Information and Communication Technology Applications in Development: India as a role model for other developing countries

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Case studies of three state-sponsored and two corporate information and communication technology initiatives in India demonstrate how India can serve as a model for similar applications in other developing countries.

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INTRODUCTION

Information and communication technology (ICT) is an increasingly powerful tool for participating in global markets, promoting political accountability, improving the delivery of basic services and enhancing local development opportunities. But without innovative ICT policies, many people in developing countries – especially the poor – will be left behind. The United Nations Development Programme (UNDP) helps countries draw on expertise and best practices from around the world to develop strategies that expand access to ICT and harness it for development. Working in 166 countries, UNDP also relies on ICT solutions to make the most effective use of its own global network.

In the industrialized world the ICT revolution is already affecting the economies and the way of life. ICT is gaining a foothold in the developing world and it may take some time before it will benefit the poor people in these countries. Telecommunication networks and other ICT infrastructure are lacking, as well as the technical and economic base for achieving widespread connectivity. The situation is worsened by the lack of technical personnel and computer literacy. The digital divide – the fact that the world can be divided into people who do and people who don't have the capacity to use ICT, such as the telephone, television, or the Internet[1] – threatens to impede the economic welfare of the developing countries.

ICT is the instrument that can help developing countries to be a part of the global economy. It is also a question of everybody's right to get information. While ICT provides tremendous opportunities for the poor people of the developing world, there also exists a risk that the ICT revolution can enhance the gap, not only between the rich and the poor countries, but also between the rich and the poor people in the same country.

The task at hand is to quickly integrate IT in the support programs of development agencies so that the developing countries can benefit from increased knowledge transfer both globally and within the countries. There are many international organizations like the United Nations, the World Trade Organization (WTO), the World Bank, the Global Internet Project (GIP) and others willing to provide financial and technical support in this regard. But how should this be done?

The United Nations Conference on Trade and Development (UNCTAD) report on *E-Commerce and Development* underlines the following recommendations to many developing nations to overcome the problems of the digital divide and benefit from ICT:

> Governments in both developed and developing countries play an important role in promoting and facilitating the development of the information society and economy. Above all, governments should lead by example by adopting e-governance practices. Experiences show that in many developed countries that have enjoyed fast growth in ICT, government has been closely has been closely involved in promoting ICT development. Governments play an important role as leaders, especially at the earliest stages by providing vision, raising awareness and making ICT development a national priority.[2]

The report also spells out that, notwithstanding the important role of government in initiating and implementing national ICT strategies, experiences show that the private sector has been the most innovative player and the major driving force behind ICT development. An ICT strategy that combines public intervention with private-sector initiative in a mutually supportive manner is the only viable option.

India presents a right blend of the initiatives by both

public and private efforts in use of ICT for the benefit of the common man. An attempt is made in this paper to present three case studies with respect to government (public) efforts and two case studies with respect to private sector initiatives in making ICT a tool for development in India.

PUBLIC SECTOR INITIATIVES

Various state- or government-owned organizations in India have succeeded in making use of ICT as a stepping-stone towards providing better quality services to their users.

The government of Andhra Pradesh initiated one such effort through a pioneering E-governance project undertaken by the then Chief Minister of the State, Mr. N. Chandrababu Naidu, who realized the importance of the adoption of ICT for the benefit of the common citizens of the state. This project, the subject of the first case study, is known as 'E-Seva', which means providing services electronically.[3]

The second case study to be presented in this section is with respect to Indian Railways, one of the largest rail networks in the world.

The third case study deals with the adoption of ICT by educational administrative agencies in India.

'E-Seva': an overview

This service was started in December 1999 in Hyderabad, the capital city of Andhra Pradesh, which is geographically spread as the twin cities of Hyderabad and Secunderabad. The objective behind this E-governance project was to take ICT to the doorsteps of the common man in the street. Andhra Pradesh is the first state in India to formulate and implement this kind of project. The ordinary citizen can avail himself of a variety of services through the Andhra Pradesh State Wide Area Network (APSWAN), a data, voice and video communication network through which various utility services, like payment of bills, property tax, purchase of certificates and licenses, building permits, registration and transport facilities, etc. are available via E-Seva centers. Andhra Pradesh has even been granted the best state award for E-governance.[4]

