

THE ▼ URBAN ▲ AGE

N E O R M A T I O N A N P C U H T E S

Cities and the Information Revolution

by Trip DuBard

CAMBRIDGE. There was a time in Delhi, India, when train passengers waited hours in line simply to make a reservation. The system, which handled 40,000 transactions per day, was overwhelmed. Little changed until, over time, the system was computerized. When the transformation was complete, average waiting time dropped from several hours to 15 minutes, saving more than 20,000 man hours *per day*.

Clearly, the information age has arrived, and not just in the world's largest cities. But the effects of the revolution are still unfolding, and cities and nations are just now understanding the promise and the peril of the information era.

The magnitude and speed of the revolution itself bears notice. Although difficult to quantify, the information revolution clearly ranks with other historic economic ground swells. For instance, the Industrial Revolution was fueled by a 50 percent decline in energy costs over a 30-year period. By contrast, the cost of storing, processing, and transmitting information has dropped 20 percent *annually* over the past 20 years.

Information has become as important an input as human, natural, and financial resources in the development of modern economies. As valuable as a commodity alone, information also serves as an input to more traditional goods and services. As a factor of production, information increases productivity (for example, by allowing one person to type, edit, design, and print in one hour a document that could have taken several people an entire day) and decreases cost (for instance, in lowering inventory costs by precisely timing the manufacturing process to coincide with customer need).

And, despite the revolution's youth —the personal computer first appeared barely 20 years ago —some potential outcomes are already becoming apparent, particularly the threat of an uneven distribution of the new age's benefits. If that continues, then an information revolution that could raise the quality of life as a whole may serve to emphasize existing societal divisions.

Impact on cities

The information age's impact on cities mirrors those on society as a whole. The new information economy favors those areas that create and store valuable information. So cities with great universities and research institutes stand to benefit most. Such cities generally are the larger ones, which in turn draw diverse interests that intellectually feed and develop from one another. This creates synergies of information development that make the

continued on page 4 ►

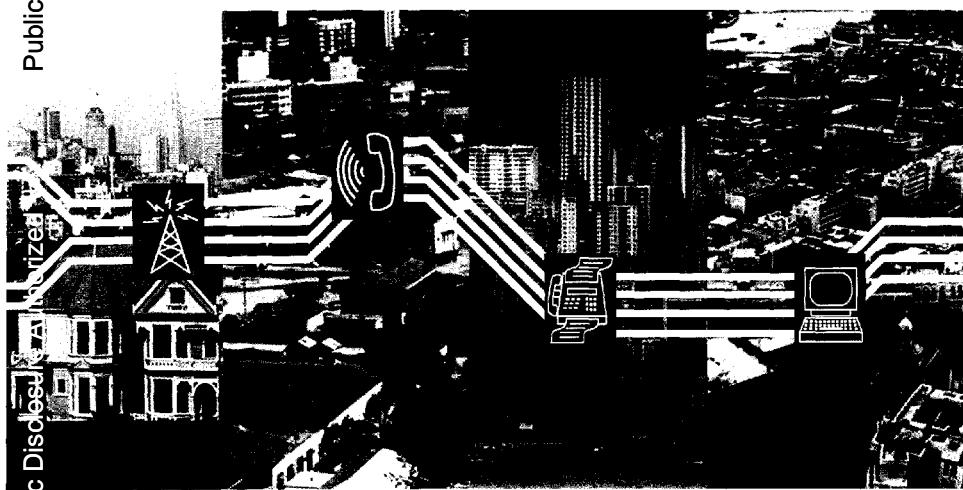
IN THIS ISSUE

- 1 Cities and the Information Revolution by *Trip DuBard*
 - 7 Linking Hong Kong and the Mainland by *Dominic Ziegler*
 - 9 Eastern Europe: Striving Toward the Information Age by *Edward G. Czarnecki*
 - 10 Data Processing: Economic Promise for Developing Country Cities by *Amos Gelb*
 - 11 Information: Correcting the Educational Imbalance in South Africa by *Tim Cohen*
 - 12 Information and the City: Cirea 2025 by *Colin South*
 - 13 Radio: Gateway to the Information Revolution by *Bruce Gerard*
 - 14 Jakarta, Indonesia: Managing Information on the Urban Environment by *Nigel Edmead*
 - 16 Staying in Touch: A Notebook by *Paul R. Berczeller*

DEPARTMENTS

- 2 Letters to the Editor**
 - 3 World View** The City in the Age of Information by *Everett E. Dennis*
 - 15 Featured Columnist**
Information Technology, Cities, and Development by *Manuel Castells*
 - 17 Mayor's Column** Information Technology as a Management Tool: Bulawayo's Experience by *Mike M. Ndubiwa*

An Interview with J.T. Malinga, Mayor of Bulawayo
 - 18 Roundtable** The Information Gap: Crisis or Opportunity? by *Howard Frederick, Anwar Al Ghassani, Zrinjka Perusko Culek, Naren Chitty, Francois Fortier, Sean Ó Siadhail, Ursula Maier-Rabler, and Arnoldo Coro Antich*
 - 20 Communities Speak** The Parque Ecologico do Cocó: A Publicity Coup by *Julia Bucknall*
 - 21 From the City Manager's Desk**
 - 22 Books**
 - 23 The Urban Calendar**





This issue of *The Urban Age* is funded by the Danish Agency for International Development, the Federation of Canadian Municipalities (Canadian International Development Agency), the Fannie Mae Office of Housing Research, the Dutch Ministry of Foreign Affairs, and the World Bank. Developmental funding has been provided by the UNDP-UNCHS(Habitat)-World Bank Urban Management Programme and the World Bank.

EDITORIAL BOARD

Jeb Brugmann
ICLEI, Toronto, Canada

James H. Carr
*Office of Housing Research
Fannie Mae, Washington, D.C., USA*

G. Shabbir Cheema
UNDP, New York, USA

Charles Correa
Bombay, India

Zsuzsa Daniel
*Research Institute
Ministry of Finance
Budapest, Hungary*

Mamadou Diop
*Dakar Metropolitan Community
Dakar, Senegal*

Nigel Harris
*Development Planning Unit
University College
London, England*

Th. H. Kolstee
*Dutch Ministry of Foreign Affairs
The Hague, The Netherlands*

Aprodicio Laquaan
*UBC Centre for Human Settlements
Vancouver, Canada*

Jaime Lerner
Curitiba, Brazil

Akin Mabogunje
Ibadan, Nigeria

Pablo Trivelli
*Urban Management Programme
Quito, Ecuador*

Jaime Valenzuela
IULA/CELCADEL, Quito, Ecuador

EXECUTIVE COMMITTEE

Arif Hasan
Karachi, Pakistan

Hilda Herzer
*Centro Estudios Sociales y
Ambientales
Buenos Aires, Argentina*

Peter Swan
UNCHS, Nairobi, Kenya

EDITORIAL STAFF

Editor Mary McNeil

Associate Editor Margaret Bergen

Production Michelle Lynch Zook

Distribution Consuelo Powell

LETTERS TO THE EDITOR

We welcome your comments, thoughts, and suggestions on *The Urban Age*.

The following were received in response to the October 1994 issue "Privatization and Cities":

Editor:

Richard Batley's article, "Privatization: Can Government Manage It?" clearly highlights the challenges Nigerian urban development practitioners and the Urban Development Bank of Nigeria face.

The three tiers of government today include the federal government, 31 states including Abuja, the federal capital, and 589 local governments. During the oil boom era of the 1970s, the three tiers of government assumed the role of providing, expanding, and maintaining infrastructure facilities. However, no attention was paid to the need to adopt appropriate technology in project implementation, to establish adequate institutional mechanisms for ensuring effective project maintenance and for enhancing internal revenue generation through rate collection and user charges. Above all, state and local governments became less accountable to their citizens because they depended largely on monthly allocations from the federal government for their operations. They did not have any incentive to mobilize abundant local resources. As a result, the country is now saddled with a mounting external and internal debt burden.

The need, therefore, for all the tiers of government to have a standard transition program from "sole producer and deliverer of services" to that of "enabler" and "regulator"

cannot be over-emphasized. Perhaps, by effectively combining its twin roles as a development agency and a financial institution the Urban Development Bank of Nigeria can initiate appropriate capacity building programs for the governments within the context of the new National Urban Development Policy.

Dr. Mustapha Zubairu

Architect/Planner

Victoria Island, Lagos, Nigeria

Editor:

Your article, "Côte d'Ivoire: Public Sector Participation in Water Supply and Sanitation" is a particularly informative piece on what might be called the gradual approach to privatization.

The article is important because it demonstrates the efficiency and cost effectiveness of service delivery and operations that are made possible by expanding the role of the private sector in water supply and sanitation.

I am currently involved in the assessment of water supply options for the City of Bulawayo and Matabeleland North in Zimbabwe. Given our need to find the appropriate mix between government and private sector involvement in the provision of sustainable supplies of water to this drought-stricken region [at an operating cost of more than US\$0.45 per cubic meter], we look forward to future articles that draw upon the past experiences of other cities.

Kenneth Small

Adviser

*Matabeleland Zambezi Water Trust
Bulawayo, Zimbabwe*

Editor's Note

There is little doubt that the information revolution is sweeping the globe, determining not only the way cities are managed, but how they will prosper and grow. Without the ability to both process and create information, technophiles warn, cities are destined to fall hopelessly behind, doomed to fail in an increasingly competitive world.

Such first world predictions sound particularly dire to many in the developing world, where the unequal distribution of resources has created a growing gap between the "information rich" and the "information poor." Tokyo today has as many telephones as all of Africa, and only 2 percent of spending on information technology is made by developing countries—which account for 80 percent of the world's population.

How can developing countries begin to bridge this information gap? In this issue we have focused on clarifying for our readers some of the new technologies being used, where they are being used, and how they are leading to social and economic development. Dominic Ziegler, Hong Kong Bureau Chief for *The Economist*, writes of the economic boom being fostered in mainland China due to improved communications with Hong Kong's massive information network. In South Africa, Tim Cohen of *Business Day*, writes of satellite networks being set up to transmit educational

programs to students long neglected under apartheid rule. And Amos Gelb of *CNN* gives us a glimpse of the data processing industry in the Caribbean, where a growing number of jobs are being generated as a result of the transfer of new technologies.

In illustrating both the pros and cons of the information age, we have tried to bring all sides of the issue into the debate. In the roundtable, eight leading specialists, the majority of whom come from developing countries, discuss how information technologies are likely to change the way we live. By exploring the ways in which information is transmitted in Equatorial Guinea, we hope to lend perspective to those of us who take access to the information superhighway for granted. Finally, through our interview with J.T. Malinga, mayor of Bulawayo, Zimbabwe, we see the importance of information technology not only in managing how a city is run but in how local leaders communicate with their constituents.

We are fortunate in this issue to have contributions from a large number of journalists in the field. As users of information on a daily basis, their timely and well-written input is especially appreciated. I would also like to welcome Margaret Bergen, a former columnist for the *Catholic Herald*, as our new associate editor. We hope you find the issue of interest, and as always, welcome your comments and criticisms.

—Mary McNeil

The City in the Age of Information

by Everett E. Dennis

Everett E. Dennis is executive director of The Freedom Forum Media Studies Center at Columbia University in New York City and the author of more than two dozen books about media, communication, and related topics. He is also senior vice president of The Freedom Forum, the world's largest media and communications foundation.

3

At first glance, much of modern communications technology in what has been called the information age seems directed by and at urban elites. Global television services, for example, are a staple in international hotels, businesses, and government ministries. At the same time, on-line information services, whether on the Internet or a more specialized network, also seem to date on the elite infrastructure of urban life.

Today many barriers that slowed or blocked the spread of global information services have broken down. The rapid spread of new technologies such as satellites, high-speed and low-cost computers, fiber optics, cellular telephones, and other innovations make possible links between and among peoples that would have been impossible a decade ago. Also cooperating are economic forces advanced by regional and international pacts and the emergence of a global economy for many goods and services. In the public sector, the transformation of much of the world after the fall of communism and the rise of market economies and democratic governments has stimulated communication between and among individual countries and regions of the world. In many countries, governmental regulations affecting broadcasting and telecommunication have been relaxed, and privatization has been encouraged. This is true in Western Europe, Latin America, East Asia, and elsewhere. This convergence of technological, economic, political, and social forces opens the way to test the idea of global communications, wherein the most advanced information systems can connect international organizations, institutions, countries, regions, and individuals in a fashion

heretofore unknown in human history.

While technophiles herald the benefits of the new information age for individuals, institutions, and societies, technophobes warn that the gap between the affluent and the dispossessed is widening. And even as businesses and government employ the full range of new information technologies and services for positive ends, so are more negative forces associated with criminal activity, ethnic hatred, and propaganda using the same tools for more venal ends.

The great challenge for cities in this period of technological

provided by either satellite or cable, and virtually none have access to computers and the flow of information they bring. Bringing poor urban neighborhoods from Jakarta and São Paulo to New York and Shanghai will happen in piecemeal, incremental fashion without some purposeful plan. Information services can be linked to economic development and sustainability, the delivery of health care information, crime prevention, and many other social needs and goals.

Advanced countries like Finland are addressing this need by achieving 100 percent com-

areas district by district, neighborhood by neighborhood, or block by block until some basic level of communications and information services is within everyone's reach. Just what this threshold will be can only be decided locally, possibly against an international or regional standard. Naturally, the spread of technology and information services requires a nexus between private sector and governmental interests, not the least of which is educating people so they can benefit from the very information being disseminated.

At present, many of the large urban communities of the world are isolated from the flow of information regarded as essential to modern life itself. The great flow of contemporary information includes not only individual messaging and news of public life, but opinions, entertainment, commercial messages, and promotion. All seem essential to membership in the modern community of nations, economic interests, and social development. Access for all, whether that access is intense or peripheral at first, is critical if the disparities among peoples now so evident in the world are not to grow greater. At the same time, students of information and technology counsel patience, noting that earlier innovations ranging from the telegraph to the telephone, as well as radio, television, and computers, took decades to reach more than half of the population even in the most developed industrial societies.

What Can Be Done?

- Establish cable or closed-circuit television systems to make accessible to all citizens public meetings of municipal government bodies or public hearings.
- Create a computer bulletin board and a hard-copy version for kiosks to facilitate interactive communication among government officials, business leaders, and other members of the public.
- Encourage neighborhood communication where neighborhoods and other urban districts and designations can communicate with each other, using desktop publishing, radio, closed-circuit TV, and other means.
- Urge all citizens to become communicators, using cable, low-power TV, cellular radio, and telephone to establish local links.
- Facilitate more institution-to-institution communication between and among business, education, labor, and other fields.
- Develop a feedback system for citizens to reduce their sense of powerlessness through personal communication that gets a response.

convergence, when all forms of communication come together in one electronically based, computer-driven system, is seeing that various new media forms and systems are used to solve serious urban problems. Information literacy, wherein the vast majority of the population has access to a wide range of information, is essential to democratization in the city as much as it is in the countryside. Yet the spread of urban poverty, slums, and shantytowns is notable the world over. Few of these enclaves of the dispossessed have services

puter literacy in children between the ages of ten and 15 in a high-quality educational system, but developing nations need programs of education and training before leapfrogging technologies can help solve local or urban problems. Some consideration might be given to communications development programs in urban

The Urban Age aims to stimulate lively debate and interaction on various topics in developed and developing countries. The ideas expressed in articles appearing in The Urban Age reflect the personal comments of each author, and are not representative of any one agency or organization. Individual articles appearing in The Urban Age may be reproduced or reprinted provided the author(s) and The Urban Age are cited, and a courtesy copy is sent to The Urban Age.

