R&D, which are new and exciting ventures India is foraying into. With facts and figures, we show what has been done and what more can be done.

KEYWORDS

Information Technology, Curriculum, Education, Health, Students. Teachers, Development, Health Care, Telecom, Agriculture, Internet, Web Portal

1. INTRODUCTION

What is Information Technology? According to Wikipedia Information technology (IT) is the acquisition, processing, storage and dissemination of vocal, pictorial, textual and numerical information by a microelectronics-based combination of computing and telecommunications. It is a very broad term that spreads across various domains and includes other issues that it may not visibly address, but still affects them in a large way.

Look around us and we would see how wired we are. But as much as our personal lives have changed, the business world has revolutionized almost beyond recognition in the past few decades. With advances in communication and information technology, it has changed the face and the pace of business.

With all these aspects there are three exciting domains that we try to figure namely, Education, Health and Development. All these factors are interconnected. With better educationists comes demand for better Healthcare facilities and scope for development. Taking any of these factors individually and focusing on what can be done is a mammoth task. Nevertheless, throughout our paper we have tried to separate these spheres and tried to show what has been done and what can be done in the rapidly changing world of Information Technology.

As information technology has developed over the last thirty years, educational establishments have been influenced in various ways. The most obvious example has been the introduction of information technology related courses. These courses are introduced to try to satisfy the demand that society has for qualified people to develop these information technologies. In this paper, we try to focus on what has been done and what more can be done in this field for the betterment of people in India, especially the ones at grassroots i.e. the ones in remote/local villages of India. It is important that the rural India gets as much preference as the urban India. We also have tried to include facts and figures to show how Information Technology can impact education and can lead to a better performance with experienced and computer-trained teachers and better and updated textbooks and supplementary material for students.

With our focus on health, we try to establish familiarity with a comparatively newer field and dynamically changing Healthcare Management. With help of information technology and its various fields like online databases, and network infrastructures we try to provide a means of communication between hospitals, physicians, providers, insurers, patients and suppliers. Always evolving and advancing, health IT will play a critical role in decisions regarding the future of personal health management and health care reform.

We try to show what barriers are there in the field of healthcare, primarily being cost considerations. With more and
more hospitals being business-oriented computing return of investments is a hard and intricate job. With the help of few technologies that IT has provided us, we try to figure what can be done and with facts and figures tried to provide our own considerations. 

Coming on development, our main aims of this paper is to analyze the influence of "information technology" on the collective activities and interests of a broad range of people i.e. development. The phrase "collective activities and institutions" has a wide scope. This report divides these into two main areas:  
1. Work processes,  
2. Social. 

With work processes, we include how Information Technology has an impact on Agriculture and how IT can be used to aim for sustainable agriculture. We have also laid emphasis on Software Industry, which is a comparatively newer field that has problems which need to be addressed. 

With social we try to focus on India as a whole, and how Information Technology has played a vital role by providing Internet for all, or the surge of telecommunication Industry. These are of course one of the few visible changes that can be seen around us. 

Of course, this is an exhaustive research and cannot be included in a single report. Nevertheless we have tried to cover major topics that India needs to look into for her development. With every issue raised, we have also tried to provide solutions of what we think can be done and what people/experts of each related industry think can be done. 

1.2. IT in EDUCATION

After a thorough research on the how IT (information technology) could impact India and its education system, we propose the following findings and how the changes can be implemented. First of all, let’s go through where does our educational system need upliftment and then we would see how Information Technology could help us with the restructuring. 

**Performance**: What is teacher oriented education? It’s a process, rather a slow gradual curve where a teacher imparts knowledge that is restricted to him/her. 

**Quality of teaching**: India with its population faces a daunting task of making sure that wishes of every child are fulfilled i.e. right to free education. With such a demand, maintaining the quality of education and efficiency is required. The under-trained teachers need professional help and training to broaden their horizons. 

**Textbooks/ Supplementary Material**: Without a doubt, social cycle does have a huge impact on the quality of education. While the students in cities/metropolitans get access to the multiple textbooks for a particular subject, what about the plebeians? Also updating of this supplementary material requires labor and diligence. 

Let me explain the whole scenario taking three examples: 

1. Ram Mohan is a science teacher in Jhajjar, Haryana where he runs a small school in the village. 

When teaching his students Newton’s law of Motions he makes use of the particular textbooks mentioned in the syllabi specified by the National Board. 

2. Uma Kashyap is a teacher in Delhi in a famous private school. Her school provides her with a LCD screen and a Workstation in her class. 