E-Seva centers are operated by various entrepreneurs and technical partners. Citizens can drop in to one of the nearest E-Seva centers to avail themselves of many of the services mentioned above. At present there are 46 E-Seva centers serving more than 3 million people living in the twin cities of Hyderabad and Secunderabad and the neighboring district of Ranga Reddy. E-Seva services are also available through 81 Automatic Teller Machines (ATMs) of Andhra Bank as well as through ATMs at two branches of the State Bank of India (SBI) and the State Bank of Hyderabad (SBH). At present there are 178 centers in operation at different municipalities in 21 districts of Andhra Pradesh state. In all, these services are available through 210 E-seva centers (including the centers operating at the twin cities of Hyderabad and Secunderabad) throughout the state.[5]

ICT in Indian Railways

Indian Railways is the largest railway network in the world under single management. It has the following important features:[6]

- it employs about 1.55 million people
- it carries over 13 million passengers and 1.3 million tones of freight every day
- it runs about 14,300 trains daily
- the first Computerized Railway Reservation system was started at Delhi in 1986.

There was a time when a rail passenger in India needed to travel long distances to visit the nearest railway station for getting the tickets reserved through one of the Computerized Railway Reservation systems. These systems were not connected throughout the country, but operated on a zonal basis. The customer may still have to wait for a few hours to complete his transaction or even to enquire about the availability of the ticket or the status of his waiting list ticket. That is all changed with the introduction of the online ticket booking facility.[7]

Indian Railways' official website (www.indianrail.gov.in) offers information on reservation status, train fares, break-journey rules, booking locations and special trains. Visiting crowded stations has become unnecessary as the customer can book the tickets online and get them delivered to the doorstep.

The Indian Railways Catering and Tourism Corporation (IRCTC), the marketing arm of Indian Railways, is handling the program, which was launched on 3 August 2002 in collaboration with the Centre for Railway Information Systems. All a traveler needs to do is register (free of charge) and book tickets for any rail journey in India. According to the Ministry of Indian Railways, '. . . this system is beginning to help reduce huge crowds at stations. People who are pressed for time are very appreciative

of this set-up'. The IRCTC also offers a 24-hour help line and e-mail support to assist customers, timetable enquiries, train timings, e-mail alerts and an online consignment tracking system to find out the delivery status of tickets. The railway has also tied up with the Housing Development Finance Corporation (HDFC) Bank, which offers the online booking facility for its credit card customers.

ICT in Educational Administration

As part of student counseling for aspirants of engineering, technology, pharmacy and architectural education across the country, an interactive website is being created to keep them informed and offer them choices.

The Ministry of Human Resources Development (MHRD)[8] has created a Central Counseling Board (CCB) to help the examinees who appear for the All India Engineering Entrance Examination (AIEEE). This offers a highly interactive, counselee-friendly and transparent system that would offer multiple choices to candidates in consultation with their parents and guides. Counseling is conducted at several of the National Institutes of Technology (NITs) and Deemed Universities (institutions which are granted the status of a university by MHRD and operated by private or corporate agencies).

The National Informatics Centre (NIC) has launched a website (http://www.ccb.nic.in) for the benefit of the students seeking admission through AIEEE which provides high bandwidth connectivity for online counseling. The newly-developed counseling model will provide assistance to students seeking admission to 24 institutions, namely, the Indian Institutes of Technology (IITs), the NITs located in different parts of India, various Deemed Universities and the Indian Institute of Information Technologies (IIIT) at Allahabad, Gwalior and Hyderabad.

Attempts are also being made by several state boards and universities in India to adopt ICT for providing online results, information regarding the status of admissions, courses, institutions under their jurisdiction and quality aspects to the students and parents, to help them make better choices.

All these efforts have benefited the millions of students pursuing education at school, college or university level. This proves that the adoption of ICT provides better quality, cost-effective services to the common citizens of a nation.