INFORMATION

continued from page 1

whole of a city's distinct communities greater than the sum of its parts. And such urban learning centers attract private industry, which in turn attracts the investment necessary to build a robust information infrastructure that can quickly and efficiently distribute the knowledge of the city.

Those cities lacking such size and synergies will have to deploy their resources with care—both to best develop the urban infrastructure, and to create and market the most “valuable” information. This means going beyond the efficiencies information technology enables in government services and operations. It means exploring ways local knowledge can be transformed and distributed as marketable information.

Some cities have already incorporated new technologies into their day-to-day operations as well as into their long-range economic development plans. Properly deployed, information resources can help governments reach more citizens, allow more informed purchasing

decisions, help improve government planning processes by providing more complete pictures of problems and options, suggest and monitor infrastructure needs, and empower citizens.

Such “internal” efforts for the most part are unseen by the city resident: a streamlining of billing processes for instance, or a quicker turnaround in information requests. These are due to such things as efficiencies of more powerful word processing and database programs. In Korea, for example, the Pusan city government installed a computerized budget and financial model that, in three years, helped increase tax collection 6 percent and halved the city’s debt.

Other inventive efforts are underway, including:

E-mail and City Computer Systems: Many cities now run or support computer systems allowing electronic (e-mail) access to government offices and elected officials, as well as to government meeting schedules. The systems can be as elaborate as click-and-change computer screens guiding viewers among services and offerings or as simple as message transfer.

Geographic Information Systems: One of the first uses of information technology, these systems allow cities to manipulate vast amounts of demographic and environmental information to determine the most efficient and effective areas to place services, such as water lines and police stations.

In Indonesia’s Semarang City, for example, use of GIS enabled a 50 percent increase in property tax revenues within a 30 square kilometer area. And in Angola, GIS proved a low-cost alternative for full parcel mapping for planning and taxation purposes. Shanty parcels were assigned codes in a virtual addressing system by digitally processing aerial photos of the area.

Health Information: In the Ahmedabad, India, district’s health information system, up to 40 percent of field workers’ time was spent maintaining as many as 18 health registers. Computerization has automated much of the system, freeing up workers’ time and eliminating eight to ten registers.

Environmental Management: In the Chambal, Mahanadi, and Krishna river basins of India, new computer and telecommunications systems monitor water inflows and warn of peak periods, creating an automatic flood forecasting network.

Telecommuting: Systematic efforts at enabling city workers to remain at home and work are designed to lower urban costs. In Los Angeles about 3 percent of the county government’s work force works from home for two to three days per week. The county estimates savings at US\$13,000 per employee per year in office expenses, increased productivity, and lower absenteeism.

Road Planning and Traffic Coordination: Los Angeles uses an automated traffic monitoring system of buried street sensors and remotely controlled video cameras to handle its traffic problems. The system has been credited with cutting vehicle delays by 50,000 hours per day, or 31 percent of the city’s daytime population. Other cities are working with similar programs.

Information Sharing: Local governments have taken advantage of cable television franchises to ensure that local programming is available. In England, cities are experimenting with systems allowing home shopping, job vacancy information, and messaging systems.

Effect on ‘external’ economies

Information is also a key ingredient in allowing cities and nations to compete more effectively in a global environment. In Mexico, for example, recent investments have helped modernize that country’s

continued on page 5►

Defining the Information Revolution

Information technology is to knowledge what roads and rivers were to the Industrial Revolution—speedy channels of distribution. More specifically, “information technology” generally includes all of those technologies that enable the rapid and efficient transportation of information. That includes computers and telecommunications, including satellite, fiber optic cable, and wireless and standard telephone wire. Also included are software applications and their uses, including broadcasting, electronic publishing, and others. “Information economy” refers to those sectors of the economy in which information is the primary output.

The new information technology’s chief characteristic is the ability to transmit volumes of information immediately and without regard to the physical location of the sender and receiver. As author John Naisbitt puts it, “Computer companies typically emphasize the benefits of people working with computers, but the real benefits, which will be increasingly realized over time, are quite the reverse. Telecommunications and its infrastructure put people in touch with one another.” This suggests a greater emphasis on the flow of ideas and less on the functions of individuals that generate them. With that in mind, the key drivers of the information revolution can be further defined as the creation of market-ready information and the technical ability to distribute it.

Of the two, technology is the easiest to define and measure, for it manifests itself with telephone wires, computer terminals, and the like. And yet, it varies in quality and capability. Traditional telephone wire, for instance, can carry from four to 240 telephone calls simultaneously; fiber optic cable can carry more than 100,000. As well, the compatibility of differing computer systems can determine the ability to distribute. This remains an issue in many governmental locations, as dispersed purchasing authority may result in differing and incompatible computer systems. Computer compatibility, then, goes beyond simply having a piece of hardware in place to include the technology’s ability to interact with other systems.

More difficult to measure is “market-ready information,” meaning information which has a buyer ready to purchase it. Such information may include the price of grain in the Ukraine, the structure of a new California microchip, or the prospects for automobile production in Japan. All such pieces of information have a value in and of themselves, yet can also increase the value of other products as well—for instance, the microchip knowledge could speed the production process of a new computer-designed industrial part, and the grain price could determine the production level at a bakery.

Which is more important—the ability to create information or the ability to distribute it? The progress of the information revolution shows that technical ability is not sufficient to drive the information economy. From the world’s most developed cities to towns such as Brusque, Brazil, technology has served to improve existing business services. Technology serves to *enable*, not produce. Information creation, then, is the basis of the economy and the more critical of the two drivers.

—T.D.

INFORMATION

continued from page 4

customs system. At Nuevo Laredo on the U.S. border, the main transit point for trucks, processing time for transactions dropped from three days to 20 minutes. Estimates show that the system will save US\$2 billion annually—or roughly 1 percent of Mexican GDP.

Inventive efforts include:

Teleports: To maintain and support information-based industries, larger cities in more developed nations have created teleports, areas concentrating information technology resources such as communications equipment linked to satellites. Users either locate adjacent to the teleport, or access it through communication lines. Teleports exist in London, Rotterdam, New York City, and Osaka and are often joint ventures between public and private concerns. Germany has a national chain of some 30 teleports, and the concept is spreading across Europe.

Specialized Telecommunications Networks: Edinburgh, Scotland, and San Antonio, Texas, have each separately worked with local telecommunications companies to develop specific packages to attract business.

Targeted Development: Singapore is the most prominent example of this tactic. This city-state seized upon its strategic location to develop as an information transportation hub and used technology to spring its economy. Some 3,000 companies have been attracted to Singapore, which has been so successful that it now directs some low-skill jobs away from its workers and toward other area countries. Still, Singapore has attributes that make such success difficult to transfer—primarily an extremely strong central government with the ability to run the public sector as an efficient business.

'Information poverty'

Despite the growing number of technologies now being used to better manage city governments, as well as to stimulate economic growth, the fact remains that most of these technologies exist in the developed world. Of growing concern is the unequal distribution of information resources between developed and developing countries. For example, Tokyo today has as many telephones as all of Africa. Moreover, the disparities promise to worsen: A 1991 World Bank study found that just 2 percent of spending on information technology was made by developing countries—which account for 80 percent of the world's population.

This disparity has led to "information poverty" in much of the developing world, according to Nagy Hanna of the World Bank. Such poverty takes many forms: planning without facts, unreliable information on external debt and poverty, poor information support to top decision-makers, inadequate financial control, and cumbersome reporting and monitoring systems, among others.

A recent report by the Economic Commission for Africa asserted that the lack of data describing demographic, social, environmental, and economic situations seriously hampered development management. Many Latin American countries lack current and adequate national accounts and balance of payments estimates as they grapple with the challenges of structural adjustment. Highly populated Asian countries lack current information on the nature and extent of poverty and on the effect of various national programs on poverty alleviation and population control. Reliable information on large organizations is scarce or non-existent in many developing countries. This causes major problems in managing public enterprises as well as private companies.

Failing to address these disparities could not only delay economic development but also increase the gap between rich and poor countries. Investments in hardware alone will not solve the problem. Information consultants estimate that technology purchases represent only about 20

The Internet: The Network of Networks

The computer network most often associated with the information superhighway is the Internet. It is the world's largest network of networks, and enables computers of all kinds to share services and communicate directly, linking tens of thousands of university, government, and corporate networks. It is not a single system owned and controlled by one group but rather 50 connected networks that provide services and hundred of hosts offering public access. The Internet is funded primarily by commercial organizations and, to a lesser extent, by government organizations.

What you can do on the Internet

The Internet was originally founded as a research and academic network. With expanded access, it has become a forum for a whole range of human interests such as community and nonprofit issues, entertainment, and commercial uses.

Electronic mail—The majority of transactions on the Internet involve mail being sent and received from friends, colleagues, politicians, and businesses across all borders and time zones.

Transferring files—Using file transfer protocol (FTP) text, spreadsheets, files, photographic images, and even X-rays can be transferred. Currently transfers are primarily text-based, although NASA provides satellite pictures over the Internet and the future will see more graphic images and digitized sounds being sent.

Searching for files and databases—Thousands of computers are available to access and search for information. Once a file is located, it is possible to run a program on other computers by accessing someone else's computer. This is helpful if someone has software the user doesn't have, or if the user doesn't need the information on his or her computer.

Discussion groups and bulletin boards—Millions of people make contact and exchange views in real time through either business or community personal forums on myriad topics of interest. People "talk" by typing into the computer to someone anywhere in the world. Both people see the information simultaneously.

How to connect

To connect to the Internet, it is essential to have a computer, a modem, and access to the network. Until recently this access was provided only to those computer users with a university or government affiliation who were familiar with an operating system called UNIX. Most of these impediments have recently disappeared. In the past year dozens of small businesses have emerged that sell access to the Internet, some starting as low as US\$10 a month. New navigation systems called browsers have been developed to increase ease of access to the system. For example, MOSAIC is a navigation system that enables the computer user to travel on the Internet by moving the mouse pointer to the desired place and clicking. This easy-to-use interface, the reduced cost of computers and modems, and the new avenues onto the Internet have created greater global access to the information superhighway.

—Eleanor Jewett

Eleanor Jewett is currently a communications consultant specializing in information technology in Cambridge, Massachusetts.

percent of an information system's total cost, due to training and implementation costs. Such costs can be compounded, especially in developing areas where multiple projects have been initiated using computer systems of different standards.

Two-tiered workforce

In addition, the information age seems likely to create two-tiered workforces—an upper level of knowledge workers, analysts, and information creators, and a lower tier of typists, data processors, and enablers. The resulting division promises to flatten previous work hierarchies and create new management challenges. Aside from simple computer literacy, those developed country cities with high numbers of

continued on page 6 ►

INFORMATION

continued from page 5

critical thinkers capable of turning raw data into marketable information will thrive.

Considering that developing country cities often lack basic information about their own residents (population statistics, income levels, place of residence), reaching a point at which they are able to compete in the global information economy may seem to be an unattainable goal. Not only will workers need to be trained in software applications, but in some cases they will have to face elimination of their previous duties or even their jobs. The increasing division of labor will make lower skill jobs more vulnerable to automation or transfer to areas of lowest cost. This is already occurring in many developing countries, where low-skill information labor is becoming a predominant part of urban economies. For cities, this may mean disruption of traditional industries as well as government infrastructures.

Governments have an important role to play in addressing these disparities. In the newly industrializing countries of East Asia, for example, governments have proved crucial in coordinating investments and programs in telecommunications, education, and training, and in diffusing information services and software applications. They have also created clusters of institutions to improve the ability of small- and medium-size enterprises to absorb and implement the new technologies. Such projects have allowed some East Asian cities to become "information nodes," providing connections and networking for cities throughout the region (see box, p. 8) and leading to rapid economic development.

The fact is that the public sector is the biggest collector of data on all types of social and economic activities, as well as on natural and demographic information. Governments, through encouraging the free dissemination of such information, hold a powerful key toward improving the competitiveness of their economies.

Investments not enough

To help bridge the information gap, technology investments have boomed over the past ten years as cities and countries move to harness the potential efficiencies. The World Bank estimates that as much as 90 percent of all investment lending operations have some component of information technology. These include such operations as a geographic information system in Tianjin, China, that led the mayor to redirect US\$6.5 million from a proposed beltway to a slum area with demonstrated sanitation problems.

But, as mentioned earlier, buying the technology is only the beginning. Social concerns, such as the willingness of governments to allow free access to information channels, exist in many developing countries. An advantage of new information technologies is that they enable the rapid distribution of information through all levels of society. The Internet, for example, enables rapid uncensored discussion between countries around the globe. Indeed, arguably the world's most successful information economy—that of the United States—explicitly seeks to distribute information technology as widely and deeply in society as possible. Similar approaches in other nations will undoubtedly cause clashes in those cultures where information is more closely controlled.

In Singapore, for instance, where government monitors society closely, officials have been cautious in allowing access to the Internet even as they developed highly efficient, high-speed communications networks for the construction, transportation, and import-export communities. The open networks the city-state seeks as part of its Information Technology 2000 plan will almost certainly lead to more

continued on page 24 ▶

INFORMATION: GLOBAL FACTS AND FIGURES

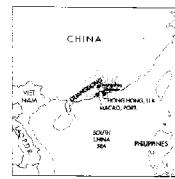
- The computer industry is already three times the size of the TV industry and growing ten times as fast. American companies sold about 50 million personal computers in 1994, some 60 percent of them for residences and home offices. The top 15 publicly traded computer networking companies have a total market value of US\$22 billion.
- People have associative memories that are millions of times larger than computer "memories"; two eyes can do more image processing than all the supercomputers in the world put together. However, in terms of communications bandwidth, people lag hopelessly behind computers, with nearly a billion times less communications power than the best computer network machines.
- The world's largest computer network, Internet, now reaches 25 million computer users, and the number of users is said to be almost doubling each year.
- Around the world there are now 100 million computers with an estimated 42 million users of electronic mail, including nearly 30 million users in the United States.
- How universal is access to the new information superhighway going to be, and who will pay for the service? Even with the plain old telephone, research shows that 6 million homes in the United States alone still do not have access to a telephone—including 20 percent of the elderly, 43 percent of those on welfare, and 50 percent of households headed by a single mother.
- To meet the information requirements of governments and administrators, a country data system integrating all the available national data sets and presenting them in a readily accessible form, has been prepared for Côte d'Ivoire. Building on this experience, country data samples have now been developed for 20 African countries, and soon all African nations are expected to have one.
- One of Russia's top geographic information companies has created a facility that can produce a large volume of digital satellite photos from recently declassified Russian military archives. The venture has implications for the world's remote-sensing market. The satellite image production facility produces digital files from Russian satellite photos with 2- to 3-meter resolution. This is five times greater than the resolution on photos produced by commercial satellites.
- Currently, the information sector employs about one-third of the workforce in the OECD countries; this number will rise to 60 percent by the year 2000.

