

## How radio, cellphones, wireless Webare empowering developing nations

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### Document Text

Wireless, computers and other innovations are quietly eliminating huge barriers to development in poor parts of the world. In some ways these are giving them the jump on us In Robib, Cambodia, villagers are getting medical advice from the world's best doctors. Schoolchildren are seeing their country's most famous landmarks for the first time. And the village economy is taking off, fueled by the sale of its handmade silk scarves on the global market.

All these benefits are coming via motorcycle - Internet-enabled motorcycles.

A wireless network links computers in the village to computer chips on each of five motorcycles a fleet. Each vehicle has a transmitter that allows it to upload and download e-mail and data via Wi-Fi, as it passes by village computers. At the end of the day the bikes return to a hub where they upload the information received.

The next morning they download e-mail and data from the hub and take it out to the villages for transmission.

Villages like Robib have been described as "leapfroggers " communities or even whole countries in the developing world, that are using information and communication technologies to leapfrog directly from being an agricultural to an information economy. It's a phenomenon that combines technology high and low in innovative ways, and is generating not only economic benefits but a new world of educational, social and political opportunities.

In highly developed countries like Canada, the information economy has emerged from long evolution - farm economies made room for craftsmen and artisans, who gave way to industrial production, and manufacturing has yielded to the rise of an information and service-based economy.

Economists and development experts wonder whether the developing world can - or should - follow the same path. Widespread industrial development would still leave much of Africa, Asia or Latin America a generation behind Europe and North America.

Of greater concern is the potential environmental impact of widespread industrialization large-scale factory production in the developing world could greatly increase global energy consumption and pollution levels, particularly if factories use cheaper and dirtier production methods.

Information and communications technologies provide an alternative to this environmental and economic nightmare. The hardware, software and networks that have propelled developed economies out of the industrial era and into the information age are now promising to take the developing world directly from agrarian to post-industrial development.

The same satellite networks that link remote villages to urban markets can bring classroom education to communities too small or poor to support secondary schools. The cellphone systems that power community businesses can connect patients or doctors, or disparate family members. The Internet kiosks that access a global marketplace can also be used to access political information or organize grassroots campaigns in emerging democracies.

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These opportunities have been opened by a growing understanding of the role of infrastructure in driving economic growth. "Until quite recently, it wasn't clear whether infrastructure generally was a result of economic growth or the other way around," notes Edgardo Sepulveda, a telecommunications economist with McCarthy Tetrault, a Toronto law firm. "There was a correlation but there wasn't agreement on causation. But now there's been sufficient evidence that most people would support the hypothesis that you can go from information and communications technology sector growth to general economic growth."

That realization has led development workers, governments, and businesses to embrace technology-enabled leapfrogging as a tremendous opportunity for the developing world. But successful leapfrogging depends on a carefully calibrated set of choices about which technologies to use, which projects to pursue, and which communities to engage.

According to Richard Fuchs, director of the information and communication technologies for development program at Canada's International Research and Development Centre, leapfrogging success depends on a combination of "ingenuity, perseverance, hard work and luck." By luck, he's talking about a constellation of historical circumstances that position a country for information and communications technology-led growth.

Societies that place a high value on education, like Vietnam, are at an advantage, because a highly educated population is ready for work in a knowledge-based economy. A history of emigration, as in Ireland, can help - because an expatriate "boomerang" can bring a wealth of knowledge, skills and capital back into a developing economy. Even a language barrier can work in a country's favour. Uruguay exports millions in software to other Latin American countries, because the online dominance of English created a market opportunity for creating Spanish-language tools.

Bangalore, India, is the best-case scenario. Recognized as the Silicon Valley of the developing world, Bangalore has parlayed India's wealth of well-educated, tech-savvy, English-speaking programmers into a massive hive of interlocking programming shops, call centres, and tech companies.

Dell opened a Bangalore-based call centre in 2001, though with mixed results. Microsoft has just announced that it will open a Bangalore-based research centre this January. These international companies recognize that Indian programmers can be had for a fraction of the cost of their American colleagues - while still paying programmers many times the average Indian income. And India's economy derives a further benefit thanks to the many locally-owned companies that have emerged to partner or compete with the influx of international technology companies.

While Bangalore's technological, educational and linguistic advantages have given it a head start on leapfrogging, regions that lack those advantages stand to gain even more from the creative use of technology. Indeed, the countries that stand to benefit most from a leapfrogging strategy are those with limited IT infrastructure, limited education access, and limited literacy rates.

