Telecommunications
& Business

BUSINESS PEOPLE in developing and industrialized nations alike are seizing the opportunities being presented by three forces: information and communication networks, globalization, and the growth of the private sector and market economies. This section of *Telecommunications in Action* looks at the various information and communication technology applications for business, commerce and industry, and some of the programmes and vehicles designed to help developing countries access the global networks and use the applications. The networks can be used to buy and sell, to research business information and to connect with partners, customers and suppliers worldwide. Applications in a number of different sectors are discussed, and case studies highlight what is being done and give guidelines on costs to participate in e-commerce – the newest opportunity and challenge for countries and businesses. For many in developing countries, access to the new global market place will come by way of special mechanisms, and three major programmes are examined in detail as models for direct use or to suggest a general framework for action. Successful enterprises have a clear contribution to make to economic development, and the tools are at hand to make them possible.

telecommunications
in Action

A NEW GENERATION of businesses in Africa, Asia, eastern Europe and Latin America is joining the information economy, using e-mail and exploiting websites. It is exploring ways to use this new communication and computer technology to reach markets, increase efficiencies, or develop new businesses that take advantage of the networks. E-mail is revolutionizing how businesses and organizations operate internationally. During the last ten years, data networks have been installed to enable banks, corporations and small local businesses to communicate internally and worldwide. Computers have become communication devices. Mobile telephones have spread to the developing world, becoming the primary means of telecommunication for many. And now the Internet is established in some 200 countries. Nearly every small and large business has an e-mail address. Many now have websites. In less than a decade the ground has shifted dramatically and dynamically, opening up possibilities for private sector businesses in developing countries to grow and to join the world market. The other side of the coin is that developing country businesses must use the technology if they are going to compete. If new technology is ignored, a company faces stiff competition from more efficient local or national operations as well as competitors in other countries for either local or global markets.

WHAT TELECOMS CAN DO

It is hard to run a business without a telephone or, increasingly, an Internet address. Businesses need access to telephone lines and computers, and connectivity to the networks. They need to understand how to make the best use of them. With the liberalization of the telecom sector in many countries, new and specialized service providers and network operators are now offering voice and data services. Internet service providers supply dial-up e-mail or full Internet service or dedicated lines to larger businesses. New technologies can connect a business to the Internet by digital radio wireless links.

Companies in the industrialized nations nearly all have websites now, a major new tool in marketing, and in actual sales in many cases, and investor relations. For example, the international publishing group Longman has a site at <http://longman.awl.com> which contains a catalogue and a mechanism for ordering, as well as information about the history of the company and even guidelines for aspiring authors. There is a growing number of examples of enterprises in developing countries establishing websites. The Virtual Souk is an initiative of the Economic Institute of Development of the World Bank. The site at <http://www.elsouk.com> offers a new opportunity to poor artisans in Morocco and Tunisia who would not otherwise have access to the international market. Browsers from anywhere in the world can take a guided tour of the glassware, pottery and textiles that are for sale, and order and pay for goods over the Internet.

In addition to using the Internet, many larger corporations and most multinational corporations are also building "intranets" (virtual private networks) that provide the same applications but with access limited to internal corporate use or perhaps selected business partners. For example, BAT Industries, one of the Fortune 500 companies, is making increasing use

of its intranet to improve communication between its branches across the world. As they reach further out to suppliers, customers, distributors and other business partners in various countries, they will build "extranets" which connect these partner intranets or local area networks. The significance for businesses in developing countries is that soon, in order to do business or participate in business with multinational corporations, they will need to have their own intranet, compatible applications and network access.

E-commerce or electronic commerce is rapidly building on these technologies. It offers businesses in developing countries an escape from the constraints of time and location. Their goods and services can be offered to the national or the world market. Business-to-business electronic commerce involves sales between businesses, companies and their suppliers, buyers and distributors, and will be a particularly significant opportunity for developing countries. It can facilitate trade, exports, offshore production, intra-regional commerce and foreign direct investment. E-commerce direct to the consumer, such as described in the case study on PEOPLink, sells the products or services directly to consumers.

The technology has been the key driver. Policy changes allowing private sector investment, competition and an open market for information and communication technology have enabled the technologies to be deployed. Competitive markets have driven down the prices and offered a wide range of products and services from which companies around the world can choose. Personal computers (PCs) with modems and CD-ROM can now be bought for as little as US$1,000. A fax, printer, copier and scanner combined into one unit is about US$500. A geographic information system (GIS) can be

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Exports and imports of goods and services as a percentage of gross domestic product, 1995

- Less than 20%
- 20–39%
- 40–49%
- 50–69%
- 70% or more
- No data
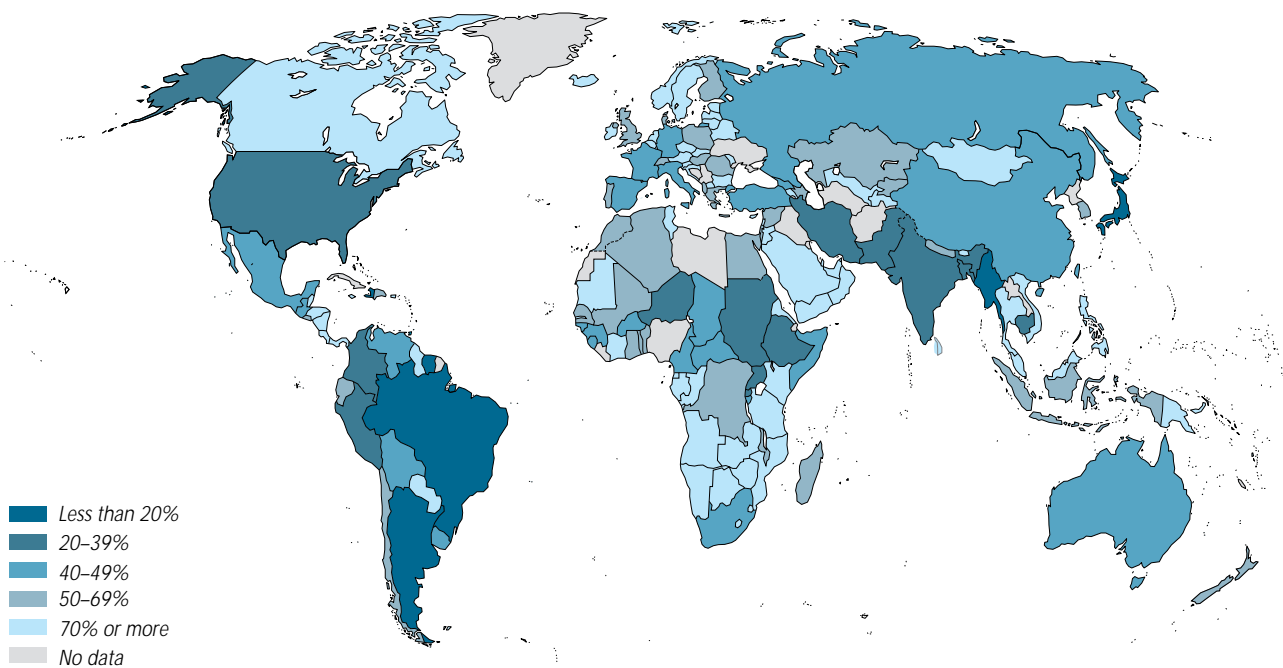
Source: *World Development Indicators, 1997,* World Bank

obtained at around US$5,000. Software comes bundled with the PC, is freeware or shareware or otherwise low cost. International telephone rates are falling. Data communications and fax deliver many pages of information instantly or nearly so. Video conferencing can operate over the Internet with free software, a US$100 digital camera for a PC, and speakers. Cellular telephones give immediate service for US$500 for the telephone and US$0.40 or less a minute usage charges. The goal of faster, better, cheaper has been realized. But to be affordable by many businesses in developing countries, access to even these competitively priced services calls for creative solutions. Innovations that let businesses share the resources and spread the costs are discussed later in this section.

TELECOM APPLICATIONS

Banking and finance

Banks were the first business sector to become major users of data communication networks to carry out cheque clearing and other transactions.

CORPORATE VIEW | Telecoms and banking

A RELIABLE telecommunication infrastructure is an extremely important requirement for any developing economy wishing to operate in today's global market place. Privately owned communication infrastructure systems provide the opportunity to keep up with the latest trends in information and communication technologies while having vital access to information systems worldwide.

CCS Chipcard & Communication Systems has more than ten years' experience as a system integrator, supplying solutions and services, which include fixed-line as well as the two common cellular digital standards, to the international telecommunication market. Having successfully supported the launch of new networks in Europe, Indonesia, Malaysia, South Africa and Thailand through its products and services, CCS's strengths lie in assisting network operators to establish and run their businesses, with full cost and revenue control, from start-up.

To achieve this, CCS has developed a Mediation System Platform, enabling network operators to integrate billing, customer care and fraud management systems into the network, providing a powerful single-shop solution for managing revenue-relevant data. Through this platform, all the components of an independently based software infrastructure are linked, and the platform is able to grow and develop with the client's needs. By integrating all the operating network's systems with administration systems, the client has full control over call data, and therefore revenue flow, and can choose to incorporate a wide range of cellular network call-routing switches. Additional

management platforms providing affordable hardware and software solutions allow network operators the opportunity to choose network services and components from a range of sources.

Additionally, CCS offers solutions based on smart cards to the telecommunication and banking sectors. Smart cards, which offer secure off-line transactions for authentication, payment and ticketing procedures, play a key role in the growing information industry. Off-line transactions, which are conducted on decentralized low-cost systems without a permanent connection to a central computer system, are soon to be connected to a global banking application which will enable the user to conduct all banking business via mobile communication networks.

CCS is independent of vendors and is able to offer services without a vested interest. It provides consultancy and training services for configuration, component integration and structural design, to assist clients in the early planning stages and during network expansion.

Integrated private networks provide business users the world over with a wide range of applications, enabling them to improve the speed, efficiency and effectiveness of their operations while gaining access to global information systems and improving their technological know-how in today's competitive market.

CCS Chipcard & Communication Systems
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For further information see Annex B

Information about money is transmitted within a bank's network of branches and cashpoint machines, as well as to other banks within the country and banks worldwide. The financial networks also connect the banks to global financial services such as VISA and MasterCard, EuroCard, Cirrus and Plus systems. These networks allow cardholders to make purchases with credit or debit cards, withdraw cash or foreign currency from bank cashpoint machines, make purchases over the telephone or Internet and obtain cash advances.

Wireless links can connect both fixed and mobile point-of-sale or cashpoint terminals, those installed in stores and kiosks, as well as mobile

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CASE STUDY | Reducing communication costs

OBJECTIVES
■ Sameer Investments Limited (SIL), a leading industrial group located in Nairobi, Kenya, decided in January 1997 to acquire Internet access so that the head office and group companies would have easy and efficient access to global news and financial information.
■ It also sought to reduce its communication costs through the use of Internet, e-mail and fax, and to market SIL on the World Wide Web.

BACKGROUND An effective alternative to telephone communication was necessary because the poor quality of telephone lines in Kenya makes telephony unreliable at times, and e-mail was seen as an attractive option.