Sources: The size of the computer industry compared to television was taken from a press release by Information Access, Co., by George Gilder, 15 August, 1994; comparisons with human memories taken from a press release by Daily Variety Ltd "Backtalk"; computers will lead telecom revolution, by George Gilder, 15 October, 1993; information on Internet taken from Time magazine article "The Strange New World of the Internet—Battles on the Frontiers of Cyberspace," 25 July, 1994; information on electronic mail taken from Information Access, Co., press release by George Gilder, 15 August, 1994; questions about access and costs of the new information superhighway taken from Communications Policy Briefing, "Universal Service and the Information Superhighway," by the Benton Foundation and from Dr. Howard Frederick, Emerson College, Massachusetts; information on Russia and Africa taken from brochure by the Planning and Development Collaborative International (PADCO), a private services-oriented company; information on economy figure was taken from World Bank Discussion Paper No. 120—"The Information Technology Revolution and Economic Development."

Linking Hong Kong and the Mainland

by Dominic Ziegler

Dominic Ziegler is the Hong Kong bureau chief for The Economist.



7

HONG KONG. The easiest way to get between Hong Kong and Guangzhou (the capital of China's Guangdong province) is still, nine decades after the British laid the first track, by train. The three-hour ride today passes, mile after mile, through the scene of an economic boom that is stupefying in its visibility. This is one vast and dusty building-site where, as Paul Theroux has put it, yesterday's paddy field is tomorrow's high-rise building, and a thousand factories bloom.

China has, for the past fifteen years, been that part of the world that has grown the fastest; the area around the Pearl River delta has, in turn, been China's export engine. Annual export growth in the delta has averaged more than 20 percent. As a result, Guangdong province, with one-twentieth of China's people, accounts for more than one-quarter of all the country's exports. Real incomes, not long ago among the lowest per head in China, are now among the top handful of provinces. The output of Shenzhen, the Chinese city closest to Hong Kong's border, is likely to grow by an extraordinary 30 percent this year.

Shenzhen 15 years ago, when China began to open its economy, was little more than a fishing village; it is now a city of 3 million. It and the many newer towns that have sprung up since provide the manufactured exports that fuel the boom. While most of these goods are shipped for export through Hong Kong's port, that colony's own economic role in the region has changed markedly. Where once Hong Kong was itself the source of cheap manufactured goods, much lower wages in China have since displaced the business.

Hong Kong has become a

high-wage economy, and services are now the dominant sector. Hong Kong's contribution to the Pearl River boom today is akin to Manhattan's role in the growth of American manufacturing from the mid-nineteenth century—firstly, by providing finance. Hong Kong businesses employ 3 million people in China, mostly in Guangdong, and that is probably twice the number they employ in the territory. As well as investment, Hong Kong also furnishes a whole host of technical, legal, and managerial professionals that Robert Reich, President Bill Clinton's labor secretary and a former Harvard teacher, somewhat pompously calls "symbolic analysts"—those people in an economy who can be said to "add value" and who, in turn, demand high wages.

It is these symbolic analysts who fill the Guangzhou train each day—that is, those who do not bump across the border in Mercedes. Either way, their passage is marked by the trills of mobile telephones and the beeps of pagers. A look at the use of telecommunications between Hong Kong and its new industrial hinterland in south China—as far as inadequate statistics allow—gives a helpful insight into the growing interdependence of the two economies.

Telecommunications giant

Hong Kong's use of telecommunications is among the highest in the world. The 6 million-strong territory has around 50 main lines for every 100 people, on a par with Japan, Australia, or New Zealand. In part because of its population density, Hong Kong also has the second highest mobile phone use in the world, and the highest use of pagers;

both markets are marked by intense competition and falling costs—though a local monopoly, Hong Kong Telecom, still dominates the local main line network. Its monopoly expires at the end of 1995.

International telephone traffic in Hong Kong has grown by an

nately, economic growth in Guangdong has outpaced the development of infrastructure, notably in transport and telecommunications. Such shortcomings now threaten to distort, and probably impose limits on, Guangdong's economic development.



Innovation first

annual average of 26 percent since 1989. And in the past ten years the proportion of total international calls that go to China has leapt from 14 percent to 50 percent, amounting to about 1.4 billion minutes a year—a tenfold increase. The statistics sadly do not distinguish between voice, fax, and data traffic. Andrew Harrington, Salomon Brothers's Asian telecoms analyst, estimates that fax traffic is twice as much as voice traffic to China, with data traffic holding up the rear. Guangdong accounts for two-fifths of Hong Kong's telecommunications traffic to China, up from one-quarter in the mid-1980s.

For the past couple of years, the desire for deeper integration between Hong Kong and Guangdong has driven innovations in communication. Unfortu-

In the past couple of years so-called "roaming" services have sprung up that allow subscribers to cellular phone or pager services in Hong Kong to call Guangdong subscribers of similar services, and also to call home when in Guangdong. This is bound to be an area of explosive growth. The leader in such roaming services is Hong Kong's ABC Communications, which has 10,000 roaming subscribers (up from none a year ago) out of a total of 120,000 subscribers in Hong Kong. In all, there are, as far as anyone can guess, about 50,000 to 100,000 "roamers," divided roughly equally between mobile phones and pagers. An admittedly unscientific survey of Hong Kong businesses indicates that mobile

continued on page 8 ►

HONG KONG

continued from page 7

phones are used for communications by factory owners and senior managers, pagers by those at the sub-managerial level. The

Hnumbers of roarmers will grow still further if the "CT2" systems that are now being set up in southern China (effectively, portable telephone booths that allow one to call out but not receive, which a pager can anyway do more cheaply) are linked with their successful counterparts in Hong Kong.

Such systems require close cooperation across the border. A paging company in Hong Kong, for instance, needs a partner, invariably state-owned, in China. If somebody is keen to reach a Hong Kong pager subscriber in China, he or she calls in to the Hong Kong paging company, the message is sent via computer to China, and then broadcast by a relevant paging company in the mainland.

The vision then is of high-tech cellular networks drawing China's pool of labor, and Hong Kong's pool of capital and expertise, ever closer. Yet such networks are never going to be a replacement to traditional mainline services, merely an attractive addition. One reason is that the cost of cellular communications is much higher than for fixed wires. Another is that, at some stage of practically every call, each cellular or similar communication must go through an orthodox fixed-wire network. And the trouble is, China's own is close to breaking point. Capacity has not increased as fast as call-volume growth.

Overburdened system

It is an overburdened system that probably explains a worrying fall-off in annual call-volume growth between Hong Kong and China during the first half of this year, to 21 percent from 31 percent a year earlier. (This, despite an economy that will have grown by 11.5 percent in 1994, against 13.4 percent in 1993.) In 1993, official Chinese statistics

East Asia—Technological Miracle

In the 1960s, the newly industrialized countries of East Asia, Japan, Korea, Taiwan, Singapore, and Hong Kong were quick to recognize the importance of information technology; each developed a national strategy that anticipated and exploited the new opportunities created by the information technology revolution. Using distinctive information technology initiatives, each country used government-industry coalitions to promote the development of the computer, semiconductor, and telecommunications industries. By the 1980s, these countries had become significant producers in the global information technology economy.

JAPAN: "Technopolis" legislation established in 1983 the technological restructuring of provincial industrial bases. It empowers prefectures to allow construction of areas called "technological meccas." These are high-tech industry cities with 40,000 to 50,000 population adjacent to cities with populations of 200,000 to 300,000. The Tsukuba science city located 37 miles northeast of Tokyo has 46 of the 98 national research institutes, has 11,000 research employees, and is one of the largest science complexes in the world.

indicate, only three-fifths of local calls were successfully completed, and only 31 percent of domestic long-distance calls. Now academics at the National Research Centre for Science and Technology Development suggest that in southern China, circuits are so congested that only one in six long-distance calls gets completed. Annual growth in China's long-distance traffic, averaging 50 percent between 1990-92 according to Salomon's Mr. Harrington, has clearly added to an already congested network.

China is no doubt aware of the problem, and has committed to increasing its telecommunications capacity. This year, the Ministry of Electronic Industries (MEI), more reformist than the hitherto dominant MPT, announced an MEI-backed consortium, LianTong, that will build a rival to the existing long-distance network, based on creaky networks that various government ministries already boast. Another MEI-backed consortium is committed to building various

KOREA: The Integrated Information Systems Project launched in 1983 was designed to build a nationwide information and communications network by the mid-1990s. The first phase of the project was completed in 1991. Computer hardware for the network includes 80 main computers in all major Korean provinces and cities and 5,000 workstations in major districts and towns. The project includes a computerized information network, linking ten science and technology centers owned by government-funded research institutes.

TAIWAN: The Hsin Chu Science Park was established in 1980 as a magnet to bring back brain power from abroad. An hour from Taipei, it is home to 13,000 researchers from four of Taiwan's six national laboratories and companies. It also hosts 150 companies, most of which are run by entrepreneurs, nine-tenths of whose sales are from computers, microchips, and telecommunications products. Since 1980 the Taiwan government has invested US\$500 million in the park. The companies based there have an annual turnover of US\$5 billion.

SINGAPORE: Singapore has become a global hub for high-value

"value-added network services" such as bank credit card payment systems. LianTong, with a claimed \$12 billion of investment, aims for 10 percent of China's long-distance traffic, and 30 percent of mobile phone traffic, by the end of the century.

Yet given the past rate of traffic growth, such investment may prove insufficient. The growth in traffic in southern China has clearly been spurred in large part by the demands of commerce. Industrial development requires the complex coordination of supplies, stocks, bookkeeping, delivery, market research, and so on—all of which depend crucially upon telecoms services. Now, as Guangdong becomes more prosperous, the advantages of cheap wage labor are likely to be lost to poorer regions. Investors are already complaining about Guangdong's high wage costs.

In turn, China's southern seaboard will need to offer other comparative advantages that carry with them higher "added value."

information technology production and use. In the 1970s a new strategy was created to bring about a second Industrial Revolution in knowledge-intensive products and services. In 1981, the National Computer Board was created to guide the shift to an information-intensive "intelligent island." Between 1981 and 1988, computer exports rose from US\$40 million to US\$3.8 billion. Today, Singapore is critical to high-tech multinationals.

HONG KONG: Manufacturing as a share of Hong Kong GDP dropped from 25 percent to 20 percent in the decade 1982 to 1992. This marked Hong Kong's transition from a center of labor-intensive consumer goods manufacture to a high-tech trading center. Hong Kong's information industry is two-tiered: a declining electronics manufacturing base where the assets, investment capital, and managerial skills are being redeployed to the Chinese mainland; and a booming information services market led by banks, trading houses, and insurance companies involved in international and gateway transactions with China. Hong Kong has one of the world's largest fiber optic networks; this network has promoted the adoption of information technology use by service firms of all types.

Prompter "just-in-time" delivery systems and higher tech manufacturing are two possible avenues. Data processing, which would mark a big shift toward a service-oriented economy, is another. For instance, Hong Kong's major airline, Cathay Pacific, has already moved some of its data-processing systems across the border. Commercial banks are looking to do the same with their back offices. Yet they all need the guarantee of an adequate telecoms infrastructure. Since telecommunications investments have been shown, by the World Bank and others, to yield high returns to the whole economy as well as to the investor (the Bank has measured economic rates of return to the general economy of between 20 percent and 40 percent on telecoms investments), China will need, sooner rather than later, to address its major bugbear, and invite foreign investment to help build its future telecoms network.

Eastern Europe: Striving Toward the Information Age

by Edward G. Czarnecki

Edward G. Czarnecki is a senior consultant with International Technology Consultants, a business development, strategic planning, and market research firm. He is also editor-in-chief of the Latin American Telecom Report and an executive board member of the Global Telecommunications Society.

WASHINGTON, D.C. Some 60 percent of all jobs in Western Europe are directly or indirectly dependent on telecommunications and information technology—and a greater number of jobs in urban areas tend to be more telecoms-dependent than in small towns or rural areas. These trends have not gone unnoticed by business leaders and regulators in Eastern Europe. Production, distribution, and marketing of goods and services all depend heavily on efficient and reliable telecommunications services. Telecommunications is undeniably a resource that enables innovation and economic growth.

In recognition of the central role of this "infrastructure of infrastructures," regulators throughout Eastern Europe have picked up the pace of reforming and liberalizing their national telecommunications sectors. It is in this environment of technical and regulatory change that the countries of Eastern and Central Europe are attempting to reach—even surpass—the level of telecommunications development in industrialized countries.

The major urban areas of Eastern Europe enjoy telecommunications services that are generally more reliable and abundant than those found in smaller towns and rural areas. By and large, this is because the majority of the population and most business activity tend to be clustered among a few large cities, such as Budapest, Krakow, Moscow, Prague, or Warsaw. Politically, addressing the needs of the large, concentrated urban constituencies became a priority for the telecommunications ministries under the new democratic governments of Eastern Europe. Further, development of

telecommunications has been biased toward urban areas because the infrastructure costs of connecting urban subscribers tends to be lower than those of rural areas.

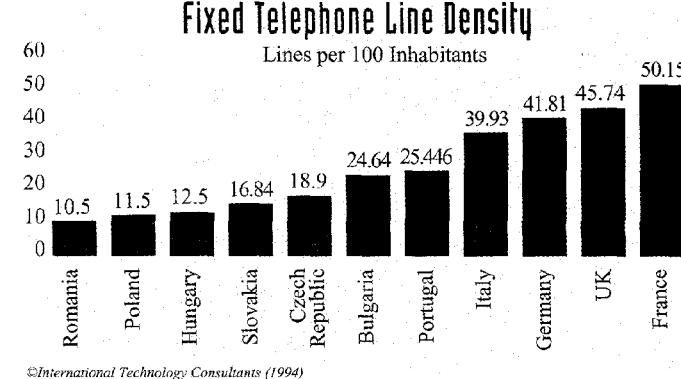
There is a need for reliable telecommunications infrastructures and services throughout the region—ranging from "plain old telephone service" to advanced "premium" business services. Much of the region lacks the high-speed telephone lines and equipment needed for basic business services, video conferencing or data or video transmission. Much of the region also maintains equipment and service standards that impede the establishment of connections for advanced services.

Many foreign companies find conducting business in Eastern Europe a challenge, but perhaps the most aggravating daily impediment to doing business is the underdeveloped state of most telephone networks throughout the region—even in the largest urban areas. The wait to get a telephone installed in many locations is abysmally long (months or years),

East European Cellular Services

Bulgaria	Mobifon, Mobitel
Czech Republic	Eurotel Prague
Croatia	HPT
Hungary	Westel, Westel 900, Pannon GSM
Poland	Comertel
Romania	Telefonica Romania
Slovakia	Eurotel Bratislava
Slovenia	Mobitel

service quality is low, and customized services are virtually nonexistent. Local enterprises have found themselves unable to restructure and startups have been hindered in their efforts to expand because of the unavailability of this key tool to managing business.



Wireless services

Wireless communications have become one of the most discussed topics over the past few years. Wireless communications cover a range of applications, including cellular, paging, and mobile radio—and each has enjoyed robust growth in Eastern Europe. Urban markets, the fastest growing initial markets for wireless services, have been spurred by the realization that mobile communications allow entrepreneurs and small businesses to prosper.

Cellular service is one example of the scope of activity that has been undertaken. Bulgaria's analog cellular service attracted 1,300 subscribers in the first two months of operation. The customer base of Eurotel Prague grew from 10,000 in November 1993 to over 20,000 one year later. Hungary launched two GSM mobile telephone networks at the end of March 1994, and by the end of 1996 services will be available throughout the country.