   She goes home, logs on to the internet finds a very interactive video of Professor Reddy, which she plays in the class. In between, she pauses the video and takes up the doubts of the class. 

   Visual learning helps her students grasp the concept much faster and better. 

3. Vimal Bhatia is a famous professor located in Delhi. 

   Every day he sits in his standard conference room with a Desktop, Network Card and microphones and speakers and number of slides he has prepared with his team of teachers/lecturers and engineers. 

   His clientele includes list of students located at various places. He continues with playing a video on Newton’s laws of Motion and elucidating every major term that pops in between. 

   Every student/group of students has their own workstation with all the peripherals. 

   Every now and then, they stop have a doubt clearing session and then continue studying. 

   Students can save the whole session so as to be accessed later. 

   Obviously, Third Scenario is the pick amongst all of them. Not only because it caters to a much larger section than what Uma Kashyap or Ram Mohan can do, but also the fact that behind every such session that he conducts, a large team is working towards providing the students quality-oriented education. This automatically helps bring down the teacher-student ratio. 

   Also we can see how Information Technology has benefitted the ones using it. Not only Uma Kashyap and Vimal Bhatia managed to impart more knowledge to the students because they used the research of other highly learned people, they cultivated a method of dynamic learning. 

1.3. FINDINGS OF OUR RESEARCH

The principal focus is to use IT for improving the quality of education. Despite impressive achievements we have notched, a few significant concerns exist. Let us take them one by one. 

With the help of DfES, Research Paper, 2003 we establish why focus on primary education is required and why a statutory curriculum is needed. 

**Performance**: Why is the performance of Indian Students, specially the one from rural sections so subdued? The reasons can be enormous. But the few that we could point out were lack of school’s facilities distance to schools, expense of schools and of course child labor. 

**Lack of quality schools and management**: This not only covers the lack of schools not only quantitatively but also qualitatively. There are large numbers of unqualified teachers that require more education and training as they work.
Teacher-Student ratio: In spite of the entire workforce, India has, still the teacher-student ratio is always around 1:40, 1:50 even in good reputed schools.

Quality of material: The books are updated infrequently and often contain obsolete topics hence containing errors.

Apart from that, there are many faults in the Indian Education System itself that needs to be corrected:

Lack of support material: Our education system still focuses on using the old chalk board mechanism. In the age computers, visual learning should be given preference. Focus on interactive learning and making learning a fun process would boost up a child’s pursuit for knowledge.

Teacher absenteeism: The teachers are largely unmotivated and which directly leads to teacher absenteeism.

Concerns regarding the curriculum and how IT can help:

Obsolete Curriculum: Learning is a dynamic process. To facilitate education learning, it is important that new topics are added and the obsolete ones deleted. No such initiative is taken and the syllabi changes are infrequent and of no use.

Supporting Education Material: Not only the students turn out to be sufferers, the teachers have to face the wrath too.

How it affects students: No access to question banks or links to what is being in other schools.

How it affects teachers: No access to slides/ database and other prospects regarding a subject that can be taken up while class discussions.

1.4. RELEVANT IT-SOLUTIONS

The best people to update the syllabus are the people who preach it or follow it. So IT provides tools for experts, teachers and students that can help in providing feedback on updates in the curricula. Tools that allow sources to create, in a timely manner, high instruction material (including texts and workbooks) and supplementary materials (like connections to text books). Formulate a mechanism for sharing of instruction material amongst schools.

Apart from this factor, Information Technology plays a pivotal role in bringing down costs and other such factors.

One such factor is improving the efficiency of textbooks: Textbooks involve huge production costs, and transportation costs. With these factors are involved the drawbacks, referral to older editions for a long period of time and other related delays like delay in transportation, updating and tree cutting mechanisms to produce paper.

1.5. HOW IT CAN HELP IN THIS?

Usage of more computer oriented learning can be preferred. With the rise in E-Book readers and technology to bring it in actual use, we envisage the usage of these technologies which would not only lead to lowering down the implementation cost but also help in doing our bit for the environment. Also by retaining content in electronic form we delay our commitment to paper to as late as the distribution process. Also changes in curricula can trickle down to the grassroots as soon as possible.

Usage of IT can help in this field by two important changes:

Data collection and Storage: Data can be collected and stored to facilitate mapping and other tasks. Centralized data would directly or indirectly, help all the schools and associated teachers and facilities to make use of this for better performance.

