

Alcatel Digital Bridge Initiative



ARCHITECTS OF AN INTERNET WORLD

What Is the Digital Divide?

A major threat to us all - where lack of connectivity can:

- *exclude Rural, Isolated or Under Served populations*
- *block Peoples' entry to the New Economy.*

Yet when an entire Nation seizes the opportunity offered by Information and Communication Technologies (ICT), they can readily enable themselves to take part in, and benefit from the New Economy. Since relying on public financing or subsidies alone is not a viable long term solution, a self-sustaining alternative is needed.

Alcatel's "ICT-based Development Model" can become that alternative, as it relies on both public and private initiatives to prime the economic pump.

With our long-standing presence in most countries around the world, a comprehensive portfolio of ICT solutions, our experience in innovative ICT pilot projects, and our public engagement through international bodies and fora to build momentum, Alcatel has a key role to play, along with our Strategic Partners, in bridging the Digital Divide.



The Divide starts in Developed Countries

Within developed countries, there is threat of Digital Divide especially in access between urban and rural areas, and between low income or otherwise disfavored members of society. This phenomenon was first noticed in the U.S., closely followed by Western Europe. Because ICT impacts employment, education, and access to information, an uneven growth of communications access and usage can have long-term adverse effects on the social and economic fabric of a country. To the contrary, easy and fast access to the Internet in rural areas can help foster tele-working and tele-learning, stimulating local job creation and slowing the exodus from the countryside to overpopulated urban centers.

The Divide challenges Developing Countries

Almost three billion people in the world survive on less than two dollars per day, and many have yet to make their first phone call. Until recently, the main issue in the developing world was how to provide quality phone services at affordable rates across the country. Increasingly, this question will encompass how to offer useful Internet services in order to support development of the local economy.

Governments have a key role to play. By creating national “enabling conditions” and defining a fair “universal access policy”, they can bridge the gap with the connected economy. Should governments fail to create these conditions and let market dynamics be the sole drivers to build networks, connectivity will remain limited to affluent, urban areas and to certain businesses. Funding programs that are both supplier- and technology-neutral are required to address the particular needs of each region and part of the population.

Conditions for building the “Bridge”

For ICT-based development to succeed, three conditions must be met:

- Widespread availability of basic network infrastructure,
- Critical mass of required skills in ICT usage and new economy management - only possible through a quality educational system,
- High priority given to “useful” end-user services coupled with information content providing high local added value.

These three conditions have already been met in some Asian and Latin-American countries, providing an excellent opportunity to leapfrog traditional phases of development to an ICT-based economy. For other developing countries, there is clear danger that the gap with advanced countries could widen even faster, as new technologies have the additional effect of making the economic clock tick faster.

Different National Approaches to the same Goal:

India, now a software giant, has created its own “Software Valley” in Bangalore. With its acquired know-how, it could become a preferred development resource for large corporation back-offices, creating a significant number of highly-skilled jobs generating new economy revenues.

China has implemented a different model where the Internet itself is seen as a powerful lever to stimulate the general economy. China’s Internet is being deployed countrywide. This ambitious program indirectly helps create jobs, not only in Internet-related activities, but in all sectors of the economy.

An “educated guess” says 513.41 million people are online worldwide as of August 2001