New services and technologies

Eastern European countries are viewing new technologies as

a way to "leap frog" existing generations of technology and accelerate the growth of their telecoms infrastructures. At present, cellular phones complement and even substitute for traditional land-line systems in some regions. In the near future, fixed wireless (cellular-like) local access systems will enable rapid and affordable installation of telephone connections to much greater numbers of individuals than has ever been possible.

Satellite system technology is also a ray of hope for regional telecommunications. The use of satellites for routing domestic traffic has grown significantly in Eastern Europe. Satellites will continue to provide essential international business services and regional television coverage well into the future. A major benefit of satellite video broadcasting will be the widespread availability of direct access television—providing an additional medium for the exchange of ideas and concepts across diverse cultures. As more powerful satellites come into service, even the smallest satellite antennas will be serviced. At the same time, satellite dish prices continue to drop dramatically. These trends will enhance business and

continued on page 10 ►

resident usage of satellite-based services.

Very small aperture terminal (VSAT) technology allows businesses and public entities to enjoy the economic advantages of modern digital telecommunications without having to develop an extensive digital infrastructure. VSAT dishes can be easily installed without connections to telephone lines—thereby providing voice, fax, and data services in locations where the telephone infrastructure is underdeveloped. For these reasons, VSAT technology has been a growing phenomenon among the region's banks, brokerage houses, stock exchanges, energy companies, retailers, and hotel chains. VSATs are bringing applications to Eastern Europe such as distance learning (or educational television), videoconferencing, and business television.

Newly emerging technologies, such as the so-called personal communications devices—show much promise in revolutionizing the way in which people will use telephone networks. Personal communications devices will incorporate wireless access to a vast array of telecoms services—voice, data, and video. Some devices will be similar to the hand-held cellular telephone; others will be portable computer-like devices that will allow the business user to take the electronic office on the road.

Telecommunications is good for business and good for people—it enhances both economy and democracy. The consolidation of democratic and market economy reforms depends in large part on continued improvements in the region's telecommunications infrastructure and services. Without sufficient (and affordable) communications links, trade, investment, economic growth, and even the daily discourse of a democratic form of government in the information age becomes difficult if not impossible.

Data Processing: Economic Promise for Developing Country Cities

by Amos Gelb

Amos Gelb is an investigative producer with CNN in Washington, DC.

BRIDGETOWN. In the new gigabyte world, data entry and data processing may prove to be a cornerstone of future economic growth for many developing country cities, in the same way manufacturing was 30 years ago for Japan and Taiwan. As the volume of data has grown from a trickle into an ocean, so data processing has become a growth industry; one increasingly the domain of developing country cities like Bridgetown, Manila, and Bombay.

The main attraction of offshore processing is cost, and the incentives for companies are compelling. In 1983, Fort Worth, Texas-based AMR, the parent company of American Airlines, was looking to cut costs at its flight information processing center. Bob Gaines, who heads AMR's data-processing operation, says the decision to move to Bridgetown, Barbados, was based on cost: the Caribbean wage of US\$3.65 an hour is half the American wage. As Geza Feketekuty, senior policy advisor to the U.S. Trade Representative's Office, points out, "Data processing is an area that was never subject to tariffs even before the recent round of trade agreements."

For AMR, reorganizing its flight information processing system has delivered other unexpected rewards. AMR's 1,100-person Caribbean Data Services (CDS) facility in Bridgetown has a stable and educated workforce and a core of people who are careful with their work. As a result, CDS is currently the largest nongovernmental employer on the island, paying the salaries of over 1 percent of the population. Although intended as a cost-

saving center, the Caribbean facility has, a decade after opening, turned into a profit center. AMR recently opened a second facility in Santo Domingo in the Dominican Republic.

Growth industry

Currently, there are no exact numbers on how much the data-processing industry has grown over the last decade, partly because this is backroom work—that part of the corporate world that rarely receives statistical attention. Feketekuty estimates it amounts to billions of US dollars a year; another estimate puts growth at 18 percent a year. The Philippines, nurturing a nascent computer industry, estimates that its entire software export business, including basic programming and data entry, grew over 400 percent to US\$36 million between 1989 and 1991.

A major advantage of data-processing in cities like Bridgetown is that workers are eager for these steady jobs. Plant manager Vancourt Rouse, director of the CDS Bridgetown operation, boasts about his workers' dedication and a wafer-thin 1 percent turnover rate. Rouse says the success of the facility has improved morale which has paid dividends: the CDS operation has evolved to market its services to other industries, offering a range of services including insurance claim and credit card processing.

Barbados is hoping to build on the success of CDS and 20 other similar foreign operations. Errol Humphrey of the Barbados Investment and Development Corporation points to the installation of a state-of-the-art fiber optic network in Bridgetown, and local cooperation with interna-

tional telecommunications carriers, which will ensure that Barbados remains competitive in an industry that brings in about US\$30 million in foreign exchange earnings annually. "In the short term, this industry is very important to Barbados. In the long term, anything is possible, but we are in the information technology area to stay," says Humphrey.

The revolution

Before that happens, data processing is likely to undergo a revolution. The new technology will increase efficiency, greatly eliminating the need for human data entry, thus reducing the cost of data entry; this should encourage more companies to put their information on line. However, workers will still be needed to ensure quality control and undertake more sophisticated managerial functions.

Feketekuty addresses concerns about unfair competition for data-processing jobs in developed nations, and concludes: "there is going to be enough for everybody. If the amount of information on line has already grown from a trickle into an ocean, it is going to become a much bigger ocean." The hope for developing country cities is that they can mature from data-processing functions to simple programming and eventually to more sophisticated roles in the information world. Although data processing is offering new economic hope to countries left out of the information revolution, it also offers these cities an opportunity to evolve from being processors of information to becoming creators of information.

Information: Correcting the Educational Imbalance in South Africa

by Tim Cohen

Tim Cohen is the political correspondent for Business Day in Johannesburg, South Africa.

JOHANNESBURG. South Africa's general election on April 27, 1994, was an event so cataclysmic that it touched every facet of a society at war with itself for decades. No person was left unmoved, no sector left unaffected; not least that of information technology.

For the new government, perverse as it may seem, the inequalities that have characterized South African society have paradoxically created some opportunities, at least in certain

existing in the education sector. The idea is not new, but the scale of the project could set it apart. In association with a banking group that currently uses satellite television broadcasts to communicate with its staff, the government plans to provide an education channel for a large number of schools and learning centers. Using an existing satellite network, a live education channel is also planned. The aim is to provide all aspects of education from basic literacy and numeracy through to university degrees and

school, only 50 move on to secondary school, and only 10 of these eventually gain university entrance.

How the electronic classroom works

The electronic classroom operates through learning sessions that originate in a broadcast studio specifically equipped for distance learning with video, voice, data transmission, and storage capabilities. Encoded broadcast signals are sent through a satellite network to learning centers across the country, in which people or groups can listen, see, participate, respond, and learn. Each of the learning centers will have a decoder, a television, a VCR, and a telephone as well as seating facilities. A trained facilitator at each learning center will ensure that the right group dynamics and mechanics are in place so that the pupils will benefit the most; the interactive aspect to the enterprise is the incorporation of telephones in the learning centers so that pupils can ask questions of their instructors. To support the classroom activities, participants will receive pre-broadcast work as well as post-broadcast work in learning guides designed for the course.

Pilot project in the Eastern Transvaal province

A pilot project will be launched in the Eastern Transvaal province in 1995 and will be aimed at providing educational facilities for students of technical subjects. The province's premier, Matthew Phosa, says that the

disadvantaged people of the Eastern Transvaal do not have their own university or technikon. "If we are to redress this historical imbalance, it is essential that we urgently provide appropriate higher learning facilities for the people of this area."

Participants in the pilot project are already planning extensions to the project to equip the centers with a personal computer, a modem, CD-ROM, and electronic mail facilities, which can be connected to the central facility's computer for computer-based training, as well as to the Internet, and other electronic media that are designed to assist in learning environments.

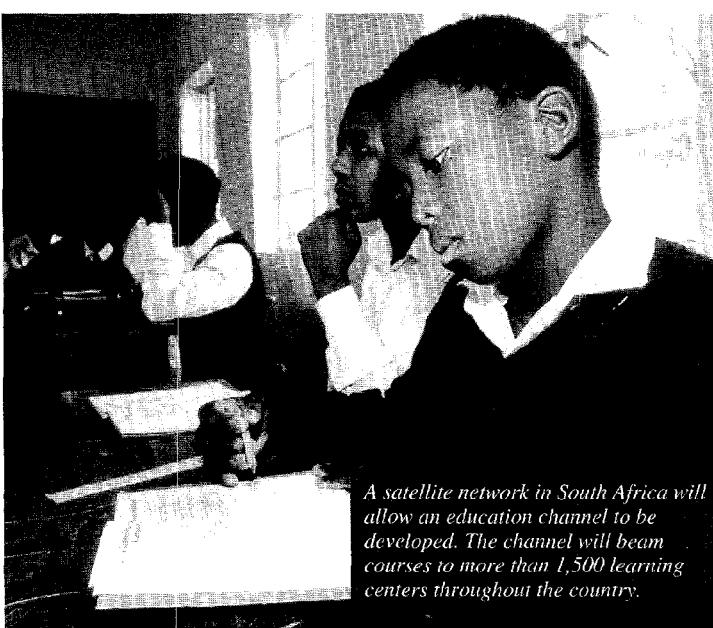
Benefits and problems

The key benefit of distance learning is its ability to cut costs, while overcoming the obvious constraints of having to provide large numbers of top-class teachers to even greater numbers of students. South Africa shares some problems with other countries such as Singapore, Malaysia, and India that have successfully used satellite-transmitted distance education with supportive multimedia technologies. These are illiteracy, lack of skills, a widely dispersed population, and lack of money among people who want to learn and who don't have access to quality education and training.

Public and private sector cooperation

The fact that the project effectively takes over and extends an existing private sector network is significant. The private sector in South Africa is keen to

continued on page 12 ►



A satellite network in South Africa will allow an education channel to be developed. The channel will beam courses to more than 1,500 learning centers throughout the country.

areas. With a ready-made infrastructure, the task at hand of extending educational facilities and opportunities to the whole population will be made easier since at least apartheid had created a framework on which to build.

Satellite education project

The government intends to launch a project to use existing information technology to redress the inequalities and backlogs

accredited management courses.

The scale of the project is huge, and organizers claim that once fully operational, it will become the world's largest—currently 1,500 learning centers are providing services. Its size, however, reflects the desperate education and training needs of the country. Decades of underfunded education for blacks have taken their toll, and some 46 percent of South Africa's adult population is currently functionally illiterate. Of every 100 black children entering primary

demonstrate its commitment to the government's Reconstruction and Development Project. After years of being rightly or wrongly perceived as associated with apartheid rule, the private sector needs

A to convince the new government that its heart is in the right place.

The project therefore includes a public relations component. It also provides concrete opportunities for the private sector. According to Africa Growth Network Managing Director Ronnie Phillips, "satellites put the powerful medium of television at the disposal of both ordinary people and companies wanting to educate their staff about new products, new corporate directives, and other developments."

When the network was used by certain banks, Phillips said that it was found to be ideal for fast, direct communication with regional managers, sales staff, and other employees as well as with customers, prospective customers, and special audiences. The main benefit was the versatility of the medium, which could be implemented to suit each particular application. "In today's fast-moving world, it is essential to have facilities to reach people quickly and efficiently and interactively," according to Phillips. By adapting the network for educational purposes, students will see and hear the same message simultaneously. This will save travel costs, teachers' salary costs, and ensure a degree of standardization.

Satellite education is not new, but its application in South Africa demonstrates how information technology can be applied to address development issues by increasing access to education, and by improving and maintaining educational standards.

UR

Information and the City: Circa 2025

by Colin South

Colin South is the head of systems research at British Telecom Laboratories where he looks at future technologies that may affect communications within a ten to twenty year time frame.

IPSWICH. Any attempt to forecast a future influenced by growth in knowledge, and its derivative technology, must come to terms with exponential change. It is almost a fundamental that knowledge earns compound interest: the more we know, the more we are able to know. The interest rate that mankind is able to secure on technological growth varies with each technological field and can be influenced by the financial return that development brings. The more competitors in the market, the quicker the development, the lower the price, until only the fittest are able to survive.

Information technologies destined to alter urban society include both processors of information (computers) and communication networks. If we measure the number of instructions a computer can execute per second, per dollar we see an increase by a factor of ten every six or seven years. Buy a Silicon Graphics "Indy" machine today for \$150,000 (typical of the type used for the graphics in Jurassic Park) and by the year 2000 the same machine will cost \$15,000;

by the year 2006 it will be down to \$1,500 and affordable as a general purpose computer in most homes. Following the "factor of ten every six years" law, around the year 2030 super computers would have the processing power to match that of the human brain.

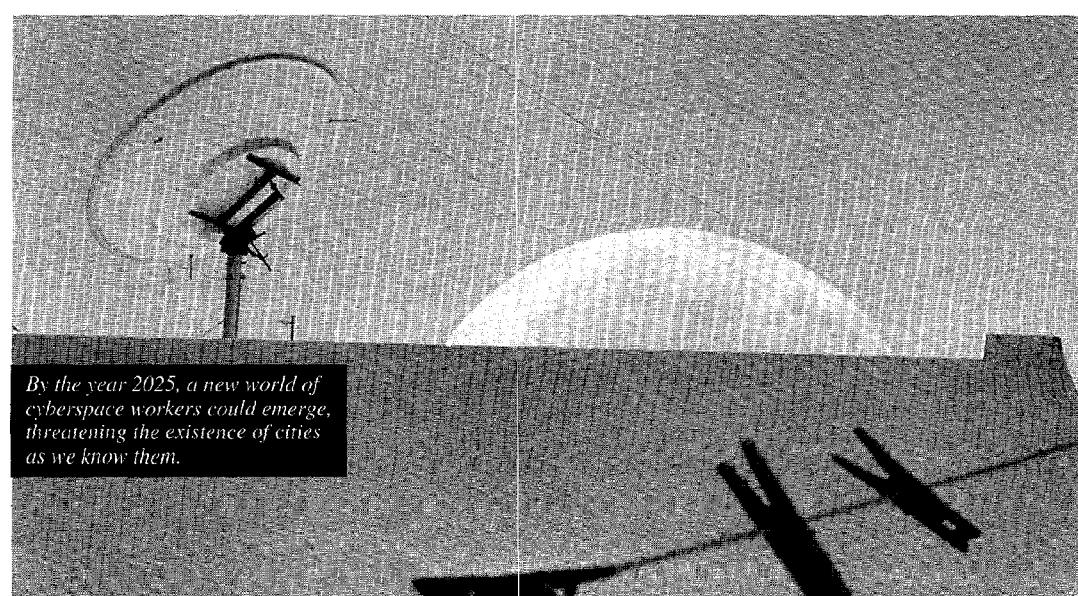
Similar technologies enhancing communication networks follow an exponential law. Optical fibers, which make up the backbone of modern networks, have a transmission bandwidth of 60THz. Our capability to exploit this enormous resource is growing exponentially, from the current .5 percent to 20 percent by the year 2010. NTT in Japan has stated that by the year 2015 their network will be end-to-end fiber, and, to survive, other industrialized nations will have to follow their lead. Cyberspace will be a reality.

