

THE WORLD BANK GROUP ARCHIVES

PUBLIC DISCLOSURE AUTHORIZED

Folder Title: President Wolfensohn - Briefing Materials for President's Speeches - Luncheon - InfoDev - Keynote Address - November 6, 1996

Folder ID: 30486630

Series: Speaking engagement briefing materials

Dates: 01/01/1995 – 12/31/1996

Subfonds: Records of President James D. Wolfensohn

Fonds: Records of the Office of the President

ISAD Reference Code: WB IBRD/IDA EXC-13-09

Digitized: 05/15/2025

To cite materials from this archival folder, please follow the following format:
[Descriptive name of item], [Folder Title], Folder ID [Folder ID], ISAD(G) Reference Code [Reference Code], [Each Level Label as applicable], World Bank Group Archives, Washington, D.C., United States.

The records in this folder were created or received by The World Bank in the course of its business.

The records that were created by the staff of The World Bank are subject to the Bank's copyright.

Please refer to <http://www.worldbank.org/terms-of-use-earchives> for full copyright terms of use and disclaimers.



THE WORLD BANK

Washington, D.C.

© International Bank for Reconstruction and Development / International Development Association or

The World Bank

1818 H Street NW

Washington DC 20433

Telephone: 202-473-1000

Internet: www.worldbank.org

PUBLIC DISCLOSURE AUTHORIZED

DECLASSIFIED
WBG Archives



30486630

R2002-036 Other #: 28 Box #: 186478B

President Wolfensohn - Briefings Books for Presidents Meetings - Meeting Materials
Speeches - Luncheon - InfoDev - Keynote Address - November 6, 1996

InfoDev: Luncheon
(Keynote Address)

Wednesday, November 6, 1996
12:00 - 2:00 p.m.
ANA Hotel

DECLASSIFIED
WBG Archives

Archive Management for the President's Office

Document Log

Reference # : Archive-01090

12/95

Edit

Print

A. CLASSIFICATION

- ☒ Meeting Material
- ☐ Trips
- ☒ Speeches

- ☐ Annual Meetings
- ☐ Corporate Management
- ☐ Communications with Staff

- ☐ Phone Logs
- ☐ Calendar
- ☐ Press Clippings/Photos

- ☐ JDW Transcripts
- ☐ Social Events
- ☐ Other

B. SUBJECT: INFODEV: OPENING & LUNCH // JDW TO MAKE REMARKS

(N) (B) - Wednesday, November 6, 1996 from 12-2 p.m.

VENUE: ANA HOTEL, 2401 M STREET, N.W.

PROGRAM:

12:30 P.M. - LUNCH

1.15 P.M. - JDW MAKE KEYNOTE SPEECH

CONTACT: CATHERINE KLEYNHOFF @ 32785 // RISCHARD'S SHOP

@ 80920 // OR SABINE IN FPDVP @ 31110

(B) FPD // DUE: FRIDAY, NOVEMBER 1

(B) REMARKS TO BE PREPARED BY GEOFF BERGEN

EXC: BERGEN / ATSUKO // ALI (8/7/96 9:54a)

Brief contains:

- Agenda
- Luncheon Keynote Address
- Symposium Panelists
- Participants
- Bio Notes

DATE: 11/06/96

C. VPU

Corporate

- ☐ CTR
- ☐ EXT
- ☐ LEG
- ☐ MPS
- ☐ OED
- ☐ SEC/Board
- ☐ TRE

Regional

- ☐ AFR
- ☐ EAP
- ☐ ECA
- ☐ LAC
- ☐ MNA
- ☐ SAS

Central

- ☐ CFS
- ☐ DEC
- ☐ ESD
- ☐ FPD
- ☐ FPR
- ☐ HRO

Affiliates

- ☐ GEF
- ☐ ICSID
- ☐ IFC
- ☐ Inspection Panel
- ☐ Kennedy Center
- ☐ MIGA

D. EXTERNAL PARTNER

- ☐ IMF
- ☐ UN
- ☐ MDB/Other IO
- ☐ NGO
- ☐ Private Sector

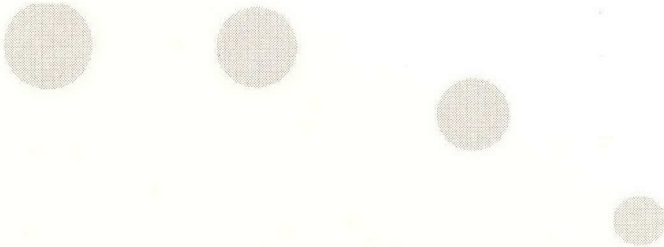
- ☐ Part I
- ☐ Part II
- ☐ Other

E. COMMENTS:

File Location ☐ EXC ☐ IISC ☒ Archives	Cleared By	Date: 12/18/96
---	-------------------	--------------------------

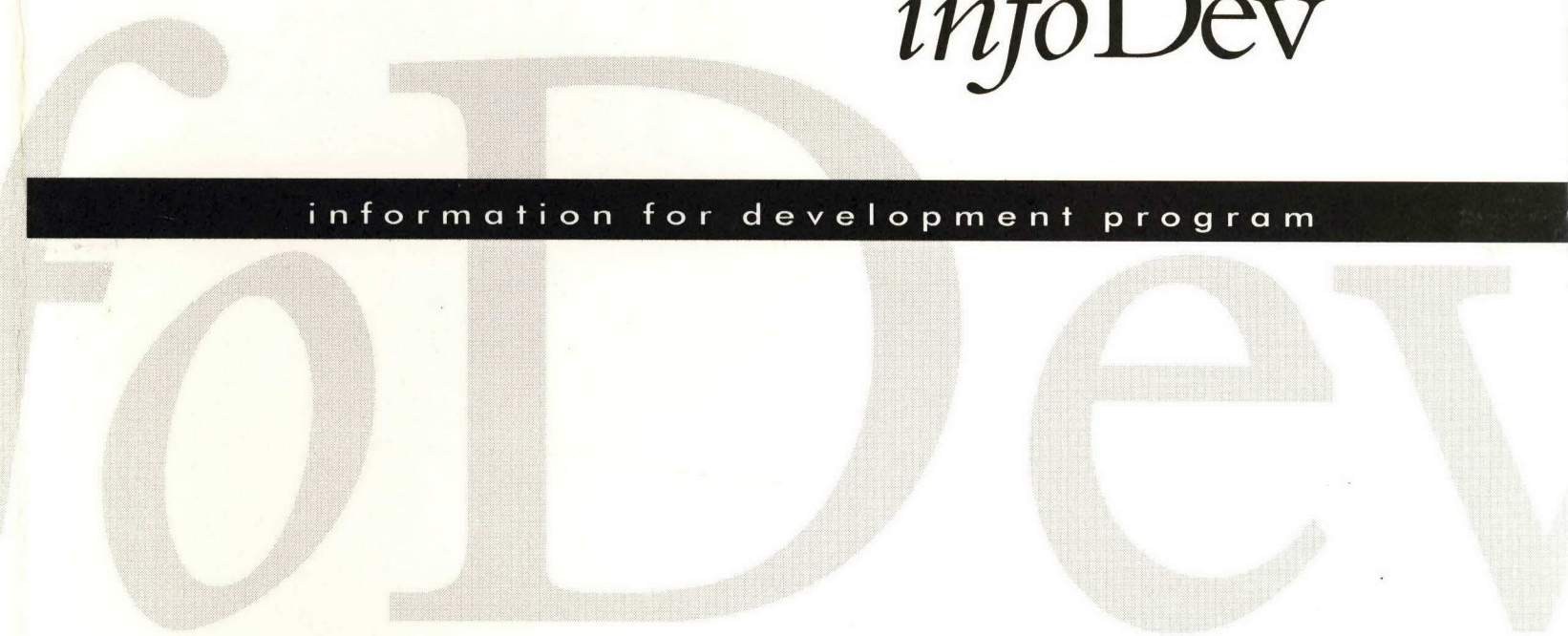
 View Update History

Annual report 1996

A series of seven dots of varying sizes arranged in a curved path above the 'infoDev' logo.

infoDev

information for development program

A large, faded, light gray version of the 'infoDev' logo is visible in the background, spanning across the middle of the page.

Annual report 1996



information for development program

The World Bank
Washington, D.C.

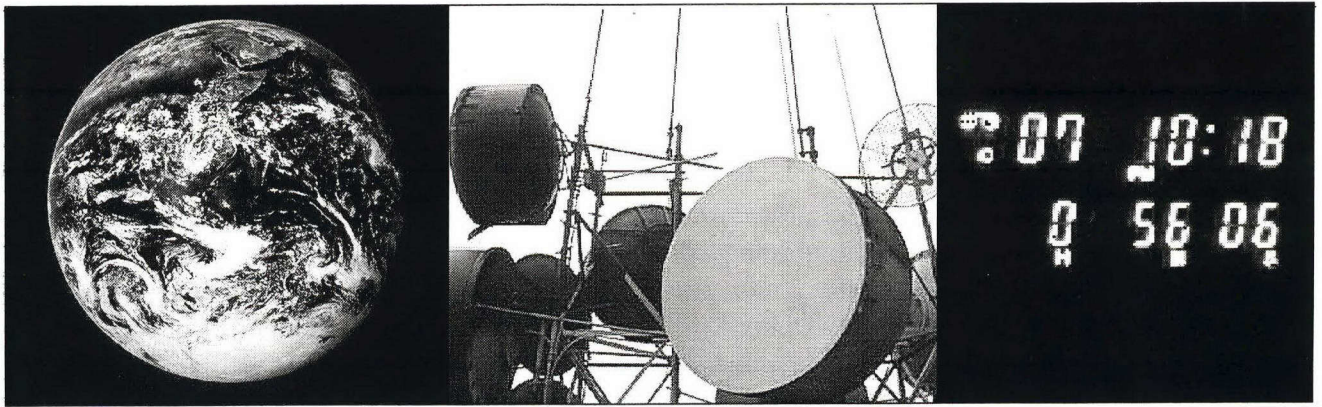


Contents copyright © 1996 The World Bank

Photo credits: page 1: Photodex Corporation; pages 4 and 8: courtesy of Peter Knight and Michael Weiner, Electronic Media Center, The World Bank. All photos used with permission.

Contents

Introduction	1
Recent Market Development and the Information Revolution	2
Opening of telecommunications markets	2
The Internet phenomenon	3
<i>infoDev</i> Organization	5
Formation of the program	5
Governance of the program	5
<i>infoDev</i> Operations	6
Project evaluation process	6
Approved proposals	7
The initial work program	7
Promising proposals for funding	9
The <i>infoDev</i> Forum	10
External activities	11
<i>infoDev</i> Finances	12
Donor contributions	12
Projected costs	12
Annex 1: <i>infoDev</i> Donors' Meeting, Final Communiqué, 28 September 1995	15
Annex 2: <i>infoDev</i> Donors' Meeting, Final Communiqué, 14 November 1995	17
Annex 3: Evaluation Status of <i>infoDev</i> Proposals	19



Introduction

Information and telecommunications technologies, once seen as the luxuries of the industrial countries, have today become powerful weapons helping developing countries battle against poverty, disease, ignorance, and violence. Ensuring that developing countries are able to benefit from telecommunications innovations and to participate fully in the global economy is the objective of the Information for Development Program (*infoDev*), created in September 1995. As a promoter of partnerships between the public and private sectors, *infoDev* encourages the development of information infrastructure through the funding of projects and acts as a forum for the exchange of ideas and best practices.

In its first, incomplete, year of operation, *infoDev* has put in place a governance system, a process for evaluating proposed projects and the results of ongoing and completed efforts, and communications links to achieve program objectives.

The program has received an enthusiastic response from many organizations and has received proposals for some 148 projects. Funds are already being allocated for the initial projects in the *infoDev* work program. These include efforts to further “distance learning” through affordable telematics tools in Africa and a feasibility study for an “African Virtual University,” computer education programs in Jamaica, and a colloquium on reforming and regulating the telecommunications sectors of developing countries.

Official donors, as well as private organizations, have shown interest in funding the *infoDev* program, and some fifteen donors have now made firm commitments in support of the program. Viable proposals for programs are outrunning the funding mobilized, however, suggesting that the program must review the scope of its fundraising as well as its efforts to serve the economic, social, and educational development of people in developing countries in the coming year.

Recent Market Development and the Information Revolution

In 1994, some US\$2.3 trillion in domestic and international financial transactions flowed daily through the SWIFT electronic network—a sum that is more than twice the annual economic output of the United Kingdom. Impressive though they may be, these financial exchanges are merely a fraction of the complex, swelling torrent of electronic information routinely exchanged through telecommunications systems in the form of telephone conversations, data transmissions, faxes, electronic messages, and radio and television broadcasts. The world's economies depend on telecommunications for reliable information, and access to the technologies and the capacity to use them effectively plays an increasingly important role in economic growth. Information technologies are particularly important to developing countries, whose institutions, educational and social services, and markets are evolving most rapidly. It is in this context that *infoDev* seeks to help emerging economies benefit from the information revolution.

The radical effects of recent changes can be seen clearly in the increasing ascendancy of the service sector in economies around the globe. The service sector—where information technology is crucial—already represents more than 60 percent of domestic economic output in high-income economies, and considerably higher in many; in Ireland, for example, services account for more than 80 percent of GDP. Although the service sector is less developed in low-income economies (annual GNP per capita of less than \$700 in 1993), it is also growing steadily, accounting on average for 38 percent of GDP—more than both agriculture (28 percent) and industry (35 percent). Moreover, quite a few developing countries already have service sectors in the range of 60 percent or more of GDP, including countries as diverse as El Salvador, Egypt, Estonia, Jordan, Mexico, Namibia, and Senegal, according to the Bank's *World Development Report 1995*.

Information technology is dramatically altering the way people do business, how they live, and how they organize themselves. These changes extend broadly—

and at times surprisingly far—into the developing world: schoolchildren in Singapore are using radio paging devices to stay in contact with their parents; aboriginal artists in remote locations of Australia are selling paintings via video-conferencing, Brazilian banks are offering services over the Internet, and farmers in West Africa are using cellular telephones to check crop prices at commodity exchanges. From the mundane to the exotic, electronic information services are crossing cultures, social conditions, languages, and age differences.

The effects of the technological and economic changes of recent years are perhaps most pervasively felt in the marketplace, where individuals now have greatly expanded autonomy in shaping and reshaping their lives. Indeed, popular initiatives appear to be at the root of many of the recent structural changes in information infrastructures. Two recent developments stand out as particular examples: the increased competition and accelerated opening of markets in the telecommunications sector, and the remarkable global development of the Internet.

Opening of telecommunications markets

During the past year, countries in all regions of the world have confirmed the movement away from state communication monopolies and toward private-led and competitive market structures. The last region to participate in this movement was Africa, where, until recently, most governments appeared unconvinced that they had the market sizes and technical skills to afford to open their telecommunications sectors to private initiative and competition. By the end of last year, however, some twenty African countries had initiated greater competition in their telecommunications sectors. Frontrunners in this movement are the Congo, Ghana, and Uganda. Ghana, for example, has already prequalified bidders for privatizing its state-owned telephone company and for creating a new nationwide operating company. The country also has a virtually open market for cellular communications. More generally, policymakers in Africa have largely come to recognize the benefits of opening their telecommunications markets in terms of increasing growth and

investment. Although some countries are liberalizing at a faster pace than others, the principle itself is now undisputed.

In other regions, countries that had already liberalized their markets are entering a second phase to deepen this liberalization. For example, Mexico—which began selling the state majority participation in its telephone company in 1990—is now opening all remaining telecommunications markets to full competition.

The experience in recent years with liberalization of the telecommunications sector shows that it has not always and everywhere been an easy process. Differences have inevitably surfaced between those willing to open the market only to a few, favored players and those urging full competition with a large number of operators. Recent trends suggest that most countries are pursuing the latter approach—emphasizing a large number of participants in a competitive market—as the best way to tailor communication services to consumers' demands and preferences.

The Internet phenomenon

Another key development of the last year or so is the accelerated use of the Internet as the networking platform of choice for businesses, institutions, and individuals in every part of the world. It would be next to impossible to pin down the exact number of Internet users worldwide, but a conservative estimate puts it at 25 million in 1995. With 50 million users projected by the end of 1996, no slowdown is yet in sight in the pace of new connections. The Internet is still far from universally accessible, of course, but its advances have been so conspicuous that initiatives are cropping up everywhere to open it to all segments of the population. Moreover, the essential role that governments can play in the Internet revolution has become clear: to create the appropriate enabling environment for the market to operate. In this regard, many governments are now being pressed by businesses, organizations, and individuals to reform their telecommunications sectors to allow the market to provide expanded Internet access services.

Thus, the development of the Internet market both parallels and reinforces the movement to open the telecommunications sector to enterprise and competition. In particular, the Internet catalyzes strong demand forces from the computing world—forces driven by individuals and organizations—for rapid structural reforms in the telecommunications sector, further strengthening the demand for reform from traditional users of telecommunications.

Another major recent impact of the Internet, with consequences perhaps not yet fully appreciated, is an unprecedented level of standardization of application interfaces: the World Wide Web's standardized markup of documents and facilitation of nonsequential access to information now spans a huge array of applications. This common interface standard is independent of the computing operating environment and of vendors' proprietary systems. Hence, the Internet not only allows compatibility between different systems but also establishes a paradigm for a new generation of information systems—ones that are no longer local or limited to a few users but rather are accessible to organizations and individuals all over the world.

At the same time, the prices of personal computers are falling so dramatically that they are becoming affordable to an ever-greater spectrum of users worldwide. At this point, it is not clear whether basic and even more affordable machines—such as the simple network terminals now contemplated by certain manufacturers—will find a large market, as these “dumb workstations” will lack some of the versatile functionality offered by today's personal computers.

If the Internet were to disappear today—a most unlikely event—it would already have had two major benefits for the telecommunications market. First, it has demonstrated that the marginal cost of transmitting information is indeed very low—only a fraction of the price usually charged to voice-communication consumers. Similarly, the Internet has also demonstrated that little need exists for a global centralized network for electronic communications. It is important to realize that, despite its name, the Internet is not a network, but simply a protocol enabling many different networks

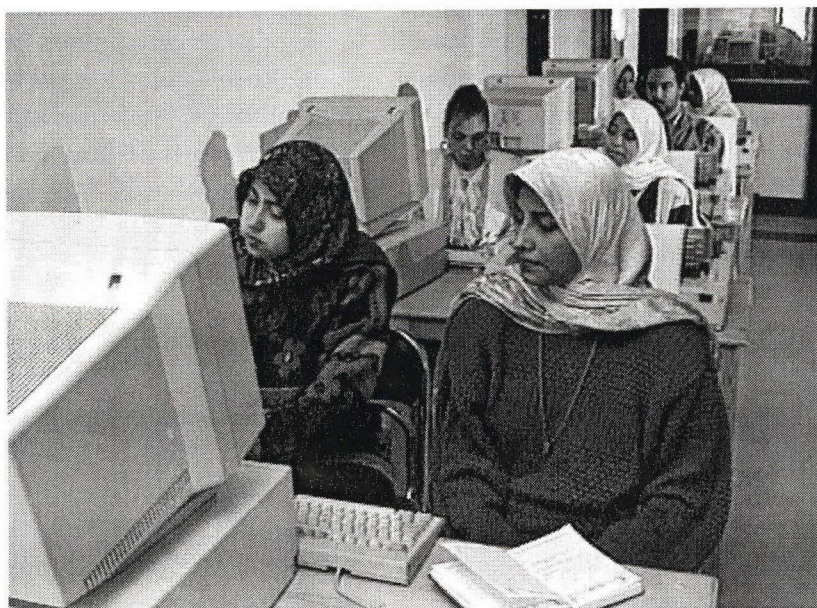
to interconnect at the will of the players in each network. It represents a bottom-up and open evolution of networks, completely different from the traditional voice-oriented networks centrally planned by each country and hierarchically moving information from international to regional to local destinations.

Second, the development of the Internet is transforming the way organizations manage their information resources. Most companies and governments are accustomed to accumulating, digesting, and disseminating information selectively, for specific tasks. Now, the Internet and related technologies are making so much information so accessible via a standard protocol that institutions of all kinds are now able to shift resources from information acquisition to implementation of objectives. Consequently, the management layers and intermediate businesses that used to operate as gatekeepers of information are changing dramatically.

The development of the Internet is also generating some serious policy and engineering issues. For example, the existence of the Internet may raise issues

about how future communications networks should be designed; that is, are the policymakers still writing too many of the rules of the game based on the standards for voice networks? In one Latin American country, for example, local switches are designed for the standard duration of a telephone conversation, about 4 minutes. But the average duration of an Internet connection in the capital of that same country is 70 minutes. Internet traffic is doubling every month (whereas voice switches are doubling only every five years), so the disparity in allotted duration of connections will soon pose a serious challenge to the rules and capacities of local communications networks.

The Internet phenomenon is also accentuating certain concerns about possible losses of cultural identities. Clearly the Internet could become the carrier of a "least common denominator" culture. The challenge today is therefore for countries to strike a balance between participation in the global economy—as a powerful way to achieve economic growth rapidly—and preservation of their distinct cultural identities.



Egyptian students use the Internet at the Information and Decision Support Center in Ismailia.

infoDev Organization

Rapid advances in communications and information technology have created vast opportunities for economic and social growth for developing countries and economies in transition. If they are to take advantage of these new technologies, developing countries will have to initiate or continue significant structural and policy changes that establish an appropriate information and technology infrastructure.

Formation of the program

To help ensure that developing countries benefit from telecommunications innovations and participate fully in the global economy, the World Bank, after consultations with governments and key players in the information technology sector, established the Information for Development Program (*infoDev*). Aimed at creating a partnership between the public and private sectors, *infoDev* is a consortium that links the business interests of potential investors to the development objectives of the public sector. Not only does *infoDev* promote the development of information infrastructure through the funding of projects but, equally importantly, it acts as a forum for exchanging ideas and sharing best practices that support ongoing initiatives and create opportunities for development.

The *infoDev* program was officially launched in September 1995 at a meeting in Washington, D.C., of government officials and representatives from other multilateral development agencies—the traditional partners in World Bank-led programs. This kick-off event was followed by a meeting in November 1995 with participants from the public and private sectors. Following discussions on the organization, governance, and strategic framework for *infoDev* operations, funding of \$4.4 million was pledged for the first year (see the meeting communiqués attached as Annexes 1 and 2).

Governance of the program

The *infoDev* Donors' Committee—the program's highest level of governance—meets annually. It pro-

vides guidance on the objectives and policies of the program and its long-term strategies and goals, and it evaluates the program's results. The Donors' Committee includes all official donors and those private donors contributing more than \$250,000 a year. The *infoDev* program manager, a senior official from the World Bank, maintains the relationships with the donors and the client countries and manages the day-to-day operations of the program. This program manager is assisted by a team comprising a coordinator, work program administrator, donor relations administrator, and budget administrator.

The *infoDev* donors and management team receive strategic advice from a Technical Advisory Panel (TAP), composed of six telecommunications and information systems experts who are also familiar with a wide range of technological and socioeconomic development issues. The members of the first TAP constituted for *infoDev* are as follows:

- *Dr. Hisham El Sherif*, advisor to the Egyptian minister of administrative development and chairman of Egypt's High-Tech Business Council.
- *Mr. Ahmed Laouyane*, director of the Telecommunication Development Bureau at the International Telecommunication Union.
- *Mr. Andile Ngcaba*, South Africa's postmaster general.
- *Mr. Philippe-Olivier Rousseau*, member of the Conseil Supérieur de l'Audiovisuel, France's regulatory body for broadcasting. Mr. Rousseau also serves as the coordinator of the TAP.
- *Mr. George Sadowsky*, director of the Academic Computing Facility at New York University and vice president for education at the Internet Society.
- *Mr. Masanobu Suzuki*, senior vice president at Nippon Telegraph and Telephone Corporation.

The TAP is expected to meet at least twice a year and to have additional communication through audio- and teleconferencing. The TAP held its first meeting in Washington, D.C., in June 1996, during which it discussed its work plan and organization.

infoDev Operations

Projects that *infoDev* undertakes fall under four main categories, consensus-building/awareness raising; telecommunications reform; information infrastructure; and demonstration (or pilot) projects (see figure A).

Following *infoDev*'s "Guidelines for Submitting Activity Proposals," project proponents submit their proposals to *infoDev* for evaluation. As of June 30, 1996, *infoDev* had received 148 project proposals; with requested financing of \$36.8 million. In comparison, donor contributions for project funding of \$3.3 million had been received (Annex 3).

Of the proposals received for fiscal 1996, 29 percent came from academic or research organizations. The private sector was the next most prolific source of proposals, at 23 percent of the total proposals for fiscal 1996. Other proponents include NGOs, regional and bilateral organizations, and governments (figure B).

The beneficiaries of proposals for *infoDev* funding in 1996 were global in distribution: 28 percent in Latin America and the Caribbean, 27 percent in Sub-Saharan Africa, 24 percent in multiple regions, 12 percent in Asia Pacific, 6 percent in Europe and Central Asia, and 3 percent in the Middle East & North Africa (figure C).

Project Evaluation Process

Once received by *infoDev*, proposals are subjected to a two-stage evaluation process that uses criteria established by the program's donors and management

First stage

Proposals are first entered into the *infoDev* data base and disseminated to a team of three reviewers for screening. The team comprises experts in information technology and telecommunications as well as experts in application areas such as education, health, environment, and trade. The team's responsibility is to evaluate and forward the submissions as follows: some are sent on to *infoDev* for a second-stage or fast-track evaluation; some are sent back to the proponents for more detail or clarification; and some are rejected.

Figure A. *infoDev* Proposals by Category

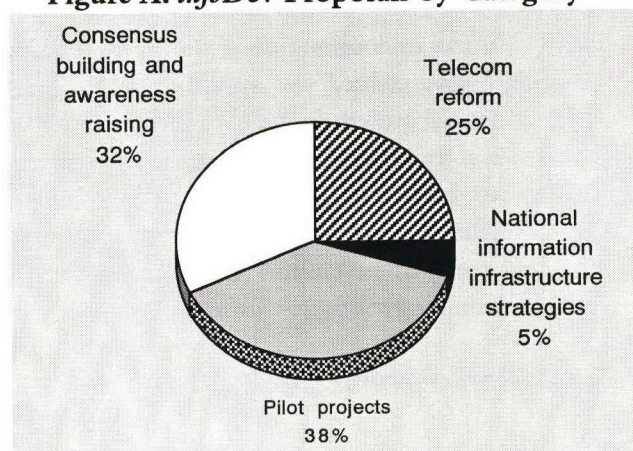


Figure B. *infoDev* Proposals by Proponent

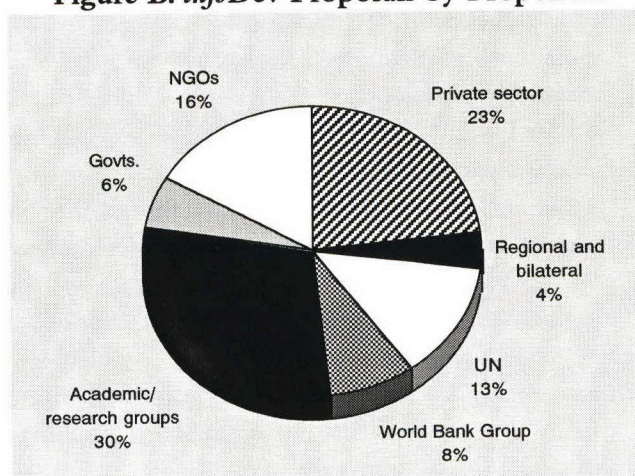
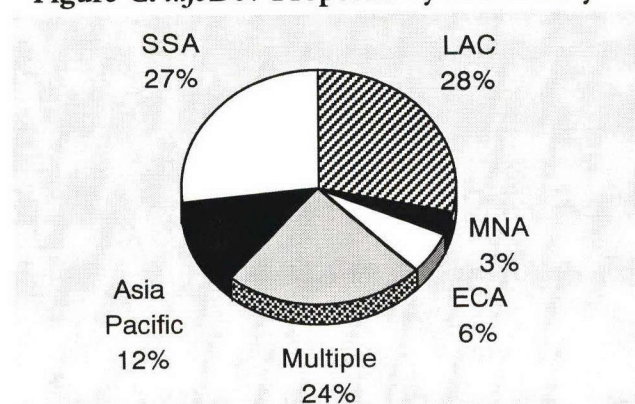


Figure C. *infoDev* Proposals by Beneficiary



Note: Refers to 148 proposals received by June 30, 1996; NGO = nongovernmental organization SSA = Sub-Saharan Africa; LAC = Latin America & Caribbean; MNA = Middle East & North Africa; ECA = Europe and Central Asia.

Second stage

Proposals that have passed the first evaluation are submitted to Second-Stage Evaluation, which is conducted for *infoDev* via a contract with the International Development Research Centre (IDRC) in Canada. Using its twenty-six years of experience in information technology and networking, and closely following the criteria set by *infoDev* donors, IDRC conducts as many as three rounds of further appraisal, in which the proponents may be asked to provide more detailed information; IDRC may recommend combining several similar proposals for greater leverage; or technical assistance may be offered to proponents whose projects are very promising but that need additional work to become viable. The reports IDRC prepares for the Second-Stage Evaluation are then used as inputs in the final decision process by *infoDev* management on projects that are selected for inclusion in the *infoDev* work program.

Fast-track evaluation

Proposals that are time-sensitive or that are otherwise deemed urgent are submitted to Fast-Track Evaluation. This procedure typically involves sending proposals to six screeners—both inside the World Bank and outside (including IDRC). Fast-track evaluators are requested to fill-in both First-Stage and Second-Stage evaluation forms, and the work program administrator makes a quick judgment regarding approval of the project.

Approved proposals

Proposals that are approved are either considered for rapid inclusion in the *infoDev* work program or become part of a pool of proposals that meet the selection criteria of *infoDev*. Projects for the work program are chosen from this pool. Proposals can remain in the pool for one year but can be withdrawn at any time during this period at the request of the proponent. As a way of promoting worthwhile projects and cooperating with other funding institutions, *infoDev* may present proposals from the project pool to other organizations for possible external funding.

The initial work program

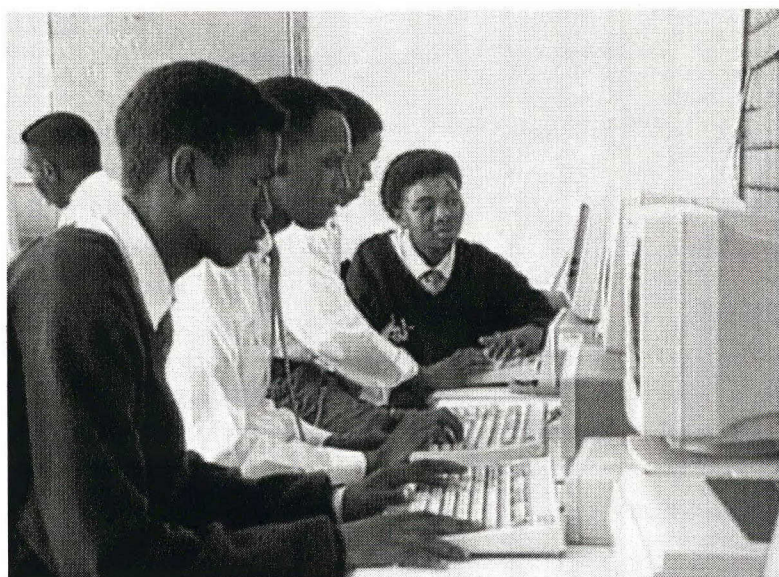
In April 1996, *infoDev* announced the four projects that initiated its Work Program. These were the African Virtual University; the Jamaica Partnership for Technology in Basic Education; the Sixth International Telecommunication Union (ITU) Colloquium; and Telematics for African Development. The selection of these projects was based on the strong evaluations they received in a streamlined evaluation process and their distinctive compatibility with the overall objectives of the *infoDev* program.

The African Virtual University

Despite development efforts in Sub-Saharan Africa (SSA), and recent encouraging economic performance, social and economic indicators remain well below those of other regions. The ability of Sub-Saharan Africa to bridge the development gap and participate fully in the global economy depends largely on the skills and intellectual capacity of its labor force, especially in the fields of science, technology, and business. Unfortunately, limited resources prevent many educational institutions, especially at the tertiary level, from meeting the growing, and needed, demand for higher education.

The African Virtual University (AVU), for which *infoDev* is supporting a feasibility study, seeks to use modern information and telecommunications technology to deliver educational services on a wide scale and at an affordable price. In particular, it seeks to improve the quality and relevance of education in science, engineering, and business education in SSA and to expand enrollment levels in these areas significantly.

To meet these objectives, the AVU creates an education corporation connected to a global consortium of universities, governments, private organizations, donor agencies, and professional associations. The consortium serves as an electronic broker of education—collecting the latest knowledge emanating from universities, conferences, and professional associations for use in SSA; adapting that information into lectures, seminars, courses, and degree programs that are appropri-



Students "on the 'net" at Isilimela Comprehensive School, Republic of South Africa.

ate for and relevant to the needs of its students; and disseminating it to dispersed universities and centers of education using affordable and up-to-date technologies such as on-line data basing, public broadcasting, videotape, satellite, and the Internet.

The Jamaica Partnership for Technology in Basic Education

Funding from infoDev will support the Jamaica 2000 and EDTECH 20/20 programs during the next phase of their development. These two programs seek to improve the quality of education in Jamaica's schools through the introduction of computers. Support from infoDev is geared toward exploring how computational and communication technologies can best contribute to literacy learning in primary and secondary schools and toward evaluating the outcomes for replication on a larger scale.

The project is expected to begin operations after the signature of agreements with the Jamaica Computer Society Education Foundation (JCSEF).

A World Bank mission visited Jamaica in early April 1996 to assist the JCSEF in preparing detailed plans for implementation of the project. An additional meet-

ing was held in Washington, D.C., in late June to examine final plans for the project's summer training program for teachers, school directors, and administrators. Consultations were also held in Washington to discuss plans and strategies for managing the project.

The Sixth ITU Regulatory Colloquium

The Sixth ITU Colloquium, to be held from December 11-13, 1996, in Geneva, will consider in an informal, expert, and practical way some of the fundamental issues facing most countries in reforming their telecommunications regulatory regimes. The colloquium will be attended by regulators from developed and developing countries and will focus on how

regulatory regimes can cope with the growing convergence of the telecommunications and broadcasting industries.

A consultant has been selected to prepare the conference briefing report and has already prepared a draft on "Regulatory Convergence." Selection of participants for the colloquium is under way. The colloquium chairman is also calling for proposals for the dissemination program that will follow the colloquium.

Telematics for African Development

The aim of this project is to use relevant information technology to improve access to and utilization of information and telecommunications in the area of distance education at the secondary and tertiary levels, and in the longer-term to poverty, health, and protection of the environment. The project focuses on South Africa's townships and previously disadvantaged groups. It is intended to outline methodologies for replicating of educational and social programs using information technology throughout Africa.

The infoDev-funded portion of the telematics project (Phase 1, Part 1: Distance Education) has been largely

completed. Prototypes of course curriculum—the Standard 7 Biology course (secondary level) and the Academic Reading Construction Kit (tertiary course)—were delivered and demonstrated at the May 1996 Information Society and Development Conference (ISAD) in South Africa. In addition, curriculum development and curriculum management tools for teachers were demonstrated. In April, the South African proponents attended workshops with computer networking and distance-learning experts from Mozambique and Brazil to exchange ideas and lessons of experience. Further exchanges took place in Moscow and Cairo in late June.