Data Analysis: Provide experts and teachers with computational tools that calculate optimal solutions to specific problems being addressed and to access the data collected so as to produce a contemporary syllabus for student and teacher referral.

1.6. HOW IT CAN HELP TEACHERS?

Information technology would provide a source of information to the teachers. They now would have a commonplace to visit and enthrall themselves to a plethora of information from other teachers/lecturers/ professors. Internet can be used as one such communication tool so that teachers can access a library of notes/link/materials for ready referral.

Schools with web connections allow the teachers to access the internet directly to come up with new and innovative learning methodologies and also numerous ways to make the subject more interesting with the help of audio-visual techniques. Learning isn’t just about books and articles anymore!

More and more educational seminars, learning sessions for the teachers in the remote areas, in the far-flung villages of India with the ones in Cities/Towns/Metropolitans for exchange of ideas and special emphasis on usage of IT.

Helping teachers become better at what they do, by enabling collaborative development of teaching material and making this material accessible to all.

Improving quality of instruction by enabling mass participation in developing curricula, monitoring text books and creating supplementary material.

1.7. HOW IT CAN HELP STUDENTS?

Prepare a web portal that allows students to search categorically for every aspect of subject.

Help in finding other quality supplementary materials for reference apart from the textbooks. Provide video link to lectures and sessions from experts to help in doubt clearing.

Help students in far flung areas be connected to the newer ideas prevailing in the cities and other parts of world and to seek help whenever required. Of course, all this requires setting up a necessary hardware and software infrastructure for collaborating and sharing information.

Formulation of hardware and software infrastructure for collaborative development of content; then making this content available across the nation. The resulting solutions are intended to assist teachers, educationists and students and improving the quality of instructions at all the levels. Hardware and software infrastructure for collecting and analyzing data from sources across the nation. The solutions are intended to help administrators improve educational efficiency.
1.8. HOW IT WOULD HELP IN LANGUAGE DEVELOPMENT?
India is a diverse nation with multi-linguistic capabilities. No one language can be used for catering the students of different regions and areas. For such Information Technology has a very important role to play. It should be capable of handling different levels of IT maturity and multiple languages.

The infrastructure would have to allow automatic translation from one language to another and to provide multilingual capabilities no manual author/publisher can provide. To be able to access the same article in a village of Haryana and in the village of Kerala simultaneously would indeed be an achievement in itself. The education system would largely benefit from translations of the best in a language.

Use of various open source software/ Wikipedia/ Blogs can be used in this aspect too.

1.9. WHAT INFORMATION TECHNOLOGY CAN DO ON THE LONG RUN?
Help teachers be more trained and better in their respective field. Allow the development of better supplementary material and textbooks. Improve operational efficiency and reduce costs by making planning and distribution IT-based, eg textbook production. Help improve the quality of education and class room instruction by providing better aids created by other teachers and students. Help the teachers/students in remote villages of India to be connected to the larger network hence enhancing performance. Help an expert or professor to cater larger sections of students in one go and clear their doubts at any particular moment. Teachers have always been the torch-bearer of education in our system.

Once the teachers would be familiar with usage of computers, then we can expect them to be a helping hand in the education development and its improvement at national level. With this we would ensure that that they will continue to shape the thoughts of Indians living in 21st century and make India an information-technology driven country.

1.10. IT in HEALTH CARE
Information Technology (IT) in human health care involves the widespread use of digitized products, online databases, and network infrastructures as the means of communication between hospitals, physicians, providers, insurers, patients and suppliers. Nonetheless, excellent IT and high-quality health care are closely linked. All of the healthcare organizations are recognized as quality leaders due to excellent clinical outcomes, which have been achieved in part because of their systems based on information technology. Furthermore, the organizations’ information systems have several common threads: all provide near-immediate access to a wide array of information including nearly all clinical results; they are highly integrated; they provide clinical decision support; they have both inpatient and outpatient data with differing views for each; and they facilitate measurement. Information technology can contribute significantly to quality improvements in healthcare institutions. There are difficulties associated with implementing information technologies, but they are not insurmountable. Always evolving and advancing, health IT will play a critical role in decisions regarding the future of personal health management and health care reform.

1.11. SIGNIFICANCE
IT in human health care provides an interactive network where medical facilities, physicians, and providers can communicate, collaborate, develop partnerships, exchange ideas and ultimately increase the quality of health care worldwide. In addition, health IT advancements now offer patients online access to e-health tools, personalized health record software and other methods for self-managing healthcare.