PRIVATE SECTOR INITIATIVES

Indian Tobacco's E-choupal Services

The Indian Tobacco Co. (ITC) is one of India's leading Indian corporations. Its agri-business group runs what is know as the *E-choupal* business. The concept is taken from the Hindi word 'choupal' which means 'village square'. The twist is in the 'E' – providing a computer and an Internet connection for farmers to gather around. *E-choupals* allow farmers to check both futures prices across the globe and local prices before going to market, and give them access to information on local weather conditions, soil-testing techniques and other expert knowledge that will increase productivity.[9]

ITC has done as much as anyone to bridge India's vast digital divide. ITC now has the means to reach into some of India's 600,000 villages, where 72 percent of the people live and where the greatest potential markets lie. Eventually ITC expects to sell everything from micro–credit to tractors via *E-choupals* and hope to use them to become the Wal-Mart of India. Sixty companies have already taken part in a pilot project to sell services and goods, from insurance to seeds to motorbikes to biscuits, through ITC.[10]

The *E-choupal* initiative strives to transform the Indian farmer into a knowledge-seeking citizen. This will provide access to information, which in turn will help him to make the right choices about farm inputs. For ITC, it is the most cost-effective route for sourcing selected commodities. It also enables the sale of products and services to farmers.

Farmers can log on to the *E-choupal* website to order farm inputs, get information about best farming practices, know the prevailing market prices of their crops at home and abroad, and the weather forecast – all in the local language. There are four *E-choupal* websites covering soya, coffee, aqua (sea products such as shrimps, etc.) and wheat.

Further, the *E-choupal* initiative has created a direct marketing channel, eliminating wasteful intermediation and multiple handling, and thereby reducing transaction costs and making logistics efficient. It has linked farmers to consumers in the local and global markets through ITC's sourcing and capabilities in branding, trade marketing and distribution.

The Andhra Pradesh Government, in association with ITC Ltd, will be establishing *E-choupals* for chilies and turmeric in the State as a public–private partnership initiative. These will be operated through

the Rythu Mithra ('Farmers' Friends') Groups in the State on the lines of those set up by ITC for soybean farmers in Madhya Pradesh.[11]

E-choupals may offer a model for other developing countries; "it is a new form of liberation" says noted management guru C. K. Prahalad, who has developed a case study on *E-choupals* for the University of Michigan's Business School.[12]

Telemedicine at Apollo Hospitals

It is evident that the digital divide in rural India has been reduced by the efforts of ITC. A similar effort was made by Apollo Hospitals Enterprises Ltd. (AHEL) in the area of providing quality super specialty health care to millions of rural Indians through telemedicine.

AHEL today comprises of a network of 37 hospitals, owning and managing 5,046 hospital beds, 10 primary clinics and over 100 pharmacies, making it the single largest healthcare provider in Asia. Apart from the core area of hospitals, the group has also diversified into various related avenues including e-health, franchising, IT and Internet-based technology, telemedicine, a virtual medical university, education and training, home healthcare, pharmacy retailing, hospital project management and health insurance.

Telemedicine is the use of electronic information and communication technologies to provide and support health care when the participants are separated by distance. It enables the transfer of valuable opinion and interpretations to complex medical cases and of patient data and images using the telemedicine software MedIntegra.[13] It also facilitates specialists from the service hub to view, in real time, images from computerized tomography scans, magnetic resonance imaging, ultrasound, electrocardiograms, positron emission tomography, tread mill tests, digital stethoscopes, digital microscopes, etc. along with the medical history of the patient. This facility enables a visual interaction between the patients and the specialists, irrespective of where they are, and helps in lowering the cost of travel for patients from far-off regions to bigger centers for medical treatment. In addition to the patient benefits, the telemedicine link is extremely useful for conducting Continuing Medical Education (CME) programs for the local doctors in these regions, enabling them to upgrade their skills by attending videoconference medical programs offered by specialists from bigger centers like the Apollo Hospitals located at Chennai, Hyderabad, Delhi and Kolkata.

Apollo Hospitals is credited with initiating the revolutionary technology of telemedicine in India and was among the first players to implement the technique for facilitating delivery of quality healthcare services to people in far-off areas. The Group started the telemedicine revolution from Aragonda, a small village in Andhra Pradesh, and has grown into the single largest telemedicine provider in India, presently operating over 35 telemedicine centers in the country, covering the interiors of the northeastern part of India, rural Andhra Pradesh, Tamil Nadu and central South India. More than 6,000 patients have directly benefited from the service till now. The Group also provides the facility to seven military hospitals in Andhra Pradesh, Tamil Nadu, Karnataka and Kerala.