The impact on mankind of cyberspace will be staggering. Computers will make better decisions than humans, having instant access to all knowledge via the world's databases, and having enough storage and processing capability to use it effectively. Where there are gaps

in knowledge, computers will initiate research, requesting or conducting experiments where necessary. Eventually there will be vast pools of knowledge that only they can understand and use.

Education, as carried out in traditional schools will be obsolete, replaced by virtual equivalents, delivered by computers, and available to all. Teachers will resume their ancient role of mentor. As control of many of the functions of society and business fall to intelligent computers, so finance and wealth will be conducted differently. The stock market in its current form will no longer exist, as super computers will be able to compete and negotiate prices directly with each other. Company structures will be radically altered, many existing only in cyberspace, and their management operations controlled entirely by computer processes. These companies will employ "knowledge" workers who will share their time at many companies. Manufacturing of physical products will be a process carried out in factories manned only by robots. By 2025,

continued on page 13 ►



By the year 2025, a new world of cyberspace workers could emerge, threatening the existence of cities as we know them.

people will travel on "smart" roads where cars will be driven automatically to control congestion. New public transport systems based on linear motors and magnetic levitation will be used.

How will this affect the life of the cities? Formed around the need to trade, cities have, in general, also grown exponentially along with the world's population. While cities vary in terms of size, there are similar patterns to their development. City centers, originally the place of commerce, have expanded, pushing up land prices, consuming surrounding living space, and forcing inhabitants to the periphery, forming sprawling conurbations. The retail trade has followed its customers to suburbia, creating retail parks and shopping malls. City centers come alive around dawn as commuters pour in along aerial routes from cars, trains, and buses into their offices, to work primarily in the manipulation and processing of information. A reverse migration takes place in the evening, leaving the center a ghostly place. As knowledge workers in cyberspace will no longer need to move physically, a vacuum will form in the city centre.

The concentration of increasing numbers of people into cities has been a modern phenomena. We can expect significant social strains as the stresses and tensions of overcrowding emerge. By 2025, the world's population will increase from its current 5.5 billion to 8.5 billion, with the majority increase in the developing countries. One trend may be the increase in the number of smaller rural communities in what are now inhospitable parts of the earth, which can be made habitable by new developments in construction and building materials. This breaking up of large social structures into smaller units with suitable space between them could offer one solution to aid humanity's development into the next century.

Radio: Gateway to the Information Revolution

by Bruce Gerard

*Bruce Gerard is the editor of *A Passion for Radio: Radio Waves and Community*, published by Black Rose Books, 1992. He is currently a project coordinator at AMARC's head office in Montreal, and has worked with community radio projects and computer communications projects in Latin America, North America, Europe, and Africa.*

QUITO. Recent developments in communications technologies offer the possibility of increased distribution of specialized news and information to community radio stations in Latin America. The Sound Bytes Project, initiated by the World Association of Community Radio Broadcasters (AMARC) and Ecuador's Centro de Educacion Popular (CEDEP), and funded in part by the Canadian Bureau for International Education, seeks to take advantage of these technological developments to link international news services with radio, the predominant mass medium in Latin America.

The project's rationale is based on the assumption that Latin America's escape from its "information-poor" status will occur less from increased direct access to information technology and far more from increased access to information. The project will identify ways for radio to provide a "people's interface" to new communications technologies, thus strengthening democratic tendencies and encouraging pluralism in Latin America.

Why radio?

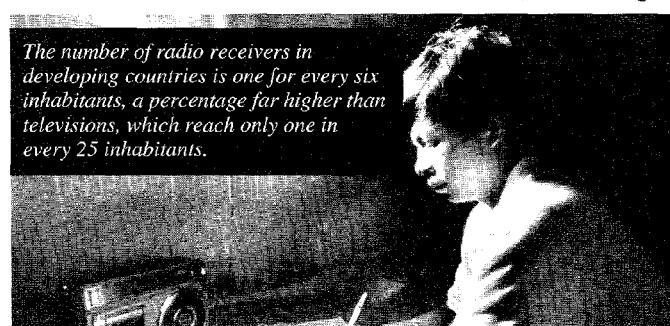
Radio has been chosen because of its prominent position in Latin American society, particularly among marginalized urban communities and in rural areas. Community radio also has a special place within Latin America culture as a medium that is locally programmed and controlled, and known for its independence and responsiveness to listeners. The statistics also favor the use of radio. In developed countries, an estimated 472 televisions exist per 1,000 inhabitants,

in developing countries the ratio drops to 39 per 1,000—one television receiver for every 25 people. Print media are restricted by medium to high illiteracy rates and by distribution systems designed only to reach urban populations with disposable incomes. However, the number of radio receivers in developing countries is 160 per 1,000—one for every six inhabitants.

Information favors developed countries

Just as the introduction of increased financial resources

The number of radio receivers in developing countries is one for every six inhabitants, a percentage far higher than televisions, which reach only one in every 25 inhabitants.



inevitably results in greater disparities between rich and poor, increased access to information dramatically favors those who already have information and the technology to facilitate access to it.

The statistics are self-explanatory:

- ninety-five percent of all computers are in the developed nations;
- the United States and the CIS countries account for 15 percent of the world's population and control more than 50 percent of the available geostationary orbit;
- ten developed countries,

with 20 percent of the world's population, have three quarters of the world's telephone lines; and

- five news agencies control over 90 percent of international news flows.

For Latin America and the rest of the Third World this means that regional and global issues are often interpreted from the perspective of the Northern news media, rarely from the perspective of local environmentalists, indigenous peoples, women, peasants, and urban workers. The only solution in the long term involves eliminating disparities in the ability to access technology. In the short term, such strategies

will have to concentrate on making the information available in a form that is meaningful and accessible to the whole population.

The Sound Byte Project will contribute to this goal by developing ways in which Latin American communities can make use of new information technologies. It will do this by producing and disseminating relevant, high-quality, and broadcast-ready information for inclusion in local community radio programming.

Planned activities include:

- creating an inventory of online Spanish language news and

continued on page 14 ►

information resources appropriate for use by community radio broadcasters;

- identifying appropriate hardware and software packages for use by community radio broadcasters wanting to access these information resources;

4

- designing methods for producing information tailored to the needs of the community radio stations; such information will be distributed by electronic networks. This will include a variety of formats including news and commentaries;

- developing techniques and formats for distributing and broadcasting digitalized information;

- testing these techniques and formats with actual broadcasters and information suppliers; and

- producing two information kits or manuals on computer communications and community radio—one for use by radio stations and the other by information suppliers, including Latin America's dozens of specialized and alternative news agencies.

Solutions

While the Internet and other electronic communication systems are increasing access to greater amounts of information, they are also contributing to a greater disparity between the information-rich and the information-poor. To prevent this situation from worsening in the developing world, a global strategy must be implemented immediately—one that will aim at reducing the disparity by supplementing strengths and reducing weaknesses. Most strategies have concentrated on the latter by building more hardware and network capacity in the developing world. The Sound Bytes Project, however, attempts to do the former by using Latin America's existing radio stations as a powerful and user-friendly interface to modern communications technologies.

UA

Jakarta, Indonesia: Managing Information on the Urban Environment

by Nigel Edmead

Nigel Edmead is a GIS specialist and environmental analyst with PADCO, Inc., based in Jakarta, Indonesia.

JAKARTA, Indonesia, in common with many other developing countries, faces increasing social and environmental impacts that result from rapid urbanization and economic growth. In the city of Jakarta, for example, annual population growth rates averaged 2.4 percent between 1980 and 1990. The urban fringe area of Jakarta, known as BOTABEK, is the most rapidly urbanizing region of the country, with recorded growth rates for the same period at an even higher level of 5.8 percent overall, and some areas are growing at 15 percent per annum.

One very visible impact of urban development in the Jakarta region is environmental degradation. Such impacts include:

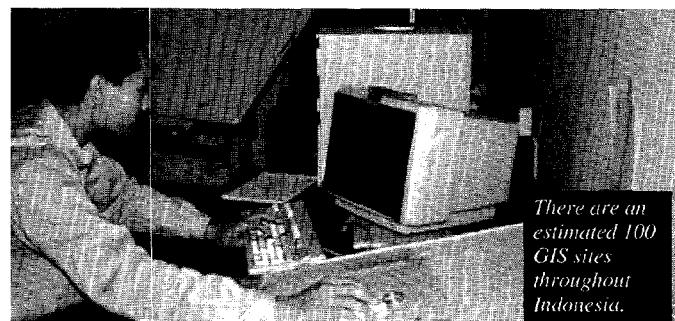
- the degradation of coastal waters and coral reefs, for example, the Pulau Seribu area;
- aquifer depletion due to excessive ground water extraction and consequent salt water intrusion;
- severe river and canal pollution;
- inadequate drainage; and
- poor air quality.

To address these impacts, the government of Indonesia has developed legislation requiring sectorally integrated urban and regional development. The Basic Provisions for the Management of the Environment Act of 1982 and the Spatial Use Management Act of 1992 mandated that management of the diverse natural resources of the land, sea, and air be undertaken in a coordinated and integrated fashion to ensure sustainable development. To further promote this policy, the Indonesian government in 1986 introduced environmental impact assessments and in 1990 estab-

lished BAPEDAL, an environmental protection agency.

The Spatial Use Management Act requires that data procurement and use, including maps, statistics, and data analysis become integral to the development planning process at the national, regional, and local levels. However, the maintenance and analysis of data require the use of appropriate management information tools, such as the Geographic Information System (GIS), which manages and manipulates geographic information and is used increasingly in Indonesia. Current estimates put the number of GIS sites at over 100 nationwide, including universities, private companies, and government ministries.

The proliferation of GIS is explained by its unique ability to



There are an estimated 100 GIS sites throughout Indonesia.

assimilate data from widely divergent sources, to analyze trends over time, and to spatially evaluate potential environmental impacts caused by development. Such advances in information technology have provided the government with the means to address the requirements of the Spatial Use Management Act.

As the technology becomes widely adopted in Indonesia, there are signs that its role is gradually changing from that of data collection and analysis to one which promotes visualization,

incorporating a variety of existing data sources and new techniques such as multi media and video. This will ensure that data, and in particular geo-information, become more accessible to a wider nontechnical audience.

The functionality of GIS, however, relies on the quality of data available, which in most developing countries is redundant or inaccurate. Although GIS is widely used in Indonesia, effective and efficient methods of data collection have yet to be systematically established, and the techniques required to use GIS have not achieved full integration within the planning process. The true value of GIS can only be realized through its successful integration within established institutional frameworks.

In order to successfully apply

GIS to improve the urban environment, the technology must migrate from being a purely data collection and analytical tool, confined to the use of technicians and scientists, to one that effectively communicates information that can be used easily by policymakers with an interest in national development strategies. Over time, GIS should be able to contribute to substantive improvements in the policy development and implementation process, positively affecting the quality of life of urban inhabitants.

UR

Manuel Castells: Information Technology, Cities, and Development

Manuel Castells is professor of City and Regional Planning, University of California at Berkeley, and author of The Informational City, Information Technology, Economic Restructuring, and the Urban-Regional Process (Oxford: Blackwell, 1989).



BERKELEY. The last two decades of the twentieth century will be remembered as the era when a new socio-technical paradigm based on information technologies was formed. As with the industrial revolution, this new paradigm has transformed the material basis of human activity and social organization: cities and regions around the world are being restructured by the combined effect of unprecedented technological change and economic globalization.

The effects of information technology on cities, however, are less obvious than what pop futurologists usually predict. For instance, several studies (including Mitchell Moss's research of New York City) contradict the image of a disappearing central business district due to the potential of telecommunications. What Saskia Sassen has shown in her study on global cities (focusing on New York, Tokyo, and London) is that the global reach of telecommunications and information systems will feature "directional centers" in nodal cities that will operate on a global scale. The centers will be able to concentrate on person-to-person micro-networks. Indeed, what we are seeing at the global level is rapid urbanization and spatial agglomeration on an unprecedented scale.

Notwithstanding the Southern California model of ex-urban sprawl, what characterizes most of the world at the end of the millennium is the acceleration of the urbanization process. This urbanization is dominated by some gigantic spatial units of megacities, which are the engines of growth, development, and innovation in countries and continents. What information technology allows is for such

nodal megacities to become interconnected on a global scale, brought together in an increasingly interdependent economic system and information network. Together with their functional hinterlands, these globally connected megacities will shape the future of humankind in the twenty-first century. Such areas, or nodal metropolitan regions, will increasingly become key political actors in the new global economy.

National governments are under pressure to preserve their legitimacy in the new techno-economic system. They are increasingly powerless to control global flows of capital, commodities, and information on which economies and societies are based. Yet they are too rigid and too dependent on a variety of constituencies to negotiate and act quickly in a global system of relentlessly variable geometry. On the other hand, regional/metropolitan governments, while mastering less power and resources than national governments, are more flexible and potentially dynamic in their adaptation to the demands of the world market. When a world economy is being formed, metropolitan governments will be better suited than higher levels of the state to provide the interface between people in their local and global flows of wealth and power.

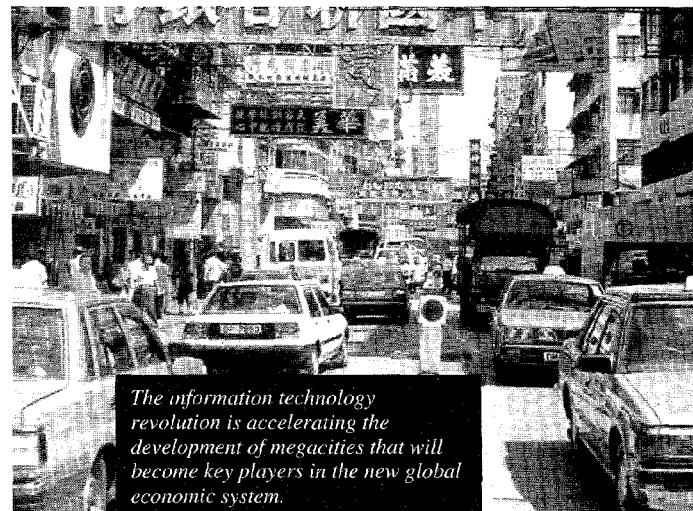
Cities' strategies for development in the new global system must emphasize three major issues: their connectivity, their informational capacity, and their ability to manage social integration. Since the dominant functions of our economic system operate increasingly on a global scale (even if the majority of economic activity does not) cities that are switched-off from the system of global exchanges will be increasingly marginalized, and ultimately

impoverished. Thus an adequate infrastructure of telecommunications, transportation, and information systems is a must for cities to exist in the system, and to compete and cooperate as wealth creators for their territories. Cities also need to enhance their informational capacity, namely their ability to operate in the new technological paradigm. They must be able to produce, manage, trade, and live in the new system.

The role of informational technology in the new system is not unlike that of electricity in

but of education at large.