DESCRIPTION Once SIL made the decision to gain Internet access, it contacted a recommended local Internet service provider and acquired a subscription for Internet access and browser software licences. It was also necessary to buy new generation computers and modems and to subscribe for additional telephone lines. The SIL staff were trained on how to access and use the Web and e-mail applications. SIL's Internet service provider gave technical support and customized Internet tools to fit SIL's needs.

After experiencing the benefits of Web access and e-mail, SIL decided to develop a website to market SIL and to interest overseas investors in the group and its activities. The website <http://www.sameer-group.com> provides profiles, including financial summaries, of companies in the group: Commercial Bank of Africa, Firestone East Africa, Eveready Batteries Kenya, First American Bank of Kenya and Sasini Tea and Coffee. It acts as a combination of company brochure and annual report, but one that can quickly and cheaply be updated whenever necessary, and it has e-mail links which take an interested reader directly to the company for further information. The company has made a one-time saving of around US$5,000 in reduced Sameer group brochure printing costs.

COSTS
Initial e-mail and Internet browsing facilities

Equipment	US$
Three personal computers	6,000
Three modems	1,200
Telephone lines	400

Website set-up costs

Design development and hosting	500
Software: e-mail and browser software provided free by local Internet service provider	–
Training: carried out free by local Internet service provider	–

Maintenance costs

Website redesign	500

RESULTS The SIL head office has benefited greatly from e-mail, which has helped reduce communication costs by some US$50-100 per month. In addition, news and financial information services from the Web have helped to create an empowered and well-informed staff, with increased ability to make economically sound decisions. Firestone East Africa has also set up an intranet and Sasini Tea and Coffee has used e-mail as an advertising tool.

The website has led to inquiries from overseas investors interested in doing business in Kenya. SIL's Web presence has also contributed to a sense of pride among the group.

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Website: http://www.sameer-group.com

terminals for street vendors, tourist sites and vehicles. People everywhere can have bank accounts from which they can withdraw by debit or credit cards and into which they can receive payments and make deposits. The access device is a bank or credit card that is swiped at a point-of-sale terminal or inserted into a cashpoint machine which may be positioned in a wall at a convenient location or on a truck with a wireless connection that visits farms, villages and remote work sites: a circuit-riding bank. As an example of this technology, state pension staff in rural South Africa travel in vans equipped with automated teller machines that use fingerprint-reading technology to ensure that payments are disbursed to the right individuals. This programme, begun in 1993, reaches about 80 per cent of elderly rural South Africans of African descent.[1]

E-commerce on the Internet

A key issue with e-commerce is providing reliable, secure means of making and receiving payments. Businesses in developing countries will be both buyers and sellers. As sellers they are most likely to receive payments by credit card, as from tourists, or by wire transfer from foreign partners. As buying through the Internet continues to expand, smaller businesses have opportunities to procure goods at competitive prices by using credit cards. There is general agreement that credit card payments over the Internet will grow massively once reliable standards are formed and accepted. A coalition of major credit card issuers has defined a secure electronic transactions standard, that consists of the following main parts:

- confidential transmission method (encryption);
- identification of all partners participating in the transaction;
- securing of data integrity when ordering goods or services through use of digital signatures;
- identification of cardholder and supplier via digital signatures and card-holder/merchant certificates.

The credit card handler deals with the on-line authorization as soon as customers enter their credit card information when making an Internet purchase. The handler can test the validity of the input automatically before transmitting it for authorization and the customer is immediately informed on-line whether the payment has been accepted or rejected. To prevent credit card numbers from circulating unprotected on the Internet, suppliers should protect their merchant servers with measures such as SSL (Secure Socket Layer) or Verisign.

Although in its infancy, electronic cash may one day offer developing countries another mechanism through which businesses can handle commerce over the Internet. Several companies offer software solutions using digital money for transactions on the Internet. Cybermoney (e-cash) is a prepaid financial transaction. The buyer arranges for electronic cash from his bank to be debited from his account and this "electronic purse" is then loaded onto his personal computer. Companies offering such forms of payment include Net Cash, NetChex, DigiCash, CyberCash, First Virtual and CheckFree.

INCOME AND TELEDENSITY, SELECTED COUNTRIES, 1997
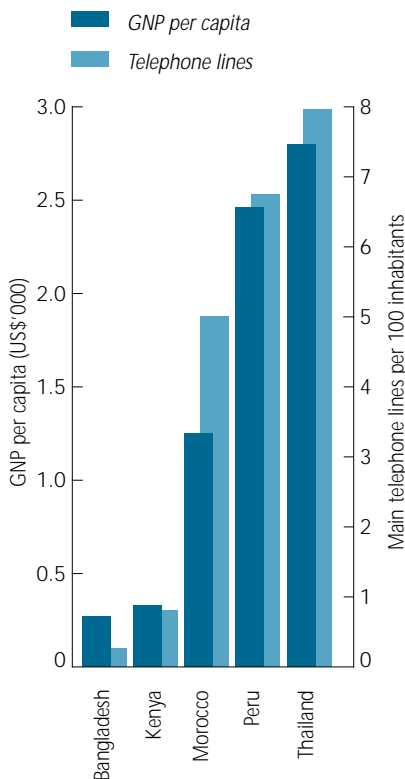
As a point of comparison, the figures for the United States were GNP per capita US$28,740; main telephone lines per 100 inhabitants 64.37.

Source: *Basic Indicators, 1999*, ITU; *World Development Indicators, 1998*, World Bank

Commodity markets

Commodity markets are key information services for developing country producers, farmers and mining operations. The oft-told example is of the farmer in Africa being able to learn the actual market price of his product, say coffee, and then being able to hold or sell to those who will give the best price. Information about markets is fundamental to a market economy. This is particularly true of commodities, which are still the major export product of developing countries. It is imperative that producers have access not only to timely and reliable information on pricing but also to information about buyers. Producers in developing countries now have means to seek this information on commodity prices and buyers through the Trade Point programme described later in this section. Once the markets and buyers are determined, the Trade Point programme also has the mechanisms to expedite shipping, customs, payments and other transactions using electronic data interchange.

CORPORATE VIEW | Fast data delivery

INCOMA is the Russian Federation's leading communication business. As a communication systems integrator, network operator and telecommunication equipment supplier, InComA won the contract to provide banks in the Moscow area with a modern digital network in place of the existing, out-of-date analogue system.

This new network has had an enormous impact on the speed and efficiency with which the banks can now conduct their business. Increased reliability, better management, more channels and high-speed data transmission from city-centre banks and more remote rural areas to the Central Bank of Russia have resulted in better customer service. Fast, 24-hour access to global markets, worldwide financial news and information services, new financial products and up-to-the-minute commodity prices are available. Over 400 commercial banks in Moscow are using communication services provided by InComA.

With a number of technically advanced communication products at its disposal, InComA also operates a public wide-area data system. This high-quality, reliable network for the transmission of public data attracted more than 300 customers during its initial 20 months of operation. It is the first network of its kind in the Russian Federation and the first in the world to realize the capability of providing Reuters 2000 service over this type of access.

Its customers dial a specific "data access telephone number" to access the high-speed networks which transfer data from client to client using a method of coding called packet switching, otherwise known as frame relay. The information or voice being transferred is gathered into small bundles or packets and sent across the network. Each bundle of information is wrapped in a coded address recognized by the switching exchanges which send it further along its journey to the next exchange.

There are a number of advantages to this type of signalling system. Should the network develop a major problem, the system is intelligent enough to be able to transmit the information in another direction, bypassing the problem and ensuring continuity of service. Bundles of information can travel in a number of different directions depending on the volume of network data.

InComA has increased and developed its impressive range of services and expertise by acquisitions and partnerships. New partners have brought new services which require new technology and InComA is constantly improving and updating its products to provide value-added services to its partners and customers alike.

InComA
E-mail: boss@incoma.com
Website: http://www.incoma.com
For further information see Annex B

E-commerce

Early examples of e-commerce in developing countries come from national government initiatives and local groups (see the case studies on PEOPLink and electronic commerce in Thailand). In a new initiative in Mali, a telecentre, supported by UNESCO and the International Telecommunication Union (ITU), is being developed by the national telecom operator SOTELMA in Timbuktu. The multi-purpose telecentre will provide access to education, health, business and trade, and the e-commerce applications of selling the work of local artisans and promoting tourism will be a priority. Initially it is operating from a room in the local hospital, also enabling health care workers to access information. It has selected a local manager and is training the staff in the operation and use of the personal computers and communication systems.[2]

In addition to buying products from electronic catalogues, in the future there will be many information services for sale and electronic delivery. Access to information delivered upon request and electronically over the

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CORPORATE VIEW | ## Voice and data

I N THE PAST worldwide telephone infrastructure was developed for voice communications. Modern advances in digital technology have left this service trailing behind and traditional telephone services have therefore become relatively expensive. PhoNet Communications, based in Israel, has developed the technology to enable voice communication to capitalize on the benefits presented by modern digital transmission techniques.

Voice communication is essential to the success of modern business. Vocal interaction is an inherent part of every company's day-to-day business operations and, although e-mails and faxes have recently revolutionized the workplace, the human voice is still one of the most successful and effective communication tools. Telephone calls, however, can be expensive. At present, large businesses often use private voice networks while smaller operations rely on dialled calls, both of which can incur high costs.

Telephones create analogue signals which are converted to digital signals by an exchange. The digital signals are then transmitted by modern switching equipment to the end of the line where they are converted back into analogue signals and delivered over the local telecommunication network to the recipient. PhoNet has developed an innovative product which reduces the cost of voice transmissions for businesses by providing them with their own digital data network compatible with the latest Internet communication standards.

A normal telephone is connected to a personal computer which has been fitted with a dedicated card and loaded with the appropriate software. With this in place, PhoNet's clients are able to use the corporate network to route a call. The personal computer converts the telephone signal from analogue to digital and transmits it across the company's data network. As the signal is digital it can be transmitted either as a voice, data or video conferencing connection. The call is routed to its destination by the software.

One of the most important elements of this innovative technology is that the calls may be routed via the company's own network, and possible overloads can either be managed by rerouting calls or increasing the network's capacity. This system has distinct advantages over similar technology which uses the public Internet for voice traffic and where end-to-end quality control is reliant on more than one supplier. The merging of voice and data using a company's own network saves costs while enabling businesses to control the quality, reliability and flow of their daily communication traffic.

PhoNet Communications
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Website: http://www.phonet.net
For further information see Annex B

Women from Janakpur, Nepal, can now sell their paintings on the PEOPLink e-commerce website.

Internet can enable professionals, business people and academics in developing countries to get the information that is readily available to their peers in industrialized countries, and can be critical to the overall development process.