The periurban cell of the wireless network that will form the basis of the telematics project was installed and is operating in the Mamelodi township. Links run from the Council of Scientific and Industrial Research (CSIR) headquarters outside Pretoria to the Mamelodi Teacher's Center, the M.L. Msezane Middle School, the Mamelodi West Library, and the SOS Children's Village. Two information servers have been constructed, configured, and put into operation for the base stations in Mamelodi and the Ubuntu Computer Centre. These accomplishments have been recognized and publicized by the Commission on Technology-Assisted Education of the South African National Department of Education.

As a result of the ISAD exposition and the visit of *infoDev* donors to the Mamelodi Teacher's Center, interest in funding Phase 1, Part 2 has been expressed.

Promising proposals for funding

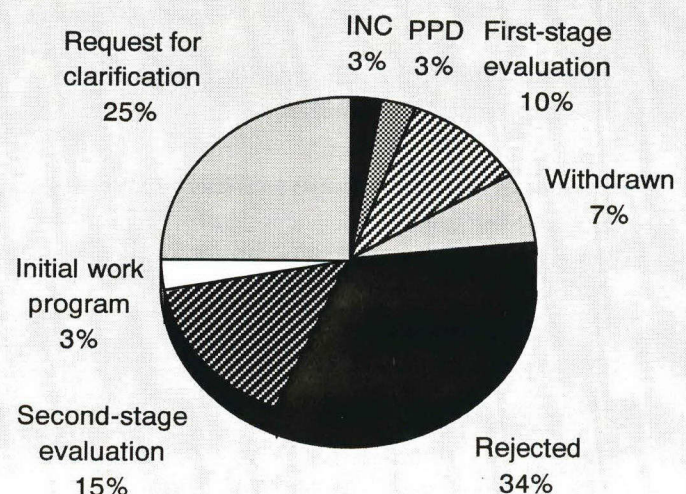
Of the 148 projects submitted as of June 30, 1996, some 25 percent are now under active consideration (figure D).

Contingent upon final evaluation, fourteen projects in an advanced stage of evaluation could become part of the pool of viable projects from which the work program is selected.

Comprising a total funding request of some \$3.8 million, the fourteen projects are as follows:

- “Increasing Electronic Connectivity between Strategic Allies in the HIV/AIDS Field in South East Asia”—part of the Information Support Services being developed by WHO SE Asia HIV/AIDS Project (\$224,000), proposed by SEA-HAP.
- “Program to Enhance Participation of Emerging Economies in WTO Telecommunications Negotiations” (\$233,000), proposed by the International Institute of Communications.
- “The National Information Infrastructure of Mexico: The Environmental Link” (\$250,000), proposed by CIESIN (Center for International Earth Science Information Network).
- “Toward a National Informatics and Telecommunications Policy for Russia” (\$248,000), proposed by the Freedom Channel.

Figure D. *infoDev* Evaluation Process



Note: Refers to 148 proposals received as of June 30, 1996. INC = incomplete; PPD = postponed.

- “Economic Tool-kit for Connectivity in Africa” (\$124,000), proposed by Africa Internet Forum.
- “Connectivity Information and Training Centres for Internet in Cameroon and Burkina Faso” (\$125,000), proposed by UNITAR in cooperation with ORSTOM.
- “Harvard International Medical Library” (\$241,000), proposed by the Picower Institute for Medical Research.
- “Workshop on Information Dissemination for Sustainable Development of Industrial Mineral Resources and Environmental Constraints” (\$70,000), proposed by British Geological Survey.
- “Biomedical Electronic Resource Centers” (\$250,000), proposed by the Faculty of Basic Medicine of Moscow State University.
- “infoDev Health Information Training Center” (\$288,000), proposed by SatelLife.
- “Development of a Medium-Resolution Demographic Database for Africa” (\$160,000), proposed by World Resources Institute.
- “Proyecto Conexiones” (\$250,000), proposed by Universidad EAFIT, Colombia.
- “Establishing National Forums for Telecommunications and Information Services across Africa to assist Sector Strengthening” (\$1 million), proposed by Telecommunications Foundation of Africa.
- “Information as a Strategic Asset in Administrative Reform and Sustainable Development in East and Southern Africa” (\$250,000), proposed by International Records Management Trust.
- “Business Plan for a World Institute for Telecommunication and Development” (\$90,000), proposed by CIDA (Canadian International Development Agency).

The infoDev Forum

The *infoDev* Forum provides an electronic venue and virtual workspace to support the *infoDev* work program. It contains a record of proposals as well as of the results of *infoDev* activities and provides a forum for the broader community interested in *infoDev*'s mission and objectives. The Forum uses a set of electronic tools mounted at the Bellanet website. Administered by IDRC, Bellanet uses network technologies to help organizations and people working in international development to increase their effectiveness through communication and collaboration.

Tools accessible to donors include the following:

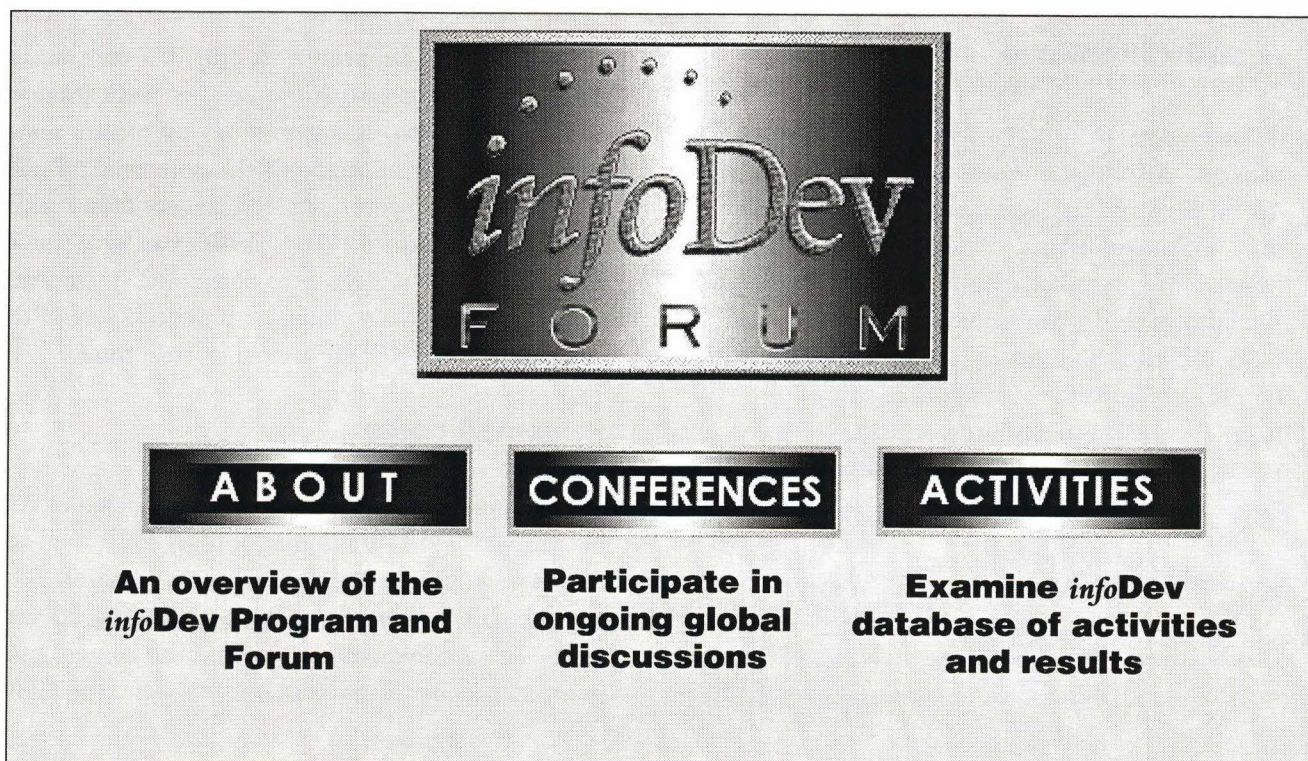
- Web pages on funded projects, proposals and the proposal process.
- Links to core program information on the World Bank's *infoDev* website:

<http://www.worldbank.org/html/fpd/infoDev/infoDev.html>

- Multiple forums for policy, participant, and stakeholder dialogues.

Once completed, the *infoDev* Forum site will offer public forums for wide-ranging stakeholder participation as well as private-password forums for discussion between *infoDev* management, donors, and the TAP. Donors and TAP members can use the Forum to gain direct access to *infoDev*'s work program data, to collaborate on policy, and to seek out interesting proposals and partners. Beginning in September 1996, the broader community will be encouraged to use the Forum to develop and submit proposals, to foster partnerships, and to access worldwide resources.

Each Web-based forum is mirrored to its own listserve so that participation in the *infoDev* Forum is facilitated by access to a simple electronic mail account. The *infoDev* Forum web pages are user friendly for text-only (lynx) browsers.



The InfoDev Forum home page at <http://www.bellanet.org/partners/infodev/>

External activities

In addition to making presentations to organizations and governments on the opportunities afforded by infoDev, program representatives participated in a number of important forums to discuss the program and to disseminate the preliminary results of its activities. Some of these included the Telecommunications Development Advisory Board (TDAB) of the International Telecommunication Union (ITU) in April 1996; the *Financial Times* World Telecommunications Conference in December 1995; and a number of European Union regional conferences.

The program developed a distinctive presence at the the G7 Information Society and Development (ISAD) Conference, held May 13–15, 1996, at the Gallagher Estates in Midrand, South Africa. The conference aimed at raising awareness within developing countries of the new opportunities offered by the information revolution and to discuss how those developments could be implemented in their own countries.

Because these objectives closely paralleled the mission of infoDev, the management team worked closely with the conference planners. Their efforts were cited by the heads of delegation from Brazil, the United Kingdom, and the United States, and by the *Financial Times*, as a prime example of how developed and developing countries can work together in promoting development through information technology. The conference concluded that close collaboration at the highest levels would ensure efficient introduction and development of a truly “global” information society and prevent the marginalization of some countries from this inevitable revolution. The conference thus represented an important step toward establishing policies and principles that would help meet that important objective.

The conference also provided infoDev with an opportunity to hold an informal meeting of donors and to visit the Mamelodi Learning Centre, part of the infoDev-funded Telematics for African Development project.

infoDev Finances

Total pledges to *infoDev* for fiscal 1996 were \$4.4 million, including in-kind contributions from the World Bank and staff seconded from the French Ministry of Foreign Affairs. By June 30, 1996, \$3.3 million had been received (although use of funding from Belgium awaited signature of the Letter of Agreement). Several donors have now pledged some \$2.5 million for fiscal 1997. With the addition of Brazil and STET-Italy (expected to finalize their respective agreements in early fiscal 1997), *infoDev* will have total contributions of some \$2.8 million for fiscal 1997 (see table 1).

Donor contributions

Donor contributions are categorized as core, noncore, or tied. Core funds are contributions that are unre-

stricted in their disbursements provided they are applied in accordance with the *infoDev* work program and financial plan. Contributions by private sector donors can only be made to the core fund. Public sector donors, however, can elect to have their contribution used as core funding, or they can have part or all of it applied according to a regional or thematic focus. These latter contributions are not part of the core fund and constitute a separate trust fund.

Projected costs

When *infoDev* was launched, it was projected to cost between \$5 and \$10 million. In fiscal 1996, total administrative and project costs were \$0.7 million. The World Bank in-kind contribution, equaling 20 percent of total contributions, covered the costs of program management and administration and the TAP.

Table 1 Funding Status of *infoDev* as of June 30, 1996 (US\$ '000)

<i>Donor country/organization</i>	<i>Pledged</i>			<i>Received</i>
	<i>Fiscal 96</i>	<i>Fiscal 97</i>	<i>Total</i>	<i>Fiscal 96</i>
Belgium	220	—	220	220★
Denmark	250	250	500	—
European Union	250	—	250	—
Finland	250	—	250	250
France	200	300	500	200
IBM	250	—	250	250
Luxembourg	100	—	100	100
Netherlands	250	250	500	250
Sweden	450	450	900	—
Switzerland	1,238	—	1,238	1,238
United Kingdom	90	90	180	90
Brazil	—	250	250	—
STET-Italy	—	250	250	—
Subtotal	3,548	1,840	5,389	2,598
France (seconded staff)	75	—	75	75
World Bank (in kind)	756	940	1,696	649
TOTAL	4,379	2,780	7,159	3,322

★ Funds received; unavailable to *infoDev* pending signature of Letter of Agreement.

As of June 30, 1996, US\$31,000 had been disbursed for the work program announced in February 1996. The undisbursed amount committed during fiscal 1996 should be fully disbursed in fiscal 1997. Startup and other administrative costs corresponding to less than half of a full year of operations amounted to some \$666,000. Administrative costs for a full year at the present level of operations were estimated at about \$900,000. A meeting of the Donors' Committee has been planned for November 1996. On this occasion, donors are expected to review the strategic orientation of the program, including its overhead and size, on the basis of the papers submitted by infoDev management.

Figure E. Donors' Actual Contributions to infoDev as a Percentage of Core Funding, Fiscal 1996

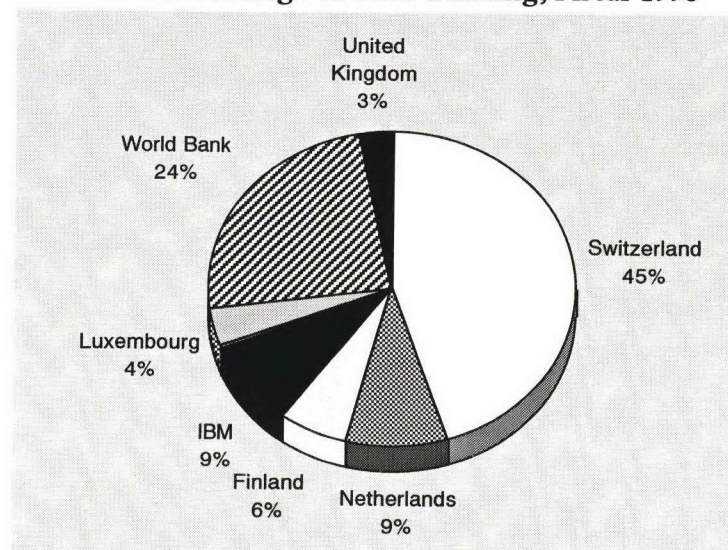


Table 2 infoDev Administrative and Project Budget, Fiscal 1996 (US\$ '000)

Cost item	Funding		TOTAL★
	Bank	infoDev	
Administrative costs			
Program administration and oversight			
Staff costs	304	—	304
Consultant fees	52	17	69
Travel	62	—	62
Proposal review	45	—	45
Design and maintenance of Internet conference site	5	—	5
Other indirects★★	123	—	123
Technical Advisory Panel***	27	—	27
Donors' committee meeting	31	—	31
infoDev Symposium	—	—	—
Total administrative costs	649	17	666
Project costs			
FY96 actuals	—	31	31
Total project cost	—	—	31
Total administrative and project costs	649	48	697

* Based on resources expected to be mobilized as of June 30, 1996.

** Includes computing, communications, office occupancy.

*** Includes honorarium, meeting, and travel costs.

Annex 1

infoDev Donors' Meeting

Final Communiqué
Washington, D.C. - 28 September 1995

A meeting of official donors was held at the World Bank headquarters in Washington, D.C., on 28 September 1995, to launch the Information for Development Program (*infoDev*). This first meeting of the *infoDev* Donors' Committee was opened by Mr. Richard Frank, World Bank managing director. It was chaired by Mr. Jean-François Rischard, World Bank vice president for Finance and Private Sector Development, and moderated by Mr. Richard Stern, director, Industry and Energy Department, the World Bank.

With the rapid technological and information-based innovations that are being witnessed today, the information revolution offers unlimited possibilities for the economic growth and transformation of developing countries and transition economies, and the advancement of their peoples. In order for these countries to fully realize their development potential and to fully participate in the global economy, it is necessary that they undertake significant structural and policy changes for development of their information infrastructure.

The *infoDev* program has been established to help these countries benefit fully from this information revolution. *infoDev* creates a partnership between the public and private sectors, linking the business interests of the eventual investors to the development objectives which guide public donors. As importantly, *infoDev* will act as a forum for the exchange of ideas—a clearing house of knowledge and information—to support ongoing initiatives and to create opportunities for development.

To maintain independence and objectivity, the *infoDev* Donors' Committee provides guidance on the direction of the program and the policies and long-term strate-

gies; reviews the proposed strategic framework of the program; and evaluates past results. A *Technical Advisory Panel (TAP)*, comprised of experts in the field of telecommunications and information systems, provides advises the Donors' Committee. A *Program Manager* maintains the relationships with the donors and the client countries and administers the day-to-day operations of the program.

The meeting endorsed in principle the *infoDev* Operational Guidelines and the Terms of Reference for the TAP. It was decided in principle that the TAP will be composed of six individuals, with significant representation from developing countries. Members of the TAP will be selected on their individual contributions to the areas of telecommunications and information technology, not upon their organizational affiliations.

It was agreed in principle that the Donors' Committee will annually review the *infoDev* strategy framework, prepared with guidance and advice from the TAP and representatives of developing countries. This preliminary framework will address four lines of activities. Initial indicative allocations of *infoDev* resources were reviewed: 35 to 40 percent to awareness raising activities; 15 to 20 percent to supply-side activities; 15 to 20 percent to demand-side activities; and 20 to 25 percent to demonstration projects. Within this framework, priority will be given to activities and projects with direct impacts upon poverty alleviation.

Agreement was reached in principle that the strategic framework will be further developed over the next few weeks, and reviewed at the second *infoDev* Donors' Meeting, to be held in mid-November. This meeting will include representatives from the public sector, as well as those from the private sector who are interested in the program.

The cost of the *infoDev* program is estimated at \$5 to \$10 million a year to be supported by the World Bank and public and private sector donors. Financial contributions by private sector donors will be made into the *infoDev* untied "core fund." Public sector donors may elect to contribute to the core fund, or have all

or part of their contributions applied in several countries with regional or thematic focus. These contributions will be made to separate trust funds and will not be part of the core fund.

The following countries and organizations were represented at today's meeting: Australia, Belgium, Canada, Denmark, European Community, Finland, France,

Germany, Italy, Japan, the Netherlands, Norway, Sweden, Switzerland, United Kingdom, United States, Asian Development Bank, Inter-American Development Bank, International Development Research Centre, International Telecommunications Union, Intelsat, and the World Bank. It was agreed that final endorsement of this communiqué by country representatives will be conditional upon review by their authorities.

Annex 2

infoDev Donors' Meeting

Final Communiqué
Paris, France - 14 November 1995

The first full meeting of the *infoDev* Donors' Committee was held on 14 November 1995, at the World Bank's European Office in Paris. The meeting was chaired by Mr. Jean-François Rischard, the World Bank's vice president for Finance and Private Sector Development, and moderated by Mr. Richard Stern, director of the Industry and Energy Department at the World Bank. This official meeting of donors was preceded by a general informational forum on the role of information infrastructure in development on the afternoon of 13 November.

Donors from both the public and private sectors confirmed their support to the *infoDev* program and its role in development. At this meeting, funding in an amount of about \$4.4 million was pledged to support *infoDev* activities for the first year of operations. Additional resources would become available as donors confirm their contributions.

The *infoDev* program was launched at the end of September 1995 at the initiative of the World Bank to assist developing countries and economies in transition obtain maximum development impact out of the new and increasingly low-cost telecommunications and information technologies which are revolutionizing the world economy. The program creates a partnership between the public and private sectors, linking the technical expertise and long term market-opening interests of the eventual investors to the objectivity and development goals of the public donors and the needs of developing countries. Participation by developing countries will include membership on a Technical Advisory Panel (TAP) which advises *infoDev* donors; representation at the *infoDev* forums; and through the submission of proposals to the work program.

The *infoDev* program acts not only as a catalytic fund but as a forum for the exchange of ideas—a clearing house of knowledge and information—supporting specific actions to raise awareness on the opportunities offered by the information infrastructure revolution and to build consensus on how developing countries and economies in transition can benefit from this evolution. The *infoDev* program will also assist in the design and implementation of telecommunications reform and information infrastructure strategies, and support pilot projects which demonstrate how this technology and information systems can result in the creation of new development capabilities.

Since the meeting at the end of September which launched the program, *infoDev* has been refined in terms of governance and structure, and strategic framework for operations. These refinements were reflected in the documents circulated at the meeting in Paris. Participation in the funding of *infoDev* was also strengthened during the six-week period between meetings.

At this November meeting, the *infoDev* Donors' Committee discussed the proposed framework for selection of projects into the work program. This framework listed the guidelines and priorities used to screen and select projects. This framework helps to ensure that the selection of proposals follows a well-defined process and that the work program consists of activities aimed at assisting developing countries and economies in transition—the direct beneficiaries of the program.

Agreement was reached on sectoral priorities with a focus on assisting the less-developed countries. It was further agreed that *infoDev* would provide assistance under the work program to help developing country organizations articulate their problems in the sector, in order that they might be encouraged to submit projects for funding. Moreover, it was recognized that the program needed to give appropriate focus to the reduction of poverty and exclusion of low-income countries and social groups. Terms of reference for the TAP, and criteria for selection of TAP members were also reviewed and agreed upon.

The following countries and organizations were represented at the meeting in Paris: Alcatel, AT&T, Australia, Belgium, CSC Ouroumoff, European Commission, Finland, France, France Télécom-Sofrecom, GEM Plus, Germany, Hewlett-Packard, IBM Corporation, Inter-American Development Bank, International Development Research Centre, International Telecommunication

Union, Japan, Keidanren, Luxembourg, Marubeni Corporation, Mitsubishi, Mitsui & Co., the Netherlands, Norway, Oracle, Prince of Wales Business Leaders' Forum, Siemens, Siemens Atea, Sweden, Switzerland, Syndicat des Industries de Télécommunication, Technitel S.p.A., Telstra, Thomson, TRT Philips Communication Systems, UNESCO, and the United Kingdom.

Annex 3

Evaluation Status of infoDev Proposals (as of June 30, 1996)

	<i>Name of activity</i>	<i>Proponent</i>	<i>Total cost</i>	<i>infoDev funding requested</i>	<i>Review category</i>
1	African Virtual University	World Bank (AFTHR)	\$990,900.00	\$250,000.00	A (WP)
2	Jamaica: Partnership for Technology in Basic Education	Jamaica Computer Society Education Foundation	\$1,500,000.00	\$500,000.00	A (WP)
3	Sixth ITU Regulatory Colloquium	Latham and Watkins, Attorneys at Law	\$145,000.00	\$145,000.00	A (WP)
4	Telematics for African Development	Telematics for African Development Consortium	\$626,500.00	\$250,000.00	A (WP)
5	The national information infrastructure of China: The environmental link	Consortium for Earth Science Information Network	\$250,000.00	\$250,000.00	Hold
6	Business plan of a world institute for telecommunication and development	Canadian International Development Agency (CIDA)	\$100,000.00	\$90,000.00	SSE
7	Development of a medium-resolution demographic data base for Africa	World Resources Institute	\$160,000.00	\$160,000.00	SSE
8	Establishing national forums for telecommunications and information services (NFTs) across Africa to assist sector strengthening	Telecommunication Foundation of Africa	\$1,010,750.00	\$1,010,750.00	RfC
9	Increasing electronic connectivity between strategic allies in the HIV/AIDS field in Southeast Asia, as part of information support services being developed by the WHO Southeast Asia HIV/AIDS project	SEA HIV/AIDS Project	\$224,000.00	\$224,000.00	SSE
10	The national information infrastructure of Mexico: The environmental link	Consortium for Earth Science Information Network	\$650,000.00	\$250,000.00	PPD
11	Toward a national informatics and telecommunications policy for Russia	The Freedom Channel	\$370,000.00	\$248,300.00	RfC

A = Accepted WP = Work Program FSE = First-Stage Evaluation SSE = Second-Stage Evaluation
 RfC = Request for Clarification REJ = rejected PPD = Postponed WD = Withdrawn

	<i>Name of activity</i>	<i>Proponent</i>	<i>Total cost</i>	<i>infoDev funding requested</i>	<i>Review category</i>
12	Workshop on information dissemination for sustainable development of industrial minerals resources and environmental constraints	British Geological Survey	\$90,000.00	\$70,000.00	RfC
13	Feasibility study for implementing electronic information network with access to Internet, for Commonwealth Association of Polytechnics of Africa (CAPA)	Association of Canadian Community Colleges	\$200,246.00	\$171,686.00	FSE
14	Demonstration and policy workshops on extending Internet in Africa	International Development Research Center (IDRC)	\$249,966.00	\$249,966.00	PPD
15	Global Lecture Hall (GLH) multimedia interactive video conference: Toward establishing a model city of global electronic distance education	University City Science Center	\$248,995.00	\$248,995.00	PPD
16	Connectivity Information and Training Center for Internet (Internet CITI)	UNITAR	\$170,580.00	\$124,920.00	FSE
17	Education and training (Internet and other online services)	Sall Consulting, the Latimer Group, & SICOR (SLS)	\$650,000.00	\$350,000.00	FSE
18	Implementation of an online service (emerging markets online)	Sall Consulting, the Latimer Group, & SICOR (SLS)	\$1,038,000.00	\$250,000.00	FSE
19	Feasibility study for information infrastructure project: The public visa system for vital statistics and other strategic information	World Bank (IECDD)	\$120,000.00	\$100,000.00	FSE
20	Foisi Broadcasting Network, Inc. (FBN): Pan-African TV	Foisi Broadcasting Network, Inc.	\$500,000.00	\$250,000.00	FSE
21	Management development in Ethiopia	The Open University Business School	\$2,860,000.00	\$861,000.00	FSE
22	RAPIDE – Réseau Africain pour l'intégration et le développement	Agence Pan-Africaine d'Information (PANA)	\$5,000,000.00	\$500,000.00	FSE

A = Accepted WP = Work Program FSE = First-Stage Evaluation SSE = Second-Stage Evaluation RfC = Request for Clarification REJ = rejected PPD = Postponed WD = Withdrawn

	<i>Name of activity</i>	<i>Proponent</i>	<i>Total cost</i>	<i>infoDev funding requested</i>	<i>Review category</i>
23	Trade agreements database (TRAG)	Tourism & Industrial Development Co., Trinidad & Tobago (TIDCO)	\$64,500.00	\$64,500.00	FSE
24	Trinidad human resource information system (TATHRIS)	Tourism & Industrial Development Co., Trinidad & Tobago (TIDCO)	\$70,000.00	\$70,000.00	FSE
25	VOLSierra Leone project: An initiative to introduce IP connectivity to Sierra Leone	SIERRAnet	\$154,357.00	\$151,500.00	FSE
26	A national community information network to establish public libraries as access points to the Internet for Trinidad & Tobago	Libraries Division, Office of the Prime Minister	\$502,000.00	\$250,000.00	RfC
27	Preliminary study on costs and benefits of telecommunications reform / deregulation, Trinidad & Tobago	Tourism & Industrial Development Co., Trinidad & Tobago (TIDCO)	\$100,000.00	\$100,000.00	RfC
28	A strategic initiative for improving competitiveness and development of the telecommunications sector in Sub-Saharan countries	Euroconsult	\$250,000.00	\$250,000.00	RfC
29	RESAFAD - Reseau Africain de formation à distance (African Distance Training Network)	INRIA	\$330,000.00	\$50,000.00	RfC
30	An information and communication system for grassroots garbage recycling enterprises	Fundacion Social	\$0.00	\$250,000.00	RfC
31	Attacking urban poverty and isolation through community information planning and management systems. (Formerly: Attacking urban poverty and isolation through youth-run info. enterprises).	Fundacion Social	\$300,000.00	\$250,000.00	RfC
32	Caribbean Hospital-based Injury Surveillance System (CHISS)	PAHO/WHO Caribbean Epidemiology Center (CAREC)	\$154,810.00	\$80,000.00	RfC

A = Accepted WP = Work Program FSE = First-Stage Evaluation SSE = Second-Stage Evaluation RfC = Request for Clarification REJ = rejected PPD = Postponed WD = Withdrawn

	<i>Name of activity</i>	<i>Proponent</i>	<i>Total cost</i>	<i>infoDev funding requested</i>	<i>Review category</i>
33	Caribbean human resource database project	TINA: Telemarketing Info Systems and Net-working Advertising	\$120,000.00	\$100,000.00	RfC
34	CAT 2000 - Telecurso 2000	Fundacao Roberto Marinho	\$247,000.00	\$247,000.00	RfC
35	Central Asian Aral Sea Basin development program	World Bank (AGRPW)	\$650,000.00	\$250,000.00	RfC
36	Defining additional training and education expertises in the domain of telecommunications, information technology, and their fields of commercialization during the preproject phase, the postproject phase, or independently	Sequoia International Restructuring	\$110,000.00	\$110,000.00	RfC
37	Electronic handbook on trade facilitation and UN/EDIFACT	UN Economic Commission for Europe	\$895,500.00	\$350,000.00	RfC
38	Experimental environment / health education project	World Bank (ASTHR)	\$0.00	\$0.00	RfC
39	Government revenue and finance enhancement information system models	IBM Corporation	\$25,000,000.00	\$250,000.00	RfC
40	Information and telecommunications for community development	IDRC	\$500,000.00	\$300,000.00	RfC
41	Information strategies in aid of socioeconomic decisionmaking and policy formulation	Institute for Managing Development (IMD), Ltd.	\$365,000.00	\$210,000.00	RfC
42	International knowledge treasury: Warsaw-New York	Columbia University, New York	\$340,475.00	\$170,500.00	RfC
43	IPTEKnet (Science and Technology Information Network)	Agency for Assessment and Application of Technology (BPP Teknologi)	\$6,335,805.00	\$2,753,360.00	RfC
44	National policy, information, training and research for global interdisciplinary risk and crisis management in Brazil	UNESCO	\$240,000.00	\$240,000.00	RfC

A = Accepted WP = Work Program FSE = First-Stage Evaluation SSE = Second-Stage Evaluation RfC = Request for Clarification REJ = rejected PPD = Postponed WD = Withdrawn

	<i>Name of activity</i>	<i>Proponent</i>	<i>Total cost</i>	<i>infoDev funding requested</i>	<i>Review category</i>
45	Pan-infoDev support for collaboration in IT for development	International Development Research Centre (IDRC)	\$209,000.00	\$159,000.00	RfC
46	Marketing grass roots products through the Internet	LinkUp	\$213,700.00	\$213,700.00	RfC
47	Networking artisan organizations	Indata Com Private, Ltd.	\$50,000.00	\$44,500.00	RfC
48	Physician-based sentinel surveillance system for emerging health and disease problems in the Caribbean	PAHO/WHO Caribbean Epidemiology Centre (CAREC)	\$190,000.00	\$135,000.00	RfC
49	Programme de formation a distance en teledetection et aide a la reinsertion des diplomes dans leur milieu professionnel local	CARTEL, Universite de Sherbrooke	\$0.00	\$0.00	RfC
50	Project SITA (Study of Information Technology Applications): Computer skills training for low-income women in India	National Junior School Bangalore	\$300,000.00	\$200,000.00	RfC
51	Proyecto Conexiones	Universidad EAFIT	\$1,320,494.00	\$250,000.00	RfC
52	Promotion and development of telematics in Ghana's public sector	UNESCO	\$215,000.00	\$215,000.00	RfC
53	Regional distance learning network for information technology	Regional IT and Software Engineering Center (RITSEC)	\$250,000.00	\$249,999.00	RfC
54	Research in Africa in computer science (RESAFRICS)	INRIA/IRISA	\$1,565,000.00	\$775,000.00	RfC
55	Strengthening of socioeconomic planning information system project	Library Services Unit, Ministry of Planning and Development/ Ministry of Finance, Trinidad & Tobago	\$600,000.00	\$150,000.00	RfC

A = Accepted WP = Work Program FSE = First-Stage Evaluation SSE = Second-Stage Evaluation RfC = Request for Clarification REJ = rejected PPD = Postponed WD = Withdrawn

	<i>Name of activity</i>	<i>Proponent</i>	<i>Total cost</i>	<i>infoDev funding requested</i>	<i>Review category</i>
56	Evaluation of effectiveness and cost-effectiveness of multi-media-based approach to in-service teacher training in developing countries	—	\$0.00	\$0.00	RfC
57	Suchna Sagar (Suchna = information, Sagar = ocean): Empowering rural populations through information	CMC Limited	\$1,100,000.00	\$750,000.00	RfC
58	The Damam TradeNet information system	Transcom International	\$368,191.00	\$250,000.00	RfC
59	Global information infrastructure and African development	Center for International Development & Conflict Management	\$20,000.00	\$20,000.00	RfC
60	Development of a regional digital spatial data base for the Eastern Caribbean region	University of the West Indies	\$64,900.00	\$64,900.00	RfC
61	Wise-Dev (Web Integrated System for Environment and Development)	ORSTOM Laboratoire ERMES	\$2,200,000.00	\$680,000.00	RfC
62	Workshop on deployment of electronic commerce for trade facilitation and national competitive advantage	EDI Chile	\$51,890.00	\$51,890.00	RfC
63	Workshop: "Facilitating Competition and Investment in Telecommunications and Information Processing Operations in the Caribbean"	Caribbean Telecommunications Union	\$76,093.00	\$72,218.00	RfC
64	Biomedical electronic resource centers	Faculty of Basic Medicine, Moscow State University	\$250,000.00	\$250,000.00	SSE
65	Computer-assisted instruction for rural educational and training development	University of the West Indies	\$1,000,000.00	\$250,000.00	SSE
66	Demonstrating in Indonesia generalizable model for introducing technologies to expand and strengthen national reproductive health training and service delivery	Johns Hopkins University (JHPIEGO)	\$3,055,614.00	\$250,000.00	SSE

A = Accepted WP = Work Program FSE = First-Stage Evaluation SSE = Second-Stage Evaluation RfC = Request for Clarification REJ = rejected PPD = Postponed WD = Withdrawn

	<i>Name of activity</i>	<i>Proponent</i>	<i>Total cost</i>	<i>infoDev funding requested</i>	<i>Review category</i>
67	Desertification Information Network and System (DINS) in Africa in the framework of implementation of the Convention to Combat Desertification	UNITAR	\$416,000.00	\$250,000.00	SSE
68	Developing human resources for sustainable agriculture in Southeast Asia	Consortium of Agricultural Universities, Vietnam	\$412,000.00	\$250,000.00	SSE
69	GAD2IS: Global and distributed, geo- & demographic information system	UNU/IIST	\$540,000.00	\$330,000.00	SSE
70	Economic toolkit for Africa	Africa Internet Forum (AIF), c/o World Bank	\$123,950.00	\$123,950.00	SSE
71	Harvard International Medical Library, Ltd.	Picower Institute for Medical Research	\$20,000,000.00	\$240,800.00	SSE
72	infoDev health information training center	SateLife	\$317,504.00	\$287,504.00	SSE
73	Information as a strategic asset in administrative reform and sustainable development in Eastern and Southern Africa	International Records Management Trust	\$249,735.00	\$249,735.00	SSE
74	Information networks to support water management institutions in the context of sustainable development in Latin America and the Caribbean	Florida Center for Environmental Studies	\$845,000.00	\$600,000.00	SSE
75	MoFIT: Ministry of Finance financial information & decision support system in Vietnam	UNU/IIST	\$540,000.00	\$330,000.00	SSE
76	Restructuring the accessibility, controllability and presentability of tourist information for the market of Zimbabwe.	Sequoyah International Restructuring	\$230,000.00	\$230,000.00	SSE
77	Using aerial video to assess impacts of natural resource management projects in Niger	World Resources Institute	\$120,000.00	\$100,000.00	SSE

A = Accepted WP = Work Program FSE = First-Stage Evaluation SSE = Second-Stage Evaluation RfC = Request for Clarification REJ = rejected PPD = Postponed WD = Withdrawn