The following technologies and terms are included in discussions of information technology in health care:
• Electronic health record (EHR): EHRs were originally envisioned as an electronic file cabinet for patient data from various sources (eventually integrating text, voice, images, handwritten notes, etc.). Now they are generally viewed as part of an automated order-entry and patient-tracking system providing real-time access to patient data, as well as a continuous longitudinal record of their care.
• Computerized provider order entry (CPOE): CPOE in its basic form is typically a medication ordering and fulfillment system. More advanced CPOE will also include lab orders, radiology studies, procedures, discharges, transfers, and referrals.
• Clinical decision support system (CDSS): CDSS provides physicians and nurses with real-time diagnostic and treatment recommendations. The term covers a variety of technologies ranging from simple alerts and prescription drug interaction warnings to full clinical pathways and protocols. CDSS may be used as part of CPOE and EHR.
• Picture archiving and communications system (PACS): This technology captures and integrates diagnostic and radiological images from various devices (e.g., x-ray, MRI, computed tomography scan), stores them, and disseminates them to a medical record, a clinical data repository, or other points of care.
• Bar coding: Bar coding in a health care environment is similar to bar-code scanning in other environments: An optical scanner is used to electronically capture information encoded on a product. Initially, it will be used for medication (for example, matching drugs to patients by using bar codes on both the medications and patients’ arm bracelets), but other applications may be pursued, such as medical devices, lab, and radiology.
• Radio frequency identification (RFID): This technology tracks patients throughout the hospital, and links lab and medication tracking through a wireless communications system. It is neither mature nor widely available, but may be an alternative to bar coding.
• Automated dispensing machines (ADMs): This technology distributes medication doses.
• **Electronic materials management (EMM)**: Health care organizations use EMM to track and manage inventory of medical supplies, pharmaceuticals, and other materials. This technology is similar to enterprise resource planning systems used outside of health care.

• **Interoperability**: This concept refers to electronic communication among organizations so that the data in one IT system can be incorporated into another. Discussions of interoperability focus on development of standards for content and messaging, among other areas, and development of adequate security and privacy safeguards.

### 1.12. BENEFITS

The synergy between Information technology and medical services has opened fascinating new possibilities for benefit in areas such as continuing care, chronic disease treatment and old people home monitoring, bringing with it the promise of essential changes in existing models of care delivery and system performance. While increasing the use of IT in healthcare would result in benefits in several domains, the quality benefits will probably be some of the largest. In particular, this would improve the likelihood that processes will be successful, and would allow delivery of evidence-based decision support to providers, narrowing the gaps between evidence and practice. Both financial and nonfinancial incentives encourage physician use of IT. Electronic billing, electronic claim submission, and digital imaging equipment are IT applications that provide hospitals and physicians with a quick and consistent return on the investment. The long-term nonfinancial benefits to using IT administratively and in clinical practice include improved patient safety and quality of care, physician accessible medical information at patient point of care, improved administrative accuracy and clinical efficiency, increased interaction between patient and provider, increased morale among employees and enhanced hospital public relations.

### 1.13. TRAINING

Computer training is essential. For example, the successful use of a "bedside information system" requires the preparation, involvement and commitment of an entire hospital staff. Training the hospital staff in IT can be a major educational process. In order to design the most appropriate training program, managers must try to anticipate how users will perceive the new IT and how it may affect routine patterns of behavior. As physicians are often not employees of a healthcare organization and because they have little time to learn new tasks, special appeals must be made for them to participate in the training and use of IT. These appeals should be benefit based, for example, how IT can save time, improve patient care and enhance status. This can enhance the various parties' feelings of involvement in the development of IT.

### 1.14. BARRIERS

Since the financial benefits of implementing IT into health care happen over time, investment returns are difficult to calculate. Consequently, initial start-up costs to hospitals prove to be the biggest barriers. These costs include purchasing products and technology, developing IT infrastructures, training the staff, providing system and maintenance support, and integrating new applications with existing systems. Because widespread use of IT is critical to its overall success in health care, the fact that thousands of smaller, lower-budgeted hospitals may be unable to participate accordingly presents an obstacle. Beyond the financial and technological concerns, the use of electronic systems for clinical reminders may not agree with some physicians’ clinical practice styles, which may rely primarily on their knowledge and experience. In addition, use of computers may be seen as interrupting the physician-patient relationship by drawing away from the personal interaction. These systems may add to a physician’s workload, rather than alleviating it. Another barrier is the reluctance of physicians and providers to accept complex changes to the system without immediate guarantees.