Finally, metropolitan regions must cope with the increasing social stress caused by the new system. Indeed, the process of globalization is selective, and highly exclusionary. Large segments of the local population could be left out, as producers and consumers, from the system. Most major metropolitan regions in the world will not lack development opportunities: the Asian Pacific countries and most of Latin America are well-engaged in a process of rapid industrialization and development, and are



The information technology revolution is accelerating the development of megacities that will become key players in the new global economic system.

the industrial economy. Yet the capacity to operate in the informational paradigm goes beyond installing and using computers. It depends, first of all, on the quality of labor. Education, in the broadest sense, becomes the most strategic investment for metropolitan regions, and not just investment in engineers and computer scientists, but in the simplification of information-based machines. What really matters is the ability to generate knowledge and to process information; this is not a function of computer literacy,

increasingly interdependent with global markets and global circulation of information. Other areas may follow a similar path in the coming years. But we are also witnessing an uprooting of rural populations and a rise in urban marginality. Unless governments and societies of metropolitan regions design programs and build institutions to redistribute wealth and ensure community building, the developmental dynamism generated by globalization and information technology will doom the promise of human enhancement, ushering in a dark urban age.



Staying in Touch: A Notebook

by Paul A.R. Berczeller

Paul Berczeller is a freelance writer specializing in African affairs. He recently returned from an assignment in the Central African Republic for Harper's, where he interviewed the former emperor, Jean-Bedel Bokassa I. He is currently writing a book about Equatorial Guinea.

Editor's Note: Paul Berczeller recently returned to New York City after a seven-month excursion in Equatorial Guinea. The editors of The Urban Age asked him to write down some reflections on the meaning of "information" in a country where terms like "cyberspace" and "virtual reality" do not exist. We are pleased to present his recollections.

MALABO. Landing in Malabo, the capital, my Guinean seatmate gives me his telephone number. A few days later I realize that I have lost the slip with his number. I walk to the telephone headquarters (there is no phone where I am living), wake the dozing receptionist, and ask her to look it up for me. "Look it up?" "Yes, you know, in the telephone book." "Telephone book?" "The list of phone numbers." "There is no list," she says and puts her head back down on the counter. She explains that I don't need my friend's phone number. "You will bump into him." I walk out of the telephone office, amazed at her reply. Three steps later, I hear someone call my name. It is my friend.

It turns out there is a telephone book, after all. It is organized alphabetically—by first name. It was published in 1985 for the first and last time.

In a town called Niefang, on a dirt road that leads into the interior, an old man sits alone in a room. His glasses are made from chicken wire, scavenged from a failed development project. His prized possession is a pencil stub. He is the town's postmaster. He has not been paid in the longest time, but still he comes to work. He has loved the post office ever since the cubbyholes lining his office walls were stuffed with mail, back during the old times. Today, only a few letters—for the fathers at the mission, the police chief, or the mayor, perhaps—still find their way to his desk. The cubbyholes are all empty. Still the old man comes to work every day, with his pencil. Just in case.

It is the rainy season and I am on my motorcycle, lost in the bush. I fly blindly over the top of a hill and down into a small ravine where the road used to be. The bike has landed on my leg, it is getting dark,

it has been hours since I've seen anyone. I hear steps. Three young men, hunters, appear out of the forest. They lead me down a path to a small village; then into the Casa de la Palabra. I sit at one end of a long bamboo bench, across from the senior men of the village. "Where are you from?" one asks. "New York," I say. They look at one another. The oldest motions for a young boy to bring me an orange. As he hands it to me, looking away shyly, he whispers: "Do you know Michael Jordan?"

Leaving the road to enter the deep forest is to travel from one world to another. Often paths are perceptible only to the initiated. But the paths are always there. The crossroad is marked by a Y-shaped stick stuck in the ground. You hang a leaf on the branch, left or right, depending on your direction. On your return, you throw the leaf away. The hunters know exactly where other men are, based on how far the dead leaves on the branch have decomposed.

Every day at 5 p.m.—in the bars, the huts, the paths, the streets—they all gather by the radio. From Madrid come the words: "Buenas Tardes, Guinea Ecuatorial..." It is the daily news broadcast of Radio Exterior de Espana. People listen because they want to hear the truth. They listen because it is a sign that they are not alone in the world; someone speaks to them from the outside. Every once in a while, the government gets angry at something in the broadcast—a statement by the opposition, the report of a jailing—and tries to jam the signal for a time. But people always discover places where the jamming doesn't work. They can't live without it.

The national TV (one channel, kung fu movies, news of flower shows in North Korea), carries pictures of the Olympic team's farewell at the airport. The Minister of Sport poses next to the weekly Iberia plane with the Olympians (two girls, tiny runners, trembling). The government can't afford the broadcast coverage of the games. Truth is, only Bata and Malabo have television anyway (or electricity and water, for that matter). Luckily, that time of the year, the signal carries well from Cameroon. The night of the opening ceremonies, people crowd around televisions to watch their Olympians enter the stadium in Barcelona,

waving la bandera of Equatorial Guinea. Their country, like all others! They drink their beers and imagine the moment to come.

The only telephones are in Bata and Malabo. In a country of 389,000, there are 2,000 phones. Who can afford a telephone? Those in the ruling clan, diplomats and aid workers, Lebanese store owners, the government. Sometimes luck—a daughter who marries a European, a relative who makes good abroad, another who unexpectedly wins a position in the government or with an aid agency—intervenes. But luck, like the wind, can change direction. Let's say you're lucky enough to get a telephone. You put it on a table prominently placed in your living room. It shimmers with prestige. Your family and friends come to visit you, and all anybody talks or thinks about is your phone. Some are jealous; perhaps they wish you bad. Their wishes come true. Maybe something happens and you can't afford it anymore. The phone stays where it is—though its line is dead, perhaps forever. It remains there: a memory, a reproach, a sign of hope.

In the middle of the Atlantic Ocean, 600 km from the rest of the country, there is a lost desert island named Annobon. It looms above the choppy water, splendidly lonely, dark and unwelcoming under the hot sky.

There is a two-way radio at the island garrison. It is for the use of the soldiers and the island's governor only. Two priests—one from Buenos Aires, the other from the deepest, most austere Castilia—live on the

island, alone in the white mission on top of a hill. They don't know if she has died or recovered. He keeps thinking about the time he has missed the program. One time, in all those months! But could that have been the time his family sent him another message about his mother? He gives me a letter for his family. The quickest, surest way to contact him, he says, is for them to send him another message through Radio Exterior. But what will happen if he misses another broadcast?

Radio Congossa, they call it. The network that ties all Guineans together, in a cocoon of shared experience, an overload of communication in a country without computers, telephones, reliable roads, or postal service.

No matter how fast I travel, news of me and my motorcycle seems to travel faster. Everyone knows who I am in every corner of the country. They have heard the jokes about me, the suspicions, they know not only my friends but my enemies as well. One day I fall off the bike 20 km outside of Bata. By the time I have dusted myself off, fixed the problem with the front wheel and arrived at my destination 10 km away, a message from a friend in Bata is waiting for me. She has heard about my fall and is worried about me.

When I returned, I asked her how she knew.

"Radio Congossa knows everything," she laughed.

In Equatorial Guinea, there are no secrets and no certainties.



island, alone in the white mission on top of a hill.

They are going slowly crazy, but don't know it. The one from Castilia has heard messages sent to him over Radio Exterior de Espana that his mother is dying. But that was it, he never hears anything again. He

There is only information.

When viewed through the prism of the outside world, it might seem as if nothing ever happens. But everybody watches everybody. Everyone talks about the other. And there is time—so much time.

©Paul A.R. Berczeller (1995)



Information Technology as a Management Tool: Bulawayo's Experience

by Mike M. Ndubiwa

Mike Ndubiwa is currently the town clerk for the City of Bulawayo, Zimbabwe. He is the chairman of the Steering Committee of the Municipal Development Programme for Sub-Saharan Africa. He is also vice-chairman of the International Council for Local Environmental Initiatives and serves on various local and international boards of urban and environment organizations.



As a city in a developing country, Bulawayo is having to address the scarcity of its resources—in this case information technology. In order to redress the balance, efforts are being made to use city residents as a resource for channelling information and getting them to work together with local officials to promote the city's development.

Meetings at the ward and citywide level continue to play an important role in promoting communication between the council and its citizens. Also, a number of citizen forums, such as the Bulawayo Environmental Forum, the Matabeleland Zambezi Water Trust, and the Greater Bulawayo Development Committee are in the process of being set up. These efforts at promoting dialogue between the council and its citizens will supplement regular initiatives such as press statements, media briefings, and advertisements. The council often makes its management and councillors available for radio and television shows to inform the public and clarify its position on certain issues. Communication of council decisions and management issues with groups outside the city has also been improved by the use of facsimile. In addition, the city intends to redesign its in-house magazine to provide more regular issues and timely dissemination of information during this time of increasing urbanization and poverty.

In a bid to take advantage of improvements in information technology, Bulawayo City Council contracted a consultancy firm to assess the city's informa-

tion requirements. The result was an information systems report which recommended the computerization of council services to be implemented subject to the availability of funds. Currently, the city owns and operates a Wang mini computer and there are a number of personal computers in

different council departments. Financial management reports are centrally produced through the Wang, which runs processes in batches. Batch processing, however, does not lend itself to the production of specialized reports, as changes in programs tend to be slow. Furthermore,

changes require computer programming knowledge to realize maximum effect. Also used are typewriters, duplicating machines, photocopiers, printing and decollating equipment, and fax machines.



An Interview with J. T. Malinga, Mayor of Bulawayo



Councillor J. T. Malinga was re-elected to serve a second term as mayor in August 1994. He is the past chairman of the Disabled Peoples' International; secretary of the Pan-African Federation of the Disabled; a member of the Zimbabwe Disability Board; a U.N. panelist on the Equalization of Opportunities to Disabled People Board; and the vice-chairman of the Bulawayo Province of the Zimbabwe African National Union Patriotic Front.

UA: What is the level of information technology used for the management of Bulawayo?

Malinga: The level of information technology used in the management of Bulawayo is reasonable for a city in a developing country with a less sophisticated community and little information technology equipment. Internal council communications such as financial management reports are computer-processed, but agendas and minutes of council meetings are typed and often have to be redone many times, delaying communication of the council's decisions to relevant target groups. The availability of the fax machine has made possible the receipt and transmission of ideas between the municipality and external bodies.

Communication of the council's resolutions on urban issues is done verbally through mass meetings convened by resident associations; for example, this occurred in 1992 when there was a water supply shortage. In that instance, a television series entitled *Bulawayo Must Live* was particularly effective in persuading the citizens to save water. The council also communicates through notices displayed at municipal centers and/or through communications sent to consumers

of council services with their bills. Newspapers are also used to publicize the council's initiatives, as are interviews with council members on national radio and television. The council also publishes *Masiye Pambili—Let Us Go Forward Together*, a quarterly in English and Ndebele that is delivered free to householders and community organizations.

UA: How is the use of information technology affecting the development of the city of Bulawayo?

Malinga: Delays in communicating with target groups have a negative effect on the development of the city. While public meetings have had a positive effect on promoting communications between the council and the citizens, particularly in times of crisis, they take time and effort to organize. Timely dissemination of information would certainly be of help in the development of the city.

UA: If the level of information technology use is not great, how is that affecting the city's development?

Malinga: As indicated above, the level of information technology use

is not adequately supportive of the rapid development of the city. A case in point is the impossibility of determining what land is available for development throughout the city. A computer database determining land ownership and current conditions would greatly help the search for land available for development. This would also facilitate decision making on the future use of such land.

UA: How much of a priority is information technology in relation to other priorities for the successful management of Bulawayo? Do you have a long-term strategy and/or policy for information technology application for Bulawayo?

Malinga: I believe that information technology should be given top priority if Bulawayo is to be successfully managed and developed. In that respect, a long-term strategy exists for the application of information technology at the council level: at this stage, the computerization of council proceedings.

The Information Gap: Crisis or Opportunity?

In the "Roundtable," we present several questions to prominent people on the topic being discussed in each issue. The purpose of the "Roundtable" is to create a forum for interchange and debate among people with opposing points of view. In this issue, we consider the theme "The Information Gap: Crisis or Opportunity." We have expanded the format to include many voices from around the world. We were interested in finding out whether the information gap is a monolith or, as Howard Frederick observes, a force further separating the developed and developing worlds. What, if any, are the opportunities to be gained from it, and, if so, how can developing countries benefit? Appropriately, this discussion was first conducted on the Internet—a perfect example of collaboration in cyberspace.

UA: Will the information gap created by the revolution in information technology be a crisis or an opportunity for developing country cities?

Howard Frederick teaches global communications at Emerson College, Boston, Massachusetts. His book, *Global Communication and International Relations* (Wadsworth, 1993) is a standard text in the field. He is now writing a book on cyber-research and global inter-networking.



Anwar Al-Ghassani is a poet and associate professor of journalism and new information and communications technologies at the University of Costa Rica. He is a member of PEN International and IAMCR.



Zrinjka Perusko Culek is a researcher at the Institute for Development and International Relations in Zagreb, Croatia. Her present research interests are in the fields of media and democracy. She has participated and/or managed research projects related to international communications, and communication and cultural policies.



UA: Who are the "information-poor," and what specifically can be done to bridge the gap between them and the "information-rich"?

FREDERICK: There is indeed a crisis. Some nations still languish in the pre-electronic age, and even many sectors of developed countries are pre-literate. Since power increasingly depends on access to information, control of its processing, and knowledge of its application in decision-making, whole nations and segments of civilization are being left behind.

FREDERICK: The information-poor are those who cannot read or type, do not have access to computers, and cannot afford a book or a newspaper. Decentralizing technologies such as computers, fax, radio, satellites, VCRs, and video cameras would help democratize information flows, and make top-to-bottom communication easier.

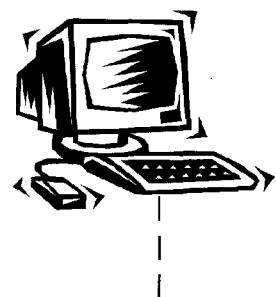
UA: Do the developed countries have a social responsibility to ensure universal access and responsible use of information technology to developing country cities?

FREDERICK: Developing country elites do not normally opt for social responsibility. They are more interested in power and profit. We now speak of the emergence of a third sector—civil society—that part of our collective lives that is neither market nor government but is so often inundated by them. Civil society is demanding the right to communicate.

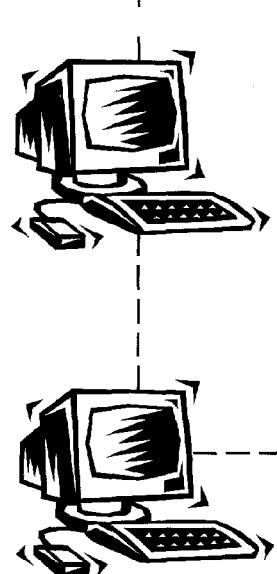
UA: Sociological observation would suggest that the notion of technological determinism is false. How then will developing country cities be able to modify and adapt information to their own satisfaction?

FREDERICK: Different media have different tendencies. The crucial factor here is decentralization. New decentralizing communications technologies have transformed citizens' capacities to build coalitions and networks, which has led to the creation of human rights movements and citizens' action organizations.

AL-GHASSANI: I would argue that it is an opportunity. Disparity between information supply and demand is permanent and needs permanent adjustment. However, disparity between information-rich and information-poor is different; its roots are economic and political which are not permanent problems. By incremental adjustment these disparities can be bridged.



