

HIGH-TECH LED DEVELOPMENT?

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The history of scholarly work on development communication has passed through several eras: From an initial era, after World War II until about 1970, when the mood was optimistic about the potential of mass communication for furthering development in Third World nations; a second era of the 1970s, in which pessimism replaced optimism; and the era of the 1980s, in which the applications of new communication technologies like computers, communications, and other high-tech microelectronics innovations have led to a guarded resurgence of positive thinking about the role of communication in development. In the 1990s, however, communication is still seen mainly as a channel through which development messages flow to some segment of the population (for example, to farmers, fertile-aged married couples, illiterates, and others).

An entirely different role for new communication technology in development is to think of it as an *industry* (such as high-tech microelectronics) which can provide jobs and create taxable income. In several Western industrialized countries, high-tech microelectronics and its applications in telecommunications and computers, have come to represent a highly profitable industry. For example, in 1990, the sales of International Business Machines (IBM) were about \$70 billion, higher than the GNP's of about 120 Third World countries in Asia, Africa, and Latin America.

Can high-technology industries contribute to development in Third World nations? In this article, lessons learned from Western nations about the development of high-technology microelectronics industries are discussed. Development-related implications for the role of high-tech industries in Third World nations are also discussed within the framework of the present day development communication paradigm.

A HIGH-TECH ROUTE TO DEVELOPMENT?

A *high-technology industry* is one in which the basic technology underlying industry changes very rapidly. A high-tech industry is also characterized by (1) a high proportion of highly skilled employees, many of whom are scientists and engineers, (2) a fast rate of growth, (3) a high ratio of R & D expenditures to sales (typically about 1:10), and (4) a worldwide, highly competitive market for its products (Rogers and Larsen, 1984). Microelectronics, the part of the electronics industry centering on semiconductor chips and their applications (such as in computers and telecommunications), is usually considered the highest of high technology. The important technical advances in microelectronics in the past two decades has spurred the revolution in communication technology. The growing miniaturization, lower cost, and increased reliability of semiconductor chips translates directly into more ubiquitous communication technologies.

High-technology industries can potentially aid local economic development in various ways: They (1) are generally high-growth

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"Off Your Horse"

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Wendell Berry in the February 1991 ATLANTIC MONTHLY warns us that "global thinking is not possible." It may even be dangerous. Get "Out of (y)ourCar, Off (y)our Horse," he says, so you can get to know the particular place you live. His words gave me pause, for I have been one who has regularly extolled the necessity of thinking globally.

Berry claims that the difficulty with global thinking is its tendency toward abstraction. "Our present 'leaders', the people of wealth and power, do not know what it means to take a place seriously: to think it worthy, for its own sake, of love and study and careful work." (p. 62) This abstractness is characterized by "its inability to distinguish one place or person or creature from another." Rather, Berry wants us to consider how we might begin to remake local cultures that will "preserve our part of the world while we use it". While Berry contends that this attention to the particularities and peculiarities of local cultures is the opposite of global thinking, I submit that it is the essence of thinking globally. As development educators, we must find ways to recognize and take seriously the myriad places people live and help those places to be better understood and appreciated.

Especially important in Berry's analysis is the use of the pronoun "we." It is not something to be done for us or to us or by us to them. "We" must all be involved.

'What are the implications of Berry's propositions for development educators? How do we help our various constituencies distinguish one particular place or person or creature from another? How do we walk the ground with persons in need next door to us and those thousands of miles away?

Development education in the U.S. grew out of a need to build constituencies to "care about and insist upon development as a major national policy issue." According to The Joint Working Group on Development Education, which in April, 1984, issued a report called A FRAMEWORK FOR DEVELOPMENT EDUCATION IN THE UNITED STATES, there is a need to link global issues and local concerns. They offered strategies for development education based on the principle of "equal partnership" and the "sharing of perspectives and mutual learning" I submit that we have done very poorly in realizing these lofty ideals.