	<i>Name of activity</i>	<i>Proponent</i>	<i>Total cost</i>	<i>infoDev funding requested</i>	<i>Review category</i>
78	WHeC2S: Health Care Computing and Communications System	UNU/IIST	\$540,000.00	\$330,000.00	SSE
79	Examination of issues for the UN Commission on Science and Technology for Development (UNCSTD)	IDRC	\$1,200,000.00	\$400,000.00	SSE
80	Information as a strategic asset in administrative reform and sustainable development in West Africa	International Records Management Trust	\$249,735.00	\$249,735.00	SSE
81	Internet training to help build the national information infrastructure in South Africa	Consortium for Earth Science Information Network	\$400,000.00	\$250,000.00	SSE
82	A "quickstart" toolkit for knowledge park development	Open World Partnership, c/o Gateway Ventures	\$220,000.00	\$185,000.00	REJ
83	ABC 2000: A study of the information infrastructure of an airline with respect to operations and economics.	UNU/IIST	\$360,000.00	\$240,000.00	REJ
84	An assessment of the existing information infrastructure in West Africa	George Mason University	\$167,805.00	\$167,805.00	REJ
85	An international business information processing system facilitating on-line trading, targeting potential markets and providing current socioeconomic news	ICT International, Inc.	\$250,000.00	\$20,000.00	REJ
86	CaVlaR: Tourism and Leisure Industry Infrastructure	UNU/IIST	\$360,000.00	\$240,000.00	REJ
87	Database/communication systems, program planning & project management	Microsearch Co. Ltd.	\$249,733.00	\$249,733.00	REJ
88	Development of integrated information system to serve the president, ministries, regions, and people of Belarus	Florida Atlantic University	\$260,000.00	\$190,000.00	REJ

A = Accepted WP = Work Program FSE = First-Stage Evaluation SSE = Second-Stage Evaluation RfC = Request for Clarification REJ = rejected PPD = Postponed WD = Withdrawn

	<i>Name of activity</i>	<i>Proponent</i>	<i>Total cost</i>	<i>infoDev funding requested</i>	<i>Review category</i>
89	Dial-up electronic data access pilot project	PAHO/WHO Caribbean Epidemiology Centre (CAREC)	\$474,573.00	\$246,113.00	REJ
90	Distant learning at primary and secondary levels in Ghana	GlobeNet	\$350,000.00	\$350,000.00	REJ
91	Distributed processing network for modeling and management of water resources in drylands	INRIA	\$745,000.00	\$745,000.00	REJ
92	EDUBASE	Coral Graphics and Systems Supply Company Limited	\$190,500.00	\$190,500.00	REJ
93	Environmental public awareness programme	Environmental Management Authority (EMA)	\$100,000.00	\$98,000.00	REJ
94	Establishment of an information system for financial, legal, regulatory data management	— (private investors)	\$150,000.00	\$150,000.00	REJ
95	Extension of planned national educational institutions network to include necessary infrastructure at faculty level	GTZ GmbH	\$225,500.00	\$225,500.00	REJ
96	Geographical information system for natural resources and environmental protection	British Geological Survey (Geochemistry Group)	\$200,000.00	\$150,000.00	REJ
97	Guidelines for the compilation analysis and deployment of minerals information in developing countries	British Geological Survey	\$250,000.00	\$250,000.00	REJ
98	Health sciences, continuing education network - Brazil	UNISA - Universidade Santo Amaro	\$7,740,000.00	\$500,000.00	REJ
99	Helsinki conference on emerging global electronic distance education	The Global University, USA	\$0.00	\$0.00	REJ

A = Accepted WP = Work Program FSE = First-Stage Evaluation SSE = Second-Stage Evaluation RfC = Request for Clarification REJ = rejected PPD = Postponed WD = Withdrawn

	<i>Name of activity</i>	<i>Proponent</i>	<i>Total cost</i>	<i>infoDev funding requested</i>	<i>Review category</i>
100	Identification and inventory of environmental information: Human and computer resources in government agencies/ institutions affecting the EMA	Environmental Management Authority (EMA)	\$124,300.00	\$119,300.00	REJ
101	Increasing the impact of statistics on policy formulation and monitoring in OECS countries	Econ. Commission for Latin America and the Caribbean, Subregional HQ for the Caribbean	\$473,300.00	\$250,000.00	REJ
102	Info-Net	PRO-Advanced Consultancy & Technology Ltd.	\$248,000.00	\$248,000.00	REJ
103	infoDev Learning Center (ILC)	University of Grenoble	\$260,000.00	\$260,000.00	REJ
104	Information based standards in support of efficient markets in the former Soviet Union: UN/EDIFACT and trade facilitation workshops	United Nations Economic Commission for Europe, Trade Division	\$767,700.00	\$500,000.00	REJ
105	Information technology training program (Namibia)	AfriTex Informatic Technologies, Inc.	\$624,000.00	\$250,000.00	REJ
106	Intellectual property rights as an aid to creation and dissemination of knowledge in developing countries	International Intellectual Property Alliance	\$244,100.00	\$244,100.00	REJ
107	International and national electronic networking - a way for NGOs within a country and internationally to exchange information	Volunteers in Technical Assistance (VITA)	\$0.00	\$0.00	REJ
108	Integrating Ghana into the global health network	University of Pittsburgh	\$145,100.00	\$145,100.00	REJ
109	Marketing study of the North American information processing industry	Tourism and Industrial Development Corporation of T&T, Limited	\$85,000.00	\$85,000.00	REJ
110	MI2CI: Manufacturing Industry Information and Command Infrastructure	UNU/IIST	\$540,000.00	\$330,000.00	REJ

A = Accepted WP = Work Program FSE = First-Stage Evaluation SSE = Second-Stage Evaluation RfC = Request for Clarification REJ = rejected PPD = Postponed WD = Withdrawn

	<i>Name of activity</i>	<i>Proponent</i>	<i>Total cost</i>	<i>infoDev funding requested</i>	<i>Review category</i>
111	Overseas resource database development programme	Tourism & Industrial Development Co., Trinidad & Tobago (TIDCO)	\$325,000.00	\$250,000.00	REJ
112	Project to build information services on trade, investment, and privatization-related legislation in CIS countries	UN/ECE Trade Division	\$150,000.00	\$120,000.00	REJ
113	Project to connect the University of the West Indies via a low-speed wireless connection (64 kbps) to an internet service provider	Tourism & Industrial Development Corporation of Trinidad & Tobago, Limited (TIDCO)	\$75,000.00	\$75,000.00	REJ
114	Providing technical assistance to enable Data Telecom Ltd. to continue assisting Ghana's government in implementing a national public data network	BCV International, Inc. Project On Line Afrika	\$328,725.00	\$249,850.00	REJ
115	Putting African science on the Internet	African Science and Technology Exchange (ASTEX)	\$111,550.00	\$111,550.00	REJ
116	RaCoSy: Railway Computing Systems	UNU/IIST	\$540,000.00	\$330,000.00	REJ
117	RoManS: Road Management Systems	UNU/IIST	\$360,000.00	\$240,000.00	REJ
118	Scientific and technological information system of the State of Minas Gerais, Brazil	Secretary of Science and Technology, Minas Gerais, Brazil	\$991,240.00	\$250,000.00	REJ
119	The global hospital	Health on the Net Foundation	\$3,400,000.00	\$1,200,000.00	REJ
120	The national education and information network	Ministry of Education (Ethiopia)	\$250,000.00	\$200,000.00	REJ
121	The Open World: A CD-ROM on opportunities in the information economy	Gateway Ventures Ltd.	\$173,000.00	\$173,000.00	REJ
122	Development of an enhanced version of the Credit Union Information System (CUIS), a fully integrated accounting and member services system for credit unions	INFOTECH Associates Limited	\$265,684.00	\$155,684.00	REJ

A = Accepted WP = Work Program FSE = First-Stage Evaluation SSE = Second-Stage Evaluation RfC = Request for Clarification REJ = rejected PPD = Postponed WD = Withdrawn

	<i>Name of activity</i>	<i>Proponent</i>	<i>Total cost</i>	<i>infoDev funding requested</i>	<i>Review category</i>
123	Toward an interactive information technology mechanism for science-led development in Africa	The Research and Development Forum for Science-Led Development in Africa	\$326,700.00	\$250,000.00	REJ
124	Training node administrators to increase availability of data and information resources worldwide	Consortium for Earth Science Information Network	\$245,000.00	\$245,000.00	REJ
125	UnIMaCS: University Information Monitoring and Command System	UNU/IIST	\$360,000.00	\$240,000.00	REJ
126	Virtual library for the Brazilian Student	Escole de Futuro, Universidade de Sao Paulo	\$292,850.00	\$249,650.00	REJ
127	Applying information tech. for sustainable development in Latin America (WWW http://tellus.com/seib.html)	Stockholm Environment Institute	\$240,000.00	\$240,000.00	REJ
128	Access on network to documented image data base concerning the human body for education: Development in partnership with the developing countries	INSERM - Department de L'information et de la Communication	\$400,000.00	\$250,000.00	INC
129	China telecom regulatory study	World Bank (IENTI)	\$150,000.00	\$150,000.00	INC
130	Commercially viable rural telecommunications	World Bank (IENTI)	\$150,000.00	\$150,000.00	INC
131	Community access networks	Department of Communication, University of Hawaii, Manoa	\$0.00	\$0.00	INC
132	Decision support systems in government: Knowledge assessment and requirements analysis	IDRC and UNU/IIST	\$250,000.00	\$200,000.00	INC
133	Development of a translation browser for the Internet and other online services	Sall Consulting, the Latimer Group, & SICOR (SLS)	\$1,500,000.00	\$250,000.00	FSE
134	International seminar on the wireless revolution	World Bank (IENTI)	\$180,000.00	\$140,000.00	REJ

A = Accepted WP = Work Program FSE = First-Stage Evaluation SSE = Second-Stage Evaluation RfC = Request for Clarification REJ = rejected PPD = Postponed WD = Withdrawn

	<i>Name of activity</i>	<i>Proponent</i>	<i>Total cost</i>	<i>infoDev funding requested</i>	<i>Review category</i>
135	Reengineering of information systems for government financial institutions	Management Information Systems	\$200,000.00	\$100,000.00	REJ
136	The national information infrastructure of China: The environmental link	Consortium for Earth Science Information Network	\$400,000.00	\$250,000.00	REJ
137	China's Industrial Pollution Projection System (CIPPS): New info. tools for China's environmental agencies	World Bank (PRDEL)	\$412,900.00	\$249,900.00	FSE
138	Symposium toward development of a national information policy for Trinidad & Tobago	Information Technology Professional Society of Trinidad & Tobago	\$50,000.00	\$50,000.00	RfC
139	Guiding NGOs to sensible use of internal e-mail (GNSI)	TOOLnet Foundation	\$245,000.00	\$245,000.00	FSE
140	Information infrastructure assessment in Morocco	World Bank (IENTI)	\$0.00	\$0.00	INC
141	Information infrastructure development "toolkit," Africa	World Bank (IENTI)	\$0.00	\$0.00	INC
142	Information systems for rural development (demonstration project in Cajamarca, Peru)	Intermediate Technology Development Group (ITDG)	\$267,775.00	\$247,775.00	INC
143	Technical assistance to draft model laws for informatics services industries	World Bank (IENTI)	\$360,000.00	\$360,000.00	INC
144	Telecottages in Estonia	World Bank (AGRAF)	\$0.00	\$0.00	INC
145	National trade data base and network project (Commerce NET Ethiopia)	FiberNET Communications (MDS Ethiopia)	\$235,000.00	\$175,000.00	INC
146	World Science Workshop (WSW) through M-bone	Communication Division, UNESCO	\$250,000.00	\$250,000.00	INC
147	Community information centers: A model for extending information services to underserved communities	VITA - Volunteers for Technical Assistance	\$430,000.00	\$212,000.00	WD
148	Training for operators of bulletin board services	World Bank (IENTI)	\$0.00	\$0.00	WD

A = Accepted WP = Work Program FSE = First-Stage Evaluation SSE = Second-Stage Evaluation RfC = Request for Clarification REJ = rejected PPD = Postponed WD = Withdrawn

THE WORLD BANK
1818 H STREET, NW
WASHINGTON, DC 20433 USA

TELEPHONE 1(202) 477-1234

FACSIMILE 1(202) 522-3186

E-MAIL infodev@worldbank.org

inf



The World Bank

DONALD H. GIPS

*Chief, International Bureau
Federal Communications Commission
United States*

Donald H. Gips is the Chief of the International Bureau of the Federal Communications Commission. In this position he has focused on promoting policies for the regulation of international telecommunications and satellite facilities that will lower prices and improve service for US consumers.

Prior to joining the FCC in January 1994, Mr. Gips served as Deputy Chief and Director of Strategic Policy of the Office of Plans and Policy. While in the OPP, he developed the widely praised PCS licensing plan, and helped create the framework for implementing the 1996 rewrite of the Telecommunications Law. Mr. Gips has worked as Engagement Manager for McKinsey and Company, for the Office of the Mayor of New York City, and for Senator Bill Bradley. He is a recipient of the CORO Foundation Public Affairs fellowship.

Mr. Gips holds a B.A., *magna cum laude*, from Harvard University, and a M.A. in Public and Private Management from Yale University.

DAVID HARTRIDGE

*Director of Services
World Trade Organization*

David Hartridge is Director of the Trade in Services Division of the World Trade Organization, where he has responsibility for the negotiation and implementation of the General Agreement on Trade in Service.

Mr. Hartridge has been involved in international trade issues since 1961, first through positions held at the British Board of Trade and the British Department of Trade and Industry. He later served as First Secretary in the UK Mission to GATT in Geneva, and Counsellor for industry, energy, and internal market in the Office of the UK Permanent Representative to the European Commission. Mr. Hartridge was Chef de Cabinet to the GATT Director-General from 1980 to 1985. In subsequent positions at GATT, he was Director of the Office for Multilateral Trade Negotiations and Director of the Group of Negotiations on Goods and GATT Policy Affairs Division.

Mr. Hartridge holds an M.A. in Politics, Philosophy, and Economics from Oxford University.

MANUEL ENRIQUE HINDS
Minister of Finance, El Salvador

(to be submitted)

JOSEPH W. HOLMES
Corporate Vice President and Group Executive
Technology Architecture
EDS Corporation

Joseph W. Holmes is a corporate Vice President and Group Executive for Electronic Data Systems' Technology Architecture Group. In this position, he has the responsibility for the technical direction and platforms that EDS employs, including telecommunications, hardware, and software. He was named a corporate Vice President in 1989. He also serves as a member of the board of directors of the Antares Alliance Group.

Mr. Holmes started his career at EDS in 1968 as a systems engineer. Prior to locating in Plano, Texas, he worked directly with customers in the transportation industry in Illinois, the health insurance industry in Pennsylvania, the manufacturing industry in Florida, and the banking industry in Texas. His corporate responsibilities have included division manager of Communication Services, regional manager of Blue Cross and Blue Shield, and group vice president of Systems Services. Mr. Holmes has also worked for IBM as a systems engineer.

Mr. Holmes holds a B.Sc. from Northern Illinois University and a M.Sc. from the University of Illinois.

GLORIA KNIGHT

former President

Mutual Life Group, Jamaica

(to be submitted)

AHMED LAOUYANE

Director, Telecommunication Development Bureau

International Telecommunication Union

Ahmed Laouyane was appointed Director of the Telecommunications Development Bureau at the International Telecommunications Union in Geneva, Switzerland in 1994. He previously also served in the ITU as Deputy Director of the Telecommunication Center and as Head of Policies Strategies.

He began his career at ITU in 1974 as Regional Telecommunications Advisor for West Africa, moving to head ITU's Asia Pacific Division and Europe and Middle East Division in 1977. Prior to joining ITU, Mr. Laouyane served in the Tunisian Ministry of Posts and Telecommunications from 1957 to 1973, where he rose to the position of Chief Engineer. Mr. Laouyane also serves as one of the six members of the Technical Advisory Panel for *infoDev*.

Mr. Laouyane holds degrees in Mathematics and Physics from the University of Tunis, and a Diploma of Telecommunication Engineer from the Ecole Nationale Supérieure des Télécommunications, Paris, France.

NEIL MACLEOD McMILLAN

*Director, International Policy
Department of Trade and Industry
United Kingdom*

Neil McMillan has been the Director of International Communications Policy in the British Department of Trade and Industry (DTI) since 1991. While in this capacity he has chaired the WTO's Negotiation Group on Basic Telecommunications, and the European Committee on Telecommunications Regulatory Affairs.

Prior to his current position at DTI, Mr. McMillan served as the First Secretary for Industry at the British Representation to the EU in Brussels, DTI Principal responsible for quality and privatization of British Telecom (BT), and Private Secretary to the Minister for Technology and Industry.

Mr. McMillan was educated at the University of Exeter and the University of Regensburg. He graduated with degrees in German and French.

GORDON NAIDOO

*Director
Open Learning Systems Education Trust*

Gordon Naidoo is Executive Director of the Open Learning Systems Educations Trust (OLSET), a non-governmental educational organization based in Johannesburg, South Africa. OLSET specializes in providing interactive radio instruction in the teaching of English as a second language and Mathematics. Mr. Naidoo also serves as Project Manager to the Radio Learning Program, where he responsible for in-house design, radio scriptwriting, curriculum and production issues.

Mr. Naidoo recently returned to South Africa after a two-decade absence during the *apartheid* era. He taught language and literature in post-independence Zimbabwe and initiated a National Research Working Group of fellow exile academics in Senegal. He co-wrote and edited a publication on South Africa, dealing with macro tranformational perspectives prior to democratic reform. Mr. Naidoo is currently involved in a children's broadcasting initiative for the region, and also serves as an advisor to the Southern African Secretariat of the International Council for Distance Education.

Mr. Naidoo, a graduate of Ulster University and the London School of Economics, holds an M.A. in Educational Policy and Planning in Developing Countries.

ANDILE NGCABA

Postmaster General, South Africa

Andile Ngcaba is Postmaster General of the Republic of South Africa. He previously served as Director of the Center for the Development of Information and Telecommunications Policy in Braamfontein, South Africa, Director, Bheki Computers, Director of the broadcast Station of the Nation, and Chairperson, African Institute of Technology. Mr. Ngcaba also serves as one of six members on the Technical Advisory Panel for *infoDev*.

Mr. Ngcaba has an MBA in Commerce and Communications from the University of Witwatersrand, Johannesburg, and was educated at Stanford University, National University of Singapore, and City University, London.

DANIEL SALCEDO

Co-founder, PEOPLELink

Daniel Salcedo is Co-founder of PEOPLELink, a non-profit marketer of grassroots products from the developing world promoting the use of the Internet as a medium for trade communications. In addition to providing educational information about grassroots producers on its Web pages, PEOPLELink facilitates direct electronic communications between poor producers and a range of people in the industrialized nations.

Until recently, Mr. Salcedo was Senior Program Associate at the Science and Human Rights Program of the American Association for the Advancement of Science, where he developed databases and electronic mail capabilities for human rights documentation. Prior to that, he was Peace Corps Country Director for the Dominican Republic. He currently serves on the boards of directors of Pueblo to People, Washington Office on Latin America, the Fair Trade Federation, and the Guatemalan Human Rights Commission.

Mr. Salcedo holds a Ph.D. in Operations Research from the University of Texas.

ROBERT VERRUE

*Director-General, DGXIII
European Commission*

Robert Verrue was appointed Director General of DGXIII, Telecommunications, Information Markets and Exploitation of Research, of the European Commission in January 1996.

Mr. Verrue has served in the EC in various capacities since 1973, notably as Deputy Director General responsible for relations with Central Europe and the CIS, Director for Industrial Affairs and Internal Markets and Division Head for coordination of monetary policies.

Mr. Verrue was educated at Ecole Supérieure de Commerce et d'Administration des Entreprises in Lille, France, and the College of Europe in Bruges, Belgium. He also holds an MBA from the European Institute of Business Administration (INSEAD) in Fontainebleau, France, where he was also an Assistant Professor in the 1970s.

OWEN M. RENNERT, M.D.

*Chairman, Department of Pediatrics
Georgetown University School of Medicine*

Owen M. Rennert, M.D., is Professor and Chairman of the Department of Pediatrics at Georgetown University School of Medicine. Dr. Rennert is a well-known specialist in genetics, endocrinology and metabolism. Since 1994 he has been Adjunct Scientist for Pediatric Endocrinology at the National Institutes of Health. From 1969 - 1987 he served on the Editorial Board of the American Journal of Clinical Research. He has received numerous awards, including Clinical Scientist of the Year in 1978, from the American Association of Clinical Science.

Dr. Rennert's interest in international child health care issues led to his appointment in March 1994 to the Board of Directors of the Vishnevskaya-Rostropovich Foundation.

Dr. Rennert holds an M.D. from the University of Chicago School of Medicine.

Moderators

CARLOS ALBERTO PRIMO BRAGA

*Senior Economist, Telecommunications and Informatics
The World Bank*

Carlos A. Primo Braga is currently Senior Economist in the Telecommunications and Informatics Division of the World Bank. He is the Work Program Administrator of *infoDev* and the co-leader of TechNet, a World Bank network of professionals working with science and technology issues in developing countries.

Mr. Braga began his career in the World Bank in 1991 in the International Trade Division of the International Economics Department. Before joining the Bank, he was an Assistant Professor of Economics at the University of São Paulo, Brazil and Senior Researcher at the Fundação Instituto de Pesquisas Economicas (FIPE) in São Paulo. From 1984 to 1991, Mr. Braga served as an economic consultant to various private companies, multilateral agencies, and governmental institutions. He was a Fulbright Scholar at the Johns Hopkins School of Advanced International Studies (SAIS) in 1987-1988, and is currently a Visiting Professor at SAIS.

Mr. Braga holds a Mechanical Engineering Degree and an M.A. from the University of São Paulo, Brazil, and a Ph.D. from the University of Illinois at Urbana-Champaign.

ELKYN A. CHAPARRO

*Senior Adviser to the Vice President
Finance and Private Sector Development
The World Bank*

Elkyn A. Chaparro has been Senior Advisor to the Vice President for Finance and Private Sector Development at the World Bank since January 1994. Prior to that, he was Chief of the Regional Missions in Cote d'Ivoire and Senegal from 1988 to early 1994.

From 1983 to 1987, Mr. Chaparro organized and managed a Public Enterprise Unit and a Public Sector Management Division for West Africa, and a Trade and Finance Division for Europe and the Middle East. He has served as the first World Bank Resident Representative to Peru and as Senior Advisor to the Minister of Economy and Finance. From 1978 to 1979, Mr. Chaparro was Division Chief at the European Office of the Bank in Paris, France. He began his career at the World Bank in 1970 through the Young Professionals Program.

Mr. Chaparro holds a License and Masters in Economics from the University of Louvain, Belgium.

DENIS GILHOOLY

*Media and Technology Director
The Wall Street Journal Europe*

Denis Gilhooly is Media and Technology Director for *Wall Street Journal Europe*, and was Executive Director of the *Wall Street Journal's* "Business & Technology in the Next Millennium" Executive Conference held in September 1996.

Previously, Mr. Gilhooly was founding Editor and Publisher of *CommunicationsWeek International*. He has also served as Editor of *Telecommunications International*, Editor of *Communications Engineering International*, and International Editor of the *Journal of Electronic Defense* and *Photonics Spectra*.

Mr. Gilhooly is a founding member of the Washington, DC-based Global Information Infrastructure Commission (GIIC).

List of Donors for the infoDev Symposium/Donors' Meeting

November 5-7, 1996

as of 10/31/96

Belgium

Mr. Guy Schorochoff
Head of Delegation
Chargé de Mission
Banques de Développement
AGCD
Rue Bréderode, 6
B - 1000 Bruxelles
Belgium

Mr. Aslam Aziz
Minister-Counselor for Development
Delegation of the European Commission to the United States
2300 M Street, NW
3rd Floor
Washington, DC 20037

Finland

Mr. Pertti Valtonen
Head of Delegation
Counselor
Industry Department
Ministry of Trade & Industry
Aleksanterinkatu 4
SF-00171 Helsinki
Finland

Denmark

Mr. Adam Wolf
Head of Delegation
Counselor
Royal Danish Embassy
2200 Whitehaven St., NW
Washington, DC
Denmark

Germany

Dr. Hubert Linhart
Head of Delegation
Ministerialdirigent
Bundesministerium für wirtschaftliche Zusammenarbeit und
Entwicklung
Friedrich-Ebert-Allee 40
53113 Bonn
Germany

European Commission

Mr. Alain Servantie
Head of Delegation
Head of Division
European Commission
International Aspects of Telecommunications & Post
200 rue de la Loi
B-1049 Brussels
Belgium

Sweden

Mr. Lars Glimbert
Head of Delegation
Programme Manager, Telecommunications
Swedish International Development Cooperation Agency
Department for Infrastructure and Economic Cooperation
Sweden

Switzerland

Mr. Remgi Winzap
Head of Delegation
Government of Switzerland
Switzerland

United Kingdom

Mr. John Hodges
Head of Delegation
Chief Engineering Advisor
Overseas Development Agency
94 Victoria Street
London SW1E 5JL
United Kingdom

Mrs. Chips Westwood
World Bank/IADB Liason Officer
Embassy of the United Kingdom
3100 Massachusetts Avenue, N.W.
Washington, D.C. 20008
United Kingdom

Mr. David Stanton
Alternate Executive Director
The World Bank
EDS03, Room IMF 11-120
1818 H Street, N.W.
Washington, DC 20433
U.S.

IBM

Ms. Lauren Harrison-White
Head of Delegation
IBM
Washington, DC
U.S.

Mr. John Cherbini
IBM
Washington, DC
U.S.

STET

Mr. Emmanuele Carboni
Head of Delegation
International Development Department
STET
Corso d'Italia, # 41
00198 Rome
Italy

Mr. Gianluca D'Attilia
Head of Delegation
Division Head
STET
Export Project Finance and Multilateral Institutions
Corso d'Italia, 41
00198 Roma
Italy

Mr. Domenico DiMartino
Washington Liason Officer
STET
1101 15th Street, NW
Suite 612
Washington, DC 20005

Initiating Work Program

- ♦ **African Virtual University.** *Feasibility study for the creation of a virtual university that would deliver technical and management education and training programs in Africa. This will be accomplished through the use of information technologies and telecommunications.*
- ♦ **Telematics for African Development.** *To use relevant information technology to improve South Africa's access to and utilization of information and telecommunications, initially in the area of distance education at the secondary and tertiary levels. The long-term objective is to provide solutions to development problems such as illiteracy, poverty, health and the protection of the environment.*
- ♦ **Jamaica: Partnership for Technology in Basic Education.** *Complimentary funding to support the Jamaica 2000 and EDTECH 20/20 programs during the next phase of their development. These two programs work to improve the quality of education in Jamaica's schools through the introduction of computers. infoDev support will be geared toward evaluating alternative approaches concerning the use of computers in basic education.*
- ♦ **Sixth ITU Regulatory Colloquium.** *The Colloquium will consider, in an informal, expert and practical way, some of the fundamental issues facing most countries in reforming their telecommunications regulatory regimes. It will be attended by regulators from developed and developing countries. This colloquium will focus on how regulatory regimes should adapt in order to cope with the growing convergence of telecommunications and broadcasting industries.*

Second Work Program

- **Program to Enhance the Participation of Emerging Economies in WTO Telecommunications Negotiations.** *This project will fund regional workshops to raise awareness of WTO negotiations which will open telecommunications markets to competition. It will also provide technical and financial assistance to selected countries in preparing and improving offers and participating in negotiations through February 1997.*
- **The National Information Infrastructure of Mexico: The Environmental Link.** *A one-year program to establish an Internet training facility and enhance information access and training capabilities. The project will provide public and private organizations in Mexico with the capability to place environmental, social, economic, and other data on-line and to familiarize a large number of users with the applications of Internet-available information. CIESIN will train trainers to conduct Internet courses and train data providers to place their data and information on-line.*
- **Toward a National Informatics and Telecommunications Policy for Russia.** *The project will organize and manage the creation of a recommendation for a national telecommunications and informatics policy in Russia, through high level dialogues between Russian policy makers, industry experts, and foreign professionals.*
- **Increasing Electronic Connectivity Between Strategic Allies in the HIV/AIDS Field in South East Asia.** *This activity is part of the Information Support Services being developed by the WHO SE Asia HIV/AIDS Project with the objective of establishing an electronic communication network between strategic allies in South East Asia (i.e. government ministries, NGOs and the private sector) in each country.*

infoDev
FY96/97 FUNDING STATUS
(US\$'000)

	Pledged			Received		
	FY96	FY97	Total	FY96	FY97	Total
Belgium	220		220	220	0	220
Brazil		250	250	0	0	0
Denmark	250	250	500	0	250	250
European Union	250	0	250	0	0	0
Finland	250	0	250	250	0	250
France	200	300	500	200	0	200
IBM	250	0	250	250	0	250
Luxembourg	100	0	100	100	0	100
Motorola		100	100	0	0	0
Netherlands	250	250	500	250	0	250
STET-Italy		250	250	0	0	0
Sweden	450	450	900	0	227	227
Switzerland	1,238	0	1,238	1238	0	1,238
United Kingdom	90	90	181	90	0	90
Sub-total	3,548	1,940	5,489	2,508	477	2,985
France (seconded staff)	75		75	75	0	75
World Bank (in kind)	756	940	1,696	649	302	951
TOTAL	4,379	2,880	7,259	3,232	779	4,010

infoDev: The Road Ahead

Introduction

The **infoDev** program was launched in September 1995. Formal commitments were made by donors in November 1995 and funds began to become available by January 1996. Since its launching, **infoDev** received and evaluated 164 proposals from all over the world. Of these, eight have already been approved and are currently in different stages of implementation. Several other proposals have been identified as worth supporting and are now part of the pool of **infoDev** potential projects.

infoDev has inaugurated a new era for partnerships between the World Bank, donors, project proponents and developing countries in the area of information and communication technologies (ICT) for development. In particular, it engages the private sector—both as a donor and as a proponent of projects—in an innovative fashion. A comprehensive evaluation process, developed in partnership with the International Development Research Centre (IDRC) of Canada, is now in place and the **infoDev** database has become a comprehensive sources of information available on ICT projects in developing countries.

Since November 1995, **infoDev** has also attracted new donors (e.g., Brazil and STET p.a. from Italy) and it has become the point of reference for new World Bank initiatives in ICT. In recent speeches, for example, Mr. James D. Wolfensohn has stated:

... information technology and communications—information infrastructure, if you will—is of the utmost importance to me and to the World Bank. It is one of the most powerful weapons we have to fight poverty, disease, ignorance and violence—the multiple plagues that combine to make life hellish for billions of people. [Wall Street Journal Conference, September 18, 1996]

... We need to become, in effect, the Knowledge Bank: ...by pioneering new partnerships that connect our clients with global centers of knowledge and investment ...[as in the case of] the Information for Development Program, through which the Bank and our partners help the poorest countries to realize the potential of information technology. [Annual Meeting Speech, October 1, 1996]

Against this positive background, this paper asks the following questions:

- Is **infoDev** on the right track?
- Is **infoDev** making a difference?



INFORMATION TECHNOLOGY & TRADE FOR DEVELOPMENT SYMPOSIUM

ANA Hotel, 2401 M Street, NW • Washington, DC
November 6, 1996

AGENDA

November 5th

6:00 p.m. Registration and Reception for Participants

IBM's Institute for Electronic Government
1301 "K" Street, NW
Washington, D.C. 20005
(there will be scheduled tours of the institute)

November 6th (ANA Hotel)

8:00 a.m. Late registration & Coffee

8:45 a.m. Welcome

Jean-François Rischard, Vice President, Finance & Private Sector Development, The World Bank

9:00 a.m. The Unfolding Information Revolution: What Are We Learning?

Panel: **Manuel Hinds**, Finance Minister of El Salvador;
Gloria Knight, former President, Mutual Life Group, Jamaica
Charles Cooper, Director, United Nations University, Institute for New Technologies;
Vinton Cerf, Senior Vice President, Data Services Architecture, MCI;
Joseph Holmes, Corporate Vice President & Group Executive, Technology Architecture EDS Corporation;
Lew Cramer, Vice President-Government Relations, U.S. West

Moderator: **Denis Gilhooly**, Media & Technology Director
The Wall Street Journal Europe/ GIIC Commissioner

10:30 a.m. Break

10:50 a.m. Creating the Environment for Development & Investment

Introduction by Renato Ruggiero, Director-General, World Trade Organization

Panel: **Donald Gips**, Chief, International Bureau, Federal Communications Commission, USA;
Robert Verrue, Director-General, DGXIII, European Commission
Ahmed Laouyane, Director, Telecommunication Development Bureau, International Telecommunication Union;
Neil McMillan, Director, International Policy, Department of Trade & Industry, United Kingdom;
David Hartridge, Director of Services, World Trade Organization;
Andile Ngcaba, PostMaster General, South Africa

Moderator: Carlos Primo Braga, Senior Economist, The World Bank

12:30 p.m. Luncheon Keynote Address

James D. Wolfensohn, President
The World Bank

2:30 p.m. Technology in Action: Benefiting People in a Sustainable Way

Panel: **Health:** **William Amoss**, Executive Director; Vishnevskaya-Rostropovich Foundation; **Owen Rennert, M.D.**, Chairman, Department of Pediatrics, Georgetown University School of Medicine
Education: **Gordon Naidoo**, Director, Open Learning Systems Education Trust;
Environment: **Vincent Abreu**, Consortium for International Earth Science Information Network;
Trade: **Shikhar Ghosh**, Chairman, Open Markets, Inc.
Daniel Salcedo, PeopleLink

Moderator: **Elkyn Chaparro**, Senior Adviser to the Vice President
Finance & Private Sector Development, The World Bank

4:30 p.m. Closing Remarks

James Bond Chief Telecommunications & Informatics, The World Bank

Revised (G. Bergen)
11/4/96

Mr. James D. Wolfensohn

**Information Technology and Trade for Development Symposium
November 6, 1996**

Talking Points

I am happy to welcome you to our *infoDev* sponsored symposium on **information technology and trade for development**.

infoDev

The Information for Development program -- *infoDev* -- is a consortium of governments, both from the developed world and from the emerging economies; of private companies [eg. IBM, Motorola, Stet]; and of the World Bank and other multilateral institutions such as the European Union.

We have come together to create this initiative, which provides expertise and grant financing to people in emerging economies who are doing truly innovative things to bring the information economy to the developing world.

Just a little over a month ago, in my speech at the Annual Meetings, I announced that a strategic priority for the Bank would be a new global partnership -- *a partnership for creating and sharing knowledge, and making it a major driver of development*. The revolution in information technology vastly expands our ability to pool our wealth of cross-country experience, capture the best global thinking on any given issue and make it accessible to our clients; and it allows us to extend the reach of our efforts to inform and educate. One example is our World Wide Web site, which already receives 1.5 million hits a month.

infoDev is a key initiative in our new global knowledge partnership. Essentially it is a catalytic tool – it brings together private and public sector partners, it promotes the development of information infrastructure, and acts as a forum for exchanging ideas and sharing best practices.

In doing so, **infoDev** helps developing countries benefit from the global expansion in trade and investment, and it can help the 4.5 billion people living in the countries we serve, and especially the 3 billion living in poverty -- by ending their isolation, by improving education and health, and by increasing access to social services.

Trade and Investment in the Developing Countries

The developing countries are booming as centers of international trade and commerce. Developing country trade has grown at 8 percent per annum since 1990, and we expect that it will continue at that rate until at least 2005. Last year alone there was a 10 percent increase in imports into low- and middle-income countries. We expect that the developing country economies will continue to grow at an average rate of 5-6 percent a year into the next century, double that of the major industrial economies; and this means that they will be major trading partners of the future.

Meanwhile private capital flows to the developing countries have soared – quadrupling in the 1990s to over \$170 billion. The share of emerging market economies in global equity capitalization could at least double from 10 percent now to 20 percent or more by the year 2004.