COMPILED BY: NUA INTERNET SURVEYS, www.NUA.com

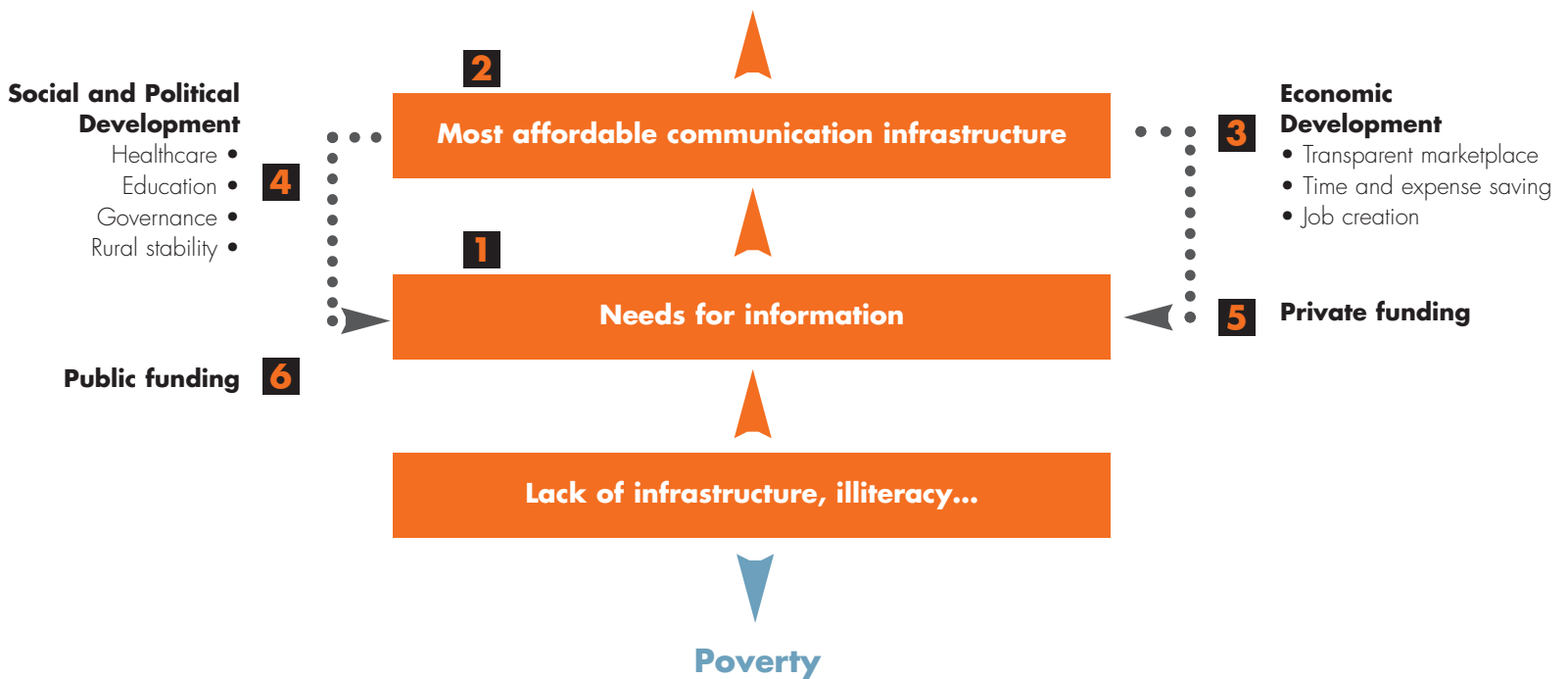


How Can We “Together” Bridge the Divide?



Today's **“ICT-based Development Model”**
for Tomorrow's Digital Bridge

Demand for Telecom Infrastructure



Here is the rationale:

1 Illiteracy and the lack of communications infrastructure are among the root causes of the development lag in poor countries.

Without access to information on healthcare, food supplies or economic activity, people in poor regions have no other alternative than to travel to where the information is.

2 Of all communication means, information and communication technologies (ICT) are the most affordable, with potentially the quickest return on investment.

Of course, the Internet will never completely replace the need for roads and trucks, but it can help the lack of many basic infrastructures such as transportation, healthcare, or education systems.

3 From an economic standpoint, ICT stimulate a more transparent and fair marketplace, where speculation and artificial shortages become a thing of the past. Time and money are saved, creating favorable conditions for a more dynamic economy. This in turn stimulates job creation, and drives the need for a further improved communication infrastructure, bringing new benefits in the form of a "virtuous development circle".

4 Accordingly, using the Internet to support healthcare initiatives, education programs and better governance policies also improves the communication and balance between Governments and their Citizens, between central and local authorities. Furthermore, this can impact the "rural exodus", by giving local populations an incentive to stay as the local economy improves. A more thriving economy will in turn drive the need for an even better communications infrastructure.

5 This "virtuous circle" works fine in theory, but how can the necessary initial funding be obtained?

The first phases must be funded by private investors, priming the pump for economic development with clear objectives in terms of return on investment.