Apollo Hospitals, which has always strived to bring the best healthcare facilities to the reach of every citizen of India, utilized modern technology back in 1996 by introducing the Heart Line Machine, providing expert cardiac opinion for all, especially residents in northeast India and neighboring countries. Apollo has successfully completed over 3,500 teleconsultations, covering all specialties from neurosurgery to pediatric cardiology.

Former US President Bill Clinton, on his visit to India in March 2000, commended Apollo for its pioneering efforts in the field of telemedicine:

> I think it is a very wonderful contribution to the healthcare of the people who live in rural villages and I hope that people all over the world will follow your lead, because if we do, then the benefits of hi-tech medicine can go to everyone and not just the people who live in the big cities.[14]

The road map envisioned for the Apollo Telemedicine Network Foundation (ATNF) in Phase I includes connecting 125 primary, 25 secondary and 3 tertiary centers in the states of Maharashtra, Gujarat, Madhya Pradesh, Tamil Nadu and Andhra Pradesh. Phase II will connect 2,500 primary centers, 500 secondary and 100 tertiary centres all over the country and attempt to extend the services to other developing countries in South Asia and Africa. Phase III will see ATNF extend its reach beyond national boundaries to connect international centers of medical excellence with local medical institutions via the telemedicine link.

ATNF will also effectively utilize the telehealth connectivity at all engineering colleges to spread AIDS awareness through celebrity endorsements enhancing the existing University Grants Commission's grant of

INR 350 per student per year to disseminate AIDS awareness.

Recognizing Apollo's expertise in telemedicine, the Government of India has invited Apollo to be a part of the Standards Committee on Telemedicine – a high-powered body convened by the government to herald and spread the concept of telemedicine in India. Apollo is also defining the standards for health informatics in India through the 'Information Technology Infrastructure for Health' project.

CONCLUSION

India has demonstrated to all the developing countries that no technology can succeed unless and until there is active collaboration between the public and private sectors.

Based on the Indian case studies, it is recommended that other developing countries consider the following policy aspects:

- Adoption of ICT for development should be made a priority. Many developing cuntries have already experienced the 'brain drain' problem, which has resulted in an outflow of human potential to the developed world. The educated, unemployed youth of the developing countries will be looking for greener pastures in other parts of the world if their governments do not take appropriate initiatives or encourage the initiatives of corporate and international bodies.
- Improvements in standards of living back home will encourage many professionals to start businesses in their homelands, thereby increasing productivity in terms of growth in the Gross Domestic Product (GDP) and the Human Development Index (HDI). India is one such country, home of the biggest software success stories of the developing world.
- Systems of decentralized and transparent e-governance can help in providing improved services to the people.
- All developing countries should formulate a Strategic ICT Policy, keeping in view their socio-economic and cultural needs.

Note

INR = Indian rupee (currency)

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Abstract

India presents a good example of the applications of information and communication technology (ICT) for other developing countries. Presents case studies of three state-sponsored and two corporate initiatives in India dealing with ICT applications in: the E-Seva e-governance project in Andhra Pradesh; the online ticket booking facility at Indian Railways; online student counseling in educational administration; the E-choupal information services for farmers provided by Indian Tobacco; and telemedicine at Apollo Hospitals for facilitating delivery of quality healthcare services to people in remote areas. Concludes with recommendations on policy aspects to be considered by other developing countries.

Keywords: Information and communication technology; India

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MORE ON ICTs IN INDIA

Impact of digital divide on developing countries with special reference to India.

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Technological change is major contributor to the growth and development of the information society. Unequal access to information and communication technologies leads to digital divide and effects the growth and development of the society by powering some people who have availability of information and depriving others who do not have access to information. The paper portrays the challenges of digital divide and describes the role of libraries in reducing the digital divide. It mentions the role of Bill and Melinda Gates Foundation in providing the Internet access in public libraries of developing countries. It describes the benefits of project Infothela initiated by IIT Kanpur, IIT-Webel software developed by IIT Kharagpur and contributions of Bill and Melinda Gates Foundation to help and enable the disadvantaged people in India to access the information resources. It also describes the project Grameen Sanchar Sewak launched by the Prime Minister of India to provide telecom services to rural people. Highlights some strategies required to be followed by developing countries to lessen the impact of digital divide on their societies.

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