Development education has too often consisted of persons from the North telling other persons from the North about problems in the South. If we are truly to build a cooperative approach to development, we in the North must stop telling and begin to listen. Particularly in the realm of education, our job is to enter into dialogue, to engage in joint problem-solving and to enable voices from the South to be heard.

Much of the new thinking in development education focuses on the need to involve our partners to the South more fully. The final report of the Africa Partnership Project, a joint project of a

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industries, (2) have a tremendous potential to create taxable wealth, and (3) have high job creation capacity (Segal Quince Wicksteed, 1987). High-technology industries increase their employment faster than general manufacturing industries and exercise a significant multiplier impact on jobs in other service sectors (Rogers and Chen, 1988). These support jobs grow rapidly, eventually becoming more important than the high-technology sector of the economy (Singhal and Rogers, 1989b).

A major center for high-tech microelectronics in the U.S. is Silicon Valley in Northern California (Rogers and Larsen, 1984). One reason for the fame of Silicon Valley is the immense riches that have been created there by converting technological innovations in microelectronics into successful business ventures. High-tech microelectronics companies in Silicon Valley contribute about \$30 billion to the U.S. economy every year, and employ about 300,000 people.

Cambridge, the prestigious university town in England, is the site of a burgeoning high-tech industry. Cambridge's 600 high-tech firms account for 20 percent of the total employment in the local area, and have a total sales output of about \$5 billion.

Governments of several Third World countries (such as Taiwan, China, India, Brazil, Egypt, and Mexico) actively encourage the development of high-tech microelectronics industry. For instance, in 1980, the government of Taiwan launched Hsin-Chu Industrial Park to fuel economic growth, and to create a Taiwanese showcase of future high-technology development. Some 100 companies are presently located in the Hsin-Chu Industrial Park with annual sales exceeding \$1 billion, and an annual growth rate of about 60 percent. In China, the Shenzhen Special Economic Zone was established in the 1980s to attract foreign capital and to create new local jobs. Shenzhen has attracted over \$1 billion in overseas capital, and is a sharp contrast with the rest of China, economically, geographically, and culturally (Rogers and Chen, 1988). Its average incomes are two to three times higher than for the rest of China.

IMPLICATIONS FOR THIRD WORLD DEVELOPMENT

The development-related implications for Third World countries which are attempting to boost indigenous high-technology industries are discussed here within the framework of the present-day development communication paradigm. Key elements in the present-day development communication paradigm include: (1) greater equality in the distribution of development investments information, and the consequent socioeconomic benefits, (2) popular participation, knowledge-sharing, and empowerment to facilitate self-development efforts, (3) self-reliance and independence development, emphasizing the potential of local resources, and (4) integration of traditional and modern communication systems (Rogers, 1976).

Socioeconomic Benefits

The high-tech route to development can result in substantial economic gains for a nation: (1) Wealth creation (and hence, taxes), (2) higher GNP growth rate, (3) creation of new jobs, and (4) moving a nation toward becoming an information society. Also

important are the social impacts of the high-tech microelectronics products (improved telephones, lower-priced computers, etc.), which can aid business development, increase productivity and efficiency, and improve individuals' quality of life. However, these benefits come at a certain human cost

Socioeconomic Inequality

Inequality is the overriding policy issue in contemporary development literature. Third World nations need to guard against the "elitist" nature of high-technology growth, which can promote an inequitable distribution of socioeconomic benefits. Silicon Valley is characterized by extreme socioeconomic inequality. The 300,000 microelectronics workers include not only white-collar engineers and managers, but also about 110,000 manual workers, mostly Third World women, who perform monotonous assemblyline tasks (Rogers and Larsen, 1984). Also such high-technology products as computers can potentially replace, displace, and deskill certain occupations.

There is also the issue of equality in the distribution of development investment. High-tech microelectronics requires heavy capital investments, the cost of which may decrease spending for education, health, and other development problems.