6 The more public policy based initiatives should be financed by public funds aiming to improve healthcare, education or governance, where financial return on investments are not a meaningful objective in the short term.

This ICT-based development model can be successful provided these two sources of investment – both private and public – flow together smoothly. In an ideal situation, public and private investors will co-finance the basic infrastructure, sharing the funding and the risks, while reaping the benefits together with the local population.

Ingredients for Success

Optimized use of Technology, high speed Backbones, Community Access, Local Content, Human Skills and a good Regulatory environment.

■ Gearing Access Technologies to Developing Country needs

Access network penetration and requirements vary considerably from one country to another. There are a number of mature technologies able to address "last mile" needs.

The strategy is to avoid designing and manufacturing specific technologies for developing countries, by deploying innovative arrangements of standard technologies, thus making maximum benefit of economies of scale. The most appropriate approach depends on the target area, its population density and the existing assets.



- When a wired network exists, it can be easily upgraded to provide broadband access by using **Asymmetric Digital Subscriber Line (ADSL)** technology. In this way, **Small & Medium size Enterprises (SMEs)** and **cyber centers** can gain access to the Internet and tap its enormous resources.

- **Local Multipoint Distribution Service systems (LMDS)** or **Wireless Internet Protocol (IP)** can be the right solution to connect the more dynamic SMEs, giving them access to competitive edge broadband services.

- **Fixed General Packet Radio Service (GPRS)** is an original way to provide Internet access at useful speeds. It offers speeds of up to 40 kbps, with always-on connections and the ability to aggregate channels to achieve a higher bandwidth if necessary.

- **Mobile telephony** with restricted mobility is perfectly suited to the nomadic lifestyle in many developing countries, and in many places operators will choose to deploy a mobile network to fulfil their Universal Service Obligation. Using the same infrastructure for Internet access will allow these operators to get a quicker return on their investment.

For example, GSM technology configured for limited mobility and prepaid services can be advantageously used as a wireless access technique; co-deployed with fixed GPRS it becomes an interesting solution to provide **Internet access via Cyber-centers**. The key advantage of this solution is to reuse well proven and cheap GSM technology, while leveraging investment in the mobile network.

- **Satellite access** can be a complement to terrestrial networks where no ground infrastructure exists, and where connection sites are scattered. This doesn't necessarily mean that new geo-stationary satellites need to be launched; there is often extra capacity on existing satellites that can be leveraged simply by deploying ground stations in proper locations. Locating cyber centers in remote sites without the need for a copper infrastructure and outside the coverage area of mobile networks thus becomes a cost-effective opportunity.

■ High Speed Backbones to reach out faster and further

The access network is only a part of the overall solution, since it serves as the interface between users and wider area or national networks. To improve connectivity, high speed backbone projects of national, regional, continental and even intercontinental coverage are already built, or under deployment.

They all use the latest technologies, including state of the art satellites, terrestrial and submarine optical networks. Such backbones will contribute considerably to bridging the Digital Divide, not only between the North and South, but also between emerging economies in the South.

■ Community Access to "Spread the Word"

In developing countries, only a fraction of the population owns or has access to personal computers. This results from illiteracy, lack of computer skills, the cost of equipment, and sometimes from the absence of electricity. A sensible way to address the problem is to create cyber centers. In many countries, the necessary elements are there to create such centers.

There are already phone-shops, i.e. sites equipped with phone sets and phone lines where people can come and make or receive calls under the supervision of an attendant.

This person is responsible for allocating the phones, dispatching incoming calls, dialing numbers for illiterates users, and of course, billing and collecting payment.

Phone-shops could easily be upgraded to become **cyber centers**, by putting into place computers and analog phone lines, adding broadband access devices such as xDSL modems where profitable. The typical manager for this type of center should be proficient with computer equipment and applications. The manager will be responsible for configuring the computers, updating anti-virus software on a regular basis, and coaching people by doing some "hand-holding" as they use the Internet to find information.





Such cyber centers will also develop demand for broadband access, and become an attractive target for service providers. Similar community access centers exist today in many cities around the world, under the fashionable name of “cyber cafés”. The concept is not new, and works perfectly well. This is a concrete way to discover the benefits of ICT services, especially for low income populations, or for policy makers, potential local actors and investors lacking experience in ICT development...