Examples of what can be bought as an information service include newspapers and journals, research publications, financial services, stock market quotes and purchases. <http://CNN.com> gives global news coverage, including "RealAudio" broadcast and on-air transcripts. The major global newspapers can be read on-line, for example, *The Wall Street Journal*, <http://wsj.com> and the *Financial Times*, <www.ft.com> are on-line to subscribers or free, enabling readers anywhere in the world to access the information they contain. National papers such as Mexico's *La Jornada* <http://serpiente.dgsca.unam.mx/jornada/index.html> are also available. It is possible to buy a book over the Internet from <http://www.amazon.com> and have it shipped that day; it is also possible to buy publications electronically and have the text downloaded direct to the computer. Industry associations provide access to up-to-date information on markets, products, production processes, research and development. For example, the Global Network of Chambers of Commerce at <http://www.icc-ibcc.org/NewSite/ibccnet.htm> provides a forum where issues of global commerce can be explored and acted upon, while the China Garment Enterprises Association at <http://www.sh.com/custom/cgea.htm>, with over 200 members from more than 20 provinces and cities throughout China, has been set up to further cooperation with the international clothing trade.

Capital markets

With the privatization of many state-owned enterprises, capital markets have evolved in a lot of developing countries. Here, again, is an opportunity to tap the power of information and communication technology to actually create the infrastructure as well as to operate the capital markets. In Romania, for example, the data communication service provider LOGICNet was selected to provide the infrastructure for operating the securities exchange. Dealers and brokers in all major cities in Romania operate on the network to process all their transactions. The model is the United States NASDAQ (National Association of Securities Dealers Automated Quotation) exchange which operates entirely over a computer network: all transactions are handled by brokers and dealers at computer terminals rather than at live auction as occurs on the trading floor of the New York Stock Exchange and in trading capitals around the world. NASDAQ <http://www.nasdaq.com> provides advice and technical assistance to developing countries that want to establish similar electronic exchanges to serve their growing capital markets, as it did in the case of Romania.

In addition to being the infrastructure for the dealers and brokers, the network also delivers a series of professional courses and seminars taught interactively by experts and experienced professionals from industrialized countries. With the transition to the Internet or an intranet the dealers and brokers, as well as the regulators, can join in a multimedia presentation and

dialogue with the experts by audio or video conferencing. NASDAQ members and staff can teach courses or modules on basic issues, and then conduct seminars to deal with the actual experiences and concerns that the new dealers and brokers are facing. The seminars are effective through audio conferencing and PC-based multimedia conferencing where documents and applications can be shared and discussed. Follow-up exchanges of comments, reference documents, and graphics are by e-mail and list serve.

Engineering and construction

Global engineering enterprises use corporate or enterprise-wide communication networks to operate sophisticated systems including computer-aided design, logistics, sourcing and pricing, inventory control, project management and procurement. Local partners of these global enterprises can benefit from shared access to (and technical training in) this range of systems. For example, Bechtel and Black & Veatch use enterprise networks extensively in managing their worldwide projects and partner relations. Project management requires connectivity and close communications with remote project sites and local sub-contractors and partners. The communication networks enable them to work collaboratively both in real time and "store and forward". Interactive multimedia systems can link personal computers or large monitors at several sites around the world to engineers and local staff in a developing country and to experts at corporate headquarters, regional operations and remote sites. Through these screens all parties can share voice, data, video: they can talk to each other through video conferencing, jointly review blueprints and plans, share the software applications and modify them interactively, and run a text-based dialogue through the chat box. CUSeeMe, Microsoft's Netmeeting and Intel's team-sharing system all operate over the Internet and simply require software, a camera, microphone and speakers.

Collaborative workgroups allow teams of foreign experts and local specialists and operators to design, engineer, manage and implement projects. Sun Microsystems has teams of software engineers in the Russian Federation and India who work interactively with a product team in Silicon Valley. Vivendi builds infrastructure projects such as water purification and distribution systems in eastern Europe and developing countries, and manages these far-flung projects from its Paris headquarters. Vodafone builds and operates cellular systems in Greece, India, South Africa and many other countries. Its rapid roll-out of the network requires collaboration and communication among its project teams, network construction team, local subcontractors and equipment vendors.

Training in the use of the software, as well as skills and project management training, can also be conducted over the networks. Examples include engineering courses offered worldwide by the United States National Technical University (NTU), <http://www.ntu.edu>, which delivers degree programmes (international MBA, computer science, electrical engineering and engineering management) and short courses to Asia and the Pacific by

Alcatel

Telecom applications can help engineers and project managers communicate, wherever they are working.

satellite. The set-up involves one channel of compressed digital video around the clock. Because of time zone differences, interaction between the course participants and the instructors is primarily by e-mail, but telephone and fax transmissions are also being used.[3] Training in software applications is available on-line by companies which specialize in such distance learning and which conduct courses over the Web, and software producers such as Apple, Microsoft and Oracle.[4]

Energy companies

Energy exploration and development use specialized applications such as remote sensing and geographic information systems (GIS) (discussed in detail in the section of *Telecommunications in Action* dealing with the environment). GIS provide visual information essential to planning the production process: depth of the deposits, nature of surrounding soils, location of aquifers and other factors for efficient and environmentally safe production. The Chevron

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CORPORATE VIEW | Secure networks

CONFIDENTIAL BUSINESS transactions are increasingly being carried out electronically. Having identified the need to ensure that business is conducted in a secure environment, Cable & Wireless Omnes has developed the Omnes system which offers customers a secure network solution using a Web browser and Internet technology. This combination allows businesses to guarantee that their corporate payments, customer services and loyalty programmes are all held securely.

Omnes Network offers a range of solutions for local area network, wide area network and secure worldwide interconnecting systems backed up by a uniform level of service, support, pricing and end-to-end network management. This means that Omnes will assume responsibility for managing a customer's system, using Cable & Wireless Omnes Network to connect to other systems. The package includes the provision of initial and ongoing support for the installation, commissioning and maintenance, and billing of the network.

Omnes uses the Service Desk Management System to deliver desktop support services to its customers. Operating on a local area network, the system is tailored to suit individual customers' needs, providing quality support to users whether they are in city offices or travelling and working in inaccessible areas on or offshore. Combining tried and tested tools and sophisticated, advanced technology, the Service Desk Management System is considered to be a highly cost-

effective way of delivering support for desktop and network hardware and software.

Omnes Service Desk analysts solve 80 per cent of all calls at the service desk without having to send technicians to the site. This method has enormous practical benefits for the customer, including cost savings, continuously improving quality of service, a responsive single point of contact and faster resolution times which impact positively on productivity levels across the board.

One of the significant advantages of this system is its ability to solve problems quickly. It achieves this by remote control of the desktop, remote server administration, on-line website network information, configuration and asset management, logging and tracking requests, and monitoring and reporting on the network's performance and the service levels of data network components. Registered to ISO 9002 quality standard, the Service Management Centre guarantees consistent support to its customers and service expertise across the enterprise network. It is a single point of contact for customers and monitors over 700 routers and 60 remote access servers, providing desktop support to thousands of computer users.

Cable & Wireless Omnes
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Website: http://www.cwomnes.net
For further information see Annex B

and Nigeria joint venture for oil production, refining and distribution developed a major GIS system. Chevron Nigeria Ltd operates 17 concessions in a total area of 23,000 square kilometres, producing 400-plus million barrels of oil per day. Since 1996 the GIS implementation has provided the enterprise with a common interface to access data owned by others, and a mechanism to publish the data useful to others. Benefits include improved quality of data, easy access, minimized duplicate data collection and management, increased time available for data analysis, and the integration of diverse data sets into decision making. The net result has been better-informed decisions and increased return on investments in data.[5]

Transmission of energy by pipelines uses telemetry systems to detect damage, leaks, sabotage or other problems. These signals are transmitted to

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CASE STUDY | Export promotion

OBJECTIVES
■ To promote the export of Ugandan coffee using information and communication technologies.
■ To further the understanding of coffee production in Uganda.

BACKGROUND Coffee prices, along with other agricultural commodities, are highly unstable because of fluctuations in supply and demand, and there is fierce competition between developing countries for a share of the world market. So it is important for each country to market its coffee as effectively as possible. Most of Uganda's coffee is still produced on family farms, involving nearly 30 per cent of the population and earning over 60 per cent of the country's foreign exchange.

DESCRIPTION The Federation began using information technology as a marketing tool for its association in 1995 with an e-mail system. This cost-effective method of reaching clients was so well received that by November of the same year the Federation had decided to expand to full Internet access. Once the basic technology was in place, the Federation developed its own website at <http://www.uganda.co.ug.coffee/index.htm>. As well as acting as an electronic market place,

the site aims to encourage direct dialogue between producers and consumers worldwide, so that coffee drinkers will know where their coffee has come from and even who has grown it. There is information on coffee producers and regions, on the different types of coffee available and on how quality is maintained.

RESULTS A large number of visitors to the website and numerous e-mail enquiries indicated that the home page generated a high level of interest for the products advertised and contributed to the promotion of Ugandan coffee.

As the Federation's knowledge of the capabilities of the Internet expanded through "learning by doing", new ideas of how to use the Internet began to take shape. In 1996 the Federation undertook an ambitious initiative. It sponsored an Internet coffee tasting in Washington, DC, in the United States and Kampala in Uganda, using video conferencing. Digital cameras were used to project live images of coffee drinkers savouring hot cups of Ugandan coffee. In addition to creating powerful marketing tools, the Ugandan Coffee Trade Federation uses the Internet for research.

COSTS Typical costs in Uganda for access to the Internet, including e-mail, plus the hosting of a website, are around US$100-150 a month. This would be a sizeable amount for one small producer, but the Federation's site markets the coffee of over 30 producers, making this approach very cost-effective.

The video conference cost just US$200-500[6] to set up because an Internet-based video conference is essentially free, if everyone involved is on the network. A multimedia conference or video conference based on the use of an ISDN (integrated services digital network) line can be held for about US$500 if the national telecom operator offers that service. Sprint offers this from many countries, usually in cooperation with the telecom operator. Estimated costs would be US$500-1,000 for a 30-60 minute point-to-point conference.

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a terrestrial network, or to a Little LEO (low Earth orbit) satellite system which operates mobile data communications. In electricity distribution, similar sensors and telemetry are used to automatically read meters at customer sites for accurate billing and to assist with demand management for more efficient consumption and conservation. Telemetry systems are widely used in other industries where sensors detect and communicate many kinds of events.

Mining

Mining, like energy production, generally takes place at remote sites where the greatest challenge is basic telecommunications: managers with headquarters, workers with families. Satellite and wireless communication networks such as digital radio are generally used to provide voice as well as data communications between mine sites and corporate headquarters. Satellite systems include very small aperture terminals (VSATs) which provide several channels for voice and data, and even video and video conferencing. Such a fixed-site system can provide the basic communication system. For mobile workers, other systems provided by mobile satellites such as Inmarsat provide voice and data communications with small terminals similar to laptops that have antennas built into the lids which send and receive the signal to the mobile satellites. The most recent satellite technology of Big LEOs (a space-based network for cellphones, or satphones as they are now called) such as Iridium provides voice communications and was designed for global coverage to reach the remote sites not covered by cellular networks. These satphones have small screens for short messages and can also link a laptop computer and send and receive e-mail. Costing US$6-14 per minute at roll-out, though dropping with future competition, these systems are for urgent or emergency messages at the moment. Additionally, mine operations can deploy low-cost radio communications to enable workers to communicate with their families. Amateur radio has developed impressive services, such as packet radio and relay radio, while other digital radio systems can connect locations 40-50 kilometres apart and more with relays.