In fact, information technology is at the center of a large portion of this growth in trade and investment. This is particularly true of the services sector, which already represent 60 percent or more of GDP in countries like Egypt, Estonia, Jordan, Mexico and Senegal. And in 1994, some \$2.3 billion in domestic and international financial transactions flowed daily through the SWIFT electronic network. The massive expanse in the global economy absolutely depends on information technology – and access to that technology is emerging as an issue of vital importance to developing countries.

Not all developing countries are benefiting from the globalization of trade and investment. While between 1991-1995, export growth for East Asia was over 14 percent per capita, in Sub-Saharan Africa the total of exports per capita actually shrank [by 1.6 percent]. Seventy percent of private capital flows go to just 12 countries; while all of Sub-Saharan Africa (including South Africa) currently receives under 3 percent of the total [less than \$5 billion]

Information technology can help these struggling countries become competitive. In today's global marketplace, being competitive means a country or a firm has to be agile and connected, and tapping into global information flows is essential.

Today, for example, you can find cocoa farmers in rural *Côte d'Ivoire* who use cellular phones to obtain direct price quotes from international commodities market, so they can bargain better with the middlemen who buy their produce.

infoDev is helping. For example:

- It is supporting our clients' efforts to attract investment and build their telecommunications capacity; for example, by helping with advice and training on regulatory reform [specifically, by supporting the Sixth ITU Regulatory Colloquium in Geneva], and assisting developing countries prepare for participation in the *World Trade Organization's* telecommunications negotiations.
- This is particularly important in *Russia*, where the old state telephone system is antiquated and poorly managed -- and without decent telecommunications, Aeroflot is the only way of communicating across Russia's 11 time zones. **infoDev** is working with the Russian Parliament on telecommunications reform to bring private investment into the country -- and this is the only way of bringing quick improvement.

infoDev helping people.

Our emphasis on information technology is not about machines; it is about human beings. For the World Bank, development means investing in **people** -- in ending poverty and improving their chances in life through better education, health and economic opportunity. In the end, this will itself have an impact on countries' ability to trade internationally, by producing people capable of working in globally competitive industries and services. We are investing in:

- The 1.3 billion people who live on less than a dollar a day.

- The 600,000 women who die in childbirth every year, and the nearly 16 million people around the world who are believed to be infected with the HIV virus.
- The 130 million children, most of them girls, who are not going to school,

Our goal is to marshal information technology and telecommunications as powerful weapons to fight poverty, isolation, disease, and ignorance around the world.

It can be done using the latest in computer technology, as in distance education programs being developed in Israel which I recently saw demonstrated. The Internet has emerged as a remarkable tool for accessing information. Or, where the infrastructure does not exist to support computers, we can be using very low-cost, but very effective technologies – like wind-up radios.

For example, in South Africa, a group using **wind-up radios** is providing high quality distance education to primary school children in remote rural areas. **We are honored to have with us today Gordon Naidoo, the Director of OLSET, the NGO that runs this *South African Radio Learning Program*.** This project shows that we can reach and educate people where computers – even electricity – are not available

Let me give some examples of how **infoDev** and its partners have already begun helping people:

- In the township of Mamelodi, near Pretoria in *South Africa*, a consortium of IBM, government institutions, local schools and **infoDev**, is financing the use of the Internet to reduce the isolation of the poor. The scheme answers local people's questions concerning employment, lodging, health and basic human rights. For the first time, people in this township have access to the basic information they can use to improve their conditions. Some of you in this audience have visited this project.
- Elsewhere in Africa, **infoDev** is supporting the *African Virtual University* (AVU), a pilot program that will deliver world-class higher education to university students by utilizing distance-education technology at far lower cost than conventional education techniques.
- In *Russia*, **infoDev** is helping develop financing options for the *US/Russia Child Health Care Telemedecine Network*, sponsored by the

Vishnevskaya-Rostropovich Foundation, which aims to establish a children's health delivery system in the St. Petersburg region, including a link-up to Georgetown University Medical Center here in Washington DC [Mr. Billy Amoss, its Executive Director will be sitting next to you at lunch, and he will be presenting what it is doing right after lunch; Mr. Silverstein, who is very influential in the Foundation will also be present].

- In Asia, a consortium headed by the World Health Organization and supported by an *infoDev* grant has created the *South East Asia Aids Network*, which using the Internet to monitor the spread AIDS in the region, enabling a quicker response to emerging trends. And in *Jamaica* -- with support from *infoDev*, the Inter-American Development Bank and other donors -- a group of private firms and the government is improving the computer literacy of Jamaican schoolchildren. This initiative was launched by Gloria Knight, who is in our first panel today.

The Challenges Ahead

Information technology has huge potential to help developing countries join the global economy, and to improve the lives of the people who live in them. But there are enormous challenges to overcome.

- **The developing world has 3.8 telephone lines per hundred people, compared to over 50 in developed countries.** In Sub-Saharan Africa excluding South Africa there are fewer than 5 lines for 1000 people. Half the world's population has never made a phone call.
- **Companies and users have difficulty obtaining the services they need,** including data lines, Internet access, and electronic mail. It is difficult to be globally plugged in and competitive if you cannot send or receive faxes and email.
- **Tariffs are high, service quality is poor, and investment is insufficient.** Too many telecommunications companies are run like a state-owned public utilities -- hardly a good model for an efficient and cost-effective telecommunications sector.
- **Computers are rare in the developing world** -- only one Personal Computer per 100 people, compared to over 18 machines per 100 in developed economies. Among low-income countries the ratio is even more dramatic, with less than one machine per 1000 inhabitants.
- **Finally, there is a shortage of people who are computer-literate and technology-aware.** Schooling and vocational training in the developing

world is even less advanced than in the developed countries, and school-leavers generally don't have the skills they need for the new economy.

We estimate that for the developing world and the transition economies, it will take investments in telecommunications of about \$55 billion to \$60 billion per year over the next five years. If we include information technology, developing countries will need a total of \$100 billion to \$120 billion in investments per year. This is twice what was invested per year in the first half of this decade.

Such sums are clearly beyond what governments can finance from tax dollars, and beyond the means of public institutions like the World Bank. These investments must be made by the private sector, both local investors and international companies. We estimate that between half and two-thirds of the investment must come from the private sector. Governments will have to entice investors into their information infrastructure sectors in order to create the information infrastructure they need..

This is the challenge for governments of emerging economies: to create a climate attractive to private sector investment in information infrastructure.

***infoDev* meeting the Challenges**

All of this leads me back to the importance of *infoDev*. There is a real opportunity now to jump-start the information revolution in the emerging economies and *infoDev* can play a critical role in doing so.

infoDev is just one year old. The Program is up and running, and financing the exciting initiatives I have just talked about. We are very gratified by what it has done. But we have been overwhelmed by what's going on out there in the emerging economies. Requests for *infoDev* assistance over the first 9 months of operation were more than 10 times the size of the fund.

Because of this I have decided to do three things [**Please note: FPD emphasizes that your announcement of these is at your option**]:

- **First**, we will discuss with the other members of the Consortium the option of growing the size of *infoDev*, both through our own

contributions and by seeking outside resources. We will do this over the course of the coming year, with the possible intention eventually to triple the program.

- **Second**, the World Bank will be mainstreaming *information for development* into its regular line of business.
- **Third**, the Bank itself is moving to becoming a true **knowledge bank**, one dedicated to sharing information, knowledge and experience around the world about how best to raise the people's standards of living and improve their quality of life.

Conclusion

In conclusion, I would like to say how exciting the information and development agenda has become. The real opportunities to do things differently give us a chance to fundamentally change people.

Thank you.

.....
infoDev
LOLLAPALOOZA

NOVEMBER 6, 1996
SYMPOSIUM PANELISTS

Panel 1

Manuel Hinds, Finance Minister of El Salvador;
Gloria Knight, former President, Mutual Life Group, Jamaica
Charles Cooper, Director, United Nations University, Institute for New Technologies;
Vinton Cerf, Senior Vice President, Data Services Architecture, MCI;
Joseph Holmes, Corporate Vice President & Group Executive, Technology Architecture EDS Corporation;
Lew Cramer, Vice President-Government Relations, U.S. West
Denis Gilhooly, *Media & Technology Director The Wall Street Journal Europe*
(Moderator)

Panel 2

Donald Gips, Chief, International Bureau, Federal Communications Commission,
Robert Verrue, Director-General, DGXIII, European Commission
Ahmed Laouyane, Director, Telecommunication Development Bureau, International Telecommunication Union;
Neil McMillan, Director, International Policy, Department of Trade & Industry, United Kingdom;
David Hartridge, Director of Services, World Trade Organization;
Andile Ngcaba, PostMaster General, South Africa
Carlos Braga (Moderator)

Panel 3

Health: **William Amoss**, Executive Director; Vishnevskaya-Rostropovich Foundation; **Owen Rennert, M.D.**, *Chairman, Department of Pediatrics, Georgetown University School of Medicine*
Education: **Gordon Naidoo**, Director, Open Learning Systems Education Trust;
Environment: **Vincent Abreu**, Consortium for International Earth Science Information Network;
Trade: **Shikhar Ghosh**, Chairman, Open Markets, Inc.
Daniel Salcedo, PeopleLink
Elkyn Chaparro (Moderator)

Participants in the infoDev Symposium on Information Technology and Trade for Development

November 6, 1996

as of 10/31/96

Page 1

Mr. Donald S. Abelson
Chief Negotiator for Communications & Information
Executive Office of the President
Office of the U.S. Trade Representative
600 17th Street, N.W.
Washington, D.C. 20506
U.S.

Ms. Kathleen Abernathy
Vice President, Federal Regulatory
Airtouch Communications, Inc.
1818 N. Street, N.W., Suite 800
Washington, D.C. 20036

Dr. Vincent Abreu
Director
CIESIN
Information Cooperative Program
250 Pierce Road
University Center, MI 48710
U.S.

Mr. William Amoss
Executive Director
Vishnevskaya-Rostropovich Foundation
1776 K Street, NW
Suite 700
Washington, DC 20006
U.S.

Mr. Aslam Aziz
Minister-Counselor for Development
Delegation of the European Commission to the United States
2300 M Street, NW
3rd Floor
Washington, DC 20037

Ms. Katherine Bennett-Novikov
Manager
Anderson Consulting
1666 K Street, N.W.
Washington, DC 20006
U.S.

Mr. James Bond
Chief
The World Bank
Telecommunications & Informatics Division
U.S.

Dr. John P. Boright
Executive Director
National Academy of Sciences
Office of International Affairs
Washington, D.C. 20418
U.S.

Participants in the infoDev Symposium on Information Technology and Trade for Development

November 6, 1996

as of 10/31/96

Page 2

Mr. Carlos Braga
Senior Economist
The World Bank
IENTI
U.S.

Mr. Henri Bretaudeau
The World Bank
IENDR
U.S.

Mr. David Brown
Embassy of Canada
501 Pennsylvania Avenue, N.W.
Washington, D.C. 20001
Canada

Mr. Steve Brown
GIIC
1800 K Street, NW
Washington, DC 20006

Mr. Warren Buhler
1300 New York Avenue, NW
Washington, DC 20577

Mr. Shahid Javed Burki
Vice President
The World Bank
Latin American and Caribbean Region

Mr. Emmanuele Carboni
International Development Department
STET
Corso d'Italia, # 41
00198 Rome
Italy

Mr. Vinton G. Cerf
Senior Vice President
MCI
Data Services Architecture
2100 Reston Parkway
Reston, VA 22091
U.S.

Participants in the infoDev Symposium on Information Technology and Trade for Development

November 6, 1996

as of 10/31/96

Page 3

Mr. Elkyn Chaparro
Senior Adviser to the Vice President
The World Bank
FPDVP

Ms. Carol Charles
Global Information & Infrastructure Commission
1800 K Street, N.W.
Washington, DC 20006

Mr. John Cherbini
IBM
Washington, DC
U.S.

Mr. David Clark
The World Bank
Office of the Executive Director for Australia
1818 H Street, NW
Washington, DC 20433

Mr. Derrick L. Cogburn
Global Information & Infrastructure Commission
The Center for Strategic & International Studies
1800 K Street, N.W.
Washington, DC 20006

Mr. Howard Cohen
Globalview Health Network
220 S.E. Second Avenue
Fort Lauderdale, FL 33301
U.S.

Mr. Francis X. Colaco
Vice President
The World Bank
East Asia and Pacific Region
1818 H Street, NW
Washington, DC 20433

Mr. Charles Cooper
Director
United Nations University
Institute for New Technologies
Kapoensstraat 23
6211 KV Maastricht
The Netherlands

Participants in the infoDev Symposium on Information Technology and Trade for Development

November 6, 1996

as of 10/31/96

Page 4

Mr. William Corbett
Director of Telecommunications Services
Executive Office of the President
Office of the US Trade Representative
600 17th Street, NW
Washington, DC 20506

Mr. Jim Cowie
Consultant
2908 Briars Hill Lane
Oakton, VA 22124

Mr. Lew Cramer
Vice President
U.S. West
Government Relations
I.S.

Mr. Gianluca D'Attilia
Division Head
STET
Export Project Finance and Multilateral Institutions
Corso d'Italia, 41
00198 Roma
Italy

Mr. Hans D'Orville
The United Nations
UNDEP
336 East 45th Street
Room 401
New York, NY 10029

Ms. Marianne Damhaug
Commercial Counselor
Royal Norwegian Embassy
2720 34th Street, N.W.
Washington, D.C. 20008
Norway

Mr. Magruder Dent
Gemplus
656 Quince Orchard Road
Suite 610
Gaithersburg, MD 20878

Mr. Mark DeSantis
Texas Instruments
1455 Pennsylvania Ave., NW
Suite 375
Washington, DC 20004
U.S.

Participants in the infoDev Symposium on Information Technology and Trade for Development

November 6, 1996

as of 10/31/96

Page 5

Mr. Mark Dessauer
GIIC
1800 K Street, NW
Washington, DC 20006

Mr. Domenico DiMartino
Washington Liason Officer
STET
1101 15th Street, NW
Suite 612
Washington, DC 20005

Ms. Sarah Dines
Embassy of Australia
Australian Trade Commission
Washington, DC 20036

Mr. Leonard S. Dooley
INTELSAT
3400 International Drive, NW
Washington, DC 20008

Mr. Frank Armand Douamba
Executive Director
The World Bank
EDS13
1818 H Street, NW
Washington, DC 20433

Mr. Gregory L. Ebel
Advisor to the Executive Director
The World Bank
EDS07, Room D12-081
1818 H Street, N.W.
Washington, DC 20433

Ms. Megan Ehrhardt
Policy and Legal Analyst
Fujitsu Ltd.
1776 Eye Street, NW
Suite 880
Washington, DC 20006

Mr. Hisham El Sherif
Advisor to the Minister of Administrative Development
High Tech Business Council
Egypt

Participants in the infoDev Symposium on Information Technology and Trade for Development

November 6, 1996

as of 10/31/96

Page 6

Ms. Tracy Elazier
Motorola University
1700 East Golf Road
10th Floor
Schaumburg, IL 60173

Mr. Howard I. Emery
PTT Telecom Netherlands US
1270 Avenue of the Americas
Room 2212
New York, NY 10020

Mr. Erik A. Emsing
Swedish Projects, Inc.
1019 19th Street, NW
Suite 600
Washington, DC 20036

Mr. Ronald Epstein
Volunteers in Technical Assistance
1600 Wilson Boulevard
Arlington, VA 22209

Ms. Debra Folz
GIIC
1800 K Street, NW
Washington, DC 20006

Mr. Brian Fontes
Sr. Vice President for Policy and Administration
CITA
1250 Connecticut Ave., N.W.
Suite 200
Washington, D.C. 20036

Mr. Richard H. Frank
Managing Director
The World Bank
EXC. Room E1227
1818 H Street, N.W.
Washington, DC 20433

Mr. Mark Frazier
Open World
1911 North Van Buren Street
Arlington, VA 22202
U.S.

Participants in the infoDev Symposium on Information Technology and Trade for Development

November 6, 1996

as of 10/31/96

Page 7

Mr. Robert W. Galvin
Chairman of Executive Committee
Motorola
13303 East Algonquin Road
Schaumburg, IL 60196

Mr. Shikhar Ghosh
Chairman
Open Markets, Inc.
Boston, MA

Mr. Denis Gilhooly
Media & Technology Director
The Wall Street Journal Europe
Brussels
Belgium

Mr. Donald Gips
Chief
Federal Communication Commission
International Bureau
U.S.

Mr. Lars Glimbert
Programme Manager, Telecommunications
Swedish International Development Cooperation Agency
Department for Infrastructure and Economic Cooperation
Sweden

Mr. Jean Pierre Gombay
Counsellor (Economic)
Canadian Embassy
501 Pennsylvania Avenue, N.W.
Washington, D.C. 20001
Canada

Mr. Nicholas Gorjestani
The World Bank
AFTDR
1818 H Street, NW
Room J8-143
Washington, DC 20433

Mr. Michael P. Greene
Program Director
National Research Council
Office of International Affairs
2101 Constitution Avenue, N.W.
Washington, D.C. 20418
U.S.

Participants in the infoDev Symposium on Information Technology and Trade for Development

November 6, 1996

as of 10/31/96

Page 8

Mr. H. Stephen Halloway
AG Environmental Group, Inc.
1200 19th Street, NW
Suite 606
Washington, DC 20036

Mr. Jerome Hamilius
Assistant to Executive Director
International Monetary Fund
Room 11-302
Washington, D.C. 20431

Ms. Lauren Harrison-White
IBM
Washington, DC
U.S.

Mr. David Hartridge
Director
World Trade Organization
Trade in Services Division
Centre William Rappard
Rue de Lausanne 154
CH-1211 Geneva 21
Switzerland

Mr. Thomas Hill
Thomson-CSF
99 Canal Center Plaza
Suite 450
Alexandria, VA 22314

Mr. Danny Hills
The Walt Disney Company
1401 Flower Street
Glendale, CA 91221-5020
U.S.

Mr. Manuel Enrique Hinds
Finance Minister
Ministry of Finance
Avenida Alvarado y Diagonal Centroamerica
Condominio Las Tres Torres 2, 80 Nivel
San Salvador
El Salvador

Mr. John Hodges
Chief Engineering Advisor
Overseas Development Agency
94 Victoria Street
London SW1E 5JL
United Kingdom

Participants in the infoDev Symposium on Information Technology and Trade for Development

November 6, 1996

as of 10/31/96

Page 9

Ms Christine Holgate
Cable and Wireless
Bermuda, Caribbean, and Latin American Regions
Safehaven Corporate Centre
Leeward 4
Grand Cayman BWI
Cayman Islands

Mr. Joseph Holmes
Corporate Vice President & Group Executive
EDS Corporation
Technology Architecture
Plano, TX

Mr. Torgny Holmgren
Assistant to the Executive Director
The World Bank
EDS20
318 H Street, NW
Room D13-031
Washington, DC 20433

Mr. Luc Hubloue
Alternate Executive Director
The World Bank
EDS10
1818 H Street, NW
Room D12-041
Washington, DC 20006

Mr. Larry Irving
Assistant Secretary for Communications and Information
U.S. Department of Commerce
National Telecommunications and Information Administration
Washington, D.C. 20230
U.S.

Mr. Byron R. Jackson
Assistant Treasurer, International
Motorola, Inc.
1303 E. Algonquin Road
Schaumburg, IL 60196

Mr. V.A. Jafarey
Adviser to the Prime Minister for Finance and Economic
Affairs
Ministry of Finance and Economic Affairs
Secretariat Block Q
Islamabad
Pakistan

Mr. James Johnson
GIIC
1800 K Street, NW
Washington, DC 20006

Participants in the infoDev Symposium on Information Technology and Trade for Development

November 6, 1996

as of 10/31/96

Page 10

Mr. Veikko Kantola
Counselor
Embassy of the Republic of Finland
Financial Affairs
3301 Massachusetts Ave., NW
Washington, DC 20008

Mr. Pavel B. Karelin
International Business Development Manager
Hewlett Packard Company
900 17th Street, N.W., Suite 1100
Washington, DC 20006
U.S.

Mr. G.I. Kenney
Senior Advisor
Canadian International Development Agency
Telecommunications and Information Policy Branch
'00 Promenade du Portage
Hull, Quebec K1A 0G4
Canada

Mr. Brian Klein
IIWC
1901 Pennsylvania Ave., NW
Suite 2007
Washington, DC 20006

Ms. Gloria Knight
former President
Mutual Life Group, Jamaica
Jamaica

Mr. Tomas Kollen
Swedish Projects, Inc.
1019 19th Street, NW
Suite 600
Washington, DC

Ms. Mimi Kriele
Ashford International
2169 West Park Court
Stone Mountain, GA 30087

Mr. Oddvar Kvale
Telecommunications Management Specialist
The World Bank
IENTI
1818 H Street, NW
Room G2-063
Washington, DC 20433

Participants in the infoDev Symposium on Information Technology and Trade for Development

November 6, 1996

as of 10/31/96

Page 11

Mr. John Lacopo
Vice President, Office of Government Affairs
Electronic Data Systems (EDS)
1331 Pennsylvania Avenue, NW, Suite 1300
Washington, DC 20004

Mr. George R. Langworth
NNS Bermuda, Ltd.
69 Front Street
Hamilton HM12
Bermuda

Mr. Ahmed Laouyane
Director
International Telecommunications Union
International Telecommunication Unit
Place des Nations
CH - 1211 Genève 20
Switzerland

Mr. Ahmed Laouyane
Director
International Telecommunications Union
Telecommunications Development Bureau
Switzerland

Ms. Kerstin Leitner
Director, Administrative and Information Services
United Nations Development Program
Bureau for Finance and Administration
1 UN Plaza
New York, NY 10017

Mr. David M. Leive
Latham and Watkins
1001 Pennsylvania Ave., NW
Suite 1300
Washington, DC 20004-2505
U.S.

Ms. Jane Lim
Hewlett-Packard
900 17th Street, NW
Washington, DC 20006
U.S.

Mr. Soe Lin
Chief Economist
CIDA
Economic Development and Poverty Reduction
200 Promenade du Portage
Hull K1A 0G4, Quebec
Canada

Participants in the infoDev Symposium on Information Technology and Trade for Development

November 6, 1996

as of 10/31/96

Page 12

Mr. Kenneth Lindhorst
International Vice President
AT&T
Room 1137L3
295 North Maple Avenue
Basking Ridge, NJ 07920
U.S.

Dr. Hubert Linhart
Ministerialdirigent
Bundesministerium für wirtschaftliche Zusammenarbeit und
Entwicklung
Friedrich-Ebert-Allee 40
53113 Bonn
Germany

Mr. Andrew Lipman
Senior Vice President, Legal and Regulatory Affairs
MFS Communications Company
3000 K Street, N.W.
Suite 300
Washington, D.C. 20007

Mr. Gareth Locksley
Mercury Communications, Ltd.
New Mercury House
26 Red Lion Square
London WC1R 4HQ
UK

Mr. John L. Mack
Director
U.S. Department of State
Africa & Middle East Trade & Dev. Policy (OICIP)
Room 2533A
Washington, DC 20520
U.S.

Mr. Alan L. Madian
Lafayette Capital Corp.
1200 19th Street, NW
Suite 500
Washington, DC 20036-2412

Mr. Klaus Mai
Director, Strategy/Government Relations
Deutsche Telekom - North America
1020 19th Street, N.W.
Suite 850
Washington, D.C. 20036
Germany

Mr. Mark Malloch-Brown
Vice President
The World Bank
EXTVP
1818 H Street, N.W.
Washington, D.C. 20433

Participants in the infoDev Symposium on Information Technology and Trade for Development

November 6, 1996

as of 10/31/96

Page 13

Dr. Salah Mandil
Director-Advisor on Informatics
World Health Organization
20 Ave Appia
1211 Geneve 27
Switzerland

Mr. Henri Martin
Chef de Division
European Commission
Direction Generale VIII- Développement
Rue de la Loi 200
B-1049 Brussel
Belgium

Mr. Francis Patrick Masambu
Uganda Posts and Telecommunications Corp.
P.O. Box 7151
Kampala
Uganda

Mr. Matthew McHugh
Counselor to the President
The World Bank
EXC
1818 H Street, NW
Room D11-057
Washington, DC 20433

Hon. Corinne A. McKnight
Ambassador to the United States
Embassy of the Trinidad and Tobago
1708 Massachusetts Ave., NW
Washington, DC 20036

Mr. Neil McMillan
Director
Department of Trade & Industry
International Policy
London
United Kingdom

Mr. Larry Mellinger
Trinity International Partners
815 Connecticut Ave., N.W.
Suite 1200
Washington, D.C. 20006

Mr. Harold W. Messenger
Director
The World Bank
Asia Technical Department
1818 H Street, NW
Room MC8-315
Washington, DC 20433

Participants in the infoDev Symposium on Information Technology and Trade for Development

November 6, 1996

as of 10/31/96

Page 14

Mr. John Middleton
The World Bank
1818 H Street, NW
Washington, DC 20433

Mr. Zbigniew Mikolajuk
International Development Research Centre
Canada

Mr. Mohamed V. Muhsin
Director
The World Bank
ITSDR
318 H Street, N.W.
Washington, D.C. 20433

Mr. Jules W. Muis
Vice President & Controller
The World Bank
CTRP
1818 H Street, N.W.
Room E5-079
Washington, DC 20433

Mr. J. Mullaney
Executive Director
SatelLife
126 Rogers Street, First Floor
Cambridge, MA 02142
U.S.

Mr. Gordon Naidoo
Director
Open Learning Systems Education Trust
Johannesburg
South Africa

Mr. Govindan G. Nair
Sr. Private Sector Development Economist
The World Bank
IENTI, Room G2-146
1818 H Street, N.W.
Washington, DC 20433

Mr. Michio Naruto
Executive Vice President
Fujitsu Japan
Marunouchi Center Bldg, 6-1
Marunouchi 1-chome
Chiyod-Ku, Tokyo 100
Japan

Participants in the infoDev Symposium on Information Technology and Trade for Development

November 6, 1996

as of 10/31/96

Page 15

Mr. John M. Nasasira
Ministry of Works, Transport, and Communications
P.O. Box 10
Entebbe
Kampala 041-256
Uganda

Dr. Michael R. Nelson
Special Assistant, Information Technology
The White House
Office of Science & Technology Policy
Room 423, OEOB
Washington, DC 20500
U.S.

Mr. Marc Newman
General Manager
General Partner, Globalstar L.P.
Globalstar
Arlington, VA 22202

Ms. Christine Ng
Minister for Communications
Ministry of Communications
460 Alexandra, #39-00
PSA Building
0511
Singapore

Mr. Andile Ngcaba
PostMaster General
Ministry of Post & Telecommunications
Private Bag X860
Pretoria 0001
South Africa

Mr. Eli Noam
Columbia School of Business
Uris Hall
3022 Broadway Room 809
New York, NY 10027
U.S.

Mr. Richard E. Nohe
Director, Corporate Affairs
NTT America
101 Park Avenue
41st Floor
New York, NY 10178

R.E. O'Rourke
Science Applications Intl.
14010 Gullivers Road
Bowie, MD 20720

Participants in the infoDev Symposium on Information Technology and Trade for Development

November 6, 1996

as of 10/31/96

Page 16

Mr. David A. Olive
Deputy General Manager
Fujitsu Limited
1776 Eye Street, N.W., Suite 880
Washington, DC 20006
Japan

Mr. Henry Owen
Senior Adviser
Salomon Brothers International
c/o The Consultants International Group Inc.
1616 H Street NW #400
Washington, D.C. 20006
U.S.

Mr. Francois Page
The World Bank
1818 H Street, NW
Washington, DC 20433

Mr. Robbins Pancake
Hewlett-Packard Company
900 17th Street, NW
Suite 1100
Washington, DC 20006
U.S.

Mr. Franco Passacantando
Executive Director
The World Bank
1818 H Street, N.W.
Room E13-07
Washington, D.C. 20433

Mr. John S. Pedersen
Scientific Attache
Royal Danish Embassy
3200 Whitehaven Street, NW
Washington, DC
Denmark

Mr. Christophe Petit
The World Bank
IENTI
U.S.

Mr. Robert Picciotto
Director-General
The World Bank
DGO
1818 H Street, N.W.
Washington, D.C. 20433

Participants in the infoDev Symposium on Information Technology and Trade for Development

November 6, 1996

as of 10/31/96

Page 17

Mr. Russell Pipe
GIIC
1800 K Street, NW
Washington, DC 20006

Mr. Ramu V. Potarazu
INTELSAT
3400 International Drive, NW
Box 6
Washington, DC 20008-3098

Mr. Ronald E. Pump
AT&T
1120 20th Street, NW
Suite 1000
Washington, DC 20036

Mr. Stephen A. Quick
Manager, Strategic Planning & Operational Policy Dept.
Inter-American Development Bank
1300 New York Ave, N.W.
Washington, D.C. 20577

Mr. Ossi J. Rahkonen
President
OR Project Associates Inc.
1420 Laburnum Street
McLean, VA 22101

Mr. Walter Reichert
Manager
Hewlett Packard
International Business Center
3495 Deer Creek Road
Palo Alto, CA 94304
U.S.

Mr. Dirk Reinermann
The World Bank
EDS05
1818 H Street, NW
Room E13-025
Washington, DC 20433

Dr. Jaakko Riihimäki
President
Omnitele Ltd.
P.O. Box 969
Fin-00101 Helsinki
Finland

Participants in the infoDev Symposium on Information Technology and Trade for Development

November 6, 1996

as of 10/31/96

Page 18

Mr. Jean-Francois Rischard
Vice President
The World Bank
Finance & Private Sector Development

Mr. Robert G. Rogers
Siemens
701 Pennsylvania Ave., NW
Suite 720
Washington, DC 20004
Germany

Mr. Philippe-Olivier Rousseau
Conseil Superieur de l'Audiovisuel
France

Mr. Renato Ruggiero
Director-General
World Trade Organization

Mr. George Sadowsky
Director
New York University
Academic Computing Facility
U.S.

Mr. Yasuyuki Sakata
Mitsubishi International Corp.
520 Madison Avenue
New York, NY 10022
Japan

Mr. Daniel Salcedo
Co-founder
PEOPLink
Kensington, MD

Mr. Peter F. Salminger
Director, International Development Institutions
Siemens Corporation
701 Pennsylvania Avenue, N.W.
Suite 720
Washington, D.C. 20004
Germany

Participants in the infoDev Symposium on Information Technology and Trade for Development *November 6, 1996*

as of 10/31/96

Page 19

Mr. Constantine D. Saris
Manager, Intl. Business Development and Policy Affairs
EDS
Office of Government Affairs
1331 Pennsylvania Ave., NW
Suite 1300 North
Washington, DC 20004

Mr. Setsuya Sato
The World Bank
1818 H Street, NW
Room G8-135
Washington, DC 20433

Mr. Guy Schorochoff
Chargé de Mission
Banques de Développement
AGCD
rue Bréderode, 6
B - 1000 Bruxelles
Belgium

Mr. Robert Schwart
Informatics Specialist
The World Bank
IENTI, G2-069
1818 H Street, N.W.
Room G2-069
Washington, DC 20433

Mr. Keiichiro Seki
Chief Representative in Washington, D.C.
Japanese Ministry of Posts and Telecommunications
1133 21st Street, NW
Suite 720
Washington, D.C. 20036
Japan

Mr. Alain Servantie
Head of Division
European Commission
International Aspects of Telecommunications & Post
200 rue de la Loi
B-1049 Brussels
Belgium

Ms. Marysue Shore
infoDev Coordinator
The World Bank
IENTI
U.S.

Ms. Cathy Slesinger
Executive Director
NYNEX Government Affairs
International Affairs
1300 Eye Street, N.W.
Suite 400
Washington, DC 20005
U.S.

Participants in the infoDev Symposium on Information Technology and Trade for Development

November 6, 1996

as of 10/31/96

Page 20

Mr. David Stanton
Alternate Executive Director
The World Bank
EDS03, Room IMF 11-120
1818 H Street, N.W.
Washington, DC 20433
U.S.

Mr. Richard Stern
Director
The World Bank
Industry & Energy Department

Mr. Ron Stevenson
G.E. Capital
1600 Summer Street
Stamford, CT 06927

Mr. Masanobu Suzuki
Senior Vice President
Nippon Telephone & Telegraph Corporation
Japan

Mr. George Takahashi
Mitsubishi International Corp.
2001 Pennsylvania Ave., NW
Suite 700
Washington, DC 20006
Japan

Mr. Eduardo Talero
Principal Informatics Specialist
The World Bank
IENTI
1818 H Street, N.W.
Room G2-093
Washington, DC 20433
U.S.

Chit Tharnthong
The World Bank
1818 H Street, NW
Room R8-175
Washington, DC 20433

Mr. Robert Valantin
Director - Information and Communications Technologies
International Development Research Centre
Information Sciences and Systems Division
250 Albert Street
P.O. Box 8500
Ottawa K1G 3H9
Canada

Participants in the infoDev Symposium on Information Technology and Trade for Development

November 6, 1996

as of 10/31/96

Page 21

Mr. Pertti Valtonen
Counselor
Industry Department
Ministry of Trade & Industry
Aleksanterinkatu 4
SF-00171 Helsinki
Finland

Ms. Vlassia Vassikeri
Development Affairs Officer
Delegation of the European Commission to the United States
2300 M Street
3rd Floor
Washington, DC 20037

Mr. Robert Verrue
Director-General
European Commission
DGXIII
Brussels
Belgium

Mr. Jose Manuel Villalvazo Baz
President, Chairman & Executive Officer
International Institute of Wireless Communications
1901 Pennsylvania Ave., NW
Suite 1007
Washington, DC 20006

Mr. Barry J. Volante
G.E. Capital
1600 Summer Street
Stamford, CT 06927

Ms. Barbara Walker-Unkle
Intl. Development Advisory Group
14010 Gullivers Trail
Bowie, MD 20720

Mr. Douglas Webb
Legal Adviser
The World Bank
LEGPS
1818 H Street, N.W.
Room D6-057
Washington, DC 20433

Mr. Bjorn Wellenius
Telecommunications Advisor
The World Bank
IENTI, Room G2-119
1818 H Street NW
Washington, DC 20433

Participants in the infoDev Symposium on Information Technology and Trade for Development

November 6, 1996

as of 10/31/96

Page 22

Mrs. Chips Westwood
World Bank/IADB Liason Officer
Embassy of the United Kingdom
3100 Massachusetts Avenue, N.W.
Washington, D.C. 20008
United Kingdom

Mr. Lawrence Wilkinson
Global Business Network
P.O. Box 8395
Emeryville, CA 94662

Dr. Ernest J. Wilson
Director
Centre For International Development and Conflict
Management
University of Maryland
145 Tydings Hall
College Park, MD 20742
U.S.

Mr. Remgi Winzap
Government of Switzerland
Switzerland

Mr. Adam Wolf
Counselor
Royal Danish Embassy
3200 Whitehaven St., NW
Washington, DC
Denmark

Mr. James D. Wolfensohn
President
The World Bank

Mr. R. Peter Wright
Consultant
The World Bank
IENTI
1818 H Street, NW
Room G2-075
Washington, DC 20433

Mr. Maxwell Wynter
President & CEO
Jamaica Digiport International, Ltd.
P. O. Box 1377
1 Mangrove Way
Montego Bay Free Zone
JAMAICA

**Participants in the infoDev Symposium on Information
Technology and Trade for Development**
November 6, 1996

as of 10/31/96

Page 23

Mr. Takuma Yamamoto
Chairman of the Board and Representative Director
Fujitsu Limited
6-1 Marunouchi 1-Chome
Chiyoda-ku, Tokyo 100
JAPAN

Mr. Joe E. Young
GIIC
1800 K Street, NW
Washington, DC 20006

Prospectus



information for development program

INFORMATION FOR DEVELOPMENT PROGRAM

The following Information for Development Program (InfoDev) prospectus specifies the objectives of the Program, its mandate and activities, and its governance and organizational structure.