### 1.15. CONSIDERATIONS

Policies and guidelines concerning the confidentiality of patient information need to be developed and enforced. There should be an effective supervisory and legal structure that provides sanctions against detected abuse of information. Systems should be designed to accommodate evolving policies and security management technologies. Access to records can be restricted. Indeed, IT can provide more protection of patients’ privacy than can paper documentation systems. Password and audit trails can protect patients. Deterrent alerts, reminders and education of the computer users are also very effective in reinforcing ethical behavior.

### 1.16. RESEARCH

Finally, while a great deal is known about what works regarding using IT to improve quality, much remains to be learned, especially regarding implementation and dissemination of systems. Key questions remaining include how best to deliver clinical decision support, how much adjustment of guidelines is needed for local implementation to be successful, how clinical information systems can best be implemented and disseminated – especially to small hospitals and community-based providers, how patients can best be involved more than they are, and the role of the Internet and other new technologies in this revolution.

### 2. IT in DEVELOPMENT

#### 2.1. IT AND RURAL DEVELOPMENT IN INDIA

Advancement in information technology (IT) has demonstrated opportunities to the people to utilize it in their socioeconomic and cultural development in a better and more sophisticated way. By utilizing it, the government finds the importance and role played in delivering services at the locations convenient to...
the citizens. The rural IT applications attempt to offer development ideas and solutions to the people who are deprived of basic human facilities such as safe drinking water, diary, education, immunization, reproductive health, employment generation, human rights, etc. Similarly, the government and administration try to exploit the technological explosion by utilizing the IT in offering improved and affordable solutions to these basic necessities of the people at their village doorsteps. There are two kinds of economic benefits by IT usage. They are static and dynamic efficiency benefits. The major advantage of the information goods is that the usage of one person does not deplete the availability for another. IT has enabled democratic political design of India. Thus IT is a key factor influencing the pace and progress of rural development. Nowadays internet connectivity is enabled even in rural parts of the country. This provides the access for rural masses to learn, update and improvise.

2.2. ROLE OF IT IN AGRICULTURE

Information Technology (IT) has a major role to play in all facets of Indian agriculture. In the context of agriculture, the potential of information technology (IT) can be assessed broadly under two heads: (a) as a tool for direct contribution to agricultural productivity and (b) as an indirect tool for empowering farmers to take informed and quality decisions which will have positive impact on the way agriculture and allied activities are conducted. Precision farming, popular in developed countries, extensively uses IT to make direct contribution to agricultural productivity. The techniques of remote sensing using satellite technologies, geographical information systems, and agronomy and soil sciences are used to increase the agricultural output. This approach is capital intensive and useful where large tracts of land are involved. The indirect benefits of IT in empowering Indian farmer are significant and remain to be exploited. The Indian farmer urgently requires timely and reliable sources of information inputs for taking decisions. At present, the farmer depends on trickling down of decision inputs from conventional sources which are slow and unreliable. The changing environment faced by Indian farmers makes information not merely useful, but necessary to remain competitive. In addition to facilitating farmers in improving the efficiency and productivity of agriculture and allied activities, the potential of IT lies in bringing about an overall qualitative improvement in life by providing timely and quality information inputs for decision making.

3. IT IN INDIAN COMMUNICATION INDUSTRY

The key aspects about Indian Telecommunications network are based on the availability of human resources for the IT market. India’s government created a business-friendly environment for the IT services industry. The rise of India’s software industry has facilitated dramatic changes in the telecommunication sector. Sometimes Technological revolutions paved way for unexpected opportunity for countries. India found such an opportunity in the IT revolution and has developed to be the increasingly favored location for customized software development. The IT innovations have favored the development of the communication industry of India.

3.1 Telecom Expansion over the Last Decade

The Department of Telecommunications (DoT) in India has made significant efforts over the last fifteen years towards expanding the telecom network, even though its efforts have been well short of rising expectations. One of the most significant initiatives of DoT has been in bringing the STD-PCO to every corner of the country, and to a lesser extent, its group PBX policy. As individually owned telephones are not widely available and affordable, PCOs become a means to reach a much wider section of people. This is correctly recognized by the IT task force as it plans to encourage expansion of STD PCOs into Internet kiosks. The step is in right direction, both in making Internet more affordable, as well as in creating stakes for small business to run it well. The Group PBX scheme of DoT had a similar aim, but the poor revenue-sharing arrangement, where the Group PBX operator gets less than 20% of revenue while putting up the full access network (which amounts to a large percentage of the cost of installing a telephone line), has not made it viable. It is hoped that DoT and the IT task force will review this revenue-sharing percentage soon, especially as the group PBX operator could also double as the local access provider for Internet.