Within the mine, underground communication systems, monitoring and safety products all utilize telecom applications. For example, mine shaft communications and signalling can be carried out using underground telephone systems with portable handsets.[7] A number of "up the rope" communication systems are also available, where the communication device, located in the miner's headgear, sends signals to the driver's unit or the winder room unit, where a computer records what is going on in all the mine shafts.[8] A mobile equipment tracking system uses global positioning systems to track truck, shovel and loader movement during the shift, with equipment locations appearing graphically on a computer in the mine office to enable better management decisions. And an equipment health monitoring system collects vital signs data and alarms automatically and sends them to the mine office over a radio link for real-time analysis. Virtual dashboard displays show field equipment gauge readings on the computer in the office. Potential problems can be addressed before they result in costly down time or an unsafe working environment.[9]

The website of the Ugandan Coffee Trade Federation aims to link producers and consumers.

COFFEE (MILD ARABICA) – YEAR ON YEAR PRICE FLUCTUATIONS ON 1990 US$ *(%)*
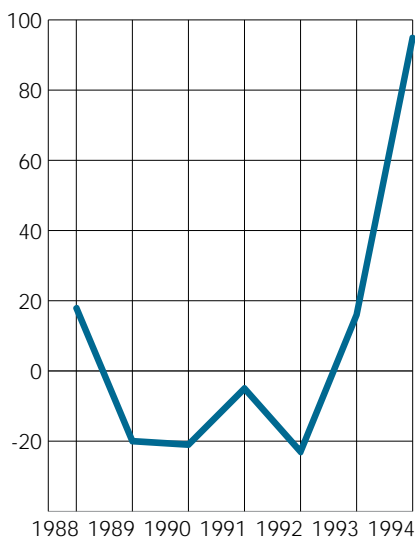
Source: World Bank staff calculations

Transportation

Transportation services such as railways, ships and buses have always had a significant requirement for telecommunication services. Railways were given radio frequencies so that they could communicate critical information throughout the system. Now they are deploying fibre-optic cables along their rights of way and thereby creating new high-capacity networks. Other transport users were given radio frequencies and had to

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CASE STUDY | Internet marketing

OBJECTIVE

■ To empower poor producers to use the Internet to maximize the benefits of global trade. This is achieved through a non-profit organization, PEOPLink, which trains and equips grass-roots trading partners to market their products on the Internet.

BACKGROUND PEOPLink grew out of the experience of Pueblo to People, another non-profit organization that was self-sustaining from its mail-order craft sales in Latin America. However, there are two main differences: PEOPLink is entirely on the Internet and it operates worldwide (currently 14 countries, although the list is growing).

DESCRIPTION PEOPLink provides video cameras and digitizers to trading partners, such as the National Association of Women's Marketing Organizations in Uganda and the Sasha Association for Craft Producers in India, and trains them to e-mail pictures and detailed descriptions of their products.

PEOPLink then places the pictures and product descriptions in an electronic catalogue on its website at <http://www.peoplink.org/> and promotes the products to retail and wholesale buyers in industrialized countries. For Christmas 1998, for example, a customer in Greenland ordered a pair of earrings from Nepal to be sent as a gift to a friend in Poland.

This process allows the artisans to bypass the complicated chain of middlemen they must normally go through when selling their products, and as a result they make more profit on their work. Each partner organization provides marketing and design services to numerous producer groups. For example, EDM Handicrafts in Bangladesh is a self-sustaining, export-oriented handicraft programme, involving 1,700 artisan families working together in a number of cooperatives. Cane, bamboo, grass, pottery, wood and jute are procured as basic raw materials and turned into high-quality products. Having studied the export market in handicrafts for the last 12 or 13 years, EDM Handicrafts normally stocks baskets and pottery which are most in demand.

PEOPLink makes use of all aspects of the Internet for promoting this type of commerce, including offering virtual gift certificates. There is also a monthly electronic magazine at <http://www.peoplink. org/linkages>, containing educational materials about the producers' work and lives.

PEOPLink and its partners are moving to using Lotus Notes which will enable each partner to update products, dates and so on each day and send the information with a click straight to the website where it is converted to the correct format and posted simultaneously.

COSTS To date PEOPLink has spent about US$500,000 to set up a secure, database-driven "shopping cart" implementation of a Web retail and wholesale system. This includes travel to train and equip the 20 trading partners involved. Where grants are available PEOPLink donates the equipment, but more often it trades the equipment for the crafts. A simple video camera and digitizer cost under US$1,000; a personal computer is also necessary. However, the main cost is for training. This originally cost around US$10,000 per partner, but as on-line training modules are developed and as some partners are able to train others, the cost is dropping.

RESULTS PEOPLink is building a worldwide network of trading partners. The individual artisans have better communication with each other and with the rest of the world which not only helps them market their crafts, but also helps them to improve their designs as they see what others are producing and what is selling in the wider market. A "designer's corner" Web page is being established where trading partners can place prototype designs for feedback from a panel of design experts.

Sales and donations to PEOPLink were US$71,000 in 1998, eight times what they were in 1997. This still does not cover costs overall but a target of self-sufficiency has been set for the last quarter of 2000.

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operate their own private communication systems. These have been replaced by mobile radio shared and digital systems.[10] Fleets of vehicles must be in touch with their dispatcher and the mobile radio systems can do this cost-effectively if there is a national network in place. An alternative is one of the satellite-based systems, where a truck carries a small satellite dish with a global positioning system that allows the truck to be tracked and located wherever it is.[11] The Inmarsat fleet management system is another example that contains a global positioning system to enable vehicle location to be tracked. It collects, processes and transfers various computerized data including loading and unloading commands, temperature and speed.[12]

Airlines are among the most sophisticated users of information and communication technology. Reservation systems could never be what they are without a robust and extensive network. Agents can reserve space, airlines can issue electronic tickets and passengers can find the cheapest flight, make

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CORPORATE VIEW | Vehicle tracking

MANAGING fleets of vehicles is costly, and costs count in the competitive world of trucking. A satellite tracking system saves money. GeoCom of Canada, working with Stellar of the United States, has developed a system that meets truck companies' needs. Using GeoCom digital mapping software, haulage operators can pre-programme routes, itineraries and stopping points directly into Stellar's dual-mode satellite radios. If the vehicle makes an unexpected stop or is late arriving, a warning is automatically sent to the GeoNav server for display on a digital map.

There is growing interest in this software in the United States and Latin America. GeoCom's OptiPlus system is designed to minimize costs by fine-detail route planning. The dispatcher can plan, well in advance, the shortest, fastest and most economical route for vehicles to take. The software uses digital maps to analyse:
- the parameters of a given road network;
- speed limits;
- height of bridges;
- one-way traffic;
- weight restrictions;
- hazardous routes, and more.

OptiPlus enables more deliveries per vehicle per day, limits delays and allows relatively precise estimated delivery times. GeoCom has its own permanent digital map production and upgrade department to ensure the reliability of the source data. It has access to digital maps of most cities and highways in the world, and can offer complete coverage from secondary roads to major highways.

GeoNav, the sister technology to OptiPlus, tracks vehicles and sends messages over different wireless communication networks, locally or throughout North and Latin America. It uses different satellite technologies, cellular phones, two-way radios and private or public dedicated wireless data networks to monitor vehicle movements or alarms. By using intelligent mapping, other information can be overlaid on the address-based maps.

GeoCom primarily uses a Windows interface and produces software based on the Microsoft technology platform; it is a member of the Microsoft development network. It is also an active member of the Oracle Business Alliance comprising suppliers who base their databases on the Oracle Relational Database Management System. Both these products are well known throughout the world, such that most companies will be running computing platforms using the technology and many employees are already conversant and efficient in a Windows environment. When used in a "notify exceptions" mode, the hauliers can concentrate on their prime business and need take corrective action only when something has not gone according to plan.

GeoCom
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Website: http://www.geocom.ca
For further information see Annex B

a reservation and buy a ticket at various websites on the Internet, such as <http://www.cheaptickets.com>. Railways offer the same service throughout Europe and North America, and in Asia. Train schedules are published, fares are given, and usually a ticket can be purchased on-line, e.g. at <http://www.eurorail.com>. Kiosks at the railway station or airport allow passengers to purchase their tickets directly from the machines.

Tourism

Tourism is an industry heavily reliant on information and communication technology. Sites and facilities for tourists need adequate telecommunications both to run their businesses and to provide telephone and fax service to visitors; tourism relies on global reservation networks for hotels, transportation and tours; and marketing is also vital, with the Web offering powerful access to potential visitors and travel agents. Several Web design, hosting and marketing firms are specializing in the tourism sector.[13]

CORPORATE VIEW | Faster access to the Internet

JUST AS THE Internet has given companies access to vast quantities of information wherever they are in the world, so businesses can have their own presence on the Internet, no matter what size they are, what their business, or even where they are. A quality website is today becoming an important business tool for companies, and using the Internet to promote, as well as sell, products and services is a phenomenon that is growing fast.

One Austrian company, Global Communication & Services, runs a successful service designing, constructing and maintaining websites for such companies. Among its clients is the Austrian Tourist Office, which needs a site that stands out in an area that is crowded with competitors and extremely popular with Internet users.

Global Communication has also developed new services for Internet users. The company realized that access to the Internet over a simple telephone line does not always satisfy the needs of business users because it can take too long to transfer data. In addition, many businesses, or branches of the same business, need to access the same information.

Now, by using satellite technology, broadcasting in the new digital video broadcasting standards, Global Communication offers users access to Internet data one hundred times faster than access through a conventional modem. This type of transmission also means wider areas of coverage, areas which normal systems cannot always reach.

The company offers various kinds of access. Users can choose to receive data at the standard rate, using a traditional telephone line to dial up the required service, and then receive information via a satellite. This has the advantage of working with commercially available equipment and with a standard Windows-based personal computer.

The user can receive higher data rates, however, by installing a standard off-the-shelf VSAT (very small aperture terminal) satellite receiver. Significantly higher rates can be achieved using fully digital transmissions and an integrated receiver decoder. These systems can retrieve all kinds of information, ranging from stock market prices from around the world, to private business channels, which are protected by encryption.

In developing these technologies, which work with readily available equipment and the services of a satellite provider, Global Communication is ensuring that businesses anywhere in the world can have fast access to the wealth of information that is available on the Internet.

Global Communication & Services
E-mail: bnocker@ains.at
Website: http://www.gcs.ains.at
For further information see Annex B

The World Tourism Organization (WTO) points out that developing countries account for nearly 30 per cent of world tourism receipts, and that tourism is the only major sector in which developing countries have consistently had surpluses; the positive balance in their travel account improved from US$6 billion in 1980 to US$62.2 billion in 1996.[14] The transfer of tourism know-how to developing countries is one of the WTO's fundamental tasks: tourism is a labour-intensive sector, and even more jobs could be created by improving tourism education. Pilot projects in distance learning as well as the WTO Network of Education and Training Centres are working to deliver quality training and content that corresponds better to the

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CASE STUDY | Electronic commerce

OBJECTIVES
■ The Ministry of Commerce of Thailand launched an ambitious and innovative programme in 1998 to provide infrastructure and support to the export sector of its economy, including facilitating trading in goods and services on the Internet.
■ It aims to assist both the consumer market and business-to-business trade through its website, the Thai Amazing Mall. Enterprises can market their products through links on this site at no cost.
■ Initially, the main purpose of the website is to educate Thai entrepreneurs about the potential of e-commerce.