The Information for Development Program (*InfoDev*) is a global program managed by the World Bank to help developing economies fully benefit from modern information systems.

InfoDev: shares worldwide experience with, and disseminates best practices to, governments and key decision-makers, both public and private, on the economic development potential of communications and information systems;

InfoDev: channels policy advice and other technical assistance to governments in developing economies on privatization, private entry and competition in the communications and information sectors, and on improving the policy, regulatory and business environment for investment;

InfoDev: conducts feasibility and pre-investment studies, and prepares experimental applications in communications and information systems.

InfoDev's key method of intervention is through specific activities in the following areas:

- Consensus Building
- Information Infrastructure Development Strategies including Knowledge Assessments
- Telecommunications Reform and Market access
- Demonstration Projects

All activities are designed to support workable strategies and can include workshops, assessments, demonstration projects, feasibility studies, or other approaches. They can cover one or many countries; and address one or many sectors.

GOVERNANCE AND ORGANIZATIONAL STRUCTURE

The governance structure of InfoDev includes the *Donors' Committee*, the *Technical Advisory Panel (TAP)*, and the *Program Manager*. Within the World Bank, the overall responsibility for InfoDev lies with the Vice President, Finance and Private Sector Development (FPDVP) who convenes and chairs the Donors' Committee, and appoints the TAP members and the Program Manager.

DONORS' COMMITTEE

The Donors' Committee comprises representatives from donors contributing resources to *InfoDev*. The Donor's Committee meets once a year to:

- consider policies and long-term strategies, and provide broad guidance for *InfoDev* activities
- approve the annual Work Program and financial plan
- review *InfoDev* performance and financial situation
- select past activities to be evaluated by the TAP following proposals by the Program Manager
- confirm donor pledges

The Donors' Committee make decisions by consensus.

Immediately prior to the annual Donors' Committee meeting, the World Bank will convene a forum, bringing together all donors, the TAP, and outside experts from recipient and donor countries, to discuss issues related to the use of information-based services in the development process.

TECHNICAL ADVISORY PANEL (TAP)

The Technical Advisory Panel (TAP) comprises five experts selected from research institutes, academia, governments, and other organizations. The TAP provides advice to the Donor's Committee, reviews *InfoDev* strategy and evaluates the impact of the *InfoDev* annual Work Program through post-evaluation of selected activities. Its findings and recommendations are forwarded to the members of the Donors' Committee at least two weeks prior to the annual meeting of the Donors' Committee. The TAP will meet as required, at a minimum of twice a year, including during the annual meeting of the Donors' Committee. TAP members are appointed for two years by the Chairman of the Donors' Committee, after consultation with the members of the Donors' Committee.

PROGRAM MANAGER

The Program Manager is a senior official of the World Bank who, under the guidance of the FPDVP or his designee, supervises *InfoDev* activities. The Program Manager delegates as necessary responsibilities for program development, supervision and administration.

PROGRAM DEVELOPMENT

Suggestions for *InfoDev* activities are received by the Program Manager from any interested source, and are considered for inclusion in the *InfoDev* Work Program. An *InfoDev* indicative Work Program is submitted at

the annual meeting of the Donors' Committee. The Work Program includes:

- recommendations from previous meetings of the Donors' Committee;
- interest from the recipients;
- status of research on information technology and services, and evaluation of sector-wide and subsectorial needs and priorities for information usage; and
- inputs from the donor community, including the private sector.

The Task Manager and team responsible for delivering each *InfoDev* activity are selected by the Program Manager on the basis of the required technical expertise, state-of-the-art knowledge about the corresponding area of intervention, and prior experience with the region or the country in which the product is implemented. The Task Manager and personnel handling an *InfoDev* activity can be World Bank staff, members of other organizations, including academic or research organizations, or of consulting firms, or individual consultants. *InfoDev* Task Managers who are not World Bank staff will be hired as consultants for the duration of the project.

FUNDING

The funding of activities performed or promoted by *InfoDev* requires a well-coordinated partnership involving the World Bank Group, other multilateral institutions, bilateral donors and the private sector, and the agreement and active cooperation of governments of recipient countries.

The World Bank contributes salaries and benefits of staff managing the program and involved in *InfoDev* activities, a portion of secretarial services and indirect costs such as communications and equipment, office space, and the direct cost of the annual meeting of the Donors' Committee.

Financial contributions to *InfoDev*'s "core fund" are made in cash in freely convertible currencies and are untied. Resources comprising the core fund are freely usable in accordance with the *InfoDev* Work Program and financial plan. However, subject to conformity to the Work Program and approval by the Program Manager, a public donor may elect that part of its contribu-

tion be applied in several countries, with a thematic or regional focus. Thematic contributions may not be made to the core fund and will comprise a separate trust fund. Contributions from private donors are accepted only to the core fund.

A contribution of \$250,000 or more to the "core" fund entitles a private donor to separate representation at Donors' Meetings. Smaller contributions will be accepted, but will not carry the right to participation in Donors' Meetings.

Each donor will enter into a Trust Fund agreement with the World Bank following clearance by the Trust Fund Administrator and the Legal Department of the Bank.

BUDGET GUIDELINES

The *InfoDev* budget is prepared and implemented in compliance with World Bank accounting principles and forms part of the financial plan submitted to each annual meeting of the Donors' Committee. Budgets for the full duration of individual activities are prepared by task managers, and approved by the Program Manager. Each budget shows the full cost of carrying out the activity, including salaries, benefits, consultants' fees, and travels.

The *InfoDev* fiscal year runs from July 1 to June 30 to coincide with the Bank's fiscal year.

RESOURCES AND INTELLECTUAL PROPERTY

Hiring of consulting services and procurement of equipment is initiated by task managers, and implemented in accordance with the World Bank's Guidelines on the "Use of Consultants by World Bank Borrowers and by The World Bank as Executing Agency" and on "Procurement under IBRD Loans and IDA Credits."

Intellectual property in any product developed by *InfoDev* will be retained by the World Bank for the benefit of *InfoDev*. The Bank will endeavor to exploit any such intellectual property rights in order to further the objectives of *InfoDev*.

INFORMATION

For further information about the *InfoDev* donor program, please contact the World Bank's Industry and Energy Department by telephone at (202) 477-1234 or e-mail at infodev@worldbank.org.

INDUSTRY & ENERGY DEPARTMENT

THE WORLD BANK

1818 H STREET

NORTHWEST

WASHINGTON DC

20433

USA

TELEPHONE

1(202)477-1234

FACSIMILE

1(202)477-0685

E-MAIL

infodev@worldbank.org



The World Bank



The Consequences of Current Telecommunications Trends
for the Competitiveness of Developing Countries

Simon Forge



information for development program

This report was prepared in January 1995 by Mr. Simon Forge of the Cambridge Strategic Management Group, for the World Bank. The findings, interpretations, and conclusions expressed in this paper are entirely those of the author and should not be attributed in any manner to the World Bank, to its affiliated organizations, or to members of its Board of Executive Directors or the countries they represent. The World Bank does not guarantee the accuracy of the data included in this publication and accepts no responsibility whatsoever for any consequence of their use. The boundaries, colors, denominations, and other information shown on any map in this volume do not imply on the part of the World Bank Group any judgment on the legal status of any territory or the endorsement or acceptance of such boundaries.

The material in this publication is copyrighted. Requests for permission to reproduce portions of it should be sent to the Telecommunications and Informatics Division, Industry and Energy Department of the World Bank at the address shown in the copyright notice below. The World Bank encourages dissemination of its work and will normally give permission promptly and, when the reproduction is for noncommercial purposes, without asking a fee.

Copyright © 1995

The International Bank for Reconstruction
and Development/THE WORLD BANK

1818 H Street, NW, Washington, DC 20433, USA

The Consequences of Current Telecommunications Trends for the Competitiveness of Developing Countries

Simon Forge

January 1995



The World Bank

Finance and Private Sector Development Vice Presidency

Industry and Energy Department

Telecommunications and Informatics Division

CONTENTS

1	A new scenario is at hand	
	The basic premise of near-zero-tariff telecommunications	4
	Key substitution mechanisms have a global impact	6
	A tele-economy will form	11
	Employment effects	13
	Effects on personal market access	16
	Electronic enterprise and virtual value chains	16
	Rebalancing effects ten years after a major price fall	16
	Value replaces growth—the regenerative economy	17
	The resulting telecommunications industry structure	17
2	Premises and caveats	
	Beyond GATT: The role of international free trade changes	17
	Free competition, private enterprise, and electronic entrepreneurialism	18
	The regulatory environment required	18
	The superhighway is not a prerequisite	18
3	The major effects for developing economies	
	The competitiveness of developing economies will increase	19
	A new infrastructure emphasis and possible savings on fixed infrastructure	20
	New employment patterns	20
	Directions for development investment—the formation of an education surplus	21
	Sectors of expansion and sectors of reduction	22
	Requirements for migration, monetary flows, job flows, and market access	22
	The role of local telecommunications operators	23
4	Implications for the principal agents of change	
	New motivations for investment by the World Bank and other international institutions	23
	A new role for government	24
	The role of government in developing countries	24
	The position of private industry in developing countries in a tele-economy	25
	Private corporations in developing countries in a tele-economy	26
5	How it could happen—the platform for change	
	Two views of the platform for change—techno-primitive and telecomia	26
	New motivations behind pricing	28
	Nonlinear demand effects	28
	Technologies for change	28
6	Recommendations	
	Measures to establish the tele-economy in developing countries	29
	Key areas for investment	29
	Conditions for investment	30
	Areas and approaches to avoid	30
7	Notes	
8	Further Reading	

ABSTRACT

What are the long-term consequences of a major price fall in telecommunications, from the point of view of developing countries? An acceleration of the rebalancing of wealth between nations in the various stages of economic development is the fundamental effect. Taking a ten-to fifteen-year perspective, this can be expected to radically affect global patterns of employment. This paper examines the overall impacts for developing economies and the conditions needed for these changes to occur. The focus here is on the competitive position of the developing countries in the global economy and the optimal role of governments and financial bodies such as the World Bank.

1 A NEW SCENARIO IS AT HAND

Major macroeconomic rebalancing (and some surprises) will occur, leading to the development of a global tele-economy.

1.1 The basic premise of near-zero-tariff telecommunications

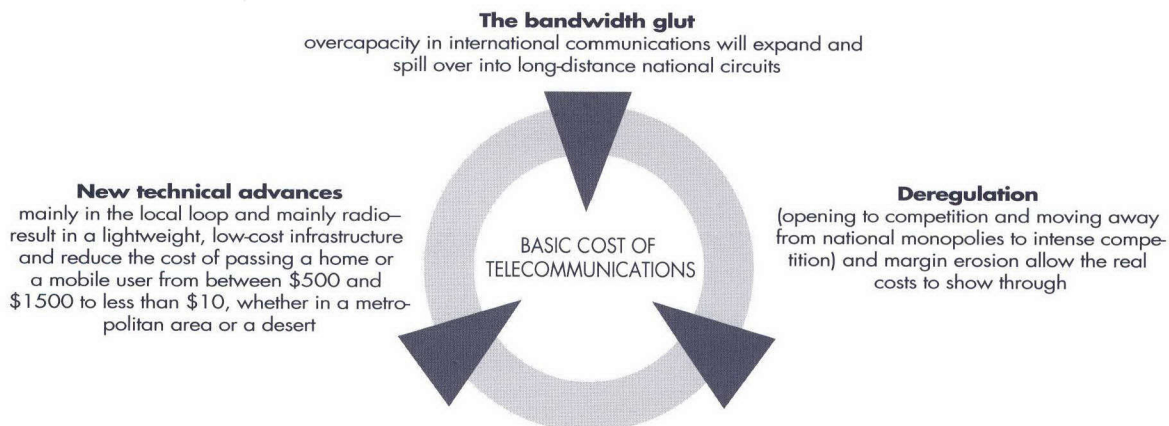
A key feature of today's telecommunications environment is the continuing fall in charges. This paper examines the consequences as the "near zero" region of tariffs is attained, perhaps by 2005.

The basic premise of near-zero-tariff telecommunications is that all charges (installation and use) will become so cheap as to be perceived as free by all users. The fall in charges must be so drastic that communications would come to be considered a basic right even in the poorest of countries. This means that telecommunications charges must fall enormously, perhaps to less than 5 percent of today's figures—perhaps to less than 1 percent in some countries. Thus the motivations behind pricing must change radically—to promote higher value-added services rather than to optimize profits from the sale of basic connections. In such cases a quantitative change becomes a qualitative change.

New forms of use will arise as price barriers are removed and telecommunications becomes more of a right than a luxury service. What is surprising about the fall in charges is not the magnitude of the fall, but the fact that the consequences have not yet been examined. This paper attempts to do just that, specifically for developing economies. It follows on a major study "The Macroeconomic Effects of Near-Zero-Tariff Telecommunications," which examines the case for OECD countries.¹

The main drivers toward this low-cost scenario are already with us (figure 1.1). We examine each of these drivers in turn.

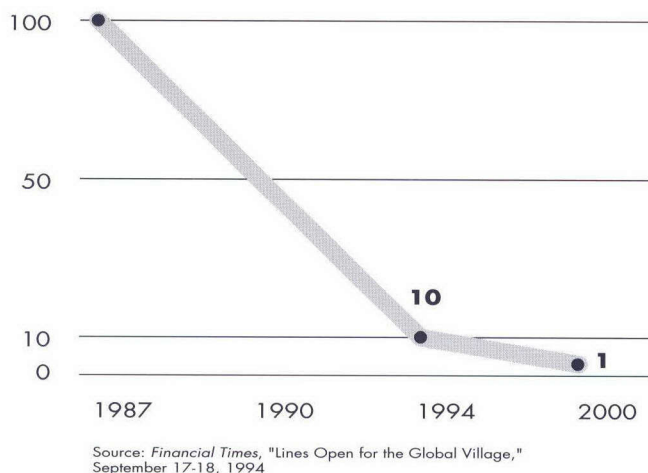
Figure 1.1 The forces driving toward near-zero tariff telecommunications



Key driver 1: The bandwidth glut—overcapacity in international communications will spill over into national circuits

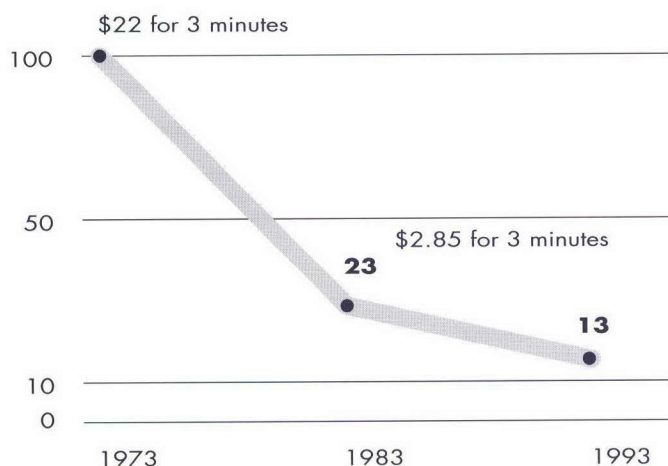
A first driver is the general glut in international links today, powered by the use of fiber-optic cables, usually with 2,400 bits per second (bps) connections. This glut is a recent phenomenon, starting from the late 1970s and linked to technical advances in fiber-optic capacity. Overall fiber-optic transmission capacity is doubling annually,² and as a result overcapacity is expanding faster than installed capacity since demand is not keeping pace due to the end-user price barrier. The largest glut is in transatlantic traffic, where a wide range of new cables is coming on-stream. Moreover, the cost of international circuits is falling faster each year. Over the past ten years costs of fiber-optic cable have fallen by a factor of thirty.³ STC Submarine Systems, now part of Alcatel, will soon offer a transatlantic system for 10 million simultaneous calls between New York and London,⁴ further contributing to the price fall in transatlantic circuit costs (figure 1.2).

Figure 1.2 The Fall in submarine transatlantic circuit costs since 1987



As costs fall so sharply, the difference between cost and price charged widens in percentage terms—the price of a transatlantic call has fallen by a factor of 7.7 over the past twenty years (figure 1.3), while the transmission investment has fallen by a factor of well over thirty times.

Figure 1.2 Fall in transatlantic charges since 1973



Source: British Telecom; *Financial Times*, "Lines Open for the Global Village," September 17-18, 1994

The call cost in direct network charges per minute in September 1994 from the United Kingdom to the United States was about \$0.10, while the charge was about \$0.60—a 500 percent margin.⁵ This implies that a wide degree of repricing is possible in a free market, especially as costs fall to 10 percent of today's costs.

We can expect overcapacity in international circuits to progress worldwide and into national links over the next five to ten years. Overcapacity will expand first between OECD countries and subsequently within their national boundaries due to the arrival of competitive infrastructures, particularly in long-distance transmission. This overcapacity will expand into less-developed economies for two reasons:

- Links between major developed zones (Europe, East Asia, the United States) will provide capacity for fiber-optic spurs (and satellite links) to Africa, South America, and the rest of Asia in order to promote additional international traffic over the main trunk sections.
- International links within and between population centers in developing countries will form an alternate backbone, and so offer a bypass for national traffic, perhaps using extraterritorial switching.

Key driver 2: Technical advance—on the edge of a new cost equation

Although the bandwidth glut may be viewed as a technical advance in fiber optics, it has as much to do with overdeployment

due to competitive forces. Other technical enablers are also at work.⁶ We are at the frontier of a new cost equation in telecommunications, driven by advances in computing power and performance.

First came digitization, which changed the whole operating equation from that of the past one-hundred years of telecommunications. With digital systems the largest share of the costs of calls and of the network infrastructure is no longer in the long-distance network. The digital plant for long-distance services costs less per minute in maintenance than the local loop. The major cost now is construction and operation of the local loop infrastructure, with its switching. Key advances in technology that affect pricing are thus mainly in the local loop and mainly concern replacing expensive wire connections with radio. Doing this cost-effectively requires far more processing power in the terminal, yet this is the area of fastest advance and most rapid price fall—far faster than the reductions in the costs of network installation and traditional telecommunications equipment.

Key driver 3: Competition

New advances in technology would not show through in user pricing without the freedom of competition. In the absence of competition operators would store up the cost savings in higher profit margins, as has been happening on the transatlantic routes. Deregulation—opening of the telecommunications markets—is essential for the price-reducing effects to show through.

A key example of the effects of competition on pricing is the international simple resale (ISR) market for the transatlantic route from the United Kingdom and the United States. On October 20, 1994, the U.K. government approved licenses for nineteen ISR operators [who lease lines from major public telecommunications operators (PTOs) such as AT&T and British Telecom] and then resell the capacity.⁷ U.S., Australian, and Swedish groups will now make one of the world's most lucrative telecommunications markets even tougher. For instance, ISR operator IDB Worldcom foresees at least a 33 percent decline in transatlantic prices over the next three years, following a 30 percent decline from 1991 to 1994.⁸ British Telecom has already been forced to cut prices by 20 percent.⁹

A new view of telecommunications usage arises with a perception of freeness

Usage patterns change with a perception of freeness. Any article or service that becomes free changes its access completely. On the Paris metro, for example, comfort is now the limiting usage factor, since the system is effectively free for most citizens. During the 1860s the telegraph did not change the way business was done due to its cost—transatlantic telegraphy cost £1 a word (equivalent to \$120 today). Such a price barrier prevented

telegraphy from becoming an operational foundation of continental and international business for the first ten years of its existence. As its cost fell in the 1880s with the rise of Western Union and the PTTs, the telegraph became the first 'T' to fundamentally alter the ways of doing business, driven by and with the expansion of railways in the United States.

One of the most dramatic demonstrations of the power of the cost-access combination has been the impact of the media on democratic decisionmaking and public opinion. Low-cost telecommunications have enabled the free spreading of news, including satellite television links from war zones. Telecommunications access also can provide universal news dispersion and so subsequently change popular opinion—for instance, fax links and computer conferencing into oppressed countries. But this can only happen if the medium is affordable to the general public.

For future use patterns, consider 2005, when a transatlantic call could cost as little as \$0.03 for one hour. Due to advances in digital technology (mostly in the terminals) it will be a full-motion, high-resolution video call. At this cost the need for face-to-face meetings will be seriously undermined. This is just one of the five major substitution mechanisms that a perception of freeness generates.

1.2 Key substitution mechanisms have a global impact

Five major substitution mechanisms accelerated by near-zero tariffs will progressively change economies and lifestyles the world over. These mechanisms take on new dimensions in the case of developing countries.

Telecommuting

Telecommuting implies avoiding daily travel to work by working either from home (homeworking) or from a local office, often termed a telecottage. Telecommuting is just one form of teleworking, together with mobile working and remote meetings via videoconferencing (figure 1.4). Telecommuting growth is largely occurring in OECD countries today, driven by traffic congestion and the difficulties of traveling to work, and so early analysis must be based on this experience.

In OECD countries 20 percent of workers will exploit some form of teleworking—be it full time, part time, homeworking, mobile working, or telecottage use—by 2004 (box 1.1).¹⁰ Take-up is being reinforced by antipollution measures for road vehicles and by traffic problems. For instance, fines of up to \$25,000 a day are being levied in California for companies not conforming to new laws on reducing the number of vehicles. Moreover, the practice of homeworking, the key type of teleworking, responds to future societies and demographics, with a rising number of single-parent families and an aging population. But

Figure 1.4 Impacts of teleworking

Type of Teleworking	Key Impacts
Telecommuting Up to 40 miles 	Lost daily travel time Car ownership and use Congestion and pollution Road construction Real estate pricing Travel costs Office building
Unlimited distances 	Job export Travel infrastructure Real estate pricing Travel costs Office building
Mobile Working Up to 200 miles in most cases, unlimited distance in rest of cases 	Lost daily travel time to base Constant contact Office building
Videoconferencing* Unlimited distances 	Lost travel time Travel infrastructure Travel cost Real estate pricing Job export

* Usually substitutes for business travel by air

telecommuting's most important macroeconomic impact is in its most extreme form, as a mechanism of job export.

With the accelerating effect of near-zero-tariff telecommunications, telecommuting could well substitute for travel in 50 to 60 percent of jobs suited to teleworking in OECD countries. What does this imply for road usage? Road usage in high car-use economies generally follows the model in box 1.2.

Box 1.1 Teleworking take-up

- At least 10 percent of white-collar workers, especially senior and professional workers, are potential candidates for telecommuting for part of the week in OECD countries.
- Jack Nilles of JALA Associates expects up to 25 percent of the U.S. work force to use part-time or full-time teleworking by 2005.
- British Telecom expects 20 percent of the U.K. work force to use some form of telecommuting within a few years.
- A study by Buck Consultants in the United States estimates that 10 to 20 percent of Americans will use teleworking by 2000.
- The Henley Centre expects 15 percent of all hours worked to be done at home in the latter half of the 1990s, with at least 3.3 million teleworkers in the U.K.'s work force.
- A 1992 National Computing Centre (NCC) study on teleworking found that 13 percent of U.K. firms used some form of teleworking (homeworking or mobile working) and another 16 percent were actively considering its use.

Source: Cambridge Strategic Management Group, "The Macroeconomic Effects of Near-Zero-Tariff Telecommunications," 1994; Sunday Times, November 28, 1993; Financial Times, August 16, 1993; Estates Gazette, October 16, 1993.

Box 1.2 Personal car travel, United States, mid-1980s

Use	Share of total miles traveled (percent)
Earning a living, including work commuting.....	34
Family and personal, including shopping.....	30
Civic, educational.....	4
Social and recreational, including vacation.....	30
Rest.....	2

Source: A. Reno, 1988, "Personal Mobility in the United States," in *A Look Ahead*, Year 2020, Washington, D.C.: Transportation Research Council

Teleworking thus removes the major structural impediment to employment—physical location near the work site. Three other major effects important for industrial economies are:

- Job search radius is dramatically increased, from tens or hundreds of kilometers to globally.
- The number of jobs available is increased enormously in an electronic market and delays in replying and processing are enormously reduced.
- Rural communities can be supported.

In developing countries the effects have less to do with car travel and more to do with:

- Reduced need for public transport.
- Reduced expenditure for road and rail transport infrastructure (bridges, roads, and repairs).
- Limiting the centralization of work in urban areas, and so halting migration to cities that have become overcrowded. It thus has a profound influence on residential demographics.
- Knock-on effects on fuel imports, overall energy distribution and consumption, congestion, and pollution.

The proportion of jobs suitable for teleworking varies by economic profile. In a typical OECD country the number of jobs suited to this arrangement can be approximated using the ranges in box 1.3. These developments have major implications for developing economies. As telecommuting develops, the potential for jobs export (mainly in services) from OECD countries to developing countries increases.

Box 1.3 Telecommuting (part time and full time) possible in a typical OECD economy

Sector	Share	Telecommuting	Overall
	in economy	jobs possible in sector	telecommuting
Service industries and public sector	70	60-70	40-50
Manufacturing	25	15-20	5
Agriculture, forests, fisheries, mines	3	0	0
Total	-	-	45-55

Source: A. Reno, 1988, "Personal Mobility in the United States," in *A Look Ahead*, Year 2020, Washington, D.C.: Transportation Research Council

Job migration—the electronic migrant

The use of teleworking to export work to developing areas produces the electronic migrant effect, the white-collar equivalent of the export of blue-collar manufacturing jobs. Telecommunications provide the essential highway for higher-value exports. Jobs already have been exported in software development (for example, U.S. firms contract programming in India and Russia) and insurance and finance (clerical and data entry tasks are exported from Canada and the United States to India and the Caribbean and from Europe to Ireland).

Overall, the key impacts of substitution for commuting can be summarized and projected as follows:

- Working distances will increase to transborder teleworking (export of jobs).
- Savings on car use, accidents, urban pollution, road congestion, office space, and fuel imports.
- Employment support for rural communities and farmers.
- Suburban spread and urban sprawl will increase.
- Mobile communications networks and use will soar.
- Corporate overheads for office buildings will plunge.
- Residential property prices will fall as the privilege of position for employment evaporates.

The significance of the impact on vehicle fuel consumption is highlighted by Jack Nilles of JALA Associates, who claims that if 10 percent of the U.S. work force had been teleworking in 1975, then the United States would not have had to import any oil, and so the effects of the 1974 OPEC agreements on the U.S. economy would have been negligible. The effects on oil imports for a developing economy with increasing car use also could be significant.

Videoconferencing

Up to half of managers' time is spent in and traveling to meetings, but less than 70 percent of meeting time is likely to be productive. Under these circumstances videoconferencing is taking off faster than expected, combined with drops in the price of equipment and lines—a circular process. Videoconferencing technology has been launched many times, either as a meetings substitute or for single correspondent conversations. In fact, the name television reflects its original classification as the visual adjunct to telephony, or phonetic communication. Reintroduction of television over phone lines occurred in the late 1930s, and since the 1950s a new version of videotelephony has been floated every ten years.

Videoconferencing is being taken up largely for remote meetings of multiple participants—in other words, as a substitute for business travel. Sixty percent of certain types of internal meetings in particular industries could be replaced by videoconferencing.¹¹ For all industries, take-up possibilities for this technology seem most promising for internal meetings and for training.¹² The figures in box 1.4 are based on the share of

Box 1.4 Potential use of videoconferencing at near-zero tariffs as a replacement for meetings

Type of meeting	Meetings replaced (percent)
Internal meetings, 10 years from price fall.....	30
External meetings, 10 years from price fall.....	15
Training, 10 years from price fall.....	30

meeting types that can be substituted for, that is, that are suitable for a conversation over a videolink rather than for direct contact. Moreover, they are for OECD countries. Videoconferencing in developing countries could be far more important for teleworkers.

Two types of videoconferencing are possible:

- Using a specially equipped meeting room for point-to-point meetings, usually for several people at each end. This form may have a limited future due to its cost and inconvenience.
- PC-based, desktop videoconferencing, usually one-to-one, over computer networks or voice telephone lines. This is a more personal conversation and document-sharing tool with a different interaction style.

Desktop videoconferencing may be considered an extension of current communication forms (voice telephony, e-mail, fax) rather than just a travel substitution. One way to assess potential growth in this practice is to examine equipment sales for meeting-style equipment and for desktop videoconferencing, and their changing proportions.¹³

Traditional videoconferencing is most accepted in high-tech industries, notably telecommunications equipment suppliers, computer and semiconductor manufacturers, and for global operations in the car industry. Toyota uses it for monthly management meetings between Tokyo and Nagoya. Certain sectors in OECD countries will be early videoconferencing adopters as substitution for business travel (box 1.5).¹⁵

Box 1.5 Sectors favoring videoconferencing

Design industries	Regular product and progress meetings are required over long distances. Includes cars, aerospace, consumer goods, telecommunications, computers, semiconductors, advertising and graphics, and construction
Health	Telemedicine
Education	Distance learning
Global travel and transport operators	Replaces extensive international travel to routine meetings just to learn situation (not contribute)
Government, oil, and gas exploration	Rapid short-notice decisions are required from dispersed decision-makers

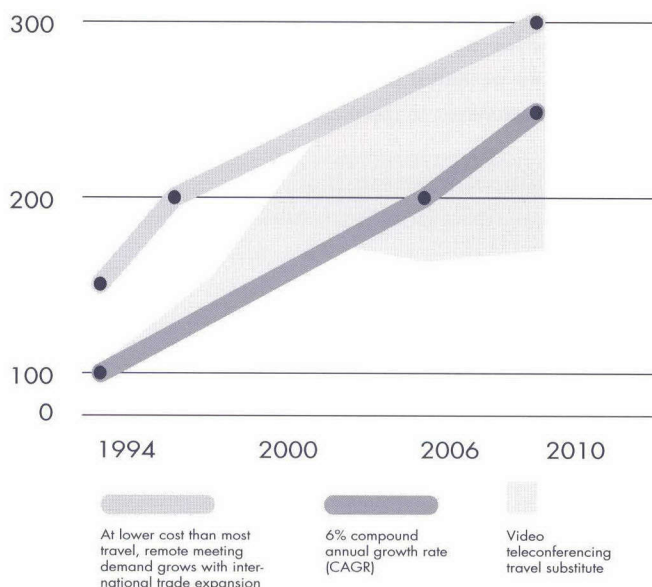
It is evident that multimedia PCs, as the personal videoconferencing station of the future, will host live sessions and also act as playback terminals for "see mail" or video clips sent as mail for asynchronous communications. Moreover, videoconferencing may also meet a latent demand for meetings for which business travel time and cost is too expensive (figure 1.5). Thus it opens up a new market segment, and is not just a substitute for physical travel.

What economies are available with videoconferencing?

The economics of business travel vary with multiple parameters. Costs include lost time (due to travel, delays, waiting to start, and so on), the hourly cost of each participant for total travel and meeting time, the cost of travel for all participants, the lost productive opportunities of each participant, the length and time efficiency of meeting, the economic benefit (value of meeting), and the increased stress, loss of effectiveness and energy, and potential illness resulting from travel and meeting.

For example, consider a four-hour meeting to which five professionals travel for eight hours in each direction. This effectively writes off one meeting day and two days for traveling. With an average opportunity cost of \$50 an hour in a developing country, and with an average of \$600 in travel expenses for each participant, the meeting costs at least \$9,000, based on an eight-hour work day. By contrast, a near-zero-tariff videoconference would cost little in telecommunications charges (less than \$10) above the participants' own time and amortization on PC videoconferencing (probably less than \$20 for five installations over three years of \$300 each). Thus the potential for cost savings and increased efficiency are considerable (box 1.6).

Figure 1.5 Videoconferencing will respond to latent travel needs
Air Travel System Capacity



Box 1.6 Impacts of videoconferencing substitution on business travel

- Corporations will benefit from major cost savings and corporate productivity will improve.
- Airport infrastructure will not need to expand as much.
- Homeworkers will be less isolated and will have more management contact.
- Health and education sectors could benefit enormously and may take the lead in innovative usage.
- The business travel industry will be hardest hit, especially airlines.
- The travel industry will move toward more leisure products.

Office buildings

Telecommuting and mobile working also tend to make conventional office space redundant. Out-siting staff to home means less office space is needed, an effect already beginning in OECD countries. In developing countries fewer offices could be required, with concentration of small offices in dispersed towns and villages, not centralized in the capital or major cities.

Some companies with highly mobile employees are moving toward shrinking the total office space required with "hoteling," "hot-desking," or "touch-down" desks combined with mobile communications. Such offices require far less total space than the traditional 10 to 12 square meters per worker (minimum) as personal effects are minimized and far fewer people are in the office at one time—either they are on the road, with customers, or working at home. Thus space is allocated for perhaps 30 percent of the total staff.

Telecottages

For companies that wish to retain traditional office teams, telecottage use is attractive due to the major disparities in urban center costs as against a rural community's. For instance, Electricité de France (EDF) estimates that a telecottage for twelve secretarial workers in northern France costs 1 percent of a Paris center office when purchase, building maintenance, operating costs, and local taxes are considered. This is mainly because a rural office may be supplied by the local community to increase employment. An example of telecottage use is a rural typing bureau in France—clients can dictate contracts over the telephone any time before midnight, and the contracts are typed in the very early morning. Documents are delivered before breakfast by e-mail or fax. Costs are lower than normal agency costs and others cannot compete for overnight service.

Financial savings. The costs of office space for a European office worker can run as high as \$12,000 in construction alone.¹⁵ In 1978 Rank Xerox of the United Kingdom explored the costs of working in major city centers and found that total support costs for buildings and travel in central London could total 2.5 to 3.5 times the average salary for a low-paid, white-

collar worker. The costs for teleworkers and mobile workers are limited mainly to equipment. But these costs are increasingly common to any job.¹⁶

A new role for the office

Thus the new role for the office is as a coordination center, and no longer as a site for stationing people and storing paper-based information. What is left of the office becomes:

- A telecenter for coordination and twice-weekly social gatherings of teleworkers.
- A "work hotel" for receiving mobile workers temporarily. Meeting rooms only, for intensive teleworking, with a reception area.
- A corporate symbol of visibility, indicating presence.

Consequently, the construction industry and real estate sector will face increasing pressure over the next decades from changing work patterns that bring the residence into use as a workplace (box 1.7).

Box 1.7 Key impacts of substitution for office buildings

- Lower demand for office buildings and new office construction.
- Reduction in office rents and prices.
- Lower building land costs in and around cities and increased land availability.
- Demand for car parks and land for parking goes down.
- Reduced demand for enhanced urban roads and urban access roads and suburban-urban public transport.
- Commercial property taxes go down.
- Lower residential prices where siting close to potential work inflates prices.
- Energy demand goes down as heating and air conditioning load falls.
- Residential property will be extended to include a home office.

Teleshopping

Today, shopping electronically is considered an innovation best-suited to the most advanced countries. But in time it will also provide the first access ever for many underprivileged people to world consumer goods. And it could provide enormous stimulus to companion distribution services while cutting out the sophisticated retail infrastructure of the OECD countries.

Teleshopping from home, also termed homeshopping, replaces traveling to shop, and in so doing replaces physical shops and car parks and lightens the access infrastructure required. It changes the whole customer interface. Goods are delivered to the customer by local delivery van, mail, or express package service, depending on their origin.

The forms of teleshopping and their technology

Teleshopping can take four major forms. The most widely used, telephone ordering and mail order, use the telephone (as well as the mail) and paper catalogs from mail-order houses—extensions of the concept use of the telephone—or a videotext terminal for supermarket ordering and delivery. Television shopping (broadcast, cable, and interactive cable television) is the next step, and is mainly available in the United States. It is still tiny, however, compared with the more than \$2.1 trillion in total U.S. retail sales—less than 0.2 percent of total sales. A newer form, CD-ROM catalogs for PCs, is starting slowly. But the U.S. installed base of 4 million CD-ROM drives on PCs (about 80 percent of all drives produced) is predicted to climb.¹⁷ On-line PC interactive networks—Internet, Prodigy, Compu-Serve—also are taking off, mostly in the United States. The Internet has an electronic catalog with more than 20,000 software and PC products. Retailers and financial services offerers are attracted by the low annual cost of \$15,000 for international on-line services use. Major growth is predicted in three years as PC prices fall in line with televisions.