■ Local Content & End-User Services: Make it Useful

Attracting users to public cyber centers is only possible if a critical mass of relevant content is available in the local language(s). Governments and public services are key players in local content creation, and need to be the spark that starts the engine.

Once initiated, this process will gather momentum with close involvement of private local content providers. Indeed, people will pay for useful services, and local entrepreneurs are best positioned to detect local needs and offer services that are pertinent, such as commercial news, agricultural advice, or healthcare information, to name a few.



Internet access can also give a tremendous boost to local economies with the advent of more transparent e-marketplaces. With such online tools, local farmers, fishermen and craftsmen can access market prices, logistical and weather information.

They can find buyers more quickly and easily, by accessing regional, national, or even international markets.

■ Human Capital as a Catalyst through Skills

To make the most of opportunities brought by the Internet (an educational tool in itself), it is vital to educate and train people in the necessary ICT skills. The first to be trained should be people in the field such as cyber center staff. This initial capital will then grow, thanks to the natural attractiveness of computers and the Internet, especially for the young who are also major catalysts for Internet adoption.

■ Good Policy & Regulation as a Development Tool

Governments and Regulators have a primary role to play by creating the enabling conditions and defining a “universal service policy” aiming to bridge the gap with connected societies. In case of lack of incentive from policy makers to address unserved and undeserved areas, as well as upgrading existing infrastructure, the build-out of networks will only be driven by market dynamics, and limited for obvious reasons to urban areas and selected business connections. Deregulation, associated with a “universal service obligation” for newcomers in their allocated area will lead to a better reach.

The competition resulting from market openness also puts pressure on end-user prices encouraging service take up and usage.

Secondly, Governments need to invest in e-Administration to benefit from the considerable advantages of electronic-based public services, leading to better access and quality of service to their citizens as well as important operational cost reductions gained from Internet practice.

E-Government also accelerates ICT coverage to remote or disfavored communities as well as contributing substantially to development of local content and national infrastructure.

Finally, a significant reduction of administrative fees and equipment costs including software will complete the conditions to create a favorable environment.

Pilot project

Fishing safely in Saint-Louis, Senegal – a market for local application providers

In this part of Senegal, coastal navigation is very dangerous. Each year, about forty fishermen drown.

Also, nearly one third of caught fish is lost due to the hot climate and poor logistics. With the right information, the situation can be greatly improved. An Internet Web site has been created for this community of fishermen, which they can access from cyber centers. One center is located right in the harbor area. There, the fishermen can get marine weather forecasts, as well as the transportation timetable and available capacity. The same Web site is used to advertise jobs to the community.

Now, before pushing their boats into the ocean, the fishermen visit the Web site. From the information they gather, they can determine the best fishing time, and improve both safety and revenues. They avoid rough seas, and the catch of the day can be loaded on trucks as soon as they return to the harbor. Food distribution in the area has been tremendously improved.

This pilot project, led by Afrique Initiatives, clearly demonstrates how the right Internet application can help support sustainable economic development for local populations, even those with a low level of literacy.

In this project, the key success factors are community access and local content.



What can Alcatel offer?



With a strong commitment to help local players bridge the digital divide using information and communications technologies, Alcatel offers adapted networking solutions covering next generation fixed, mobile, data, backbone and enterprise networks.



■ High Speed Backbone Networks

Alcatel's cutting edge portfolio includes wet and dry optical, as well as satellite backhaul solutions allowing service provider networks to reach isolated areas. Alcatel offers the only complete optical and satellite networking solution available on the market, providing end-to-end solutions, as well as related network and service management applications. Alcatel is involved in major projects connecting continents North and South. The SAT3 project links 10 countries of the west coast of Africa with Europe and, in the next step, with Asia, with a scalable speed of 20 Gb/s. This is the most significant project illustrating the global attempt to bridge the digital divide with Africa. SE-ME-VVE is a similar project connecting Europe to the Middle East and Southeast Asia.

■ Voice Network Evolution

With one out of five subscribers in the world Alcatel-connected, the company is particularly well positioned to help service providers capitalise on existing networks to supply competitive, next generation services. These include high speed Internet access and voice over ADSL.