DESCRIPTION
The Ministry lists products of selected retailers in its electronic Mall and makes them available to over 100 million Internet users worldwide at <http://www.thaiecommerce.net>. Amazing Mall is an integrated e-commerce system that allows buyers to submit orders and payment via the Internet. Eliminating the middleman can reduce costs for producers and make product prices more competitive. Amazing Mall promotes the products and generates more income for the retailers.

Amazing Mall sells goods directly to consumers. Goods must have a unique selling point so that consumers in the United States and elsewhere will buy them via the Internet rather than locally. They must also be deliverable to foreign countries. The company must be able to manage multiple small orders.

The website also has a moderated discussion board called the Virtual Trade Embassy that provides an electronic discussion forum for Thai exporters seeking opportunities overseas and for foreign traders interested in Thai products. Access is open to all and visitors can ask for help from the Thai trade officials in their own countries.

COSTS
Besides a microcomputer and modem, at a cost of around US$2,000 and US$200 respectively, users need to have an Internet account with any local Internet service provider. This costs around 500-1,000 Bht (US$13-26) a month. The Amazing Mall charges no fees to participating traders.

However, users must be responsible for the fee charged by the credit card company in collecting customers' payments as well as transport costs to deliver their products. Most transactions on the Internet are paid via credit card and the policy of all credit card companies is for sellers to be responsible for any fraud that occurs. The current statistics show that this loss accounts for 1 per cent of total transactions. The Ministry can advise the user on calculating the optimal product price to cover these expenses.

RESULTS
There are already more than 40 companies selling directly on the site. Products offered range from electrical appliances from Thai Energy Conservation to Japanese-style instant noodles from Thai Myojo Foods. Pornchai Quality offers a range of brass door furniture while the Acme Fashion Leathers Co. specializes in leather accessories for men and women in exotic skins such as Thai stingray and African ostrich.

The business-to-business programme has allowed Thai and international traders to make contact with other businesses in a number of different industries.

The Ministry of Commerce plans to encourage medium to big businesses to sell their products on the Web in the near future. Initial interest can be registered now. The government has said that it will set only those rules necessary "to guarantee that trading over the Internet is certain, consistent, just, convenient, secure and meets the international standard."

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needs of employers. A recent development is an information centre on the Internet dedicated to the newly created Asia Pacific Training Institutes in Tourism network which can be found at <http://www.itto.org/apetit/indexap.htm>.

Manufacturing

The growth of globalization presents challenges to developing country industries, but also opportunities to be partners and suppliers in ever more efficient production processes. The future intranets and extranets will transmit detailed specifications, blueprints, 3-D images and machine tool settings so that remote manufacturing facilities equipped with the computer-assisted design and manufacturing tools and machinery will produce the parts or products exactly to specification. Aeroplanes, computer components, machinery, vehicles and appliances can be manufactured to order at remote sites. Remote manufacturing can also be used in textile and clothing production, transmitting design of fabrics and patterns for garments, possibly directly to the machines that print or weave the design and cut the fabric.

One manufacturer, Boeing Corporation, for example, has used networking technologies to reduce costs, expedite production and improve product quality. Most of the company's production is now being "outsourced" to suppliers all over the world. These specialized suppliers are connected to one another by an information network with seven mainframe computers and 2,800 workstations. Via this network, suppliers have designed and preassembled the entire new 777 jet airliner. Boeing estimates that this system will reduce costs by 20 per cent.[15]

FAO

Remote manufacturing can be used in a number of industries to improve production efficiency.

THE FRAMEWORK FOR ACTION

Three major programmes are operated by international organizations to enable businesses in developing countries to participate in electronic commerce and access the global networks: the International Telecommunication Union (ITU)'s Electronic Commerce for Developing Countries initiative; the United Nations Conference on Trade and Development (UNCTAD)'s Trade Points; and the World Bank Multilateral Investment Guarantee Agency (MIGA)'s IPAnet. These programmes are presented here as possible vehicles for businesses and entrepreneurs to use. They are guides on how to create, cost and implement e-commerce solutions, trade facilitation centres, and programmes to bring in foreign direct investment and business partnerships. These models will suggest how to access the global networks and then how to use them.

The ITU model – Electronic Commerce for Developing Countries

The ITU established a significant development initiative in 1998 with its Electronic Commerce for Developing Countries (EC-DC). The EC-DC model for electronic commerce is a working and reproducible model, which aims to enable developing countries to use existing telecommunication infrastructure and services to participate in e-commerce by providing

a low-cost gateway to the global market place for merchants and to allow several merchants to share the cost of a central system for secure payment for e-commerce in their region, thereby increasing the likelihood of sustainability.

An EC-DC centre is run by a central entity such as a cooperative, a chamber of commerce, an Internet service provider or a private company, serving several merchants who would typically share the costs. EC-DC separates the components necessary for implementing e-commerce systems so that developing countries can start with those components that use their current infrastructure. These components interface with other components running elsewhere, thereby lowering the costs. If developing countries wait until a complete infrastructure for e-commerce is in place, the gap with industrialized nations in this new business field will grow much wider. Once the EC-DC pilot projects are up and running they will encourage the expansion of the infrastructure.

CORPORATE VIEW | Global travel card

UNTIL the last few years, the only provider of telephone services in most countries was a public monopoly, which set the charges for local, national and international calls. Today, as telecom markets are being rapidly liberalized, there is more competition and more choice for users.

GlobalTel Resources offers a range of services to cut the cost of international telephone calls. With the company's Primecall service, for example, an account customer has only to dial a pre-assigned access number, then hang up when the computer answers. The computer rings back within seconds and gives the customer a dial tone to make an international call at United States rates, which are often more than 50 per cent less than standard charges elsewhere.

The service, which is especially popular with small and medium-sized businesses, is already operating in more than 120 countries. It has a switching and messaging infrastructure in Los Angeles, fax nodes in Hong Kong and Mexico City, and an operations centre in Seattle.

A Primecall Calling Card can be bought with an advance payment allowing calls worth US$10 or US$20. This permits long-distance or international calls originating in the United States from any touch-tone telephone.

The Global Travel Card allows calls from any touch-tone or cellular telephone from over 70 countries, eliminating the need for local currencies or even credit cards. The user dials a toll-free number from any of the countries, enters a personal authorization number, then dials the destination number. Advance payment means no monthly billing, and calls are charged at a flat rate 24 hours a day.

With "promocards", or Private-Label Calling Cards, users pay in advance for a predetermined amount of long-distance calls. The cards carry a message from the purchaser so that they become a mini-billboard for promoting the company every time they are used, and can be given away as a promotional item.

GlobalTel harnesses the power of the World Wide Web for its Webcall service. A user enters the Primecall website, punches in a log-in identity and personal identification number (PIN), then enters a callback location and the destination number. Clicking on the "connect destination" button establishes the call, and the user picks up the telephone to be connected.

This is a rapidly growing service and calls can be originated from an increasing number of countries. Its success confirms that this is a technology which is set to develop, offering strong pricing competition with the established telecommunication providers.

GlobalTel Resources
E-mail: ron@echarge.com
Website: http://www.primecall.com
For further information see Annex B

Costs and financing

The costs for engaging in e-commerce depend on the level of the existing infrastructure for information and communication technology and the location of the region. A preliminary feasibility study for a specific country or location will determine the type of software that is most suitable. Alexander Ntoko, Project Coordinator at ITU,[16] can provide cost estimates for software and hardware, and other services once a feasibility analysis is done. He describes the criteria for selecting pilot countries for the ITU EC-DC project as having "minimum Internet connectivity, shipping/handling service, and an operational banking sector". Least developed countries are expected to benefit more from the ITU seed funds. Contributions from the private sector are sought and can be made in cash or in kind, including software, hardware, telecom services and other forms of support. Discussions for implementing the EC-DC model are currently under way with Brazil, Cameroon, Chile, Ecuador, Morocco and Venezuela.

ITU Electronic Commerce for Developing Countries model

Developing countries　　　*Worldwide*
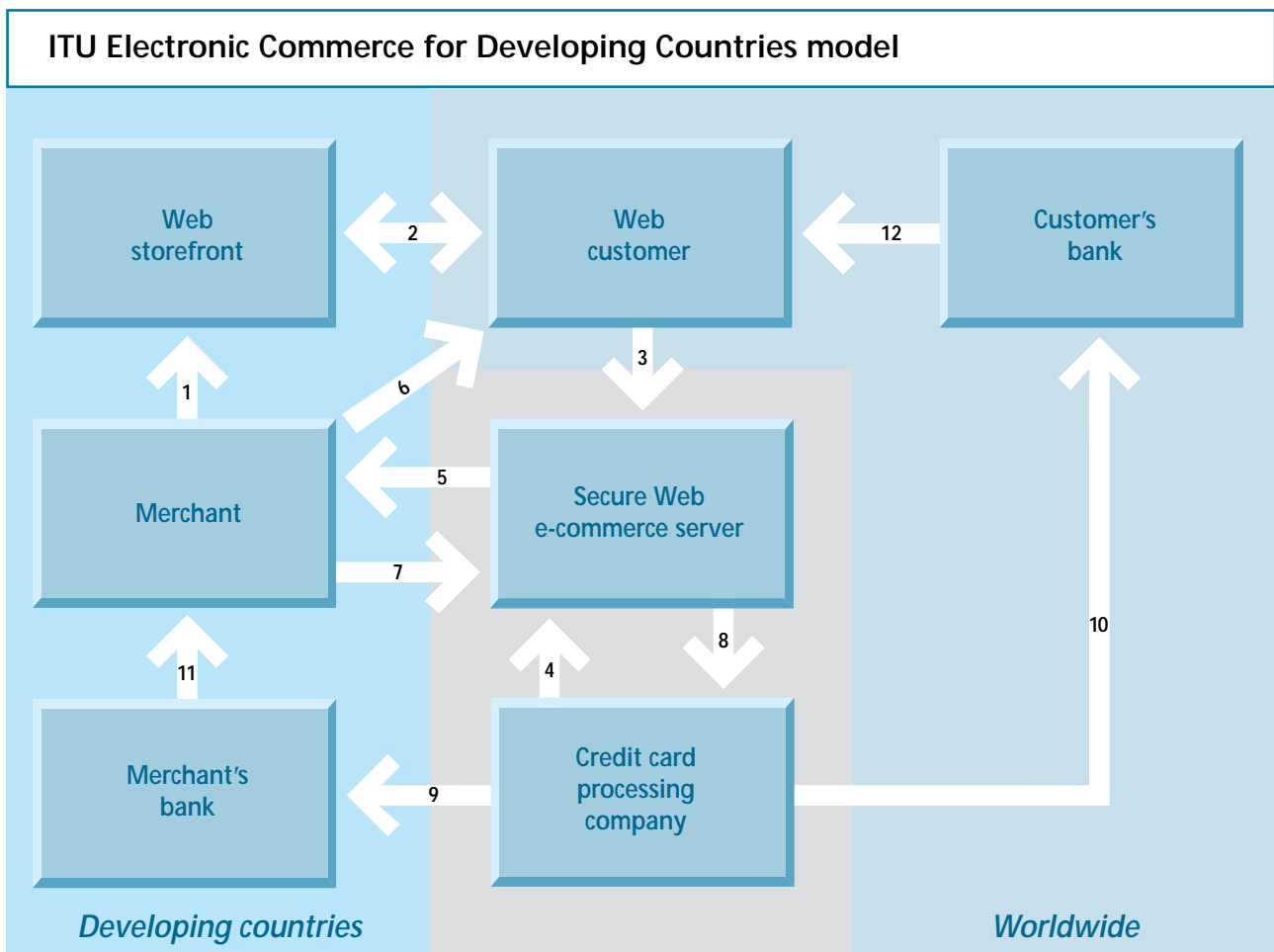
1. *Merchant posts products information (catalogue) on the Web storefront*
2. *Customer uses Internet browser to select product*
3. *Customer uses a secure link to enter the credit card information*
4. *which is validated in real-time*
5. *Merchant is informed to ship*
6. *Merchant ships product*
7. *and sends shipping number to commerce server*
8. *which requests the credit card company*
9. *to transfer payment to the merchant's bank account*
10. *and to debit the customer's bank account*
11. *Merchant's bank sends statement to merchant*
12. *Customer's bank sends statement to customer*

Implementation

Implementing the project includes:

- development and installation of payment gateways and integration with merchant Web and banking services;
- establishment of the application, network, host and system security procedures necessary for the implementation of secure on-line payment on a public network;[17]
- training in e-commerce in order to build local expertise on how to run virtual stores and meet the demands and expectations of business partners and consumers.