The next step is the virtual supermarket—shopping internationally as an entertainment experience. Customers, especially those who suffer from lack of transport, may strap on a headset connected to a powerful multimedia processor to shop at any time they wish. They would find themselves in a lush virtual supermarket environment, able to take items off the shelves, look at prices, and with a dataglove feel the product. Smell and even taste could be simulated. A further advance could be shopping agents—network software entities that understand needs, budget limits, and tastes and act over the network, combing catalogs and databases for their owners.

Shopping for services as well as for products

The principle of home shopping access and operations applies equally to consumer services and to the transactions to interact with them, which will grow progressively with the wealth of developing countries (box 1.8).

Box 1.8 Teleshopping extends to home services

Home banking: Operations and transfers by phone, cable television, or computer network.

Cash payments: “Electronic purse”—Mondex (early experiment on electronic money in UK).

Direct life insurance: Sales by videoconference over phone line or cable television.

Financial and credit services: Videoconference advice or sales.

Share sales: Through electronic brokers with transactions by computer network, telephone, or cable television.

Key impacts of teleshopping

The major direct economic impact of teleshopping beyond the retail industry itself will be on road travel, with secondary effects on the construction of retail premises (box 1.9). Two opposing road travel effects will be seen:

- Reduced traveling to shop.
- Increased delivery of groceries and other purchases to the customer.

Box 1.9 Key impacts of teleshopping

- Expansion in delivery-vehicle journeys, together with road demand, congestion, fuel consumption, and pollution.
- Construction of retail premises will decline.
- New types of shops—essentially just a warehouse and telecommunications or television networking operation.
- Public transport and private car use in traveling to shop will decline, together with road demand, congestion, fuel consumption, pollution, and car park construction.
- New retail organization structure in some products (for example, if customers buy direct from farms using computer networks or television).
- Overall retail sales may expand as the transport-poor, the aged and infirm, and those restricted in travel are able to shop and choose far more widely.

Paper documents, trading, and postal services

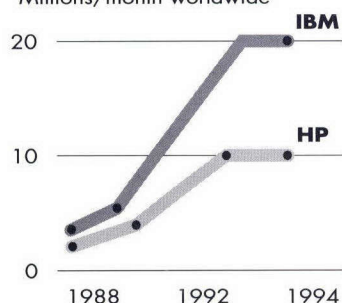
The electronic document will evolve to be the business glue both for intra-organizational systems, through workflow and e-mail, and inter-organizational systems, through electronic data interchange, electronic funds transfer, and messaging. Substitution by an electronic file for paper documents of all types—including trading documents (such as invoices, orders, and fund transfers), paper money, books and reports, letters and memos, and postal services—has three major effects:

- The document has completely new attributes. Substitution effects come from the document being immediately storable with minimal physical volume, instantly sendable, and, unless blocked, continually editable. The electronic document can be far richer in content—it can be a video clip of the sender speaking (see-mail), audio voice mail, or a combination of text, image, and voice—and so provide far more context and information.
- Replacement of physical delivery (by road, air, and rail) using postal and courier services and of internal mail within a building, together with its delays, uncertainty, and costs, by an instant contact.
- The creation of new electronic communities based on message and bulletin boards such as Internet (and eventually on videoconferencing) is a development that is completely divergent from the paper-based heritage. Fast, easy, low-cost messaging has meant that new forms of social groupings can grow. Today, many companies cannot run without e-

Figure 1.6 Electronic documents progressively advance through the economy

Electronic documents are replacing paper documents and postal services. The largest high-tech companies already depend on e-mail for internal operations at all levels, worldwide

E-mail messages,
Millions/month worldwide



Electronic documents will progressively invade new markets

Financial/Business	Commercial Media	Advertising Media	Social Mail
Invoices	Journals	Mailings	Personal Letters
Checks	Books	TV	-
Payments	Magazines	Posters	Christmas
Insurance	Newspapers	Radio	Greetings
Legal	-	Newspaper	-

mail, especially in the high-technology sector. This was not the case even five years ago (figure 1.6).

Electronic mail, electronic data interchange, computer conferencing, on-line services, and facsimile services are progressively substituting for postal and courier services (box 1.10). This is highlighted by a series of surveys by the Electronic Messaging Association. In 1991 the survey found that the 2,000 largest U.S. companies had e-mail at 94,000 sites; by 1993 that figure had expanded to 180,000 sites (50 percent CAGR). The e-mail user population is growing by 15 to 20 percent a year, with e-mail messages over local area networks (LANs) doubling each year.¹⁸ Facsimile machines are also invading the home in countries such as Japan where graphic, rather than symbolic, writing is dominant. Japan has more than 4 million home faxes.

1.3 A tele-economy will form

As a result of these forces a new form of economy will appear, transgressing national boundaries for international commerce. The basic input factors of such an economy will differ from the norm in that the most important factor in capital and investment will be education. Education comes to the fore in a knowledge-based society for two reasons:

- It develops initial skills, and so enables work, and brings those skills up to date.
- It adds new skills, and so enables the transport of work with the export of skills to new minds.

Access to all forms of education can be instant, and at much cheaper rates, and the pressures for higher education will increase. Education will also become a traded commodity, sold internationally through distance learning and broken into affordable parts with educators competing for students and trainees. Constant re-education will be essential to maintain and create employment opportunities.

Thus education will no longer be simply a vague personal asset and qualification. The capital and value of an economy will lie in its educational stock. The value of static educational capital is already being recognized; its order of magnitude can be judged by figures for the United Kingdom. In 1992 the net measured wealth of the U.K. personal sector was \$3,600 billion, but its stock of human capital was worth nearly twice as much

Box 1.10 Future trends in electronic messaging

- Video clips (see mail) showing the sender speaking, with inclusion of documents, objects, and demonstrations, will become widespread if low-cost desktop video-conferencing becomes available with high compression (so that the video clips do not choke the servers or the network).
- Continued meteoric rise in the use of voice mail systems, with digitized versions for computer networking.
- Most e-mail today is text only, but the medium slowly will evolve toward being enhanced with graphics, photographs, and voice annotation.
- Electronic contracting systems such as computer-aided acquisition and logistics support (CALS) are changing the entire sector.
- Electronic data interchange is expanding into smaller companies, but even in countries where it is well advanced—such as the United States and the United Kingdom—less than 10 percent of companies use it.
- Electronic newspapers and journals are starting to be published over networks, and may not be released in other media.
- On-line information bases and books are replacing paper-based libraries.
- The speed difference of document delivery is so great that new work practices can form around these tools, using work flow tools with image processing to capture paper in electronic form.
- Mobile data with e-mail services are expanding document reach.

Source: Cambridge Strategic Management Group, "The Macroeconomic Effects of Near-Zero-Tariff Telecommunications," 1994.

(\$6,300 billion), valued as the difference between actual labor incomes and unskilled incomes (about \$300 billion) and capitalized at a real interest rate of 4 percent.¹⁹ In a tele-economy this value would be much higher because it is dynamic and advances continually to optimize its value.

Electronic markets are forming a new level of electronic commerce

The tele-economy, based on trading through electronic marketplaces, increases the competition in global markets:

- Prices are decided at the world level and driven down by open access to competing offers because buyers can compare more suppliers at a lower cost. Electronic markets generally reduce the costs of purchasing, whether for oil futures by a trading conglomerate or a single share by a housewife.
- Disintermediation is rife—intermediaries are cut out as sellers talk directly to buyers using the electronic markets, increasing market efficiency.
- Work forces can be widely dispersed and can be recruited more quickly and easily.
- Virtual corporations can be formed rapidly for a new product or market from existing units of production. Creating global work forces to coordinate global manufacturing or services provision is cheaper.
- Vertical suppliers disappear in favor of networks of specialists.
- Consumers can easily talk to suppliers and so provide more detailed requests, resulting in customized products.
- Contracts will be far more binding to lower risk between interdependents, and aberrations will be more severely punished.

Visions of electronic trading

Visions of the future are pointed to by CommerceNet in California and TradeNet in Singapore. CommerceNet offers an electronic trading environment for the entire Silicon Valley community. Founded by Intel, Sun, Hewlett Packard, Apple, Packard Bell, and sixteen others, it has \$20 million of initial funding. CommerceNet is aimed at all companies, from the smallest start-up (an entry kit costs \$15,000) to the largest players. It offers electronic catalogs for electronics components, subassemblies, and products.

Singapore's TradeNet is a far larger operation, aimed originally at speeding the cargo transfer for shipping from days to hours by handling paperwork electronically while ships are at sea. It has established Singapore as the major transfer port in Southeast Asia. But electronic trading networks usually change basic market dynamics in six ways. They:

- Reduce the number of tied relations to customers.
- Offer a new channel for reaching a far wider world of customers at low cost, especially if the customer base is small and dispersed.

- Reduce the cost to buyers of comparing offers from different vendors.
- Allow electronic bidding so that local price disparities disappear—prices tend to drop by an average of 10 percent.
- Reduce the role of intermediaries by allowing direct contact between buyer and seller.
- Accelerate the effects of changes in prices and conditions to minutes rather than days or weeks.

These effects already have brought major changes to global trade where electronic markets are in operation (financials and commodity markets).

The overall effects of substitutions for physical paper documents and their transfer by post are summarized in box 1.11.

Box 1.11 Key impacts of substitution for paper and post

- Enormous expansion of global information transmission.
- Complete dependency on e-mail for internal company operations (already true for the largest high-tech companies).
- Asynchronous communications worldwide overcomes time zone differences.
- New communities are created based on e-mail and computer conferencing.
- Electronic data interchange make trade faster and cheaper, but it also changes market dynamics and supplier-consumer relations.
- Electronic document management (EDM) reduces the control managers.
- EDM allows vast document storage with rapid retrieval in a small physical space (for example, twenty volumes of an encyclopedia can be stored on a single CD-ROM).
- Paper consumption will gradually be curbed.

Investment flows

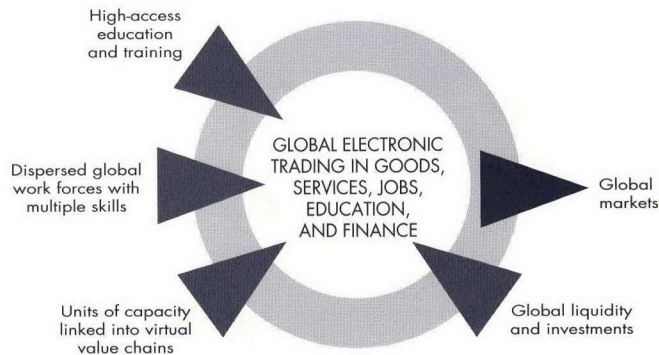
Liquidity and investment for new ventures will be far higher as access to funds by companies and awareness of opportunities by investors are vastly widened as information access expands. Access to information and funds is easier to gain at a lower cost. Information access on opportunities will move down to the level of individuals rather than just specialized market players, and so will change in form to be more easily assimilated.

It should also be noted that with instant electronic settlement down to a personal level, the notion of money, bank deposits, and currency becomes less important. Other negotiable assets can be used, be they bonds, equities, or mutual fund shares. Money is one asset, but other negotiable forms will be more important in a post-monetary society in setting standard values for exchanges.²⁰

The resulting shape of the tele-economy

Highly skilled global work forces with flexible combinations of service and manufacturing units create offerings for global markets using highly liquid funding. The resulting tele-economy operates using high-access communications to all factors of production and can create economies in production through its focus on the building of virtual value chains of the best suppliers of each stage or item (figure 1.7).

Figure 1.7 The structure of tele-economy



The tele-economy is powered by the formation of “electronic capitalism,” in some ways the opposite of monetary capitalism. The primary need is not for money—it is for electronic access. Businesses do not require a stock of capital funding because skills and employment are based on minimal capital outlays. Skills and knowledge are the barriers to market entry, and the key ingredient to making these profitable is electronic contact.

Moreover, electronic access allows everyone to participate, so the unemployed and deprived can advance through distance learning. The tele-economy takes away privileges of contact as contacts become universal (figure 1.8). Still, we can expect to have two parallel economies for some time.

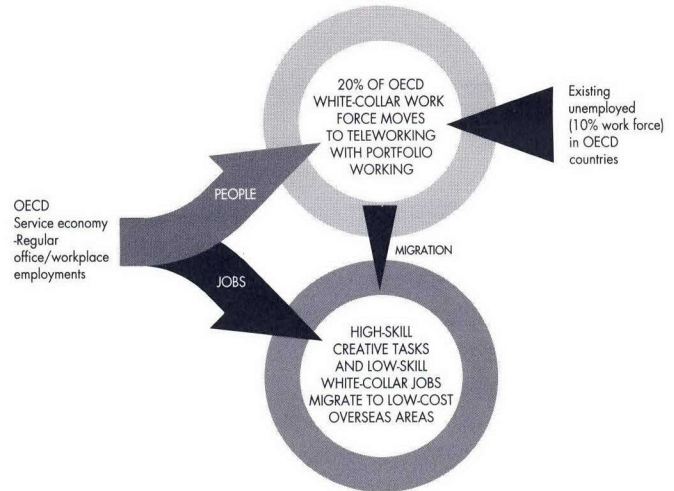
1.4 Employment effects

The tele-economy has clear employment effects. Taken to its extreme, teleworking is job export. Examples of electronic job export are hard to come by today because neither the economic regime nor telecommunications infrastructure required are in place yet. It will take ten or fifteen years for the major changes to occur. A key factor is teleworking’s power to open employment to the unemployed, as well as to transfer jobs to lower-cost areas (figure 1.9).

The types of jobs exported

Two basic categories of jobs are most likely to be exported initially: high-level creative and professional skills and low-level processing and clerical tasks (boxes 1.12 and 1.13). Decisionmaking, management, and control, especially financial, are likely to be the last to migrate from the home country. But in

Figure 1.9 Portfolio working will export jobs from OECD countries

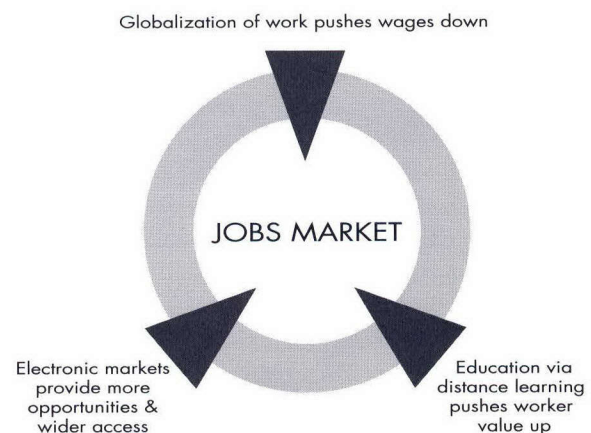


a professionally managed concern, even the executive tasks will gradually follow.

The rise of portfolio working and skills aggregation

Electronic mobility and skills aggregation mean more opportunities for jobs but at lower wage levels (figure 1.10).

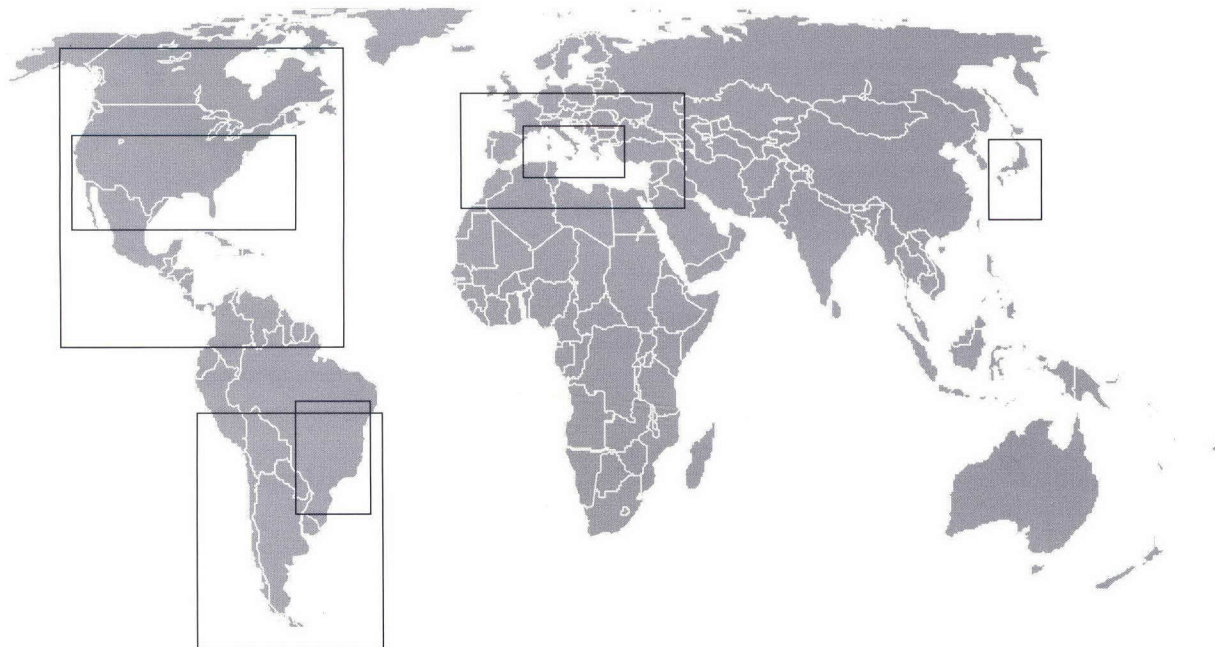
Figure 1.10 Electronic markets will reduce wages but increase employment



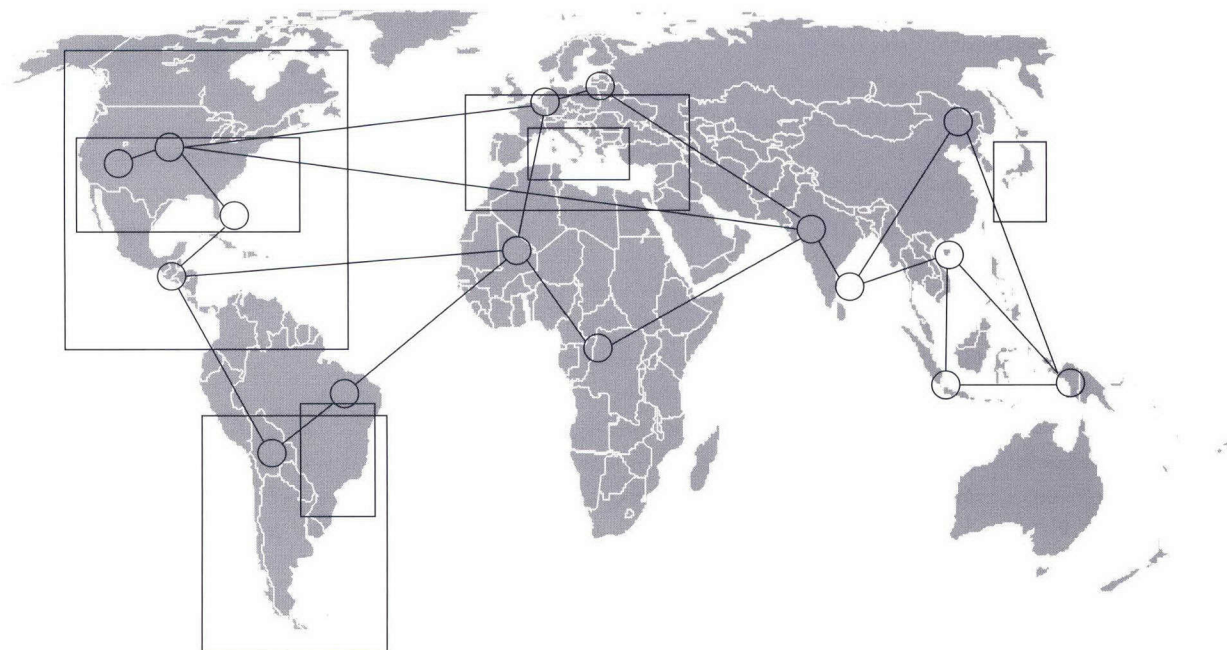
Electronic markets will widen overall employment access but intensified competition will drive down wage levels for the OECD economies. Moreover, as enterprises become more efficient there will be less work available and so employees will seek multiple employers. Globally, high employment levels will be reached through the rise of portfolio working—which will compensate somewhat for the reduction in wages. Thus vocational education becomes key, since few teleworkers will work full time for one employer and multiple skills and jobs will be the norm.

Figure 1.8 Trade barriers and trade blocks tend to be less evident in a tele-economy

Traditionally, there is a macro level of competition between trading blocks and nations



In the tele-economy, only individual companies compete across frontiers



Box 1.12 Export of high-skill, white-collar creative tasks

Higher-level, white-collar skilled employment is starting to be exported, but only in relatively restricted areas where computer technology and telecommunications are accepted as natural working platforms, such as computer programming.

Indian software—Madras, Bombay, New Delhi, Bangalore, and Calcutta
Indian software production had CAGR of 47 percent between March 1993 and March 1994. The total value of software exports reached \$300 million for the year to mid-1994, while total industry value exceeded \$500 million. About 150 of the 600 Indian software companies now operate on global contracts only, mainly with the United States and Europe. Growth has been rapid. Only five years ago there were few companies working internationally. Although some companies offer skills for the older mainframe computers and "legacy" systems, most Indian software companies have leapt past their Western counterparts, going straight to the latest in programming technology (object-oriented development for PC and client server systems). Links to customers are made using a satellite for data, with a local teleport in each of the science parks offering high-quality, high-speed direct links based on 64,000 bps channels. A dedicated organization, SATCOMM, provides the data communications facilities. Indian skills are being widely exploited for:

- Custom financial applications—several U.S. and European banks successfully use Indian developers, and Citicorp has set up its own financial software developer, CITIL, in Bombay.
- Custom insurance applications—some insurance companies consider Indian programs better than those available in Europe, and are often less than 20 percent of the local cost.
- Telecommunications software—German telecommunications and aerospace companies are using advanced software companies in Calcutta.
- PC application developers such as Microsoft and large-system package vendors such as Oracle have started their own software operations inside India.

Some companies are offering new forms of interworking to facilitate closer working over long distances. For instance, Eurolink of New Delhi offers its clients the direct management and control of a dedicated team, while Eurolink only manages infrastructure and provision of resources. The client may then employ the development team as its own subsidiary after the project finishes to ensure ongoing maintenance and extension support. Such support is almost mandatory for a core business software application in many sectors.

Russian software

Sun and other Unix software sellers have signed major agreements with Russian academies and their software spin-offs, especially for complex systems software.

Indian design and computer-assisted design centers

Singapore and India are setting up a center not only for software development but also for advanced product design with overseas links as part of an information technology park east of Bangalore.

Source: NASSCOM (National Association of Software and Service Companies), Electronics and Computer Software Export Promotion Council, New Delhi, 1994.

Box 1.13 Exports of low-level, white-collar tasks

Insurance forms processing for claims and application

Offshore insurance claims processing and all back-office work is being offered by third-party processors in Ireland to financial institutions and insurance companies in the United Kingdom and the rest of Europe. Countries in the Caribbean will offer similar services to North American insurance and banking firms in the future. One example is an Irish service for claims processing and applications management. It handles 60 motor accident and 120 house and life insurance products at its processing centers, which receive the documentary information by e-mail and fax. Both data and paper documents are processed; the latter are transferred electronically as scanned images which are then stored on image servers. Employment for 100 already has been created, and between 150 and 200 jobs are eventually expected. The service provides data entry and claims processing as well as risk assessment for applications using expert systems on PCs. The firm is also developing its own software for the expert systems. Major advantages for the company of settling in Ireland include the local educational surplus, with more than half the staff being college graduates. This ratio compares well with the education levels of staff for forms processing within the client insurance companies in the United Kingdom. Moreover, staff turnover is very low compared with the United Kingdom since the jobs are highly valued, leading to greater professionalism and quality of work.

Time zone difference job-switching

Low-cost transatlantic telecommunications are enabling British Airways to plan for a future scheme in which customer calls to flight reservation centers received after 6 p.m. in the United Kingdom are switched to the United States. Although this is not an example using a less-developed economy, it is an example of reducing costs while improving service. Due to the time lag reservations staff are fresher in the United States at 6 p.m. European time. Moreover, they are not on overtime pay rates, as they would be in Europe at that hour.

International multilingual call centers

Low telecommunications rates are being designed by some PTTs to attract call centers for tele-sales and reservations to lower-cost economies. Ireland is a prime example. The country's educational surplus means that multilingual staff are available relatively cheaply, as are the required quality of supervisory staff. Multilingual, twenty-four-hour service is maintained because it is relatively easy to find qualified and keen staff, even for night-shift work. Several major U.S. hotel chains have set up call centers in Ireland for 800-number services.

Revenue accounting and report preparation

SwissAir's revenue accounting is done near Bombay airport, with a telecommunications link to Switzerland, to process 1 million flight coupons a month at lower cost. Cost savings are mainly in payroll costs, which are between 20 percent and 25 percent of Swiss costs per head. But a major part of the cost savings has come from better business practices and improved software systems. These have reduced the workload so that the facility now requires 100 people, half the number used previously in Zurich.

Source: Financial Times, "Wired to the Rest of the World," January 10, 1995.

1.5 Effects on personal market access

One of the major general effects of the tele-economy is increased personal access to markets for goods and investments. The latter implies that global liquidity will increase because:

- Electronic payments will result in free cash flow across borders. This will have a major effect on the ease and speed of fund flows. For instance, an average paper transaction for funds transfer between banks within the European Union currently takes between one and four weeks. A transfer between banks in India can take six weeks.
- Personal ownership of shares will rise as the cost of purchasing will be near zero and market access will be maximized, while knowledge of equities and other financial markets will be raised and its presentation enhanced for easy assimilation. Thus the percentage of personal wealth amassed in freely traded instruments such as equities and mutual funds will rise.

Access to a network of local and central governments for questions, information, and decisions will change the structure of government administrations. Moreover, participation in local and central decisionmaking will be opened cheaply and easily for the first time. The role of the individual in the political process changes as individual potential for interaction increases.

1.6 Electronic enterprise and virtual value chains

The enterprise is likely to continue to change forms and progress toward small, coordinated units as the costs of control fall. Transaction automation makes orders, deliveries, and payments safer, surer, and faster. Videoconferencing allows for problem-solving at a human level. The combined risks, capital, and overheads of a large vertical enterprise no longer make much sense when a virtual value chain can be constructed across many companies, with a new kind of commercial operation held together by electronic messaging for interorganizational systems.²¹ The forerunners of such organizations have appeared in OECD countries:

- Benetton, for textile, production, and sales distribution.
- Supermarkets linking directly to own-brand suppliers for replenishment.
- Lithonia Lighting distributing through its chain of sales agents.
- Car manufacturers linking production lines directly to parts suppliers (Toyota and Mineaba)

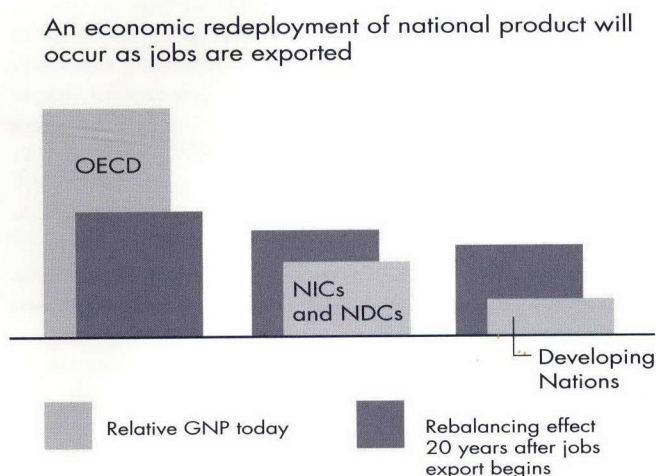
The future lies in international value chains stretching across countries. To some extent this is already happening, for instance, in car dealer chains. Orders from dealers for cars and parts are fed into production in another country automatically, with the aim of reducing delays from the current eight to twelve weeks to two weeks, with make on order. Virtual value chains with interorganizational systems allow specific functions to be decoupled in a vertical firm and placed externally—today it is

software creation, tomorrow it may be product design, customer service, and tele-sales.

1.7 Rebalancing effects ten years after a major price fall

Thus a major redistribution of value and wealth in all economies will occur as jobs are exported electronically, mainly in service sectors, and mainly from the Western economies. Developing nations with an educational surplus and a low-cost environment relative to OECD prices—such as India or Viet Nam—are likely to benefit the most (figure 1.11).

Figure 1.11 Rebalancing between industrial and developing economies in the tele-economy



The result will be fewer jobs in the OECD countries, while developing countries will grow in economic power over the next ten to twenty years. The net effect is not only to redistribute wealth and jobs in services. Rebalancing will occur with skills export in the most deeply skilled areas of manufacturing (biomedics, aerospace, and semiconductors) first to the newly industrializing countries (NICs) (China, Republic of Korea, Taiwan, China) and then to the newly democratizing countries (NDCs) of Eastern Europe (Czech Republic, Hungary, Poland).

Services job areas in developing nations may be offshore zones that serve particular core markets, possibly tied together by time zones. For example, South America might service North America, with the Caribbean being the first step for financial back-office services. Some Wall Street firms' back offices already have moved to New Jersey and to Tampa, Florida—with a next move to Belize and the West Indies now being considered. These new economies can be expected to eventually promote growth in their own local internal service industries—in the business services, retail, distribution, hotel, and catering sectors.

1.8 Value replaces growth—the regenerative economy

Telecommunications and education act together as multipliers: telecommunications investment of the right kind expands the economy to greater value than that invested in telecommunications. Figures for this vary from \$1 to \$5 of telecommunications investment for every dollar of GDP growth, depending on the economic situation prior to investment. But when liberalized and free from cost and technical (standards) barriers, telecommunications provides the capacity for an economy to multiply (or reproduce).

Telecommunications and education tend to act as global economy enablers rather than as national economy enablers because their effects are widespread, transborder, and not confined by distance. There are four major pillars of the reproductive or regenerative economy:

- The main factor is the abandonment of absolute growth for value—total GNP may shrink in OECD economies due to lower wages, better efficiencies, and global rebalancing of economic output. But internal wealth in all societies will be redistributed and so overall living standards will tend to be maintained or improved.
- The second is accelerating positive (re)productive investment, specifically more efficient investment in education. Investment in education reaps higher income and wealth generation throughout the worker's career. Education also tends to make large wealth gaps disappear and so incite new growth.²²
- The reproductive investment effects of telecommunications are the opposite of military investment—negative capital waste, the reason for the economic collapse of Russia, South America, and Africa. By contrast, Japan and Germany have flourished, having avoided military expenditure beyond 3 percent of GDP, and usually less than 2 percent.²³
- The entrepreneurial character of the economy will increase as distance trading becomes the norm for all firms, not just those involved in local or national trading. Alliances are more quickly formed but can be far more closely controlled. The corporation will deverticalize as necessary, focus on what it does best, and outsource more, so value chain networks can be formed for robustness and flexibility. The efficiency of the corporation in the new model is heightened, shrinking in size yet closer to markets and far higher in productivity for a reduced fixed cost and asset base. It is faster to react and can make decisions locally (tactically) and globally (strategically) with greater speed and knowledge. Information is much easier and cheaper to find so more time can be spent on processing and turning it into real market knowledge.
- The new society is intensely consumerist—it encourages and eases the comparison and purchase of goods and services over electronic networks, creating electronic markets, yet making their entry simple and protected even for the most sophisticated products and services.

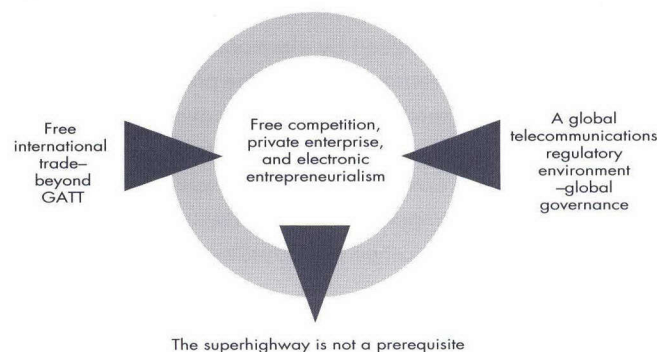
1.9 The resulting telecommunications industry structure

In a tele-economy with near-zero pricing, the telecommunications industry will be completely restructured. First, five layers of added value are likely.²⁴ At the bottom of the value layers half a dozen global connectors will compete for margins of less than 5 percent, selling volume in bulk to higher-value players. These global network offerings will be the most important element for the formation of a tele-economy in developing countries and in changing their competitive position. Important new actors may also appear through alliances and combinations of current players, as well as those entering the arena from media, retail, utilities, software, computer systems, and other areas.

2 PREMISES AND CAVEATS

Certain preconditions are required for the new economy to emerge (figure 2.1).

Figure 2.1 Pre conditions for the tele-economy



2.1 Beyond GATT: The role of international free trade changes

The tele-economy depends far more on international trade than on national trading. It thus depends on the freedom to exchange services and payments internationally and electronically, and with fewer restrictions than the limited steps that GATT has already taken. Trade liberalization has to go much further, eventually toward a global common market. A tele-economy will require the more far-reaching vision foreseen under the World Trade Organization charter: the free movement of electronic “money” or securities, jobs, trading documents, and information.

The signs of economic globalization are already with us. Transactions in services and income from overseas investments (or invisibles) exceeded 40 percent of total world trade in 1993.²⁵ Because the ability of governments to shape the national economy will tend to be reduced quickly as trade barriers are removed and international electronic commerce

takes over, the emerging market will require new laws and protective brakes, inspections, and audits, probably by a new regulatory agency for electronic markets.

The opening of markets by developing nations is justified by the rewards. Enhanced economic activity appears to be the only way to advance in areas such as South America, where poverty still outweighs growth even though growth in 1994 reached a fourteen-year high.²⁶ Few government initiatives can succeed as well as enhanced economic activity in stimulating employment and wealth in deprived areas.²⁷

2.2 Free competition, private enterprise, and electronic entrepreneurialism

Free competition is as necessary to the tele-economy as the free flow of services, goods, and payments. It is difficult to imagine today the extent of exchanges possible in goods and information under a tele-economy. "Electronic capitalism," as distinct from monetary capitalism, will form through unhindered equal access to electronic markets. Thus it is essential to allow access that promotes electronic entrepreneurialism, access that enables everyone to compete and participate with no privileges of location inside certain national boundaries. Restrictive practices to limit competition by electronic market operators, major players, or governments should be prevented. The new regulatory agency mentioned above will have to ensure equal electronic commerce and protect each trading party in a transaction. The free entry of computer and telecommunications goods is especially important to this endeavor. For example, India is currently constrained by technology import barriers.

2.3 The regulatory environment required

The tele-economy depends on free competition in telecommunications to bring down prices and advance the range and penetration of services. Specifically, it requires:

- Separating regulations from operations.
- Removing noncommercial budgetary restraints on operators.
- Competition for services.
- Open competition in infrastructure provision.
- Unrestricted and complete interconnection of networks and services.
- Spectrum liberalization on a global scale.
- Common international standards for governance and regulation.
- Common global standards for connection, services presentation, tariffs, intelligent network operation and access, and network interconnections.

Fears that a freely competitive market will result in inequitable access to telecommunications services have recently been shown to be unfounded.²⁹ Experience in the United States between 1895 and 1921 shows that it was competition by independent operators that brought telephony to the poor and

rural United States. It was not the Bell company, which by 1895 had penetrated only the seventy-two most prosperous industrial cities in its eighteen years of monopoly operation. This development contrasts with Europe where, apart from Scandinavia, telephone service was an expensive luxury between 1880 and 1950—or even 1975—due to the lack of affordable access in a monopoly situation.