The evolving architecture of the Alcatel 1000 series of products allows service providers to manage the convergence of voice and data traffic efficiently and at their own pace. These access solutions constitute key building blocks in Alcatel's next generation architecture, combining Alcatel's portfolio of gateways, packet-based transport systems and soft-switches.

■ Mobile Solutions

The quick adoption of cellular technology in Africa demonstrates the ability of mobile services to meet user needs. Reliable and cost-effective technology and fast deployment of mobile networks are key advantages in connecting people easily. Voice services, naturally evolving into mobile Internet with wireless application protocol (WAP) or GPRS, will make mobile the preferred communication tool.

Combined with microwave, LMDS and satellite backhaul, mobile networks accelerate bridging Divide. Mobile can solve several issues, such as cable installation, access to rural areas, and billing (using prepaid solutions, for example).

■ Data and Satellite Networks

The Internet has brought tremendous change, facilitating knowledge-sharing between people — between enterprises and employees, enterprises and suppliers, Governments and Citizens.

With the ever-increasing need to improve services, network operators must find ways to save on their capital and operating budgets. Network convergence can play a major part in this. Alcatel simplifies this process for the network operator by delivering the Unified Data portfolio of products in combination with several access solutions, from broadband to fixed Global System for Mobile Communications (GSM), in order to provide data network solutions.

When there is no ground infrastructure and sites to connect are scattered over a wide area, satellite-based access is the ideal complement to terrestrial networks. Creating cyber centers in remote locations, becomes easy and affordable. Alcatel is a leading expert in space-based communications.

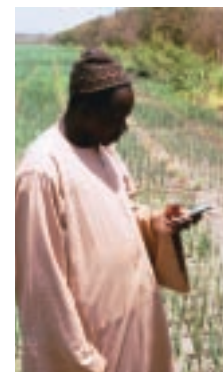
■ Enterprise solutions

The enterprise too is changing — the borders between on-site and remote workers, between in-house and outsourced applications, and between centralized and distributed resources are dissolving.

The enterprise communications infrastructure has evolved from a business support to a business enabler. Availability, security, performance, manageability, mobility, evolution and interoperability are the criteria for next generation enterprise networks as well as the right tools to compete in the global environment.

Pilot project

A virtual market place in Dakar, Senegal – internet payback for information supply



As in many areas in developing countries, market place are not transparent enough in Dakar region: high price fluctuation in very short time, artificial shortages and speculation,...

An enriching experience is that of Manobi in Senegal proposing a professional tool to all actors of value chain in order to manage food prices on real time. Thanks to its Internet platform, Manobi offers marketing and supply assistance services for small producers, fishermen, wholesalers and carriers; for example, a "virtual" market place has been set up for the fruit and vegetable sector.

Collectors note the prices of various products on the town markets and supply the information to a data base that the sector's professionals consult, from wherever they are, using WAP mobile phones. All the people involved can then refer to this information to negotiate sales in a far more open fashion, which leads to a better distribution of the profit margin between middlemen and producers.

This experiment clearly shows the wide set of benefits for local economy and food security management; not only small producers are benefiting: the cost of the service is quickly paid back by the increase of operational margins and there is no more waste of foods.

Alcatel

Digital Bridge Initiative



Usage is the key enabler!

At Alcatel, we believe real Internet access on a large scale will only happen in the developing world if “usage” is not a mere duplication of those contents existing in industrialized countries.

In case of duplication, Internet will only address a small part of the population corresponding to large business corporations and people with the highest standard of life and education skill.

As soon as relevant Internet services and applications are offered to address specific local needs and daily concerns, then revenue will be locally generated securing return on investment and making project fully sustainable. Internet usage must be reinvented to comply with specific needs of developing countries!

Internet, as a public utility?

Internet represents for developing countries an efficient way to offset their endemic deficiency in basic infrastructures of health, education, agriculture, transport, industry, logistics or services.

This is why Alcatel promote a self-sustainable ICT-based development model, which has been experimented on several **pilot projects** in Asia and Africa. Such experiments are conducted with local partners, all strongly involved in the emerging Internet world such as ISPs, start-up and project incubators, software developers, information system designers and NGOs, as well. Together, these partners and Alcatel aggregate all the necessary expertise to cover the Internet value chain in order to deploy “end-to-end” solutions including both infrastructure and relevant applications.