Making and marketing the website

An ITU EC-DC partner in South Africa, Steerage, provides Web design, hosting and marketing for clients, and advises that: "Web design that combines relative simplicity mixed with interactivity and user friendliness

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CORPORATE VIEW | Customized e-mail

COMMTOUCH SOFTWARE provides turnkey, Web-based e-mail solutions to companies and corporate institutions. As the importance of electronic messaging and the Internet grows, an increasing number of companies are realizing the need to become a part of the global electronic market place by establishing websites that project the company's brand and identity on the Internet. Offering free e-mail accounts is a proven way to attract customers to a corporate website, but companies are reluctant to divert their resources to implement the technology and software necessary to provide this service on the Internet.

CommTouch allows the client company to offer free e-mail accounts to its customers on the company's own website with minimal lead time. In order to achieve this, CommTouch launches a customized e-mail service for the company, and in consequence all electronic messages that are sent by customers using the company's free e-mail service carry the company name and Web address, greatly increasing its visibility.

As CommTouch manages the e-mail platform on a CommTouch server, it is not necessary for the client to procure and run its own server. It does not need to commit capital to server hardware, or to maintain a computer help desk. The company can design the e-mail service itself using tools provided by CommTouch.

A significant feature of the CommTouch service is that it currently supports nine different languages – Chinese, Dutch, English, French, German, Italian,

Japanese, Spanish and Swedish – so that it has a wide understanding of national cultures and perceptions, which is essential in today's multinational business environment.

In addition to its multilingual and multicultural strengths, CommTouch offers a full portfolio of communication options for its users. Through its link with Internet telephone provider Net2Phone, for instance, CommTouch provides a prepaid Internet telephone service at a fraction of the call charges levied by international telephone companies. The e-mail account holder is given a credit of telephone call units which can be spent on national and international calls. When users access their mailboxes, they are given the opportunity of making calls using the Internet at significantly reduced prices.

CommTouch provides an invaluable service to those businesses and institutions which are unable to access global information and communication services through lack of infrastructure or know-how by providing instant, reliable and cost-effective links to these systems.

CommTouch Software
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Website: http://www.commtouch.com
For further information see Annex B

is the key to Internet marketing success." Steerage's hosting services offer the facility of either indexed <http://www.steerage.co.za/whatever>, or "own domain" registered sites. Domain registration is done at cost as a service to clients, and hosting charges are based on the amount of time the site's readers spend looking at it, so the better read the site, the more it costs, as in most advertising or marketing. Marketing the client's site on the Internet is done in a number of different ways: via distribution lists, newsgroups and bulletin boards, international business groups and various other methods.

Maintenance

The EC-DC model would enable several merchants (or groups of merchants) to use the secure payment system located in their region. The shared use of a payment gateway by several merchants will reduce the ongoing operational costs. The potential economic benefits of e-commerce and the relatively low

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CORPORATE VIEW	Remote training

A LARGE CORPORATE business in South America had a problem that will be familiar to many other companies worldwide. It had around 40 offices, but it needed to expand into new parts of the country – and to do so at a time when it also wanted to reduce costs and improve quality.

Reliable telecommunications were essential. Yet the associated costs were high and it could take several months just to get a simple telephone line installed. The company needed prompt installation. And to maintain its technological lead over competitors, each site would need to have fast access to the Internet. The company also needed to further develop and utilize its intranet.

Cybersat used its proven pioneering satellite technology to provide a turnkey solution to meet all the company's needs, including for voice, data and video. The personal computer/Unix-based solution involves using satellite dishes to deliver data directly to the user's intranet server.

Access can be protected to ensure that each site can have full Internet access without compromising the security of the intranet. Simple extra-expansion cards have also given the company voice and video traffic, meaning that it now has the possibility to provide remote training for its employees.

This system is currently available in Buenos Aires, Argentina, and São Paulo, Brazil, but Cybersat also intends to supply it to many more South American countries in due course.

The company also provides users with "kiosk" access to the Internet. In places such as post offices, restaurants and airports, customers can access their global e-mail accounts by swiping their Cybermail card and entering an encrypted password. With Cybermail, it really is that easy to access e-mail from anywhere in the world.

Cybersat's Cyberbridge CB 2000 system also gives local information service providers affordable access to previously unreachable territory. Using VSAT (very small aperture terminal) technology, the satellite dish can be as small as 90 centimetres across, and can communicate with a satellite 43,500 kilometres in space.
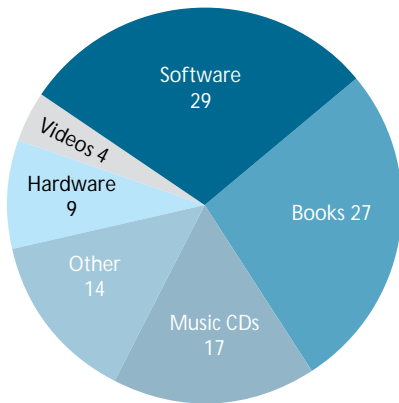
Yet this can allow anything from 500 to 4,000 users to access the Internet. They can do this at the same rate as a local call – an important issue when in other respects the infrastructure may be less than the highest quality or when the cost of a long-distance call is prohibitive.

Cybersat
E-mail: bcatlett@planet.net
Website: http://www.cybersat.com
For further information see Annex B

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cost of running the payment gateway will increase the likelihood of sustainability and will encourage financial participation by merchants and other funding organizations.

UNCTAD Trade Points

The Trade Point programme was established by UNCTAD in 1992 to facilitate trade by small and medium-sized enterprises and micro-enterprises in emerging markets and developing countries. It provides access to electronic networks for companies wanting to export or import and lets them process the paperwork of the transaction in an efficient manner that reduces the costs.

A Trade Point is a trade facilitation centre, where participants in foreign trade transactions are grouped together under a single physical or virtual roof to provide all required services for trade transactions at a reasonable cost. These transactions cover customs, foreign trade institutes, banks, chambers of commerce, freight forwarders, transport and insurance companies. A Trade Point is also a source of trade-related information, where businesses and traders can get data about market opportunities, potential clients and suppliers, trade regulations and requirements. Each Trade Point is equipped with efficient telecommunication tools to link up to the Global Trade Point Network (GTPNet <http://www.untpdc.org>) and to other global networks.[18] Trade Points use the GTPNet as a means of concentrating all the information available on a particular country that may be of importance to international traders. They produce home pages which contain basic country data, trade statistics and regulations, investment profiles and information on electronic commerce. They also provide details of the major trade events (e.g. fairs, exhibitions, seminars) due to take place in the country. More and more Trade Points are using the GTPNet to post company data and electronic product catalogues, which give many small and medium-sized companies unprecedented international exposure.

Bruno Lanvin of UNCTAD sees the Global Trade Point Network as bringing electronic commerce effectively to developing countries. It is not just helpful to enterprises wishing to trade globally. In poverty-stricken areas, Trade Points can play a vital role in allowing small producers, for example a market gardener or a potter, to trade locally, within a radius of, say, 100 kilometres. They can provide access to basic information about local markets, as well as access to trade-supporting services including transport or credit. They can work with local communities and non-governmental organizations to promote the activities of micro-enterprises in a large array of sectors and regions.

Costs to establish a Trade Point

■ Start-up capital

The amount of initial capital required to set up a Trade Point varies considerably among countries and Trade Points. A survey carried out by UNCTAD in 1996 showed that 40 per cent of operational Trade Points were set up with capital amounts of between US$10,000 and US$50,000, 20 per cent with amounts of between US$50,000 and US$100,000, and 40 per cent with more than US$100,000. No fees have to be paid to UNCTAD or to the

GTPNet in order to be certified as a Trade Point. The following start-up costs need to be considered:

◆ office furniture;
◆ computer software;
◆ decoration/renovation;
◆ printer;
◆ installation of telecommunication lines;
◆ scanner;
◆ telephone equipment;
◆ fax machine;
◆ local area network;
◆ photocopying machine;
◆ computer hardware;
◆ legal costs.

■ Operational costs

Once the Trade Point has been set up, it is expected to become self-financing by selling products and services to its clients. The following operational costs need to be considered:

◆ office rental;
◆ information acquisition, database subscriptions;
◆ salaries (full-/part-time, subcontracting): director/manager, administrative assistant, computer expert, trade expert, marketing expert;
◆ insurance (employees, premises);
◆ cleaning;
◆ telecommunications (including Internet connection);
◆ travel (local and overseas);
◆ utilities (electricity, water and so on);
◆ repairs/maintenance;
◆ office stationery;
◆ miscellaneous.

■ Technical requirements

The technical requirements for a Trade Point include hardware and software and full Internet connection. Internet access can be provided through a wireline, wireless or satellite connection. Specifically, the following items should be installed:

Computer hardware:

◆ 3 microcomputers with 32-megabyte RAM, 2-gigabyte hard disk, CD-ROM drive, VGA colour monitor;
◆ 1 fax-modem;
◆ 1 (laser) printer;
◆ 1 scanner;
◆ 1 dedicated or dial-up line to a local Internet provider.

Computer software:

◆ Microsoft Windows (95, 98 or NT);
◆ Web browser;

ITU/A. de Ferron

Information and communication technologies have made the global workplace a reality.

◆ graphics software;

◆ Microsoft Office 97;

◆ computer fax software.

Other:

◆ several telephones;

◆ 1 fax machine;

◆ 1 photocopying machine.