2.4 The superhighway is not a prerequisite

The premise that a global "information superhighway" with high bandwidth reaching into each home and business is required for balanced economic growth remains unproven. What is required is a link, but only a low-cost, comparatively low-bandwidth link to the end user. Since most of the cost is in the local loop, a minimal and cheap local link can provide key services to all users. Where a mix of transmission media is already available, this mix can be profitably exploited. The cost of a fiber-to-the-home network is estimated at \$1.5 trillion for the whole of the United States. An alternative view of what is required is explored in section 5.

But even the costs of providing local basic telephony services are enormous if a conventional network is considered. These vary between \$500 and \$1,500 per line depending on local conditions and distance. In a world requiring perhaps more than 3 billion new lines (to equip developing countries with the same or a higher density as industrial nations) such investment is impractical—\$3 trillion at least. Thus a whole new cost equation is required, an equation that will become feasible with technology that arrives over the next five years, and beyond.

3 THE MAJOR EFFECTS FOR DEVELOPING ECONOMIES

Developing countries will find new opportunities in the tele-economy.

3.1 The competitiveness of developing economies will increase

There are fears that the least developed countries will be left further behind by the latest information technology developments. But in fact the opposite is possible. Developing economies are often low-cost economies in terms of salary and costs of living. For instance, software developers in a fairly developed economy, such as India, cost 20 to 25 percent of the payroll cost in OECD countries.³⁰ Further down the scale, white-collar workers in low-paying clerical jobs may earn 10 to 20 percent what their equivalents earn in industrial countries. Thus there is considerable potential for cost savings and increased productivity for industrial country high-tech firms that export jobs to developing economies. Examples of such job export are only starting to appear because the key factors of ultra-low-cost telecommunications are not yet developed (box 3.1).

Box 3.1 Job export through rekeying and report preparation

An American company offering corporate health care plans, Cigna, has set up a back office in Loughrea, an Irish village of 3,500 inhabitants. The office provides jobs for more than eighty local people, mostly women, and handles about 20 percent of Cigna's business by formatting and keying in about 5,000 forms a day. The center processes paperwork from patients, doctors, and corporate clients in the United States. Results are transmitted back on leased lines on a transatlantic cable to Cigna headquarters in Delaware, United States, in time for the start of the working day. U.S. paperwork is currently flown to Shannon airport, but in the future this could be transferred as images.

Technology investment

Long-distance, low-cost telecommunications based on fiber-optic trunks.
Office automation based on PC networks.

Context

- High national unemployment and limited local employment opportunities.
- High migration to cities from countryside.
- Scarcity of jobs in other countries (United Kingdom, United States) and difficulties of emigration.

Key factors enabled the arrangement

- Educational surplus with available office skills (20 percent influence). Skilled people willing to accept low wages (average starting annual salary is \$11,000) rather than move to city or remain unemployed (20 percent).
- High-speed, low-cost communications (25 percent).
- Openness and encouragement from government to overseas employers and aid for set-up (5 percent).
- Availability of a vocational school capable of providing courses in office work and computing (15 percent).
- Language capabilities (15 percent).

In the tele-economy price differences in goods and services are more immediately obvious due to the advanced market reactivity, which is the result of faster transmission of market rates to a greater number of buyers and sellers. Such "electronic notice-board effects" facilitate far wider competition. Any factor that lowers cost will thus come out far more quickly.

Thus developing countries can attract more business in industries where skills are the essential production factor and labor is the major cost factor. Not only is the total payroll cost likely to be lower, local general and administrative costs for such personnel also are likely to be lower. This cost can be substantial in service industries—for instance, general and administrative costs for European banks are at least 20 percent of revenues. Thus moving a back office to a developing country can have impressive impacts on the bottom line in far more than payroll terms.

This will produce a feedback effect. In the manufacturing industries, such as cars and electronics, jobs were initially moved offshore to lower-cost areas that lacked the modern productivity of OECD industries. In a second step, car plants in the developing economies of China, the Republic of Korea, Malaysia, and Mexico are gaining the productivity of Western and even Japanese plants. The feedback effect has driven down industrial wages in Western nations. In similar fashion, wage rates in OECD countries are beginning to stabilize in a few of the most advanced white-collar industries (such as software development) as a result of overseas job export. The trend to export of white-collar jobs is likely to expand much further over the next decade. But in ten to fifteen years' time a further effect will be seen. As wages are cut heavily in OECD economies the cost of living will remain high due to the inertia in the infrastructure, pension, and tax systems and especially in fixed assets inflation such as housing. Knowledge workers and lower-level, white-collar workers will be highly mobile in their jobs, able to move to wherever the cost of living is cheapest, combined with a suitable quality of life-style. Thus developing areas having attractive and healthy climates with basic education and social services could benefit from an influx of skilled and employed migrants if they are inclined to accept them.

Inflation in residential property values in OECD countries is a particularly impregnable barrier to national cost reductions and will tend to drive migration to lower-cost economies. Not only do property values drive up basic wage rates and corporate overheads, but property is the major object of private investment in most OECD countries (France and Germany excepted). Thus downward movement in housing values is slowed or prevented by heavy resistance to personal equity losses.

In summary, the underlying costs in a highly competitive (electronic) market driven by job migration become magnified

in their importance. In consequence, the overall effect of a tele-economy is to favor the competitive position of developing countries. Industrial economies will become less competitive, too expensive both for corporate operations and for those employed in lower-paid jobs, as their wages decline with international competition.

3.2 A new infrastructure emphasis and possible savings on fixed infrastructure

In a tele-economy personal mobility—and thus highways, bridges, and vehicles—become less essential to economic development. The converse is the norm in much of the industrial world, where cars are considered a prerequisite for employment, to get to work. The United States and Russia highlight this in opposite ways. Whereas U.S. workers will pay up to \$10,000 for reliable personal transport,³¹ current unemployment in Russia is attributed to a lack of personal mobility, which reinforces unemployment.³² The infrastructure substitution effects of telecommunications are summarized in box 3.2.

The resulting demographic dispersion

The tele-economy will allow many nations to return to a dispersed population distribution, as in agricultural economies of the past, and so move away from the blueprint of Western industrial economies. The Western model emphasizes urban centers as higher-paid work areas to which all migrate, so that the countryside is abandoned. A population dispersion closer to that traditionally found in developing countries can be achieved with an economy based on teleworking, a model termed *telecomia* (figure 3.1).³⁵

Infrastructure advances to cope with future demographics

In ten to fifteen years an aging population in many countries will strain national budgets through pension plans and support programs, especially health care costs.³⁶ Combined with appropriate technology, low-cost telecommunications can alleviate this strain in two ways:

Box 3.2 The infrastructure substitution effect of telecommunications

<i>Infrastructure area</i>	<i>Impacts</i>
Roads and civil works	Less need for roads due to teleworking; knock-on effects are on the demand for construction and materials. An economy may develop with lighter roads and fewer routes for passenger car traffic, but not for road freight traffic. Commuting reductions on the order of 10 percent in a car-saturated economy are projected.
Offices	Reduced need for office construction and associated investment due to telecommuting and mobile working.
Air transport	Air traffic is growing by 6 percent a year globally and 9 percent in Asia, and limits have been reached in some markets. The International Civil Aviation Organization predicts that \$250 billion to \$350 billion is needed for airport infrastructure improvements. Videoconferencing will be suitable for certain types of meeting and could substitute for 20 percent of travel needs beyond the saturation limits of air passenger services.
Teleshopping	Reduces needs for roads and stores. In an industrial economy road traffic is reduced by 4 to 5 percent.

Source: Cambridge Strategic Management Group, "The Macroeconomic Effects of Near-Zero-Tariff Telecommunications," 1994.

Thus attracting large capital investment to turn a less-developed country into a model of its more developed counterpart should no longer be the goal of development. Instead, the aim is to preserve an attractive environment with low costs of living—and thus avoid foreign debt—and sufficient taxes to pay for infrastructure works and debt interest, which now accounts for 10 percent of national budgets in many countries.³³ Moreover, debt-servicing costs escalate rapidly in real terms when the interest rate paid on public debt exceeds the nominal growth rate of the economy.

In summary, a key aim of developing countries participating in the tele-economy is to limit borrowing for infrastructure by using telecommunications to substitute for high personal physical mobility. And the pressure to do so is likely to increase as the real interest rate (adjusted for inflation) mounts, as it has done since 1982.³⁴

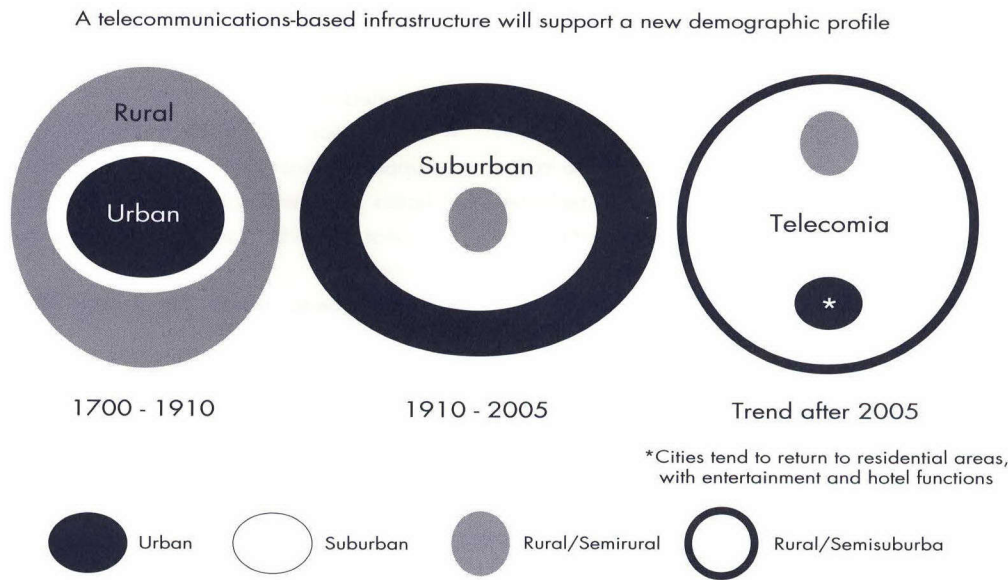
- By extending the average working life and allowing sedentary employment and job-seeking, thereby cutting the overall social security budget and changing the ratio of supported to supporters.
- By providing more care at a lower cost by making the home the center of care through surveillance and through paid local helpers, creating local employment.

3.3 New employment patterns

Service industry employment will account for an important share of the occupations in developing countries under a tele-economy. Multiple jobs with multiple employers—portfolio working—will be the norm.

The nature of work for developing nations in a global tele-economy will most likely be transformed toward tasks that are

Figure 3.1 A possible new pattern of population dispersion



easily exportable electronically, and where the local economy can show cost advantages. This contrasts with the concentration on primary materials extraction and processing, which, along with agriculture, provides the basic employment source for many developing nations. Moreover, depending on the development of the local economy, the balance of service work will move away from national to overseas customers. This is already happening in the Indian software industry.

In the future scenario new business will likely be sought electronically, through transactions with bulletin boards and direct contacts in electronic communities. Such electronic markets for goods and services better position corporations in developing economies against those in developed markets. While the disadvantage of distance from physical markets and consumers disappears in electronic trade, the cost of access to business is equal to that of companies in industrial countries, although operational costs may be lower. Customer requirements and contracts can be agreed electronically, so the basic cost of negotiating and doing business falls, especially if videoconferencing is used for the more mundane meetings. This will move the business mix away from local and national business toward international operations, where there are more opportunities.

3.4 Directions for development investment—the formation of an education surplus

Three areas are crucial for developing country investment in the tele-economy.

Education

Investment is particularly needed for vocational and higher education of all kinds. The aim is to produce an educational surplus—far more qualified people than are required by the

local infrastructure and industry, who will turn to international teleworking. A key part of education will be business studies, emphasizing small business. Entrepreneurialism, financial management skills, personal interaction skills, and business individualism are required to set up or partner a small company and maintain competitive differentiation. For this, higher education institutions with systems for ongoing education and retraining are required. Distance learning will be a basic ingredient, especially for vocational and higher education courses. Thus international expertise can be brought in to enrich the offerings. Courses should be available in “pieces,” to be purchased as the customer needs them.

Telecommunications

Any investments in telecommunications should be made by the private sector in competitive conditions to ensure price minimization. Investments will most likely come from the outside, from global carriers, perhaps in concert with local interests. They will provide three levels of communication:

- Access to global transport networks.
- Local loop at minimal cost—probably local loop radio using fixed links or low-earth orbit satellite. Motorola’s Iridium is canvassing India to this end, although the links are fairly costly compared with what is required for near-zero-tariff telecommunications. A new low-earth orbit model is required.³⁷
- Internal long-distance links by the cheapest means, be it satellite, microwave, or fiber optics placed at the side of rail or road links.

It should be noted that existing investment in telecommunications is not always needed or useful when external operators can provide new infrastructure quickly. In fact, the technical heritage

and political interference of an existing structure may impede free competition and the introduction of new systems, especially where there is pressure to amortize previous large expenditures by the national operator.

Environment

An attractive and safe environment, and one that is simple to do business in, is essential for outsourced operations. This requires investment in the appropriate institutions (see section 4).

3.5 Sectors of expansion and sectors of reduction

The global tele-economy is characterized by service sector activities, especially in white-collar job export. Sometimes these jobs may support manufacturing, as when they involve back-office functions or software creation for automating manufacturing processes. But a developing economy using job export will gradually move toward the profile of an industrial economy, where 70 to 90 percent of commerce is now in the service sector.³⁸ Areas of the tele-economy showing major expansion and contraction are outlined in figure 3.2. Particularly important sectors of growth for developing countries are education, media, and health, followed by internal retail, wholesale, and financial sector activities as the economy develops further.

3.6 Requirements for migration, monetary flows, job flows, and market access

There are several catalysts for establishing the tele-economy within a developing country.

Migration

To improve their competitive position, developing countries should attract skilled workers from more developed economies

seeking a low-cost environment from which to telework. These workers will:

- Act as the seed, finance, and training ground for local employment, encouraging less-skilled workers to gain knowledge.
- Create more wealth for less-skilled workers by driving the support services sector (retail and wholesale, freight transport, hotels and restaurants, and so on). The overall effect is to repeat the U.S. "melting pot" phenomenon in developing economies.
- Provide the tax base for improving infrastructure services.

Thus traditional migration flows could even be reversed. Workers will seek a low-cost environment to live in, rather than a manufacturing plant to work in, as location-independent teleworking becomes the norm. Moreover, as the low-skilled services jobs of the "tan-collar" segment are created around the teleworkers, lower growth may be expected in the high-cost OECD economies for occupations in restaurants, hotels, truck delivery, and so on.

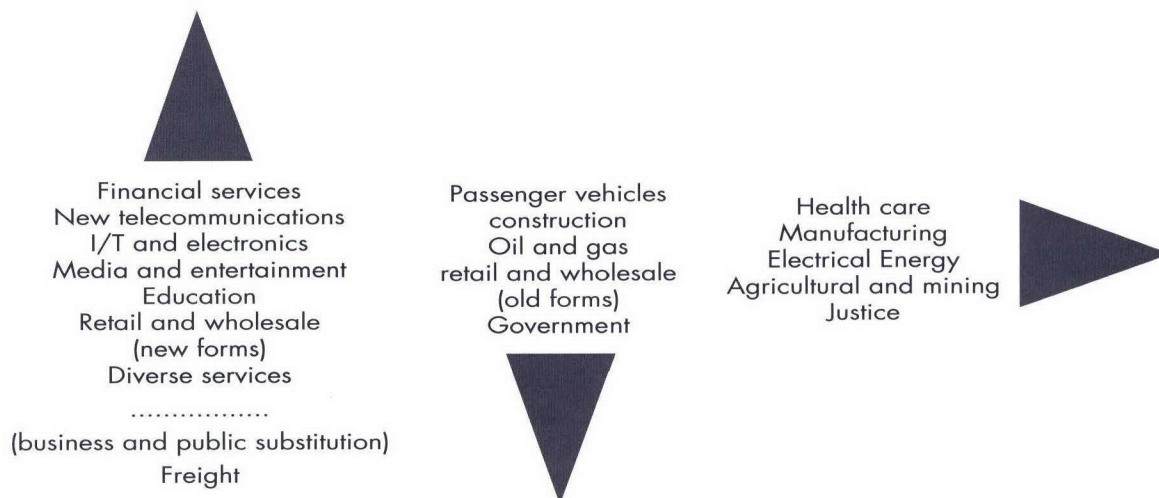
Monetary flows

Companies in a developing country will be trading internationally and so will require unrestricted flows of investments and payments. Thus national currency barriers must come down. Currency flows will be in electronic money—credit cards and electronic purses with electronic banking to pay remote workers. Thus cash flows will be faster but also more transparent. Taking part in an international banking system to support unrestricted flows, probably in global currencies, will be necessary.

Job flows

Although the tele-economy will bring in many jobs, the market mechanism has no respect for national boundaries. Irish

Figure 3.2 Sector growth and rebalancing in the tele-economy



authorities have already learned that jobs will flow out just as fast as they flew in if a cheaper, better service can be offered from another location. But the early examples of companies setting up overseas are somewhat misleading, since they are essentially one-way events: a decisionmaker in an expensive region decides to set up offices in developing regions. The converse effect of the tele-economy, of private companies bidding for the work, is not yet in evidence. In an electronic market of players seeking new work as well as performing existing contracts, their proactive efforts will tend to smooth the flow of work in both directions, so long as they have access to a low-cost wage structure and skills (which implies the education required to gain them). With sufficient entrepreneurialism, job flows will never be just one-sided, since workers can react by gaining new skills.

Market access and operation

Access to all types of electronic markets must be unrestricted for participation and competition, in line with international regulatory measures. These same freedoms must apply to the services and products flows involved, with minimal paperwork and bureaucracy. A major competitive advantage will be in operational efficiency. For example, Singapore's TradeNet electronic data interchange network won its lead position for cargo transfer and lightering in Asia through its efficiency in handling trading documentation electronically.

3.7 The role of local telecommunications operators

Local telecommunications operators will experience major changes in role and market position as free competition enters. They should eventually become part of the global network, perhaps through a global partner, and operate as one of several local and international operators.

4 IMPLICATIONS FOR THE PRINCIPAL AGENTS OF CHANGE

The emerging tele-economy will create new roles for the World Bank and other international institutions, as well as for private industry and governments of developing nations.

4.1 New motivations for investment by the World Bank and other international institutions

Developing countries may choose full participation in the global economy and in technical advances, but a new style of national operation is required. Thus the role of funding organizations such as the World Bank will be to ensure the participation of developing countries in the tele-economy through two measures. First, these institutions must help create the opportunity for the

tele-economy. Second, they must ensure that developing countries have the political and economic base from which to establish the legal, monetary, and social structures, institutions, and access mechanisms required for investment—which is essential to full participation.

Creating the opportunity

A key role for funding organizations such as the World Bank will be to ensure that a major price fall occurs in telecommunications and that equal network access is available worldwide. These can be brought about by three forces, working together:

- Intense competition in telecommunications infrastructure, services, and equipment.
- Installation of an ultra low-cost telecommunications infrastructure.
- Technical advances to enable the low-cost global infrastructure.

Funding organizations can support these advances in a number of ways (box 4.1). In encouraging deregulation, funding organizations need to create a new model of the telecommunications industry for developing countries to follow. A further major goal will be to promote the development of global networks so that little or no internal infrastructure spending is needed from the developing countries. With technologies such as low-earth orbit satellites for mobile satellite services and the support of outside telecommunications investors, developing countries can trade with minimal investment in their own infrastructure.

Box 4.1 Potential forms of support for the burgeoning tele-economy

Competition

Support deregulation and multiple low-cost global operators. Encourage governments to open national telecommunications to a mix of local operators, outside operators, and funding. Encourage governments to open markets to free international trade. Encourage governments to encourage private enterprise. Support global governance for radio frequencies.

Infrastructure

Seed the set-up of low-cost low-earth orbit satellites, fiber-optic networks, and all forms of alternative bypass infrastructures.

Technology

Support research for low-cost telecommunications mechanisms, product development, and pilot roll-out.

Ensuring that developing countries have the institutions, investments, and legal, monetary, and social structures to participate fully

Funding organizations should ensure that developing countries' policies:

- Encourage small business to set up locally.
- Remove international trade barriers, with free passage of

finance and payments.

- Encourage electronic trade and settlements.
- Encourage free telecommunications competition.
- Encourage major educational programs and centers of excellence, with distance learning.

4.2 A new role for government

In a world where a global economy holds sway over national economies, governments' degree of control over their own economies inevitably reduces. This has been true since the 1960s—when the rise in world trade exceeded that in GNP for the first time—but has accelerated recently. Progressively lighter government can be expected, with the following effects:

- Government responsibilities will be reduced as populations interact and vote in large networks, increasing popular participation in decisionmaking.
- Government functions will tend to shrink, but will have more expertise in what is left.
- Smaller administrations and less bureaucracy.
- A trend toward smaller civil service employment.

4.3 The role of government in developing countries

The role of government will change in developing countries as policies are fundamentally modified. Several policies will be key to this change.

Support trade liberalization

Trade liberalization will require several key institutions. A regulatory structure for corporate governance, for instance, is needed in larger countries to apply international law and to provide external auditors and directors for companies with more than 100 employees.

In addition, an extremely simple and rapid regulatory framework is needed for corporate set-up and operation, with straightforward tax, monetary flows, and social security systems. This should favor the formation of small companies. For instance, a new entrepreneur creating a company in the United States takes just four hours in New York City; in the United Kingdom it takes one to two days; in France it takes four to eight weeks; and in some South American countries it can take 200 working days. Paperwork must be cut to a minimum. In India, for instance, 10 percent of the value of traded commodities is spent on paperwork—delivery of international consignments requires 118 forms, and 258 signatures are needed for export clearance.³⁹

Finally, regulatory structures should encourage private share ownership (often by employees) by protecting investment and allowing simple trading of shares by individuals electronically, with suitable national and international safeguards such as centralized electronic share registration.

Set up an environment for educational excellence

The pressure for education will increase. Higher-education institutions will be required that can offer systems for ongoing education for an increasing number of students. At least 40 percent of eighteen-year-olds can be expected to go into some form of higher education, increasing the demand for education at higher qualification levels. Moreover, education will be extended throughout the working life, and so educating those who did not go into higher education at eighteen also must be considered. There will be a trend toward a self-ordered learning environment; rather than just a teacher dictating minimum needs, curriculums may become less defined and broader in scope. A personal learning environment is difficult to construct, however, and so will be fairly limited. All universities will move toward the open university model and toward electronic universities rather than the traditional physical form. Higher education will become a commodity sold to students, trainees, and anyone interested. Universities will sell courses worldwide to generate income, often over television and computer networks.

Low-cost telecommunications would be used in the following ways:

- Geographic extensions of existing universities and institutions will occur with distance learning. For example, videoconferenced tutor interaction allows tutors to be in other countries, and lectures can be taped to provide decentralization of expertise and asynchronous access.
- Electronic libraries will replace book libraries because books are too expensive—networked books are far cheaper since the same copy can serve all and there is less investment in buildings. Library-style knowledge will be shared worldwide and libraries will be interconnected for sharing.
- Multimedia documents that teach core courses will be widely diffused. Due to the costs of production and the time required to produce these programs, a limited number of multimedia instructional works will be widely used.
- Primary and secondary schools will use networks freely, sharing narrowcast sessions and video-conferencing. Full-day home study and distance learning will be less common, although they may form part of homework.
- Telecommunications will extend the reach of education industries into new market segments by expanding the geographic areas where institutions can sell, and reforming structures into closer groupings of institutions.

Edutainment will have some effect, but real learning is unlikely to be based on "Sesame Street for Adults." Thus video games will have little effect except in specific areas, and in very changed form (for example, a simulation for raising children and seeing how they turn out as part of a child psychology course).

Establish an environment for job migration and worker retention

Several governments are aware of the possibilities and examining the options for teleworking. For instance, the Egyptian government and Irish administrations are interested in attracting local employment through telecommunications links.

Obviously, justice, law enforcement systems, and democratic stability are an important part of both attracting outside work and retaining highly skilled indigenous workers. People who are job-mobile are the first to migrate if the environment is politically unstable. Basic crime control is also a major factor, as witnessed by the recent migrations from California's urban areas to the United States's mountain and southern states, leading to the first shrinkage ever in California's high-skill worker population.

A key part of a developing government's role will be to create a competitive environment for teleworking by ensuring that it is low-cost and attractive. One way of doing so is to keep property values at low levels compared with OECD countries—one of the few advantages the Commonwealth of Independent States and Eastern Europe have over OECD countries is low property values. If these values increase speculatively, the result will be high costs, and so little employment and few ways of attracting employment in a global tele-economy. One role of a developing country government may therefore be to regulate against speculative property transactions, and the waste in assets inflation as exemplified in Japanese cities.

Another way for developing countries to attract telecommunications investment is to create attractive environments. Environment has never been more of an economic advantage than in the tele-economy, where choice of habitation is far wider. The U.S. mountain states are siphoning away California's high-skilled workers by offering them relatively crime-free streets and unspoiled countryside. Governments must improve natural resources and the quality of life to attract the most skilled workers, as well as to retain indigenous workers. For instance, the south of France has used its climate to attract software development, airline reservation systems, research, and electronics to a large development in the Nice-Cannes corridor. With its low-cost but attractive environment, Greece could become a center of knowledge working as teleworking expands.

Support telecommunications liberalization

One of the key initiatives for governments in developing countries will be to ensure the liberalization of telecommunications at the national level and to lobby for it at the international level. Several measures are required:

- Support full deregulation by separating regulatory and operational entities. This is a delicate task even in the most promising and developed of economies. For instance, one

recent failure in this area, which indicates how political pressures can slow or mask deregulation, occurred in Germany, with the regulator appearing on the board of Deutsche Telekom.⁴⁰

- Allow free competition between telecommunications operators, both global and national. Competing operators will provide the required telecommunications structure at the lowest cost—providing their own capital—and will offer a range of choices to the subscriber. This process can be minimalist: the information superhighway into each home and office is an unattainable myth. Moreover, multiple players are required because duopolies have not proven satisfactory. The range of price reductions in the United Kingdom in mobile services under a duopoly as against that of four mobile operators has emphasized the tacit market mechanism that normally pertains between just two operators.
- Encourage the market entry of global network operators as creators and promoters of new infrastructure.⁴¹ This approach contrasts with traditional government stances approaches to the economy. In India, for example, the India Telecommunications Department wants prospective operators to pay a \$20 million application fee and turn over 35 percent of net revenues to use the existing infrastructure. And any operator constructing its own local network must still pay the government an annual fee of \$1 million. Such tactics discourage new entrants (and so discourage competition), raise prices (directly in fees and generally through lack of competition), and limit network penetration and accessibility (in terms of both physical development and affordability).
- Support radio spectrum liberalization. Radio is a key building block for future low-cost technology infrastructure. A vital companion to national spectrum liberalization is lobbying and support for international policing of the spectrum. A globally uniform liberalization of the spectrum is required for satellite-based mobile telephony and other radio services.⁴²

In going against the traditional model, governments used to sharing in the generous margins of the state telecommunications operator are liable to undergo a fiscal shock. But eventually all developing countries will have to reduce their budgetary dependence on revenue from the local telephone and telegraph monopoly. In a richer economy, with very low pricing of telecommunications but universal use, the returns in taxes on income, goods, and services will more than compensate for this reduced revenue, and a minimal tax on telecommunications could bring in considerable revenue.

4.4 The position of private industry in developing countries in a tele-economy

"Electronic capitalism"—electronic markets, investment flows, and rapidly formed relationships for daily commerce—will be the economic motor of the tele-economy. Thus the private sector, through export of services, plays a central role in the tele-

economy. But it is individual entrepreneurialism, not corporatism, that is the real driver. Be it in association with others or in one-person companies, individual entrepreneurs provide the drive and invention. Larger entities are constructed from this, first in small companies consisting of associations of single person enterprises and then in medium-size companies formed from the association of smaller firms. In consequence, large state enterprises become less important to the developing economy.

4.5 Private corporations in developing countries in the tele-economy

The new kind of company is the most important agent of change. Its drive is high-speed entrepreneurialism. This company differs from current models of state and private concerns, in that it will be smaller, have a particular structure, and individuals will have more power to decide on their work schedule and employment.

Working styles and work patterns within the company

With teleworking, employees may be located anywhere in the country, or outside it—and in remote villages, small towns, or empty countryside. The need for central offices will reduce, as will a presence in the capital. Working patterns will move to teams and projects. Teams need not be in the same location, or even in the same country. Thus the management pattern and style will be to reward by results, not by presence. Alternatives may be to have telecottages that support a rural community, either shared by employees from several companies or dedicated to one company. Moreover, since employees may not necessarily reside in the same country, “mixed nationality” companies will become common. In the teleworking company, where knowledge working is the prime activity, education and training become far more important. But such skills will be far cheaper to acquire because training will be done through electronic media, often with use of tutorials in narrowcast video-conferencing.

Contractual relationships with employees

Companies will allow more flexible employment than is the norm today, since full-time work twenty-two days a month may not be possible. Employees—especially those with more experience and a greater range of skills—will have a flexible contractual relationship that allows them to work for several employers at once. Moreover, workers will tend to have multiple skills and several jobs with different employers. Staff may only be used on an as-needed basis, for project style working, and often from the international labor market. Only low-level, mundane tasks, which require consistency and reliability, will be full time with a single employer.

Relations with customers and suppliers

Cooperation with clients and suppliers will also be closer, with a local team working as part of a client company, as often

happens in service industries. Thus the borders of the company may become indistinct as cooperation with clients and suppliers increases.

Resulting corporate structure and corporate governance

Corporate structures will be flat, with several partners or principals sharing company ownership with stock options and guiding teams, whose members may also be shareholders. National identity will not be strong (except where language is important) and the company may be spread across several countries and time zones, whatever its size. The overall corporate structure will be “virtual,” since workers are brought together as and when needed. Employee relations are based on trust and performance. They are looser contractually than previous models, where having multiple employers was taboo.

Such a commercial framework will require strong global governance to control against corruption. International bodies and safeguards will be more important than national ones as business becomes increasingly dependent on international transactions. But safeguards will be easier to implement because invoices, orders, and workflows will be maintained in a central electronic service. Operations may resemble stock exchange transactions, in which each step is recorded.

In the tele-economy the company hub is no longer the physical office but instead is an electronic network. This will often be simple networking over voice circuits with PC-style terminals linked to servers inside and outside the company. Companies will require groupworking software as well as national and global communications access. Network structures will emphasize ubiquity, rather than high speed in the local loop, due to technical advances in terminals.⁴³ Box 4.2 describes a possible structure for a private company based in a developing country in 2005-10.

5 HOW IT COULD HAPPEN—THE PLATFORM FOR CHANGE

The tele-economy will require changes in resource allocation and investment decisions.

5.1 Two views of the platform for change—techno-primitive and telecomia

Until now developing countries have generally built telecommunications for business and for the privileged, and more slowly for the masses. The new paradigm questions the basic cost model of telecommunications using advanced technology. This contrasts with the question posed by Silicon Valley developers of how to build a high-speed structure into every U.S. home and office—a proposal entailing extremely

Box 4.2 **A teleworking company in a developing economy**

The arrival of a tele-economy will unleash new access to and availability of work and working styles. The company described below, five to ten years after a major fall in telecommunications charges, reflects seven of the most likely changes:

- The nature of work—toward a service orientation.
- New ways of acquiring business—the impact of electronic markets.
- Changing working styles and work patterns within the company.
- More flexible contractual relationships with employees.
- Relations with customers and suppliers.
- Corporate structure and corporate governance.
- Monetary flows.

The Nouvelle Génération Financial Services Corporation is a small company with fifty staff dedicated to processing financial transactions for retail operations offering their own credit cards. The corporation's key tasks are to handle the electronic paperwork and to verify the accounts on behalf of clients retailers and their customers. Nouvelle Génération specializes in servicing retail credit card operations for French-speaking countries, including several African clients. Language is no barrier for the company, however, and Spanish-speaking, Portuguese-speaking, and Vietnamese retail chains are also catered to. Originally a spinoff from a teleshopping operation, the company now only supports physical shopping chains. Costs are held down because the company works from a central African country and from a location in the Caribbean that serves North American clients. The company can handle transactions for debit, credit, and promotional activities as well as credit card fraud, micromarketing, and prospect tracking for ten different types of accounting rules, which are embedded in software. It has links to major banks and card issuers as an outside adviser on transactions.

Mme. Devalle, the president, always arrives at her desk early, partly because it is in her home. She reviews a summary of the past night's transactions from the Caribbean operation and on yesterday's transactions in her own country. She then reads electronic mail received over night. In an hour she has replied to queries about outstanding transactions from Sao Tomé, France, Seychelles, Brazil, Viet Nam, Colombia, Peru, and Tunisia.

For the next two hours she roams the bulletin boards for financial processing and sees an invitation to bid for a new retail operation in Quebec, Paradis. Over the next four hours Devalle converses with her main telecottage operation in a distant village, where several of the ten business partners who form the core of the company operate from. They quickly put together a bid and include an electronic company brochure on the "do's and don'ts" of retail card operations—with full graphics and voice annotation in French and English—as part of their qualifications. One of the partners, Mme Ogwessa, suggests that they include the professional videoclip of the Caribbean telecottages to introduce the company's principal officers there. She contacts the video production company's server in Port au Prince. The videoclip is transferred across the Atlantic and appended to the bid letter. The whole bid is prepared just before the opening of the business day in Quebec, at 2 p.m. central African time. The president and the three partners then converse briefly with the Caribbean operation, which is now active, to prepare them for a possible telecast to the potential client later in the day.

The partners in the telecottages then return to the daily workload, verifying transactions and covering the accounts of thirty small and medium-size retailers worldwide. Some clients have a few thousand transactions per day, but most are in the hundreds. Each partner works with a team of four to six clerical staff who may be located in one telecottage or who may be in remote villages. Teams are connected locally over a dense matrix of low-earth orbit satellites for cellular radio packets, with fiber-optic

international links for client connections and to remote offices. Financial records are kept in a secure remote archive server in an outsourced security center, updated hourly. Telecommunications charges are flat, and are of the order of \$5 per month per staff member connected.

Each team only handles certain clients and tries to build up a strong personal rapport over the videolinks, which allow for full facial expression. Teams use groupware with workflow and some sophisticated tools for bad debt prediction for new customers. Tools are based on experience in each national market and the work of a small financial expert-systems company in Viet Nam. Their processing equipment consists of standard client server systems, with handheld client machines and wall screens, all connected together over standard radio links for data, voice, and video.

Mme. Devalle returns to the monthly administration, verifying that a global bureau operation for the payroll has paid each staff member—using electronic credits to their bank accounts—based on results (projects completed that month and any new training).

Nouvelle Génération has found that only by becoming more skilled and expert can it ward off competitors. So, customized ongoing courses in accounting, credit card fraud, and marketing are taken on-line from the best business schools, some of which are in the United States, others of which are in Ireland and Japan. Courses are taken every month by most staff through videoconferencing. Language skills are expanded by similar courses, which cover cultural issues, local marketing, and different accounting practices.

Staff also may work for other companies, since Nouvelle Génération's workload fluctuates over the month and staff numbers have to be flexible to accommodate the end-of-the-month rush. Staff numbers at mid-month may shrink to half the full complement. Thus most staff have adjacent skills in insurance processing and software creation or in a local occupation such as farming—they have built up a portfolio of skills.