CULEK: The information gap occurs between those who have and do not have access to international computer networks. In Croatia, access to the Internet has been an opportunity; access to the "net" affords greater visibility and connectivity for developing country researchers who often cannot attend international meetings.



AL-GHASSANI: This is above all a moral responsibility. Ideally, an institution to recommend and coordinate global technology policies—to create a global information infrastructure—should be set up.

AL-GHASSANI: All technologies have certain deterministic effects on consciousness, productions, and culture. "You are what you use." Developing country cities can modify and adapt technologies to promote decentralization of government, and to promote transition to direct democracy.

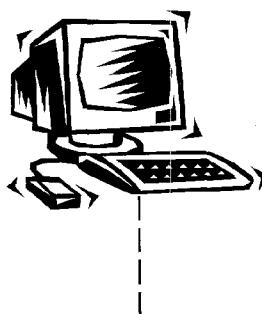
Naren Chitty directs the Graduate International Communications Program at Macquarie University in Sydney, Australia. He is managing editor of the *Journal of International Communications*.



François Fortier is a Ph.D. candidate in political science at York University, Toronto, Canada. He is currently working on a fixed term contract for the U.N. World Food Programme and is also working as a researcher and advisor to NetNam, a national governing organization computer network in Vietnam.



CHITTY: The globalization of information society will link metropolitan spaces such as New York and London to provincial capitals in the developing world. A single global urban space will emerge—a telecommunity. Developing country cities will be able to use the information superhighway to transport readings of their own cultures to metropolitan spaces.



CHITTY: The nations of the world should negotiate a policy for the management of the global information infrastructure. Whether a policy is negotiated or not, one will emerge anyway, with the values of the players.

FORTIER: A gap is never an opportunity; it always benefits some at the expense and marginalization of others. Powerful groups are more likely to benefit from disparities than other less-endowed sectors. The information gap reflects no less than the commoditization of information, in an economy where information has become a key means of production.

Ó SIOCHRU: That a gap will open up is inevitable. The questions are: Will the benefits of information technology to those on the right side of the information gap outweigh the costs to those on the wrong side? Will the distribution of benefits strengthen present inequities or will the information revolution help marginalized groups turn their ideas into better lives?



FORTIER: Universal access will only be secured by the struggle of those who refuse marginalization. We can only hope that the rich will recognize, through the resistance of the poor, that equity and participation are essential conditions for socially sustainable development, including theirs.

Ó SIOCHRU: Developed countries have an ethical and social responsibility to warn of technological consequences and to act to ensure that these are positive for others. They also have an economic interest in ensuring that the economic benefits of information technology are maximized in developing country cities.

FORTIER: Technological determinism is certainly a myth. Appropriation only occurs when a technology is developed or adapted by poor sectors for their specific needs.

Ó SIOCHRU: It is true that technological determinism holds no hidden inner logic. Modifications required have often less to do with the technologies per se than with the context in which they are being implemented.

Sean Ó Siocru is a consultant to the Commission of the European Union on telecommunications for development. He is also involved in local media initiatives worldwide and is currently vice-chairperson of the MacBride Roundtable on Global Communications. He is a founder and full-time member of NEXUS Research in Dublin.



Ursula Maier-Rabler is assistant professor at the Department of Journalism and Communication, University of Salzburg, Austria. Special interests include the socio-spatial dialectic of the new information and communications technologies, especially for the development of existing cities.



Arnaldo Coro Antich teaches at the School of Journalism at the University of Havana, Cuba. He also works at Radio Havana, and produces a radio show on international broadcasting. His present research interests include non-conventional energy sources and how to manage social systems.

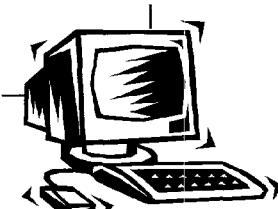


CORO ANTICH: This is a major crisis. Management of the urban environment is a very difficult task, made even more so when those in charge lack appropriate information on vital problems. Lack of up-to-date technology will negatively affect developing country city inhabitants.

CORO ANTICH: Up-to-date technologies may allow developing country cities to replace obsolete systems, thereby encouraging the process known as leapfrogging—i.e., changing from telephone switching gear to the integrated digital network without having to climb the ladder of techno-development one step at a time.

CORO ANTICH: Ensuring universal access and responsible use of information technology is in the best interests of both developed and developing countries. Social responsibility is necessary because the introduction of new information technologies will have a positive impact on the quality of life of hundreds of millions of human beings.

CORO ANTICH: In order to be able to introduce, modify, and adapt information to their own satisfaction, developing country cities must select, train, and keep personnel with the highest qualifications in management science.



The Parque Ecologico do Cocó: A Publicity Coup

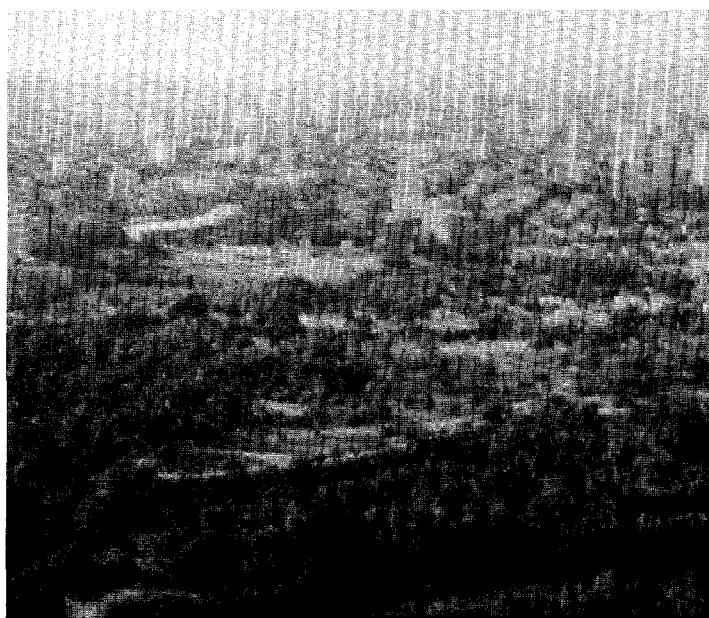
by Julia Bucknall



Julia Bucknall works at the World Bank on environmental and urban development projects in Mexico, Central America, and Venezuela.

FORTALEZA. Through the establishment of the Parque Ecologico do Cocó in Fortaleza, Brazil, the state government of Ceará used information cleverly to create a political and administrative climate conducive to reconciling environmental and social objectives.

The Parque Ecologico do Cocó



The state of Ceará used information to reconcile social and environmental objectives by creating the Parque Ecologico do Cocó in Fortaleza, Brazil.

is the largest urban park in Latin America and protects a mangrove swamp situated on some of the city's most valuable real estate. At the same time, the park harbors on its periphery a shantytown of 10,000 inhabitants. Conservation initiatives usually come at the expense of the poor, and in turn, local people often undermine conservation initiatives by taking land or resources illegally. Not so in this instance. In creating the park, the state planners of Ceará did not remove the 10,000 squatters living in terrible conditions, rather they upgraded the housing and services in situ. Squatters now protect

people to protect area resources has been practiced for at least a decade in Ceará. But initially success has been difficult to achieve because of the differing interests of powerful groups. The state of Ceará managed to reconcile the diverse interests of the squatters and the conservationists by keeping them informed of efforts to establish the park throughout the 15-year campaign to establish it.

State government's use of information

Initially, the two campaigns conflicted. The city's intellectual

their new homes by stopping illegal dumping and acting as an informal park police. The founding of the Parque Ecologico do Cocó managed to turn the usual conflict between social and environmental aims into a situation beneficial to both interest groups.

Creating incentives for local

elite campaigned to preserve biological diversity and the natural area of the park, while the squatters mobilized for better housing and services in the Cocó shantytowns. Both campaigns made heavy use of existing information dissemination tools. The conservationists were most visible, as they had access to newspapers and contacts with local celebrities and politicians. Conservationists organized a rock concert, an ecological picnic, and petitions and leafleting campaigns. Conversely, the squatters organized community groups and relied more on direct pressure on state officials.

The state government realized the opportunity for synthesis between two mutually reinforcing campaigns. It used various forms of information to create and respond to the political climate. The government realized that the location of the park in the middle of town made the area a political bombshell. It also recognized the importance of the international climate in which green credentials mattered and political payoffs could be substantial. The administration made sure everyone knew about the existence of the park by erecting attractively designed signs that linked the park clearly with the state administration along its perimeter. The government also maximized its political payoff through local and national advertising. It paid for advertisements on state television that described the project as the largest urban park in Latin America. It also used the 1992 U.N. Conference on Environment and Development in Rio de Janeiro to gain international publicity by advertising its green credentials through videos, publicity stands, and advertisements in national magazines.

Keeping voters informed

The state government was acutely aware of the value of informing voters about all of its initiatives. It did not therefore ignore the shantytown upgrading along the park's boundaries. Interspersed with advertisements about the Cocó park, viewers could see the terrible conditions of the shantytowns, juxtaposed with pictures of 10,000 residents building their own houses, machines digging sewage lines, and people using clean water arriving from standpipes or individual taps.

The publicity about the public sector initiative did not just create political goodwill among the voters. It had the unexpected effect of making public officials proud of their jobs. People had suddenly heard of their initiatives and approved of them. They received recognition and praise. As officials became proud of their work, they began to do it better.

The state of Ceará is one of Brazil's poorest. Now the state has become well-known in Brazil for achieving both an economic upswing and for successful social programs. The government skillfully used available information resources such as television advertisements, billboards, and international conferences to make itself popular with voters, who then supported the project through economic adjustments. Using publicity to foster consensus allowed the government to build the park and integrate the needs of the shantytown residents.



This article is based on research conducted with Professor Judith Tendler of MIT, funded by the state government of Ceará.

We actively seek our developing country readers' input for this section. Our intention is to facilitate networking among developing country city managers and their constituents.

THE PANOS INSTITUTE

Contact: Dr. Melanie Beth Oliviero, Executive Director, The Panos Institute, 1717 Massachusetts Avenue, NW, Suite 301, Washington, DC 20036, USA; Tel: 202-483-0044, fax: 202-483-3059.

The Panos Institute, an international information organization, was established in 1986. It consists of three autonomous institutes operating in Washington, London, and Paris. Their aim is to promote socially, environmentally, and economically sustainable development.

Through media training workshops and materials production, community outreach, and dissemination of information, Panos Washington aims to deepen understanding about development issues worldwide. It concentrates on building the local capacity for reliable information gathering and responsible reporting in the global South and on bringing these perspectives to the attention of Northern audiences. Current programs include information capacity-building among journalists and editors in the Caribbean and Central America, mobilizing the media on responsible reporting about HIV/AIDS, and promoting Southern voices on population, consumption, and development, and on the consequences of conflict on development locally.

INDORE HABITAT PROJECT

Contact: Diane Diacon, Research Officer, Building and Social Housing Foundation, Memorial Square, Coalville, Leicestershire, LE67 3TU, UK; Tel: 44-0-530-510444, fax: 44-0-530-510322.

The Indore Habitat Project in Indore, India, provides an innovative city-wide approach to urban improvement through the networking of slums and other distress zones in the city. Incorporating full community support, the project has brought dramatically improved living conditions to 900,000 people, at a fraction of the cost of conventional approaches.

The project covers 183 slums, benefiting 39 percent of the population directly. A further 35 percent of the population has gained indirectly through the citywide environmental improvements. There are two main components to the project: physical improvements in the slums and the city, and community development works. In a separate program, the legal rights of the land are being transferred to the slum-dwellers.

The British Overseas Development Agency is the principal funding agent for the slum upgrading components of the project—this is regarded as seed money to encourage contributions from beneficiaries and other sources of funding, including state and municipal funding. Maintenance and running costs will be met by the municipality, but will be recouped from increased tax revenues from the slum population and connection charges for the non-slum population. The health, educational, and social components of the project are run at the grassroots level by community volunteers.

LINCOLN INSTITUTE OF LAND POLICY

Contact: Ann Long, Registrar, Lincoln Institute of Land Policy, 113 Brattle Street, Cambridge, MA 02138, USA; Tel: 800-LANDUSE, fax: 617-661-7235.

The Lincoln Institute of Land Policy is a nonprofit and tax-exempt educational institution established in 1974. Its mission as a school is to study and teach land policy, including land economics and land taxation.

The institute seeks to understand choices for the strategic management of land, community and individual rights and responsibilities in land, the taxation and regulation of land, the functioning of land markets, changing patterns of land use, and the interrelationships of transportation and land use.

It maintains a multidisciplinary approach to the study of land and tax policy. Experts with a variety of backgrounds come together to study, reflect, exchange insights, and work toward creating more complete and systematic land and tax policies.

Through its research, courses and conferences, and publications, the institute seeks to advance and disseminate knowledge of critical land policy issues and to have an impact on land policy.

WORLD BANK LAUNCHES ELECTRONIC MEDIA CENTER

In today's increasingly knowledge-based world economy, information—and the means for disseminating it—are recognized as vital economic resources. The continuing decreases in the costs of storing, processing, and transmitting information electronically are driven by a wave of technological change known as the digital revolution, which is affecting every economic sector. The digital revolution promises major productivity increases in education and training at a time when learning is becoming crucial to achieve and maintain the economic competitiveness of people, cities, countries, and nations.

It is vital to the World Bank's future to be actively engaged in harnessing this technological revolution to meet the challenges of pursuing economic reforms, investing in people, protecting the environment, stimulating the private sector, and reorienting government. To this end, the pilot Electronic Media Center (EMC) was established in June 1994 as a joint venture of three central vice presidencies and the External Affairs Department of the World Bank.

The EMC provides a new focal point in the World Bank for coordinating, encouraging, and demonstrating applications of the electronic media—including television, radio, video- and audio-cassettes, video-disks, CD-ROM, videoconferencing, and the Internet—and enables other units of the World Bank to:

- disseminate strategically selected analyses of important development issues to the world at large and encourage interactive feedback;
- support World Bank operations through facilitating the inclusion of electronic media components within loans, credits, and investments as a means to improve stakeholder participation;
- expand the reach and increase the cost effectiveness of the Economic Development Institute and internal training activities; and
- promote the external relations of the World Bank, primarily by carrying out the first three functions, thereby increasing the visibility and outreach of the World Bank's activities.

The EMC has successfully completed its startup phase, is almost fully equipped, and has launched a series of pilot projects. The first of these pilot projects, a mini-series of two 55-minute television programs on worldwide experience with high inflation, hyperinflation, and stabilization and their relevance to Russia today, has been completed and an evaluation commissioned. The series, entitled "Your Money or Your Life" and produced by the Russian firm PERSONA, was broadcast on Russian television (Channel 2) in October 1994.

Other pilot projects include two one-hour videos entitled "Dams, Debates, and Development" and "The Human Face of Urban Development" in the format of Socratic dialogues; a one-hour video entitled "Learning Nations" on the crucial role of information technology in development; a manual on teleconferencing; participation in the development phase of WETV, an Agenda-21-oriented global access television broadcasting service; and development and implementation of an on-line database accessible over the Internet on audiovisual materials promoting sustainable development.