Financing

Trade Points provide the required technical, administrative and business know-how to support the financing of micro-enterprises and small businesses by non-governmental organizations and local development organizations. Such "microfinancing" is now a growing portfolio for donors such as the World Bank, USAID and many non-governmental organizations. By generating a critical mass of small and micro-enterprises at the regional and international levels, the Trade

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CORPORATE VIEW | Personalized customer service

INCREASING costs for customer support personnel were threatening a European telephone company's entire marketing programme. New market-driven products and services needed additional customer service representatives to initiate sales calls and respond to customers' enquiries. In turn, more representatives meant increased training costs and longer lead times. As service representatives could not be trained fast enough, the handling time on customer calls increased, resulting in missed profitability goals on new products. Enthusiasm for the products slowed and employee morale was low.

InfoActiv has been designing and implementing computer telephony integration solutions to meet its clients' profitability requirements for over ten years. In this case, having established why customer service costs were growing, InfoActiv recommended a comprehensive solution. Under its IntellActiv services, it designed and implemented a telemarketing and customer care centre with data storage and processing services. This solved the client's need for cost-effective customer sales and support with a full call centre and customer care facility, an Internet/intranet customer care centre database and order entry system, data mart and performance analysis tools.

Other services included expert customer service representative interface design, recommendations on practices and procedures, documentation and training. An interactive voice response system was installed to handle incoming calls efficiently, enabling simple calls to be assigned directly to dedicated representatives or dealt with by delivering pre-recorded announcements. More time

was then available for customer service representatives to take calls which the voice system was unable to handle.

Computer telephony integration was provided by the linking of customer computer records and the automatic voice response system. When calls were answered, customer service representatives were presented with the latest computer-stored information on the relevant customer. They were also provided with a user-friendly, Internet-based, order entry screen that could be updated from a desktop computer, reducing training time. Improved customer service reduced customer handling time, which facilitated increased new product launches. The client was able to provide personalized customer service for each new product economically and efficiently, providing valuable support to the marketing programme.

IntellActiv services enable clients to operate their systems efficiently and effectively while IntellActiv practice assists in the understanding of user behaviour. InfoActiv assists its clients under IntellActiv's business and marketing practices, including planning and customer research.

Through a number of partnerships and reseller programmes with leading industry suppliers, InfoActiv delivers the right hardware, software and network components to meet a client's needs, from establishing a new customer service centre to expanding and upgrading an existing facility.

InfoActiv
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For further information see Annex B

Point network can encourage credit providers to help such enterprises develop with export credits and innovative financial instruments. Clearing houses and cooperative mechanisms supported by the Trade Points can help the enterprises overcome hard currency shortages or lack of access to currency markets.

Results

UNCTAD says the Trade Points play an essential catalytic role in increasing awareness of the potential and difficulties of electronic commerce. Issues such as taxation, payments, privacy, security, cryptography, intellectual property and regulation must be addressed as e-commerce becomes international. Through direct, hands-on use of tools such as e-mail or Web presentations of products, users have been able to assess for themselves the relevance of electronic commerce to their activities as entrepreneurs, importers, exporters or intermediaries. Often the pool of experience created by the Trade Point network becomes a resource for governments and policy makers. The Trade

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CORPORATE VIEW | ## Market research

BUSINESS planning processes and thorough market research are critical for a successful enterprise and to raise finance in today's volatile economic climate. IsraTec, management consultants and financial advisers based in Israel, have enabled a number of clients in the communication sector to develop highly successful business plans and to raise the necessary finance to carry them out. By understanding market conditions, analysing product potential, planning a comprehensive marketing and sales strategy, and assessing the financial needs of the operation, businesses are able to define strategies while fully understanding the risks of any proposed venture.

Thorough market research to determine customer needs and pricing expectations is key to any successful business venture. Having carried out a careful market research programme, Hynex, a leading-edge data communication access business and one of IsraTec's clients, established a niche market offering equipment which matches that of larger competitors. A clear understanding of the competitive environment is essential. With the help of IsraTec, Tradeum and Parpicom, companies active in the electronic commerce sector, have set aside significant resources for research into this dynamic growth sector. In-depth knowledge of the competition's products, pricing and market share means that they are well positioned to develop a winning strategy.

Distribution channels are also extremely important to any successful operation, but in many cases setting up an exclusive sales mechanism can be prohibitively expensive. Existing distribution chains, co-marketing arrangements and sales by original-equipment manufacturers can be the most effective way for a business to capture the largest market share. Israel's third cellular provider, Partner Orange, chose to market its product with a large drugstore chain in order to penetrate the highly competitive local cellular market.

IsraTec's long experience in gathering and analysing market information means that it can assist its clients to formulate realistic and successful business strategies. Once the model is firmly in place, companies can project future costs in addition to critically forecasting profit-and-loss projections and cash flows. In this way an enterprise's potential as well as its shortcomings and financial needs can be measured and assessed, enabling would-be investors to form an accurate picture of the project.

Detailed planning is critical to the long-term success of any business. IsraTec has guided a number of its high-tech clients in this way with excellent results in both business performance and in attracting the necessary finance.

IsraTec
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*For further information see Annex B*

Point Development Center offers over 30 on-line courses for managers, staff and users of the Trade Points.

In the seven years of the Trade Point programme, 120 countries have become involved, 44 Trade Points are operational (the vast majority of them in developing countries), 19 will be soon and 84 more are under development. The website at <http://www.untpdc.org> is one of the most visited trade-related information sites on the Internet, with about 5 million hits every day. Trade Points connected to this site can benefit from this opportunity to reach a large international business audience at relatively low cost. More than 85 per cent of Trade Point customers are small or micro-enterprises, and of these more than 31 per cent are micro-enterprises. Some impact numbers suggest significant benefit to small enterprises:

"An average of 200 Electronic Trading Opportunities (ETOs) are disseminated each day to over 10,000 subscribers. It is estimated that ETOs reach over seven million companies every day. The ETO list server on the Internet ranked among the top 20 sites by number of messages delivered daily, and users indicated that 86 per cent of ETO users receive response to their ETOs and 27 per cent of those conclude business deals on the basis of ETOs. The value of these transactions is in 50 per cent of the cases less than $10,000; however, in 20 per cent of cases it is more than $1,000,000."[19]

The Zimbabwe Trade Point provides an example of the types of businesses using the facility. Links take the browser to, among many others, Zimbabwe Shona Stone Sculptures <zimtrade@harare.iafrica.com>, which has exported its sculptures to Australia, Canada, the Middle East, the United Arab Emirates and the United States; the Cochrane Group of Engineering Companies <cochrane@harare.iafrica.com>, whose 400 skilled personnel work with companies around the world; and Data Control & Systems <datacont@iafrica.com>, developers of networks and suppliers of personal computers and database information systems.

DEVELOPING COUNTRY RECIPIENTS OF FOREIGN DIRECT INVESTMENT, 1997
(% of total)

4	Poland
5	Indonesia
7	Mexico
13	Brazil
31	China
40	Other developing countries
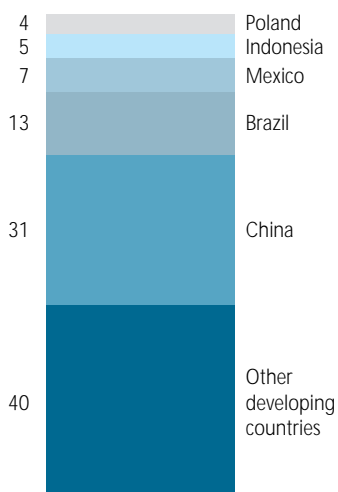
Source: *World Development Indicators, 1998,* World Bank

World Bank MIGA IPAnet

IPAnet (the Investment Promotion Agency Network) is an initiative of the Multilateral Investment Guarantee Agency (MIGA) of the World Bank to harness the functions and information resources of the Internet for promotion of international investment into emerging markets. Through IPAnet <http://www.IPAnet.net>, visitors can exchange information about investment worldwide: from business operating conditions to detailed descriptions of investment projects, joint venture opportunities and privatization initiatives.

IPAnet is open for exploring at no usage cost to anyone who registers. Registered visitors can access all the general databases, directories, calendars of events and other functions IPAnet offers, including the following free information and services:

■ global information on investment opportunities, business conditions and leading organizations in international investment;

■ proceedings and calendars of investment-related events;

■ a vehicle to announce upcoming events and distribute databases;

■ World Bank Group project, procurement and economic information;

■ Trade Compass, a daily electronic newsletter that accesses country commercial guides, product market research and multilateral trade statistics.

For organizations and individuals who wish a fuller range of services, there are a number of membership and sponsorship options that can be tailored to meet their objectives. Members of IPAnet enjoy additional services, including:

■ a marketing "billboard" in IPAnet to introduce the member's organization and its products;

■ market intelligence on the composition of the audience accessing the information, and avenues for follow-up;

■ opportunities for the mobilization of revenue through sponsorships and advertisements;

■ inexpensive intranets through which IPAnet members can serve their own constituencies.

CORPORATE VIEW | An alternative carrier

POPTEL TELECOMMUNICATIONS, a German company providing voice gateway installation systems around the world, is focusing on the reduction of call charges while at the same time offering callers an alternative long-distance carrier to the traditional network operator.

The Internet carries voice messages which are then accessed by strategically placed gateway switches within the countries served by POPTEL. Significant reductions in the charges of long-distance calls have been introduced as a result. Depending on the source and destination of the call, and the point of Internet access, calls can be up to 80 per cent cheaper than those offered by conventional long-distance carriers.

China, the United States and three European countries currently have access to this technology, with Asia and the Middle East set to join the network soon. The service is available to all telephone subscribers including those without an existing Internet service provider.

The POPTEL client receives a calling card and personal identification number (PIN) which allows access to the nearest gateway server. The network of telephone, Internet and gateway switches then transports voice messages to their destinations. It is also possible to connect cellphones to the network, providing cheaper long-distance calls for those customers.

Businesses are benefiting from a reduction in charges for long-distance calls as well. The business voice switch can be programmed so that direct international calls are carried over the Internet. Businesses served by telephone companies with modern digital exchanges can register with POPTEL for an automatic authentication service which identifies each caller. On the other hand, businesses with a wide area data network can install their own POPTEL switches, which will add voice facilities to their existing data networks to enable networks to be used more economically and reduce the volume of expensive external calls.

This technology has an increasingly important part to play in developing countries, where the lack of sophisticated infrastructure can often mean more expensive telecommunication services, and therefore calls, placing services beyond the means of large sections of the population.

Lowering the cost of local, national and international calls will enable many more people to use communication services.

POPTEL Telecommunications
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For further information see Annex B

Monitoring and safety procedures in many industries utilize information and communication technologies.

Topham Picture Point

Costs

There are no charges to access information. Basic IPAnet membership is available at a cost of US$2,000 per annum.

Progress

Now in its third year of operation, IPAnet has become a focal point on the Web for the international investment community, with more than 12,000 users from over 180 countries. IPAnet's databases now catalogue over 8,000 information resources drawn from over 450 investment-related organizations, providing a growing pool of information on investment conditions, legal and regulatory issues, as well as over 1,600 foreign direct investment opportunities in emerging markets worldwide. IPAnet was recently selected as one of five public sector finalists in the *Financial Times* competition for "business website of 1998", which endeavours to select websites which "demonstrate an effective and impressive use of Internet technology to achieve commercial advantage".