Meanwhile, Mme. Devalle has sent "president-class" e-mail as a warm-up contact to the president of Paradis in Quebec, Mme. Aupont. The Paradis president immediately replies to a vocalized version of the text as she drives into work, requesting a review of the bid that morning followed by a tele-session with the ten partners participating, six of whom are across the Atlantic. The bid is sent in (all such communications are in high-security financial industries protection) and confirmation of reception is received with a time stamp from the local electronic notary public.

Since the bid is highly visual, essentially a set of fifteen animated charts and talking slides with two videoclips, Mme. Aupont can review it with her financial officers in thirty minutes. Paradis financial officers then spend two hours collecting references in live videoconferences from all over the world. Mme. Devalle already has primed key clients in other time zones to leave brief videoclips of their views on the company if they cannot be contacted directly. The live references and videoclips are in strict confidence and are very honest. Paradis soon learns that the accounts processing is impeccable but that micromarketing needs strengthening, due to use of a demographic model that only works well in North America.

Since Paradis has already reviewed five other accounts processors, the going looks tough, except that Nouvelle Génération Financial Services has specialized in the retail sector and so their bad debt prediction software is probably the best there is. Having reviewed the personnel they would deal with in the Caribbean office during the tele-session, Mme. Aupont makes a decision—to go ahead on a pilot basis. She conferences with their main card issuer to ensure that all is well on that side. At 6 p.m. Quebec time she signs the deal electronically, videoconferencing with the Caribbean office where Mr. Rocquefort, the senior partner, signs for the company and registers the contract with the notary public server. He then sends Mme. Devalle a videoclip on their success, to await her until the next morning.

high costs that are somehow paid for by entertainment services. More pressing than this “information superhighway” is how to build minimal global telecommunications on top of the basic telephony that is already in place—not introducing the most advanced (and expensive) new model (figure 5.1).

Figure 5.1 Two views of telecommunications-based development

The telecomia view:

5 billion users worldwide

- Sufficient mobile bandwidth for users’ needs
- Intelligence and compression
- New rules

Communication

- Whatever’s enough to the person or whatever
- Wherever

The techno-primitive or raw-bandwidth silicon valley view:

300 million U.S. users

- Raw bandwidth—as much as possible
- Static—fixed fiber optic, no terminal intelligence for communications
- Current rules

Entertainment - CATV

- 12 x 500 Mbps channels, minimum for HDTV, in use simultaneously all the time
- To the house/office

5.2 New motivations behind pricing

Pricing simplifies enormously in the tele-economy. Telecommunications pricing traditionally has aimed at gathering the maximum revenue from a basic connection. In a market where connection has ever-lowering costs, and charges are such that even children have mobile phones, profits will be sought in higher-value services, and so the motivation for pricing changes to encourage maximum usage of such services. Thus connection becomes a very low-cost commodity, with flat charges, sold on long-term contracts at world prices indexed to other global commodities. Any excess telecommunications capacity can be auctioned in a twenty-four-hour spot market.

5.3 Nonlinear demand effects

Studies of residential demand with lowering prices indicate a nonlinear effect at very low levels of current pricing, at which point a perception of freeness takes hold and demand explodes. Probing in the business sector has a similar effect, but the perception of freeness price point is above that for residential customers.⁴⁴ Any telecommunications system thus must be capable of handling much greater volumes of local and long-distance calls, putting heavy loads on local switching systems in particular. In the new architectures for telecommunications, however, the distinction between the local and long-distance outside plant becomes unclear.

5.4 The lightweight telecommunications infrastructure

One of the key barriers to the tele-economy is that enormous funds are not available for the technological infrastructure.

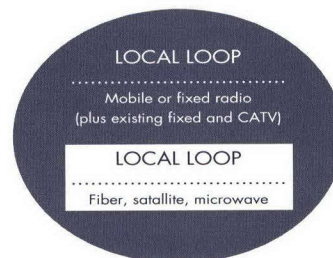
And the payback for a high-cost infrastructure is not even evident. This lack of payback forms the basis of France Telecom’s objection to providing a fiber-to-the-home structure across France. Moreover, the recent Thery Report to the French government notes that telecommunications services and cable television consumers will not pay enough in increased usage to repay such an outlay. Three other schemes have been put forward, none of which appear to be justified:

- The government borrows heavily on the international markets to fund the enterprise. It is not clear how the national-scale network would pay back such sums.
- Subscribers are forced to finance the new infrastructure through increased charges, as some RBOCs are proposing.
- Taxpayers subscribe in increased levies, directly and indirectly.

In a deregulated world, however, forced dependence on the traditional fixed infrastructure—as occurs in most of the OECD countries—could disappear. Over the next decade the older model could be leapfrogged by a new model: radio for local connection,

Figure 5.2 The new technical infrastructure with competing external

The new infrastructure is essentially radio local loop and fiber long distance



global operators providing long-distance services over a variety of transport media (figure 5.2).

Thus a developing country’s society can coexist with modern commerce and the technical support it needs by using finance and technology from outside investors.

5.5 Technologies for change

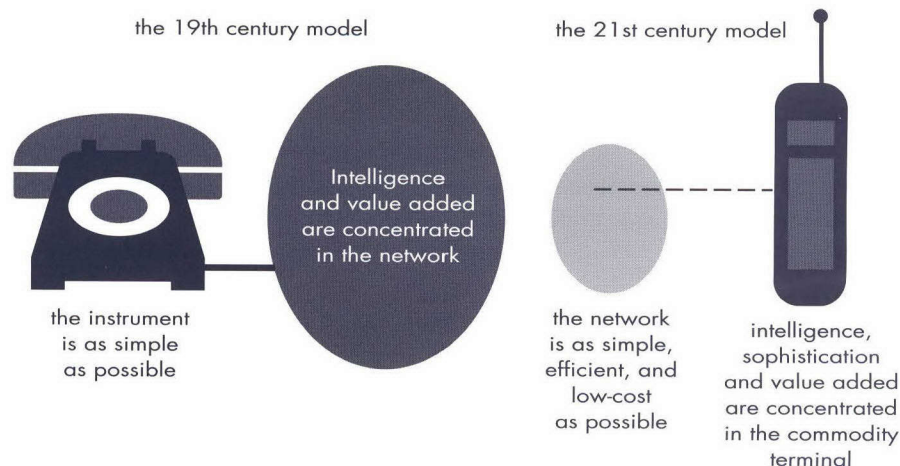
The cost of computing and processing intelligence is falling faster than the cost of installing wireline telecommunications. Thus progress will be toward cheap, simple networks, intelligent servers at the edge of the networks, and highly sophisticated user terminals (figure 5.3).

There are several key areas of progress:

- In suburban and urban areas radio is replacing wireline because of reduced static, the ability to serve mobile users, and the declining costs of the technology. Local loop radio can reduce the cost of passing a home with wireline or of connecting a mobile user from \$500 to \$1,500 toward less than \$10.

Figure 5.3 A reversal of the location of intelligence

The new infrastructure is based on a complex terminal and a simple network



The network is simple and low-cost while intelligence is poured into the element that will decrease in price fastest, the terminal.

- Techniques to reduce the cost of switching expand network call capacity and expand service choices, which together produce a new lightweight telecommunications infrastructure such as out-of-area switching and asynchronous transfer mode (ATM).
- Intelligent terminals now handle low-bandwidth communication channels for high-bit-rate media, with software agents to guide and support users.
- Low- and medium-earth overhead satellites are being placed in rural and remote areas, with a new equation for engineering, installation, and operation to lower costs.⁴⁵

6 RECOMMENDATIONS

There are some essential areas for action by the World Bank and other funding organizations and for governments. These actions must be viewed over a ten- to fifteen-year timeframe, even for early results. The key point is to begin planning now, since there is so much to negotiate and put in place.

6.1 Measures to establish the tele-economy in developing countries

The most immediate actions for developing countries are:

- Support, using standard trade documents and procedures, the creation and enforcement of World Trade Organization agreements that promote free movement of jobs, services, goods, and funds to gradually form a global common market over the next decade.
- Support the implementation of technical infrastructure and research by encouraging projects for competing local

telecommunications operations and for global services from several operators.

- As a first step, support an electronic marketplace for developing countries over the Internet.
- As a second step, develop a business Internet with low-cost, flat-rate access as part of or with links to the Internet and having a global communications infrastructure network, a Commercenet/electronic data interchange-style environment (including electronic funds transfer), and platforms for freely acting electronic markets in services.
- Form a ten-year plan for a global telecommunications governance body, covering the radio spectrum particularly, and promote the body strongly.
- Form a ten-year plan for a governance body for global electronic markets, based on experience in equities markets regulation, and link it to World Trade Organization agreements.
- Create a model of a streamlined economy for developing countries to use. This model should reduce paperwork and red tape to speed commercial processes and encourage small businesses and one-person firms to set up and participate in the tele-economy.
- Encourage improved education at all ages and especially expansion of higher education and vocational training with distance learning.

6.2 Key areas for investment

The areas suggested below are for early participation by investment institutions, perhaps with other bodies and national governments, in order to get the ball rolling:

- Set up initial financing for a global telecommunications and services governance body—especially for the radio spectrum

and for true liberal competition.

- Seed finance for a minimal technical infrastructure implementation, with early research on a number of projects, using competing participants where appropriate.
- Initial financing to set up the electronic marketplace for developing countries over the Internet.
- Initial financing to set up the second-stage business Internet.
- Planning and initial financing for a global electronic markets governance body.
- Research to create a model of a streamlined economy for developing countries to use for participation in the tele-economy.

Financing for education and training experiments using distance learning and electronic libraries.

6.3 Conditions for investment

Investment should be provided only if governance, education programs, and freedom of trade and competition in all areas are in place. Such initial conditions are essential to commercial ease of success.

6.4 Areas and approaches to avoid

Several areas should be avoided:

- Do not fund a superhighway of high-bandwidth links into the home and office.
- Do not support national PTTs in dominating telecommunications markets or in acting as the sole actor in development.
- Do not support international monopoly organizations such as Intelsat and Inmarsat in maintaining privileged positions, since they hold back private low-earth orbit satellites and global operators.
- Do not support restricted competition or monopoly price structures in local or long-distance communications, or in interconnection charges, as prices will remain artificially high.

7 NOTES

- ¹ CSMG (Cambridge Strategic Management Group), "The Macroeconomic Effects of Near-Zero-Tariff Telecommunications," 1994, Boston.
- ² British Telecom spokesperson, *IEE Review*, December 1994.
- ³ *Financial Times*, "Lines Open for the Global Village," September 17-18, 1994.
- ⁴ *Ibid.*
- ⁵ *Ibid.*
- ⁶ CSMG, "The Macroeconomic Effects of Near-Zero-Tariff Telecommunications," 1994.
- ⁷ *Financial Times*, "Big Cuts Likely in Cost of Transatlantic Calls," October 21, 1994.
- ⁸ *Financial Times*, "Cost of Transatlantic Calls Will Fall Further," January 5, 1995.
- ⁹ *Financial Times*, "British Telecom Will Cut Cost of Transatlantic Calls by up to 22 Percent," January 4, 1995.
- ¹⁰ CSMG, "The Macroeconomic Effects of Near-Zero-Tariff Telecommunications," 1994.
- ¹¹ *Ibid.*
- ¹² *Ibid.*
- ¹³ *Ibid.*
- ¹⁴ *Ibid.*
- ¹⁵ *Ibid.*
- ¹⁶ *Ibid.*
- ¹⁷ *Ibid.*
- ¹⁸ *Ibid.*
- ¹⁹ Report of the Commission of Social Justice, 1994, *Social Justice: Strategies for Renewal*, London: Vintage; *Financial Times*, "Farewell to the Family," January 9, 1995.
- ²⁰ Central Bank of Ireland, *Inflation—Dormant, Dying, or Dead?*; *Financial Times*, "Post-Monetary World on Our Doorstep," November 17, 1994.
- ²¹ Simon Forge, 1994, "High-Power Computing and the Value Chain: Information Technology Use in the Packaged Consumer Goods Industry," *Futures* (May).
- ²² CSMG, "The Macroeconomic Effects of Near-Zero-Tariff Telecommunications," 1994.
- ²³ *Ibid.*
- ²⁴ *Ibid.*
- ²⁵ British Invisibles 1994; *Financial Times*, "Invisible Trade Exceeds 40 Percent," June 15, 1994.
- ²⁶ United Nations Economic Commission for Latin America and the Caribbean 1994; *Financial Times*, "Poverty in Latin America Outweighs Growth," December 21, 1994.
- ²⁷ Policy Studies Institute 1994; *Financial Times*, "London Found to Contain Worst Poverty," November 21, 1994.
- ²⁸ *Financial Times*, "Wired to the Rest of the World," January 10, 1995.
- ²⁹ Milton Mueller, 1993, "Universal Service in Telephone History," *Telecommunications Policy* (July): 352-69.

- ³⁰ Recent industry cases in outsourced custom software development and in commercial software package development.
- ³¹ CSMG, "The Macroeconomic Effects of Near-Zero-Tariff Telecommunications," 1994.
- ³² Simon Commander and Fabrizio Coricelli, 1994, *Unemployment, Restructuring, and the Labor Market in Eastern Europe and Russia*, Washington, D.C.: World Bank.; *Financial Times*, "Low Mobility Hits Russian Jobless," October 6, 1994.
- ³³ Walter Eltis, bank credit analysis, 1995; *Financial Times*, "What Makes Debt So Special," January 16, 1995.
- ³⁴ *Ibid.*
- ³⁵ CSMG, "The Macroeconomic Effects of Near-Zero-Tariff Telecommunications," 1994.
- ³⁶ World Bank, 1994, *Averting the Old Age Crisis: Policies to Protect the Old and Promote Growth*. New York: Oxford University Press; *Financial Times*, "Confronting the Old Age Crisis," December 19, 1994.
- ³⁷ CSMG, "The Macroeconomic Effects of Near-Zero-Tariff Telecommunications," 1994.
- ³⁸ *Ibid.*
- ³⁹ *Financial Times*, January 10, 1995.
- ⁴⁰ *Financial Times*, "Telekom Sails into Unknown Waters," December 28, 1994.
- ⁴¹ Sharon Moshavi, "India's Great Telecom Bazaar," *Business Week* (January 9, 1995).
- ⁴² Simon Forge, 1992, "The Business Use of Radio: Opportunities and Barriers," Index Foundation Position Paper.
- ⁴³ CSMG, "The Macroeconomic Effects of Near-Zero-Tariff Telecommunications," 1994.
- ⁴⁴ *Ibid.*
- ⁴⁵ *Ibid.*, appendix 3.

8 FURTHER READING

- Joseph Pelton,
Future View, 1992, University of Colorado at Boulder.
- Robin Mansell,
The New Telecommunications, 1993, Sage.
- Stephen Bradley and others,
Globalization, technology, and competition, 1993, HBS.
- Peter Drucker,
Post-capitalist Society, 1993, Butterworth Heinemann.

INDUSTRY & ENERGY DEPARTMENT

THE WORLD BANK

1818 H STREET

NORTHWEST

WASHINGTON DC

20433

USA

TELEPHONE

1(202)477-1234

FACSIMILE

1(202)477-0685

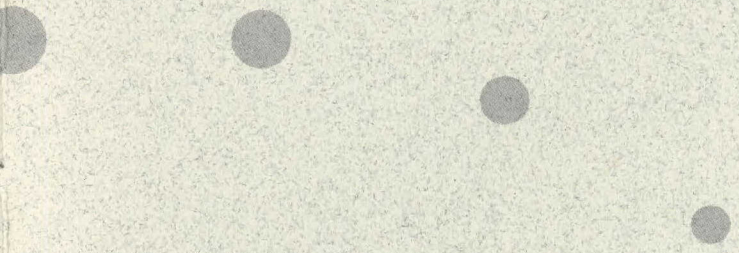
E-MAIL

infodev@worldbank.org@internet



The World Bank





infoDev

information for development program

foDev



harnessing information
for development



The World Bank

With the rapid technological and economic innovations we are witnessing today, the information revolution holds inestimable promise for people in emerging economies. But to leapfrog into the future, developing countries need a place where information on building an infrastructure, accessing social services, organizing production and creating an investor-friendly environment can be shared. Economic growth needs knowledge. The more knowledge is shared, the more growth is generated in industrialized as well as emerging nations.

"THE INFORMATION SOCIETY IS RELEVANT TO ALL HUMANITY
AND, THEREFORE, CANNOT IGNORE THE POSITION, NEEDS AND ROLE
OF THE DEVELOPING WORLD."

-THABO MBEKI

DEPUTY PRESIDENT, REPUBLIC OF SOUTH AFRICA

information technology revolution



AROUND THE WORLD, AN INFORMATION TECHNOLOGY REVOLUTION IS OCCURRING...

In Mexico, the government's economic program emphasizes the role of information. As a key tool to further the country's participation in the global economy, the government has requested an examination of the way the country acquires, diffuses and utilizes technological knowledge. Access to experienced consultants is necessary to complete this knowledge assessment.

In Brazil, the government is helping establish a national information infrastructure to support education and research activities around the country, including the poorest regions. Receiving expert advice on improving and expanding local area and national network linkage, obtaining financing, and training network administrators would greatly assist the country's fight against poverty and growth into the advanced information age.

In Central Asia, water resource management is essential to control environmental degradation and manage irrigation and energy production. The complex water resource management relationships among Uzbekistan, Kazakhstan, the Kyrgyz Republic, Turkmenistan and Tajikistan requires an easy flow of data and exchange of information among the five Central Asian nations. The creation of a managed electronic network would allow these nations to share experiences with other water basin areas around the world.

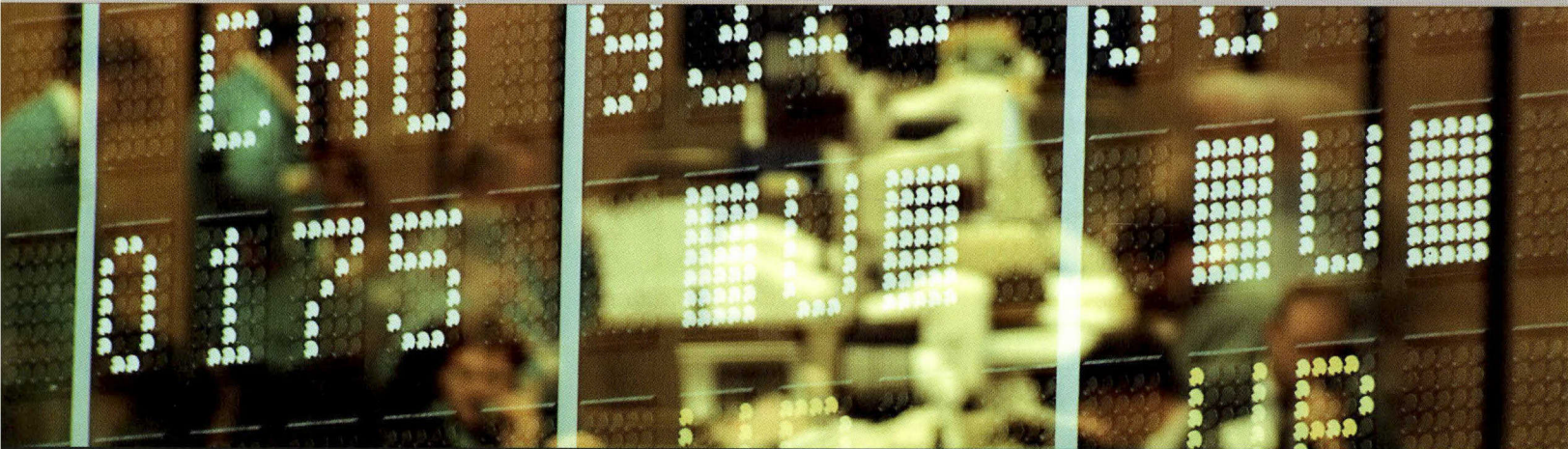
Sub-Saharan Africa is facing a huge unmet demand for higher education as well as a dearth of well-qualified faculty. Utilizing the capabilities of new technologies, a proposed "virtual university" would provide quality professors plus access to libraries and laboratories to people and enterprises including those in isolated and remote places throughout Africa. Establishing this important educational vehicle requires feasibility studies, research and development and organized financial support.

With the rapid technological and economic innovations we are witnessing today, the information revolution holds inestimable promise for people in emerging economies. But to leapfrog into the future, developing countries need a place where information on building an infrastructure, accessing social services, organizing production and creating an investor-friendly environment can be shared. Economic growth needs knowledge. The more knowledge is shared, the more growth is generated in industrialized as well as emerging nations.

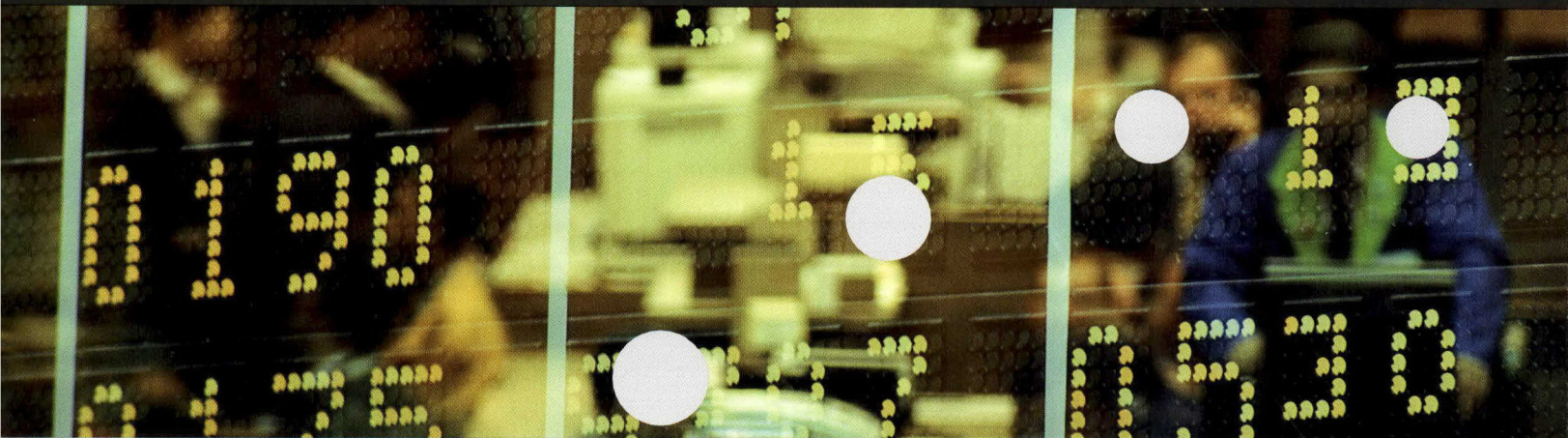
"TO FURNISH THE MEANS OF ACQUIRING KNOWLEDGE
IS THE GREATEST BENEFIT THAT CAN BE CONFERRED UPON MANKIND.
IT PROLONGS LIFE ITSELF AND ENLARGES THE SPHERE OF EXISTENCE."

-JOHN QUINCY ADAMS

1846



e m e r g i n g e c o n o m i e s



EMERGING ECONOMIES AND THE INFORMATION AGE ... OPPORTUNITIES AND CHALLENGES

As the world moves to an information-led economy, telecommunications and informatics are rapidly changing. Telecommunications is relying increasingly on private participation and competition. Information processing is permeating all the sectors of economies in both developed and developing nations. New data compression systems are being developed. Fiber-optics and wireless communications techniques are constantly improving. Costs are dropping so rapidly that, within the next twenty years, the exchange of information may be practically a free commodity. Digitalization is causing a convergence of broadcasting, publishing and other information-based services and opens the possibility of universal networks with the world available at one's fingertips. For the emerging economies these changes present exciting opportunities and pose many challenges.

New technology allows countries to overcome some development constraints. Distance education, for example, can become a viable complement to conventional schooling. Modern information infrastructure can create the "end of geography" and allow isolated countries and regions, which often are also the poorest, to participate in the economic process. Financing, operation and ownership of information infrastructure are becoming increasingly attractive to the private sector, thus reducing the burden on public sector finances.

Governments of emerging economies need to take several steps to prepare for this shift to an information-led economy. Appropriate legal and regulatory environments need to be set in place as information infrastructure development requires moving away from traditional monopolies to an environment in which information services are provided on a competitive basis. In addition, a major effort in knowledge expansion is needed to ensure that productivity gains improve competitiveness.

Throughout the world, there is a need to share knowledge about infrastructure information development and telecommunications advances. The time is ripe for development assistance institutions and private organizations to form a partnership to further help emerging economies benefit from the rapidly expanding information revolution. The time is ripe for *InfoDev*, the Information for Development Program being established by the World Bank.

InfoDev

OPENING DOORS TO THE INFORMATION REVOLUTION

For developing countries to integrate fully into the information economy, access is needed to knowledgeable and experienced resources to open the doors to the vast potentials of new technologies. In response to that need, the World Bank is establishing the *Information for Development Program—InfoDev*—a global program.

InfoDev is an important link to the vast network of technical, informational and communications expertise available throughout the world. The program helps ensure that developing economies have access to information that is relevant, just in time, and above all objective and free from conflicts of interest. Through its partnership with governments, multilateral and bilateral donors, the private sector and not-for-profit organizations.

InfoDev shares world-wide experience with and disseminates best practices to governments and key decision-makers, both public and private, on the economic development potential of communications and information systems. *InfoDev* channels policy advice and other technical assistance to governments in emerging economies on privatization, private entry and competition, and on improving the policy, regulatory and business environment for investors in communications and information systems. *InfoDev* conducts feasibility and pre-investment studies and prepares experimental applications in communications and information systems.

InfoDev ACTIVITIES

InfoDev's principal vehicle for attaining its goals is through the support of diverse, action-oriented *activities* that are local, national, regional or global in scope. Activities, which can cover one or more countries and address one or many sectors, usually require partnerships between governments, the private sector and the international development community. *InfoDev* helps create such Partnerships.

Most *InfoDev* activities fall under four broad categories: Consensus Building, Information Infrastructure Strategies, Telecommunications Reform, and Demonstration Projects.

Consensus Building may include national, regional or sectorial workshops focused on a wide range of topics including telecommunications reform, information infrastructure or information systems for education and health. International workshops on targeted information issues like international telecommunications accounting rates and the protection of

intellectual property rights may also be held. In addition, *InfoDev* sectorial networks, in association with similar networks, could provide communication facilities to virtual communities and improve exchange of specialized information.

Information Infrastructure Strategies may include national information infrastructure assessments, sectorial competitiveness strategies, feasibility studies for information infrastructure projects, assistance with legal, institutional and regulatory reform and the dissemination of best practices for sector reform. Specific activities could include defining a portfolio of strategic information systems or defining policy or institutional reforms such as intellectual property rights legislation to support sector competitiveness. Knowledge assessments, in which a team studies the efficiency with which a society acquires, diffuses and utilizes technological knowledge could also help a nation define a broad strategy to better utilize information resources and processes. Other activities could include creating documentary or software packages on model agreements, legislation and regulatory instruments.

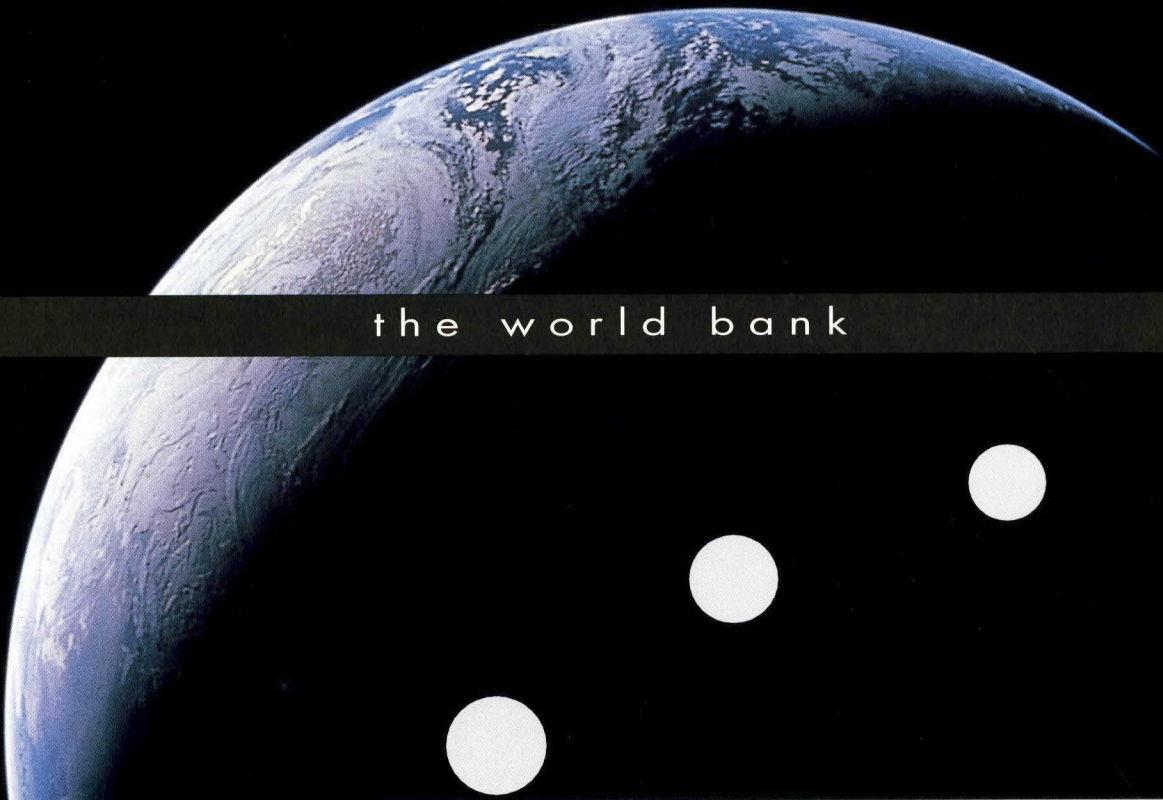
The assessment, design and/or implementation of **Telecommunications Reform** includes activities ranging from single issue studies to comprehensive sector reform plans to multi-year reform implementation programs. Specific activities could include assessing an existing policy, designing a plan for opening telecommunication markets to competition and promoting the role of the private sector in investment.

Through **Demonstration Projects**, *InfoDev* tests the applicability of information technology and telecommunications to the solution of vexing problems of development including poverty, illiteracy, environmental degradation, urban decay, illness and malnutrition. Activities could include developing an educational and entrepreneurial facility for training, or designing distance education programs. Other activities could include creating a prototype software system to demonstrate the feasibility and features of an integrated public financial management system or sponsoring self-sustaining community centers that provide information services to underserved urban and rural communities.

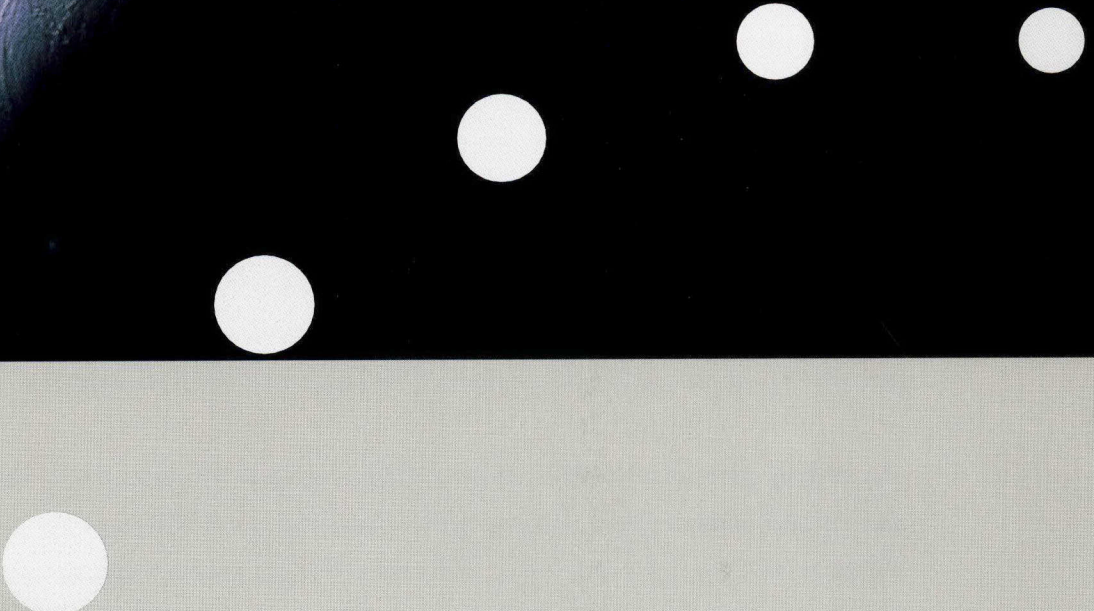
Depending on the scope of the project, *InfoDev* activities may take a few weeks or several years to complete, at costs ranging from several thousand dollars to \$1 million or more. Whether it be assisting with the privatization of a telecommunications sector, increasing awareness of the implications of the information revolution for economic development or recommending measures that a country could take to strengthen its technological capacity, *InfoDev* mobilizes world-class, unbiased expertise in support of government initiatives in the information sector.

"THERE ARE THINGS THAT ARE KNOWN AND THINGS THAT ARE UNKNOWN
IN-BETWEEN ARE DOORS"

-ANONYMOUS



the world bank



THE ROLE OF THE WORLD BANK AN OBJECTIVE AND EXPERIENCED THIRD PARTY

Governments often have difficulty filtering and absorbing the required professional advice and, even when they do, have problems managing the strong domestic and foreign vested interests which can derail and delay the needed reforms.

A program like *InfoDev*, therefore, needs to be managed by a third-party institution with excellent links to—but independent of—the sector participants, including: governments, national post and telecommunications companies, the private sector, development assistance institutions, consulting firms, investment banks and consumers. The role is one of an *honest broker* working in an objective manner with the emerging economies as they define their needs, and subsequently, reaching out to match these needs with the resources that are required to satisfy them.

Given its multilateral status, its cross-sectorial approach to development issues and its relationship with both developed and emerging economies, the World Bank is uniquely able to play the role of intermediary between all *InfoDev* parties. Through *InfoDev*, the World Bank becomes not only a significant direct financing source but also as a catalyst in attracting financing from other sources and acting in a more advisory capacity.

infoDev FUNDING CONTRIBUTIONS, ACCOUNTABILITY, GOVERNANCE

InfoDev has access to resources provided by: the World Bank Group; other public organizations and private sources including enterprises and non-profit foundations.

The responsibility for the administration of the financial resources of *InfoDev* is with the World Bank. Donors receive quarterly updates on program disbursements and activities in progress. A report on *InfoDev* activities and financial statements is prepared annually by *InfoDev* management, reviewed by external auditors and circulated to donors and others.

GOVERNANCE

The governance of *InfoDev* includes a Donors' Committee, a Technical Advisory Panel and a Program Manager.

The *Donors' Committee* approves policies and long-term strategies, and the prospective annual work program and budget.

The *Technical Advisory Panel* (TAP), comprises world experts in telecommunications and information systems, who provide advice to the Donor's Committee.

The *Program Manager* is a senior official of the World Bank who is responsible for the preparation and execution of *InfoDev*'s annual work program and financial plan. The program manager also maintains close relations with donors, mobilizes resources, and keeps all interested parties informed on *InfoDev* activities.

For further information about the *InfoDev* donor program, please contact the World Bank's Industry and Energy Department by telephone at (202)477-1234 or e-mail at infodev@worldbank.org.



Erratum

The second paragraph of the Governance section of the present *InfoDev* brochure should read as follows:

The *Donors' Committee* considers policies and long-term strategies, and approves the annual work program and budget.

INDUSTRY & ENERGY DEPARTMENT

THE WORLD BANK

1818 H STREET

NORTHWEST

WASHINGTON DC

20433

USA

TELEPHONE

1(202)477-1234

FACSIMILE

1(202)477-0685

E-MAIL

infodev@worldbank.org



The World Bank

