

Leapfrogging the Technology Gap

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 the five motorcycles. Each vehicle has a transmitter that allows it to upload and download email and data 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 email 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 education, social, and political opportunities.

In highly developed countries, the information economy has emerged from a 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 communication 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 cell phone 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.

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. 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.

While Bangalore's technological, education, 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 infrastructure, limited education access, and limited literacy rates.

In Bolivia, a rural radio station uses the Internet to answer questions from listener—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.

" 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, a village in Pondicherry, India. A region in which many people live on incomes of less than one dollar 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 [2004] from his current home in Singapore. When Gunasekaran called home to warn his family, they passed along the warning to fellow villager—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.