Awareness Training Programs

Training policy makers, technical staff and service providers in developing countries is a key success factor in creating the right conditions for a self-sustained ICT-based development model.

Alcatel University

Through Alcatel University, the company has played an instrumental role in two programs in Asia:

- Multi-Media University, Malaysia

Collaboration between Alcatel and this university was initiated in 1997 when Alcatel assigned a professor and two lecturers to the institution. In addition, Alcatel offers scholarships to students and conducts short courses with experts from Alcatel. Alcatel also provided hardware and software for a multi-media laboratory.

- L'Institut de Technologie du Cambodge (ITC), Cambodia

Collaboration between Alcatel and the ITC started in February 2000 and includes scholarships and telecommunications courses for the staff of operators, and computer-based training. A small multi-media center was also provided.

ITU-D Centres of Excellence

In order to develop and strengthen the capability to generate ICT expertise in developing countries around the world, the ITU has adopted the concept of **Centres of Excellence**. The ITU Centres of Excellence assist telecom policy-makers in establishing the regulatory and policy environment, and in obtaining the technical and business management expertise conducive to private sector investment in telecommunications infrastructure. The program addresses the critical need to build human capacity and skills in both the public and private sectors.

The ITU remains in charge of organizational and logistical aspects of the program, while Alcatel provides content and expert participation in particular, for incubator projects and trainer training.

Our International engagement to fight the Divide

Alcatel, is engaged in different fora and VIP Councils used as Divide resolution think tanks:

The UN Secretary General Advisory Group on ICT, including 21 high-level executives from the ICT world. Serge Tchuruk, Chairman & CEO of Alcatel, has joined the group to support global policy decisions to fight the Digital Divide.

The Global Digital Bridge Initiative of the World Economic Forum. In Serge Tchuruk's own words: "There's a clear message giving nations a chance to jump ahead in their economic development, thanks to rapid deployment of a powerful new kind of infrastructure – that of high speed access to the Internet which opens the door to the Information Society." (July 19th, 2000).

The GBDe (Global Business Dialog on eCommerce), focusing on electronic commerce and including a clearinghouse of best practices for private sector projects on the Digital Divide.

The G8 Digital Opportunity Task Force, a workgroup focusing on fast-track operational projects supported by 68 authorities and public-private partnerships.

The Presidential International Task Force on Information Society and Development in South Africa, an advisory council, to assist the government in developing an accelerated strategic framework, identifying barriers and constraints and the critical resources required for the future.



Pilot project

The cyber-pediatrician in Saint-Louis, Senegal – health care using Internet

In Saint-Louis, one pediatrician serves more than ten thousand children. Here, the experimental project uses the Internet as a bridge between the patients (a group of one thousand infants) and the doctor.

The weight of a child can be considered a key health indicator. It is measured twice a week by "weight collectors", local women equipped with scales to weigh babies and a laptop computer to collect data. The measurements are then uploaded to the pediatrician's database via the Internet. Within five minutes, the doctor is able to detect which children have odd weight curves and require further attention. When that happens, he sends an e-mail to the weight collector, who in turn informs the family that the baby needs medical attention.

This pilot project, led by Afrique Initiatives, shows how the Internet can help leverage very scarce healthcare resources to benefit the general population. In this example, families pay a small fee to access the service, and today the waiting list is already very long. It is proof that people are willing to pay for services when relevant, even if they are poor. It shows that the Internet can help fill the gaps when there is a definite lack of infrastructure, and when high-level skills (such as those of a pediatrician) are scarce.

Finally, it demonstrates that local content and service providers can design and implement this type of application, since there is a market for it.

www.alcatel.com

Alcatel and the Alcatel logo are registered trademarks of Alcatel. All other trademarks are the property of their respective owners. Alcatel assumes no responsibility for the accuracy of the information presented, which is subject to change without notice.

© 11 2001 Alcatel. All rights reserved.

3CL 00469 0209 TQZZA Ed.01 11613



ARCHITECTS OF AN INTERNET WORLD