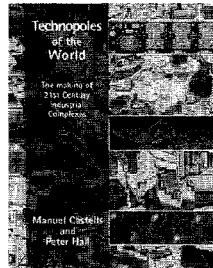
How can the EMC help promote sustainable urban development? Urban projects financed by the Bank can include components using the electronic media to achieve their objectives, and the EMC can provide suggestions on how this can be done. The power of television has been insufficiently used to build support for innovative approaches to urban development problems. The EMC has staff with knowledge of development applications of all the electronic media—especially television, video, and the Internet—and the EMC is developing worldwide contacts which can help make use of these media to achieve project objectives. As more video products are produced within Bank-financed urban projects, WETV will provide a global network for broadcasting the best work so that lessons of successful sustainable urban development can be known worldwide.

—Peter T. Knight

Technopoles of the World: The Making of 21st Century Industrial Complexes

2 by Manuel Castells and Peter Hall. Routledge, 11 New Fetter Lane, London EC4 4EE, UK, 1994. ISBN 0-415-10014-3.

The emergence of a global economy and new information technologies are changing the way we do business and the goods



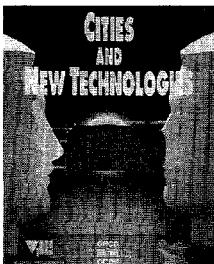
and services we produce. These developments, in turn, are leading to entirely new uses of cities and regions. Such new uses may develop in a haphazard way, say the authors of this book, or they may be planned as technopoles—special centers where a concentration of high-technology industries is deliberately encouraged. For a place to be a technopole, the authors say, it must have access to a skilled workforce, capital, and the latest technological information.

The book examines various cases where such technological centers have been planned. The cases include science parks, science cities, and industrial complexes. These three cases have been undisputed successes. But one of the striking conclusions of the book is that despite the planning, over the years the world's most enduring high-tech production has emerged from places that have not been specifically designed for these industries. Instead, such technology has emerged from the old metropolises of the industrial world, like London and Paris.

Cities and New Technologies

by Head of Publications Service, OECD. 2 Rue Andre Pascal, 75775 Paris, Cedex 16, France, 1992.

Information technology is changing the ways cities function in the industrialized world. For this reason the Organization for Economic Cooperation and Development (OECD), whose



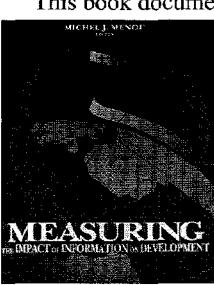
members comprise the world's leading industrialized countries, established a working group on urban matters to study the implications of an "information society" on the way cities are traditionally organized. In the course of its work, the group held an international conference in Paris, which is the subject of this report. According to the report, the mayors, businessmen, and scientists at the conference agreed that information technologies are going to have a profound impact on urban policies like housing, transport, education, infrastructure, and land use and environmental services.

Measuring the Impact of Information on Development

by Michel J. Menou. The International Development Research Centre, P.O. Box 8500, Ottawa, ON K1G 3H9, Canada, 1993. ISBN 0-88936-708-6

For decades, multilateral and bilateral agencies have been encouraging developing nations to establish information infrastructures. It was always assumed—perhaps glibly—that information has a positive effect on societies, including developing societies, but can this be proven?

This book documents the first-ever attempt by information specialists around the world to analyze this issue



and to present an answer. The book summarizes the experts' discussions at the first-ever computer conference held on the impact of information services in developing countries. The experts suggest ways for measuring whether information services do in fact have a positive impact on development, whether the aim of the developing country is to save money, to make management decisions more efficiently, to facilitate communication in remote rural areas, to improve higher education, to save lives in the health services, or to get ordinary people to participate more in society.

The Information Technology Revolution and Economic Development

by Nagy K. Hanna. The International Bank for Reconstruction and Development, The World Bank, 1818 H Street, NW, Washington, DC 20433, USA, 1991. ISSN: 0259-210X.

Developing countries cannot afford to ignore the information revolution of the 1990s, the author affirms in this study. Information technology and informatics are at the heart of the global economy and are having an

impact on all types of industries and services. Such technologies can help

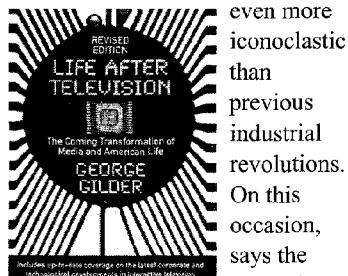
developing countries have timely and reliable information. It can also be a powerful tool in encouraging popular participation and in moves to decentralize. The study claims that the new information technology will be beneficial to developing countries. It says it will help these countries in a variety of areas such as economic planning and management, in agriculture and rural develop-

ment, management of the environment, urban development, education, and health and family planning.

Life After Television: The Coming Transformation of Media and American Life

by George Gilder. W.W. Norton & Company, New York and London, 1994. ISBN 0-393-31158-9.

The world is poised for another breakthrough in information technology, which may prove



even more iconoclastic than previous industrial revolutions. On this occasion, says the author in

his ground-breaking new book, developments in fiber optics and digital computers will lead to the demise of telephone and television communications as we now know them. People-to-people communication will give way to links between computer users and digital computer networks which will be found in every office and home.

The rise of the telecomputer—the "teleputer"—is going to radically alter the way we learn and educate our children, do business, shop, stay healthy, and spend our leisure time. The teleputer era, when it arrives, will completely undermine the need for the large, centralized, top-down organizations that now proliferate in industry, like the giant cable networks, phone companies, government bureaucracies, and multinational corporations. The information provided by the new teleputer will also be varied, educational, and participatory—a far cry from the fare now dished out to audiences by the mass media.

Below is a selection of urban events and training courses culled from The Urban Age's current files. We are not always able to list events more than once, given space limitations. Please refer to past issues of The Urban Age for additional events scheduled in 1995. Send your announcements to: The Editor, The Urban Age, Room S4-031, The World Bank, 1818 H Street, NW, Washington, DC 20433, USA. Fax: 202-522-3224, Internet: mmcneil@worldbank.org

Conferences

Manchester, England—March 27–28, 1995. **International Sustainable Development Research Conference.** Contact: ERP Environment, P.O. Box 75, Shipley, West Yorkshire BD17 6EZ, UK. Tel: 0274-530408, fax: 0274-530409.

Lapland, Finland—April 1–5, 1995. **Living on the Margins—Making the Best of Limited Resources.** Contact: Douglas Gordon, Secretary General, Suomi-Finland IFHP, P.O. Box 100, Helsinki, 00521, Finland. Tel: 358-0-148-88412, fax: 358-0-148-6672.

London, England—April 4–7, 1995. **Health at the Crossroads: Transport Policy and Urban Health.** Contact: Conference Office, London School of Hygiene and Tropical Medicine, Keppel Street, London WC1E 7HT, UK. Tel: 44-0-171-927-2314, fax: 44-0-171-580-7593.

Dallas, TX—April 23–26, 1995. **The Challenge for America's Communities: Economic Development in a New Era.** Contact: National Council for Urban Economic Development, 1730 K Street, NW, Suite 915, Washington, DC 20006, USA. Tel: 202-223-4735, fax: 202-223-4745.

Washington, DC—June 25–28, 1995. **Violence as a Global Health Issue: Responding to the Crisis.** Contact: NCIH Conference, 1701 K Street, NW, Suite 600, Washington, DC 20006, USA. Tel: 202-833-5903, fax: 202-833-0075.

University of Warwick, Coventry, England—September 11–15, 1995. **The 23rd European Transport Forum.** Contact: PTRC Education and Research Services Ltd., Glenthorne House, Hammersmith Grove, London W6 0LG, UK. Tel: 44-0-181-741-1516, fax: 44-0-181-741-5993.

Education Programs and Courses

Harvard University—The Graduate School of Design will offer its 14th annual international training program called "The Role of Public/Private Partnerships in Financing Sustainable Urban Development" from June 26–July 21, 1995. The four-week course will address the issues faced by local agencies while they promote economic growth in partnership with private enterprise. Contact: Randa Tukan, International Training Programs, Unit for Housing and Urbanization, Harvard University-Graduate School of Design, 48 Quincy Street, Cambridge, MA 02138, USA. Tel: 617-495-4964, fax: 617-495-9347.

Boston University—The School of Public Health will offer its 13th annual Health Care in Developing Countries program, to be held May 24–August 18, 1995. The program stresses principles and practical techniques essential in the planning and delivery of health care services in resource-constrained environments. Contact: Joseph Anzalone, Course Manager, Center for International Health, 53 Bay State Road, Boston, MA, 02215, USA. Tel: 617-638-5234, fax: 617-638-4476, Internet: cih@bu.edu.

Rotterdam, The Netherlands—Courses offered by the Institute for Housing and Urban Development Studies in 1995 include master's degrees in Urban Management (September 1995–December 1996), Urban Environmental Management (September 1995–December 1996), Construction Management Technology (April 27–July 28), and Inner City Development in Transitional Economies (April 27–July 28). Contact: The IHS Registrar, P.O. Box 1935, 3000 BX Rotterdam, The Netherlands. Tel: 31-10-4021523, fax: 31-10-4045671.

Liverpool, England—In May 1995, the Liverpool School of Tropical Medicine and the Royal College of Obstetricians and Gynaecologists will offer a new course for doctors and nurse/midwives. The course will lead to a diploma in reproductive health in developing countries. Contact: Christine J. Piper, Course Convenor, Liverpool School of Tropical Medicine, Pembroke Place, Liverpool L3 5QA, UK. Tel: 051-708-9393, fax: 051-708-8733.

Newsletters

A selected list of newsletters and journals carrying information on urban development issues.

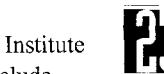
PRODDER NEWSLETTER
Programme for Development Research
P.O. Box 32410
Braamfontein 2017
South Africa
Tel: 927-11-339-4451
Fax: 927-11-403-2353

SOCIAL WEATHER BULLETIN
Social Weather Stations, Inc.
Room 312, PSSC Building
Commonwealth Avenue
Diliman, Quezon City 1101
Philippines

WORLD OF WORK
International Labor Office
1828 L Street, NW
Suite 801
Washington, DC 20036
USA
Tel: 202-653-7652
Fax: 202-653-7687

WORLD RIVERS REVIEW
International Rivers Network
1847 Berkeley Way
Berkeley, CA 94703
USA
Tel: 510-848-1155
Fax: 510-848-1008
Internet: irn@igc.apc.org

POPULATION HEADLINERS
Economic and Social Commission for Asia and the Pacific (ESCAP)
United Nations Building
Bangkok 10200
Thailand



INFORMATION

continued from page 6

widespread distribution of information beyond the government's control.

Such issues likely await China and Vietnam, as well, where highly centralized governments are introducing technologies that promise free-flowing information beyond government's control. China plans to quadruple the number of telephone lines to 80 million by the year 2000 by investing some US\$100 million in telecommunications equipment.

And by the end of this year, all 26 provincial capitals with the exception of Lhasa in Tibet will have optical fiber links to Singapore, Taiwan, Hong Kong, and Thailand. At the same time, Vietnam hopes to add 300,000 optical fiber telephone lines annually.

It's much easier to point to areas where information technology has sped development than to those areas where a lack of information has clearly stymied development. Anecdotal evidence is clear, though. Africa, the poorest continent, also has the least developed information infrastructure. Though not drawing a connection, a World Bank report found that "its bureaucrats do not appreciate the relevance of information to decision making. And its policies tend to control rather than promote information sharing and information technology diffusion."

The new information technologies may also serve to supplement more traditional information sources as well, in developing and developed countries. Large staffs and printing presses are no longer necessary to produce a newspaper, thanks to new software printers and copiers. This can increase the number of more traditional printed publications available. And the increasing availability of information means that local radio broadcasts can be strengthened with up-to-date news from around the world, aiding distribution in more traditional manners than the fiber optic cable that remains a hallmark of the information age.

The future

Given information's importance in the world economy and the challenges awaiting cities as they seek to harness it, what might the future hold? No one knows for sure, of course, but here are some educated guesses.

First, as suggested earlier, those cities that are centers of information and knowledge are likely to grow stronger in this new age, especially those cities with strong existing information infrastructures. Demand for information will be heightened by its ability to be transmitted easily and cheaply, and by its ever-increasing role as both a factor of production and a product itself. As well, cities offer synergies of personal contact, made all the more possible by the convergence of transportation networks found in cities.

Photo credits: page 1: J. Mark Eberman; page 7: Liba Taylor/Panos Pictures; page 11: ©Jon Spaull/Panos Pictures; page 12: Börje Tobiasson/Panos Pictures; page 13: Paul Smith/Panos Pictures; page 14: Nigel Edmead, PADCO, Inc.; page 15: Maurice Harvey/Panos Pictures; page 16: Betty Press/Panos Pictures; page 20: Julia Bucknall.

Cities will likely grow wider—not necessarily taller—as information capabilities allow businesses and workers to enjoy the amenities of a city while utilizing the urban information infrastructure to distance themselves from city-center problems. "City" will likely be more broadly defined to include the range of satellite cities (both literally and figuratively) that will develop near the great urban centers.

Public-private partnerships will grow more active in the development of information infrastructures. Cities, especially smaller, more competitive ones, may increasingly partner with corporations to develop infrastructure in exchange for tax and other incentives. Cities will also seek private partnerships for the technical training advanced companies can offer citizens.

Cities without strong knowledge centers will likely continue competing for low-skill, high-tech jobs, such as the data-processing work which credit card companies now farm out around the world (see story, p. 10). Cities with newly created capacities for handling rapid and complex transmissions will initially seek such jobs to establish industry footholds and develop expertise. These low-skill jobs, though, will constantly relocate as companies seek those areas of lowest costs, and as developing cities offer the necessary infrastructure combined with low-cost labor.

And finally, large urban knowledge and information centers will likely become more distinct from the nation. This may be the most interesting aspect of all. As cities become more a function of information flows than of personal interactions or physical manufacturing, they could easily become increasingly disconnected from their host country even as they dominate the national economy. Already, one study has found that some 70 percent of one major overnight courier's U.S. business is accounted for by just 15 domestic cities. The increased globalization that information technology brings will increase ties between those urban nodes at the intersections of the information networks.

Taken together, information technologies promise to place an enormous burden on city managers and officials. The information revolution holds both promise and warning: promise to those able to leverage its efficiencies both to make city services more efficient and to induce economic development; and the threat of economic struggle to those that cannot.

Trip DuBard is an information analyst on the social impacts of information technology. He is a former reporter for the Associated Press and Knight-Ridder.

Next Issue

The next issue of *The Urban Age* will be on the Human Environment of Cities. The following issue will be on Financing How Cities Work. We look forward to receiving your comments and thoughts on these upcoming issues.

The Urban Age is printed by **Automated Graphic Systems, Inc.**, on recycled paper using soy-based inks.

To receive *The Urban Age*, please fill out the information below and return to The Editor, *The Urban Age*, Rm S4-031, The World Bank Group, 1818 H Street NW, Washington, D.C. 20433.

NAME _____

OCCUPATION _____

ORGANIZATION _____

ADDRESS _____

A fee of \$20.00 per year will be charged to developed country subscribers.

English

French

Spanish

The Urban Age is published four times a year and is available to developing country subscribers free of charge. Developed country subscribers are charged US\$20.00 annually. Editorial offices are located at Room S4-031, The World Bank Group, 1818 H Street, NW, Washington, DC 20433, USA. Fax: 202-522-3224, Internet: mmcneil@worldbank.org