John R. Wille of MIGA[20] explains that MIGA's objective is to maintain IPAnet as the Internet portal for professionals and organizations involved in cross-border investment – providing one-stop access to information and analysis on investment and business conditions in developing economies, overviews of specific investment and privatization opportunities available to foreign investors, directories of investment organizations and professionals, investment-focused news, and a calendar of investment conferences and seminars worldwide.

Training

It is essential that the leaders of industrial or trade associations, government agencies and quasi-governmental organizations responsible for attracting foreign direct investment to their countries prepare themselves with the skills, knowledge and tools to develop and implement the strategies that attract investment to their critical sectors. MIGA provides practical, hands-on training of these key investment intermediaries and Karen Millet, MIGA Director of IPAnet, says that soon such training will be carried out using electronic means such as the World Bank's Distance Learning Network. "Developing these economic development strategies to target foreign direct investment to specific sectors, for specific outcomes on jobs or tax revenue, and to prepare the plans requires the practical knowledge that MIGA shares with local officials. Capacity building is a critical first step and the new electronic networks should expand the access and opportunity."

BENEFITS   Overall benefits to economic development

In their seminal book in 1986 on telecommunications and economic development, Bjorn Wellenius and his colleagues made the case for investments in telecom infrastructure as an essential precondition to development. During the 1990s such investments have been made, by governments and national telecom operators, by local enterprises and by the international telecom industry. Subsequent economic impact studies arrived at similar conclusions and new observations are now being made about the impact of Internet access.

For the period 1965-1995, the World Bank found that the availability of communication infrastructure, as measured by telephone density (the ratio of telephone lines to population), taken together with openness to international trade and educational attainment, correlated significantly with economic growth rates. In a group of countries studied it was found that the impact on the annual growth of GNP per capita can perhaps be as much as four percentage points for a country that moves from significantly below the average to significantly above the average on these indicators.[21]

Cost savings

The use of information and communication technologies enables businesses and industrial concerns to benefit from the cost savings associated with automation. The use of e-mail and fax reduces communication costs and allows immediate communication anywhere in the world. Business papers, correspondence, orders, invoices and payment no longer have to be sent by expensive courier services to achieve reliable and speedy delivery.

Economic benefits of e-commerce

The Internet has given businesses the opportunity to reach a large international audience of customers and suppliers at relatively low cost. More goods can be sold, and it should also be possible to make a higher profit on them. Associated with the growth of e-commerce is the growth of delivery services, including a new lease of life for postal services, as goods ordered over the Internet in a virtual shopping mall must then be delivered in the real world.

Individual craftspeople, for example, who join a Web marketing scheme, communicate with each other as well as with their customers. This can help them to improve their products as they see their competitors' work and can get feedback on what is selling in the wider market.

Banking activity and economic activity have increased significantly since the introduction of debit and credit cards and the growth of e-commerce, electronic funds transfer and bank accounts for citizens, according to Hungary's Minister of Finance Zsigmond Járai. Businesses can also benefit by making sales to foreign visitors via credit cards, often for major purchases that would not have occurred if cash were required. Such purchases increase the export earnings, foreign currency reserves and the wealth of the country. Smaller businesses also have opportunities to procure goods at competitive prices by using credit cards. Local banks will also benefit from these transactions.

Increased availability and quality of information

Trade and professional journals, as well as other sources of business data, are available on the Internet. This immediate access to information can be a significant benefit to entrepreneurs, industry leaders, academics and government leaders in developing countries, allowing them to compete on equal terms with their peers in industrialized countries.

Benefits of using computerized information systems for business and industry include improved quality of data and less likelihood of duplicating

IMPACT OF EDUCATION, OPENNESS TO TRADE AND TELEPHONE DENSITY ON ECONOMIC GROWTH
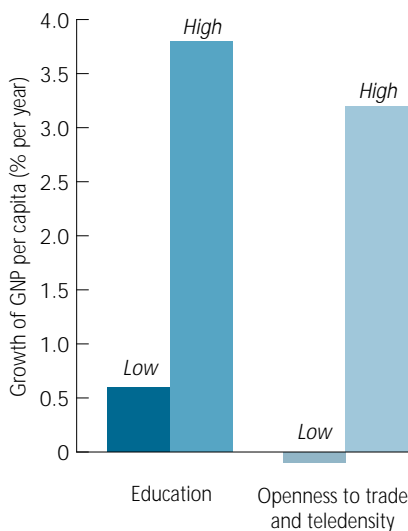
Each bar represents the average growth rate for a group of countries over the period 1965-1995. Education is average years of education in the population. Openness is the sum of exports and imports divided by GDP. Teledensity is the number of main lines per 100 people. Countries with "high" or "low" values on these variables are those with values at least one standard deviation above or below the sample average, respectively.

Source: *World Development Report, 1998/99,* World Bank

data collection and management, as well as increased time available to analyse the data and use them sensibly in decision making. The net result is better-informed decisions.

Training and education

Local partners of global enterprises in engineering, construction, transport and other areas can benefit from the shared access to, joint use of and technical training in the growing range of sophisticated information and communication technology systems. Similar benefits are also available to small traders who join Web marketing schemes and receive on-line training on how to create and update their websites. Such training has educational benefits beyond allowing the partners to participate in the scheme itself. The frameworks for action that have been set up by international organizations also all include training elements. For example, Virtual Campus has links to the World Bank IPAnet and offers interactive business courses on-line.

CORPORATE VIEW | ## Voice commands

RECENT advances made by the communication industry have accelerated the development of sophisticated yet user-friendly technologies. One of these, and one which has major implications for developing countries poorly served by telecommunication infrastructure, is the satellite. Today, the implementation of satellite routing has allowed the most isolated rural user access to the same high level of technology as the city dweller.

Making full use of the facilities offered by satellite routing, Teltronics has developed an innovative computerized learning system called Mentis. An advanced, voice-controlled, multimedia computer, Mentis can also offer video, CD-quality audio, graphics and text. It can be physically attached to the user and, because it is voice activated, has particular relevance for people who need to access information either in the course of their work or in other situations which prevent them from using their hands.

For example, vehicle technicians work in an environment of oil and grease which would damage a manually operated computer keyboard, but they need instant access to the vast amount of data needed to service the complex engines of today. Using Mentis, technicians are able to give simple voice commands which can activate a video presentation, animated programmes and question-and-answer sequences for servicing a multitude of electrical and mechanical systems.

This technology also has positive implications for health professionals working in difficult and isolated circumstances. Learning systems like this will allow quick access to up-to-date, electronically stored data while performing a medical procedure or examining a patient. The ability to deliver this kind of information as and when it is required dramatically reduces the need for formal training, which is of particular importance to emerging economies where skills in specific areas may not yet be fully developed.

Satellite routing has also made it possible for businesses to set up telephone call centres and computer help desks off site as a cost-saving measure. To facilitate this, Teltronics has developed a powerful software package which has been specifically designed for small and medium-sized call centres. "Quevision" monitors the efficiency of the centre allowing supervisors to react to immediate needs. It collects and collates data and reports on performance, while reader boards illuminate the volume of calls waiting. With this technology, even remote regions of the developing world can set up and operate call centres servicing global businesses and creating local business and employment opportunities.

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For further information see Annex B

contacts & references

Trade Points
<http://www.untpdc.org/untpdc/gtpnet/>

USAID Microenterprise Innovation Project
<http://www.mip.org>

Institute of Finance and Banking at the
University of Göttingen
<http://www.wiso.gwdg.de/ifbg/currency.html>

The Universal Currency Converter
<http://www.xe.net/currency>

ExporTutor <http://www.nemonline.org/tutor>

International Business Forum
<http://www.ibf.com>

US Department of Commerce, International
Trade Administration
<http://www.ita.doc.gov>

World Trade and Tourism Council
<http://www.wttc.org>

World Trade Organization
<http://www.wto.org>

The Network of Chambers of Commerce &
Industry of the UN Group of 77
<http://www.g77tin.org/g77afrca.html>

The African Trade Exhibition
<http://www.euroyellowpages.com/exhibitn/
trade/afritrad.htm>

UNCTAD – United Nations Conference on
Trade and Development
<http://www.unicc.org/unctad/en/enhome.htm>

Trade Compass – Trade Library
<http://www.tradecompass.com>

Bloomberg Online: World Currency Values
<http://www.bloomberg.com/markets/wcv.html>

EnterWeb: The Enterprise Development Website
<http://www.enterweb.org/>

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Wallingford, UK, 1997.
<http://www.cabi.org>

1. *World Development Report 1998/99*, World
Bank/OUP, New York, 1999.

2. John B. Rose
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3. For information on non-credit short courses
and general information about NTU and how to
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   Regarding equipment requirements:
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   The Association for Media-based Continuing
Education for Engineers Inc. is another source of
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Tel: +1 77 612 9060
Fax: +1 77 612 1060
E-mail: amcee1@aol.com
<http://www.amcee.org>
   IEC Web ProForum are Web-based and video-
based tutorials. The International Engineering
Consortium <http://www.iec.org/>.

4. For Apple see <http://www.apple.com>.
Microsoft's programme for on-line learning in
higher education has courses in information
technology areas, see
<http://www.microsoft.com/education/hed>.
   Oracle offers an Internet Seminars series of
courses about using technology in business and
on Oracle applications. For further information
check the website at <http://www.oracle.com/
applications/html/iseminars.html>.

5. Information from Sara Moola, Environmental
Industry Manager, Environmental Systems
Research Institute (ESRI)
E-mail: smoola@esri.com

6. Lane Smith of the Leland Initiative.

7. E.g. the Portaphone made by Plessey Mining.

8. Information from <http://www.mining-
technology.com/contractors/communications/
plessey/index.html>. Plessey Mining
E-mail: aeltze@plessey.co.za

9. Developed by Modular Mining Systems
E-mail: olivieri@mmsi.com

10. Alan Shark, Director
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1150 18th Street, Washington, DC 20036, USA
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11. Alan Parker, President, Orbcomm, Dulles,
Virginia, United States.

12. <http://www.via-inmarsat.org>

13. One such firm, Baxter Group of Toronto,
Canada, describes its services, fees, network of
related firms and clients on its website
<http://www.baxter.net> and offers a free
consultation and "Net" demonstration.
Tel: +1 416 968 7252
Fax: +1 416 968 2377
E-mail: netsales@baxter.net

14. World Tourism Organization website:
<http://www.world-tourism.org>.

15. *Electronic Enterprises: Looking into the
Future*, Office of Technology Assessment, US
Congress, Washington, DC, 1996.

16. To participate in EC-DC pilot projects,
countries should contact Alexander Ntoko,
arrange for a pre-feasibility study, determine
likely costs and assess the existing infrastructure,
then explore private sector partnerships.
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E-mail: ntoko@itu.int
<http:// www.itu.int/ecdc>
   The ITU E-Commerce Applications website is
<http://www.itu.int/ecommerce>.

17. Vitress AG, Grundstrasse 18
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Fax: +41 799 50 85
<http://www.vitress.ch>

18. <http://www.untpdc.org>

19. <http://www.untpdc.org>

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E-mail: jwille@worldbank.org

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