

8. The "green factor" will become a major consideration, as operators struggle with the inadequate power infrastructure in rural areas. Designs with efficient base stations and less power will be a premium.

9. Mobile location and navigational services will do well, given India's chaotic road networks and addressing system.

Yahoo has worked on services that enable navigation by landmarks rather than navigation by street names, given the fact that most Indian streets do not have name boards, joked Chintan Mehta, Director India Incubation "Cellar" Yahoo!

TV 18, parent company of Mobile 18, has acquired a controlling stake in Infomedia India, a publisher of business directories, said Pandey. IndiaCom Directories, another major publisher of print and online business information, has also formed tie-ups with Google for locator services.

10. Mobile number portability was much touted recently, but will not implemented for at least a few more years.

Other trends to watch in India's wireless industry are mobile utility services in verticals like healthcare and education, and the growth of WiMax. In sum, the mobile growth in India will continue to be a success story in the Asia Pacific markets.

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The Internet to the 21st century is what electricity was to the 20th

R. SIVAKUMAR

Internet is the gateway to individual as well as National knowledge, entertainment, services, well-being, opportunity and ultimately socio-economic growth. Further, pervasive broadband is imperative to effective Internet access, given the overall evolution of the web and its contents.

As India makes significant economic strides, the Internet is fast emerging as a defining step in education, communication, business and entertainment. The Internet usage in India is growing at a rapid pace. The future is here, yet unevenly distributed. The paradox is that we make up one-fifth of the world's population but only a fraction of the people are connected to the Internet. Only when we provide access to the shepherd in Nagaland or the truck driver in Rajasthan will it be a turning point in human experience. I would like to bring forth a brief overview on how the Broadband acceleration drives economic growth and can be a game changer.

Impact of broadband on Indian economy: Broadband has the potential to deliver \$180 billion output growth over 10 years, i.e., \$18 billion per year. Currently, the over-

all growth potential in National Output (Present Value of estimated additional growth in the 2010 - 2020 period) due to ubiquitous broadband deployment in India is approximately USD 90 billion. This includes:

- >> The Labour productivity improvement of existing workforce at approximately USD 49 billion.
- >> Output growth due to e-literacy programs in secondary schools at approximately USD 14 billion.
- >> Output growth due to e-education in vocational / higher secondary schools at approximately USD 27 billion.

National Employment Opportunity Creation by 2020

Through increase in employment of rural youth and improvement in labour participation of urban women through tele-working and distributed computing, there will be 59 million full time equivalents (approx. 68 million peo-

Broadband could boost economies in much the same way as railways and highways did in previous eras

ple including part-time teleworkers)

Broadband as a new Industry by 2020

Based on various estimation, Broadband will grow to a \$25 billion industry and create 68 million additional jobs.

Education

Improved accessibility, flexibility and quality of education can be made available for all 100% connected villages through virtual primary, secondary, adult literacy and distance education programmes through the village kiosks.

Health

Real time professional medical attention / care can be made available for all, as every village broadband kiosk can act as a tele-medicine center

Governance and citizen empowerment

Real time interface between every citizen and the relevant Government agency can be a reality: a virtual single window service can now be made available to citizens.

In short, broadband could boost economies in much the same way as railways and highways did in previous eras.

Several studies conclude that in slack economies, more broadband means more jobs. The Brookings Institution, a think-tank in Washington, DC, projects that for every percentage point increase of broadband penetration at state level, employment increases by 0.2% to 0.3% per year, equivalent to 300,000 jobs nationally.

Change is happening, for sure!

Today, the humble neighbourhood telephone service provider is able to increase his earnings despite falling mobile tariffs. Thanks to

Computer and Internet initiatives in education are showing tremendous success being combined with the normal curriculum

Internet enabled services like mailing & ticketing. For example the ePCO initiative in Karnataka, started recently by BSNL and Intel along with local government, where the Internet is been instrumental in creating entrepreneurship. Similarly in education, the Internet has allowed increased resources for global education and learning. People worldwide can take university courses online, students can access data and study tools and children can visit varied education web-sites.

Perhaps the better example yet is that of around 200,000 Railway tickets are being sold

every month online. Imagine what this does to an hourly wage employee. He no longer needs to stand in line for hours to book his ticket for a family vacation. You can now donate as little as Rs. 40-50 and change someone's life through giveindia.org. A Candidate in a village looking forward to getting employed with a job in the city can now apply free of cost for a job in Bombay. At shaadi.com - marriages are now made online.

Computer and Internet initiatives in education are showing tremendous success being combined with the normal curriculum. In the process, the learning environment gets richer. They are not only learning the normal subjects, but as a bonus they learn ICT skills and other skills like critical thinking, receiving feedback, communication skills, organisation and planning skills among others.

Internet as means to social development

The Internet is not only about entertainment and medium of communication like emails. It connects people with people; students to teachers; patients to doctors; capital & services to entrepreneurs; citizens to governance; businesses with customers, and so on.

- >> It enables endless opportunities: e-commerce, tele-education, tele-medicine, e-governance, entertainment, & employment generation.
- >> At the macro level, facilitating business on the Internet contributes to the GDP of an area, far more than what a phone can

do.