Dependency

Dependency is defined as one country's reliance on another for material or non-material support. Since international competition and technology transfer are particularly unique characteristics of high technology industries, Third World countries should consider dependency relationships and other external factors which might impede their national development: International terms of trade, the economic imperialism of the multinational corporations, and the vulnerability and dependence of the Third World recipients of imported capital and technology (Singhal and Rogers, 1989a).

Technology Suitability

"Big", imported communication technologies may not always serve the best interests of a Third World country (Schramm, 1977). "High-tech" and "low-tech" need to co-exist in Third World countries, and should supplement each other. The Third World's challenge is to internalize, absorb, and manage technology to serve socioeconomic development goals. For example, the Indian Center for the Development of Telematics (C-DOT) has indigenously developed state-of-the-art rural telephone exchanges which do not require air-conditioning, which tolerate electrical power surges, extreme temperature variations, high humidity, and a dusty environment. C-DOT's rural telephone exchanges aid socioeconomic development in rural India (Singhal and Rogers, 1989a).

Impacts on Culture

Culture consists of material and non-material aspects of a society, which are shared and transmitted among the members of a society (Rogers, Burdige, Korsching, and Dennermeyer, 1988, p. 29). The high-tech "culture" may not fit well with the traditional values of several Third World countries. For example, cut-throat competitiveness, a stress on material gain, and high divorce rate

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which characterize U.S. technopolis like Silicon Valley clash with cultural values of various traditional societies. Conversely, certain traditional values in Third World countries may be an anathema to high-tech growth. For example, in India, a high value on job security restricts the spread of entrepreneurial fever.

Production-Centered Vs People-Centered Approach

Third World governments who are taking a high-tech route to development should guard against the pitfalls of a production-centered approach, which emphasizes economic growth through the production of goods and services (Korten, 1984). This approach stresses (1) industry over agriculture, (2) urban development over rural development, and (3) the utilization of capital resources over human resources (Korten and Carner, 1984). The needs of the production system take precedence over the needs of the people. Needed is a *people-centered* approach to development in which the needs of the people take precedence over the needs of the production system.

The Kukshi case illustrates economic development via a people-centered approach. The village of Kukshi, located in a tribal district of Madhya Pradesh state in India, is home to a fast developing rechargeable flashlight industry.² In 1982, Laxman Pal Kumawat, a Kukshi farmer, developed a rechargeable flashlight, specially adapting it to the needs of his fellow farmers. The local bank provided Kumawat with \$4,000 (U.S.) to start his manufacturing operations. Today about 30 small-scale flashlight units have sprung up in this backward village, providing employment to 1,000 villagers, and generating sales of \$15 million (U.S.).

Conclusions

In Third World countries, the design and production of new communication technologies is an industry that can help (1) create wealth (and hence, taxes), (2) provide jobs, (3) create a high rate of economic growth, (4) move a nation toward becoming an information society, (5) increase productivity and efficiency, and (6) improve individuals' quality of life. However, these economic benefits may often come at a price: (1) Greater socioeconomic inequality, (2) decreased spending for other development programs, (3) greater dependency on Western countries for capital and technology, (4) adoption of technology which might be unsuitable for local conditions, (5) an erosion of traditional cultural values, and (6) an emphasis on production processes instead of on people.

So how valid is the conception that new communication technologies as a growing "industry" can contribute to development in Third World nations? Development problems are far too complex to justify a simple technology-driven solution. High-technology-based economic growth does not cover the full range of meanings associated with the term "development."

Third World countries should guard against an extreme position of *technological determinism*, the belief that technology is the main cause of social change in a society (Mody, 1983; Rogers, 1986, p.23). Other political, social, cultural, and economic factors along with technology help shape a society. Third World governments

should attempt social, technological, and political reform to optimize the positive effects of technology, while minimizing its negative effects.

Notes

1. This article draws upon Singhal and Rogers (1989a; 1989b).
This case study is based on Singh (1989).

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