The second major initiative of DoT has been in privatizing telecom equipment manufacturing, whereby DoT no longer makes purchases solely from state-owned units. This has resulted in a large number of telecom manufacturing units coming up. While many of these private units have not done well, others have used in-house R&D and out-sourced R&D to reduce costs significantly. Low-cost PCO equipment, analog and digital pair gain systems, PDH multiplexers, point-to-point microwave links, and multi-access rural radio equipment, are some examples. One reason the local manufacturers are struggling today is because liberalization has sometimes gone to the other extreme, providing protection to equipment importers over the local manufacturers. Another reason is because they are ill-prepared to cope with fast changing telecom technology where software and hardware combine to provide unique telecom and networking products. These companies are fast learning their lessons. It is likely that some of these manufacturers could become the nucleus for making India a leading provider of IT products in the world, as the IT task force report envisages.

4. GROWTH OF THE SOFTWARE INDUSTRY IN INDIA

The software industry in India gained recognition in the early eighties, as companies took up export of trained software manpower, especially to USA. Very soon, instead of just exporting persons, several companies started taking up software projects at customer sites, and sent their professionals.
to carry out this task. Starting with routine jobs, most companies graduated to more and more sophisticated tasks and India started getting recognized as having special talent for software development and management of software projects. It was only in the early nineties, after the Indian software industry got sufficient recognition, that Indian companies were able to win contracts in a large way to carry out software projects off-shore (in India). From then on, projects have gotten more sophisticated and bigger. Today, even though the software tasks carried out by India for the West may amount to a small portion of the worldwide IT industry, Indian companies and professionals are regarded as amongst the best in the world.

However, having achieved considerable success, most front-running software companies are dissatisfied with their performance. They recognize that they have come up with very few products that they own. Although they may have made significant contributions to many products on the shelves, hardly any carry their brand names. They are eager to make and own products, but they have little experience in marketing products worldwide. The home market is still too small to allow these products a trial site as well as a little protection, before they could handle fierce competition.

Product ownership is imperative if the Indian software industry is to take a major leap forward. Certain parts of the IT task force report aim to address this need by proposing liberalization. However, the task force report does not address how to enable Indian companies to handle market their products worldwide. Maybe this is best left to the innovativeness of the industry itself.

Another problem that Indian software houses face is the large-scale migration of software manpower. With the dollar continually appreciating vis-a-vis rupee, the continued large-scale shortage of software professionals in the West, and the large income difference for these professionals in India and the West, a large section of Indian software personnel stay in India only until they get trained and an opportunity to move abroad. Most software companies have unsuccessfully tried restrictions such as bonds to stem this outflow, but have slowly come to live with this phenomenon. Making the work here more challenging, providing better remuneration, and more recently awarding them a part of the company's stock, to give a sense of ownership, are what the companies are offering.

5. IT IN INDIA

What is normally regarded as India’s greatest weakness — the large population — can also be strength. While the growing population has created a lot of problems in the country, it also represents a large potential market. This potential can be converted into reality only if the products are affordable to a large section of its people, and this is indeed a difficult task since most people of the country can afford very little. After a new product is introduced in the West, it is continuously innovated upon to bring down the price till it is widely affordable. Beyond this, there is little motivation to further bring down the price. All innovations thereafter are geared to improve features while the price is kept constant. Unfortunately, this affordable price level in the West is affordable to only the top few percent of the population in a country like India. To make it affordable to a larger cross-section, innovations different from those pursued in the West are required. However, 20% of the Indian population is a large market, equal in size to the West, and can fuel unprecedented growth. This approach is daunting, since it requires us to take a few steps ahead of what is normally done in the West.

6. CONCLUSION

Undoubtedly, there is an enormous potential for IT to improve the performance of existing Indian educational, healthcare and social system. Progress in implementing IT within various institutions, however, continues to be rather slow compared to the advances in the technology itself.

Change is on the horizon. In a few years from now we can re-convene — only this time we will have a very different conversation about technology and its impact on society. As Information Technology transforms education, health and development, we hope that providers take advantage of the platform to customize increasingly for individuals and escape from the standard, monolithic system we have today.

REFERENCES
[6] Dr. Prabhudev Konkana, Dr. Sridhar Balasubramian, India as a knowledge economy, 2001
[8] Role of Information Technology in Agriculture and its scope, SC Mittal