Each day a new usage models and needs continue to evolve. A few examples of evolving pockets of excellence are:

- >> Schools scaling pure computer literacy through computer labs for delivering subjects and interesting topics enhancing teaching experience and effective learning.
- >> Monitoring nutritional deficiencies through Internet in schools.
- >> Across hinterland, higher education college youth aspiring to learn from the best of teachers at IITs/IIMs and the likes.
- >> Rural hospitals addressing capacity building through delivering critical care through Internet at 1/10th of the cost.
- >> SMEs aspiring to get connected to global markets.
- >> Shared access centers in need of connectivity to deliver last mile for 2/3 of our citizens in rural areas.
- >> PCOs becoming ePCOs amidst falling voice tariffs.

India is behind - we have room to grow

As per Confederation of Indian Industries (CII) estimates, India loses a staggering \$90 billion (Rs 3,60,000 cores) every year due to inadequate broadband connectivity. The broadband network could, for example, allow millions of people to sidestep

clogged roads and work out of home. Broadband Internet growth in India has been abysmal, and as per TRAI (Telecom Regulatory Authority of India) there are only 3.6 million subscribers, which is much lower than even the modest goals set by the Government of India in its early Broadband Policy of 2004.

In the interim period, many developing nations have spurred ahead in terms of broadband adoption, and are now enjoying consequent developments. India's broadband penetration is much lower than not only all other BRIC (Brazil-Russia-India-China) Nations, but even most of the South East Asian countries, clearly reflected. Some of the examples of how broadband can enable delivery and completion of numerous services and activities using innovative models:

- >> e-Governance services for all citizens
- >> Tele commuting options providing freedom to work from home, easing the strain on local transport and infrastructure
- >> Tele medicine - extending the facility of specialty health care to remote locations
- >> Rural enablement through CSCs (Common Service Centers) providing increasing accessibility and services
- >> e-Education - extending reach of educational serv-

In the interim period, many developing nations have spurred ahead in terms of broadband adoption, and are now enjoying consequent developments

ices and content to distant areas

>> Online Entertainment sources like Digital TV, Video on demand etc.

Approach: What's required?

Collaboration is the key

The need of the hour is to focus on comprehensive efforts across building awareness, education on the benefits of Internet adoption, enabling affordable access through affordable devices and accelerating deployment and roll out of wireless to connect the last mile. Given India's expanse, and lack of copper infrastructure, the most cost effective and yet the fastest way, is to drive the adoption of wireless broadband infrastructure.

We thus need a co-coordinated and concentrated attempt to accelerate broadband Internet access through the availability of a slew of affordable devices and with Government policy and industry efforts to build a sustainable wireless broadband infrastructure. As per research provided by IMRB, PCs and notebook prices have progressively fallen by 7-10% every year for the last ten years and becoming affordable by the day.

There are new processor being invented and offered through Internet-centric netbooks and nettops for the masses. The focus thus shifts entirely to enabling Wireless broadband for mass market deployment in India and south Asia, as it offers the only reasonable alternative for a price conscious popula-

tion.

SO Can a Billion Indians get connected?

There are tens of efforts that could be seen in the market to increase the mobile reach, geometric progression in connectivity. Thus, recently, even we have also got into the grind: Intel along with its over twenty partners has initiated Internet awareness across 37 towns through the Netyatra , a bus equipped with Internet connectivity, latest category of Internet centric devices - netbooks and nettops, & demos to communicate the benefits of Internet to improve lives. 75,000 citizens, school children, college students have visited the Netyatra to learn and experience the power of the Internet.

It is overwhelming to observe that how a little effort can prove the point that if the services and infrastructure could be initiated then citizens would positively respond. Across the country, over 200,00 Indians have pledged their support by joining the "Connected India" movement through the website - www.connectedindians.com. The onus is now on us and partners to make each and every Indians to get connected. I urge you all to join the connected Indian movement at www.connectedindians.com and pledge to put the power of the Internet in the hands of every Indian.

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Digital Content in Local Languages: Technology Challenges

VASUDEVA VARMA

World Wide Web holds the key to shape our societies and cultures in the future. The cultures and languages who dominate the Internet presence will have more chances of survival than those with less Internet penetration.

It is a well known fact that information on the Internet is skewed and all languages are not represented equally well on the Internet. English appeared to be the universal language of the Internet for sometime but now there are other languages establishing themselves. Some of the dominant languages of Internet are English, Mandarin (Chinese), Japanese, Korean, German, French and Spanish. In fact, recently Mandarin language has overtaken English as the most popular language on the Internet. There are reports that Chinese government is making a conscious effort to make Mandarin as a number one language in the world and promoting the Mandarin language teaching globally. The success of this campaign is evident from the news that starting from mid March, Vatican will be making its website available in

Chinese. From a simple Internet search, one can easily figure out that there are a large number of tools available for learning, analyzing and processing Chinese languages. My intention here is to emphasize the need to do similar things for Indian languages.

Indian languages are among most widely spoken in the world in terms of population. India is a multi language, multi script country with 22 official languages and 11 written script forms. About a billion people in India use these languages as their first language. About 30% of the Indian population speaks Hindi but it is concentrated only in the northern and central region. There are many areas within India where Hindi is not known.

In fact, nine out of top 30 most widely spoken languages in the world are Indian languages with Hindi ranked at number 3 after Mandarin and English. Other languages are Bengali, Urdu, Punjabi, Tamil, Telugu, Marathi, Gujarati, and Kannada in that order. Please note that Bengali, Urdu,