As a result, international agencies have had to get creative in the kinds of information and communications technology they use in developing countries. Where Canadian entrepreneurs often focus on the opportunities offered by the very latest technological innovations, the savviest leaders in Africa or Asia recognize that bells and whistles don't necessarily translate into economic results. The technologies that have the greatest impact are often relatively simple - and thus widely accessible.

Radio has been rediscovered as a tool that can be effectively paired with the Internet - or used on its own in new and creative ways. In Zambia, a radio-based training system is now delivering primary education to out-of-school children, about a third of whom are orphans; radio programs cover not only traditional skills like reading and math but also life skills like hygiene and nutrition. In Bolivia, a rural radio station uses the Internet to answer questions from listeners - like the farmer who wanted help dealing with a worm that was devouring his crops. Working online, the station found a Swedish expert who identified the worm, and broadcast the information on pest control to the entire community.

Cellphones have emerged as a leading leapfrog technology. Many developing countries have very limited landline penetration, in part due to the economic incentives for digging up copper wire and selling it. These same countries are now experiencing a cellphone explosion, due in part to the way that cellphones become what Fuchs describes as a "common property resource" - a resource that can be shared among an entire community or village.

The best-known example is Bangladesh's GrameenPhone, which has established a network of pay-per-use cellphones throughout the country. A similar network in South Africa has created a network of over 1,800 entrepreneurs, operating "phone shops" in over 4,400 locations across the country. Information gathered by cellphone lets farmers in Senegal double the price they get for their crops, and herders in Angola track their cattle via GPS.

Video compact disks, a technology not in wide use in North America but a popular entertainment medium in southeast Asia, have become crucial educational tools. A project in the Mekong region of Thailand and Laos has used VCDs to educate young women and girls on immigration issues, employment alternatives, and health services. It's a way of helping a group that is often only semi-literate, and particularly vulnerable to HIV/AIDS, drug abuse and sexual exploitation.

And yes, the Internet has a role, too. In the post-Soviet country of Armenia, development teams are using the Internet for everything from teacher training to employment counseling.

Says Nancy White, an information and communications technology consultant who has worked on a number of Armenia's online development projects, "These projects are demonstrating, to people that live on a mountain top that is inaccessible in the winter, 'I can connect with other people who share my interests and needs.'"

Despite this technological eclecticism, access to hardware and software remains a core challenge. The United Nations' World Summit on the Information Society, which will culminate in a meeting later this year, has devoted a great deal of attention to the challenge of bridging the digital divide between the rich and poor nations.

While the U. N. summit has become a magnet for information and communications technology (ICT) champions from governments, businesses and civil society organizations around the world, its U.N. sponsors explicitly describe ICT access as a means rather than an end.

This focus is embodied by the U.N.'s Millennium Declaration, a 2000 agreement that contains commitments to halve, by the year 2015, "the proportion of the world's population living on less than one U.S. dollar per day, suffering from hunger or having no access to drinking water," the summit's Web site declares. "ICTs can help in achieving all of these goals."

That orientation is mirrored by the approach that Canada has taken in supporting information and communications technology projects in the developing world.

"The development community has placed a great emphasis on being able to meet basic development objectives," says Richard Simpson, the Director of E-Commerce for Industry Canada. "IT is not about rich countries getting richer. It's not even about emerging economies. It's about countries at every stage of development using technology in a way that is appropriate to their needs."

Needs like those of Nallavadu village in Pondicherry, India. A region in which many people live on incomes of less than \$1 a day, Pondicherry's information and communications technology development strategy traces back to a 1998 project that brought Internet-linked telecentres to the region's villages. Today, villagers routinely use the Internet to access information that helps them sell their crops at the latest commodity prices, obtain medical advice, and track regional weather and transport.

How does that kind of technology affect daily life?

Just look at what happened in the village of Nallavadu. Vijayakumar Gunasekaran, the son of a Nallavadu fisherman, learned of December's earthquake and tsunami from his current home in Singapore. When Gunasekaran called home to warn his family, they passed along the warning to fellow villagers - who used the village's telecentre to broadcast a community alarm.

Thanks to that alarm, the village was evacuated, ensuring that all 3,600 villagers survived.

If information and communications-technology-enabled leapfrogging could hold the key to economic opportunity for the developing world, are the citizens of advanced industrial nations - like Canada - ready for what that means?

"The information economy is heading to Asia," notes Fuchs. "India and China are the next information technopols. If wealth, income, profitability and productivity rest in part on ICTs, then India's economy is increasingly more competitive than ours."

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