

Bridging the digital divide: An opportunity for growth for the 21st century

Bridging the digital divide is a challenge on which much has been written and to which many events have been devoted, including the World Summit on the Information Society (WSIS) organized by the United Nations in December 2003, a second phase of which is scheduled for November 2005. This article outlines an approach for bridging the digital divide resulting from the experience gained from the initiative launched by Alcatel in 2001. In this approach, the targeted use of the communication resources ensures their financing and future-proofs their deployment, including in the least favored rural areas; it can also provide a means of achieving the development objectives enshrined in the Millennium Declaration of the United Nations.

BRIDGING THE DIGITAL DIVIDE: AN OPPORTUNITY FOR GROWTH IN THE 21ST CENTURY

Universal access to communication resources can be achieved through an approach prioritizing their use for economic and social development.

Introduction

The concept of the “digital divide” expresses the gap in access to information resources in some countries compared with those with state-of-the-art networks: telephone, radio, TV, Internet, satellite, in short, anything that can be classed as Information and Communication Technologies (ICT). Thus the digital divide expresses the difference in facilities for people to communicate, relative to their geographic location, their living standard and their level of education. Ultimately it is an indicator of a country’s economic and social situation.

Despite the boom in the availability of access to communication resources since the beginning of the 1990s (from 700 million to nearly 2.5 billion telephone lines, and from scarcely a million to over a billion Internet users), the divide is deepening and the differences in the usage of communication resources between countries and regions intensifying. However, the digital divide exists not only between countries but also within countries, normally between “rich” urban regions and “poor” rural regions. This regional divide is more pronounced within the developing countries, even though rural areas have benefited to some extent from the boom in access to communication resources.

This realization justified the convening of the World Summit on the Information Society (WSIS) by the United Nations in December 2003, with a second phase scheduled for 2005.

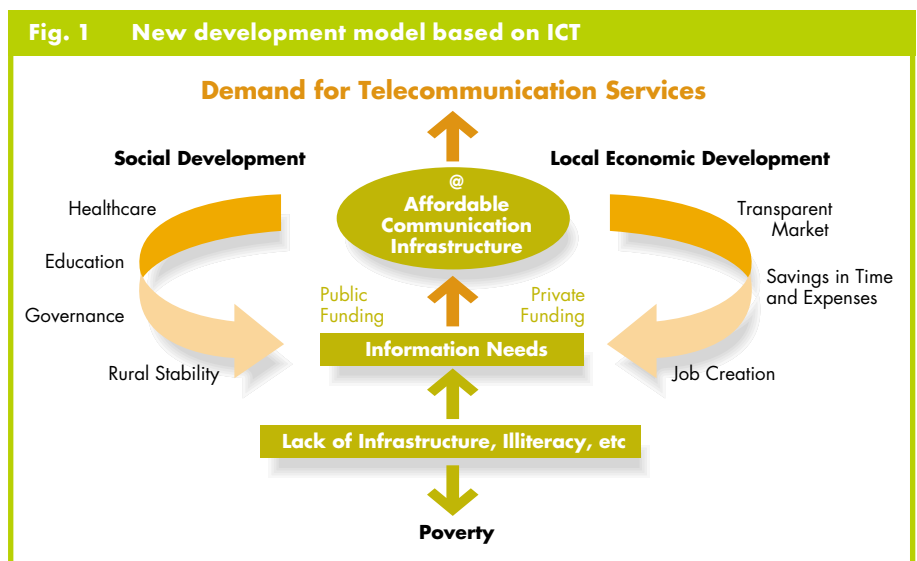
The digital divide would not have attracted so much attention were it not for its impact on development within a global economy increasingly

based on the exchange of information and knowledge. As a result, access to ICT as a development tool is becoming a major political, economic and social issue.

ICT: Tool for Local Development Encouraging experiences

How can communication tools, like the Internet and telephone, contribute to the local development of communities that are often disadvantaged by the lack of even more basic facilities, such as drinking water, roads or electricity? Why, in this situation, should ICT investment be not only useful or a priority, but even economically realistic?

Various case studies (see *Box 1*) show how it is possible to develop “proximity” services, that is, services that meet the basic everyday needs of the local economic and social organizations and the poorest people. Such services must be defined locally, taking into account the people’s way of life, real needs and incomes.



Box 1: Encouraging experiences with proximity services

Manobi set up a short message transmission and mobile Internet access service for the use of farmers and fishermen in Senegal. The company's investigators periodically collect, from the Dakar markets, the closing prices of fruit and vegetables together with characteristic market activity indicators. A website is fed with the gathered information. Small producers can use their cell-phones (Wireless Application Protocol; WAP) to access this information and find out the precise value of their products. Producers can use the information to negotiate the best price for their goods with carriers and merchants. The service also provides the carriers and merchants with a better knowledge of what producers are offering and of the market's requirements. As for exporters, they can compare the prices of products on international markets with the national prices so they can improve their marketing. Thus, all the players in the chain benefit from a transparent information system and obtain the best margins for their added value. Quite simply, this is the basis of a modern trading system.

Using a service like Manobi's, ICT becomes a working tool for defining economic models that can attract telephone operators into rural areas. Manobi has interested Sonatel, Senegal's principal telephone operator, and together they have created a company to attack the

rural sector, which accounts for 70% of Senegal's population, and thus contribute to the better distribution of ICT in these areas.

Still in Senegal, in the town of St Louis, Afrique Initiatives in partnership with local players has developed an Internet access called "Saint-Louis@net" which offers proximity services, even in the town's poorest districts. These services were defined following a survey of the population, which identified the most urgent requirements and expectations of their everyday life. A study was then conducted into how the Internet could offer services that met their main requirements as closely as possible in health, nutrition, education, or in terms of the local economic business profile. A few key services are currently being commercially tested.

The first example concerns healthcare; it aims to reduce the infant mortality rate. A regular weighing service, known as "Pésinet", is offered for very young children. The weight information (collected twice a week from the families) is updated in the hospital's database via the Internet. The practitioner can then identify potential problem cases and alert the families concerned to take the child to hospital for a consultation.

In St Louis, where there is only one pediatrician for tens of thousands of children, "Pésinet" can be used to improve the effectiveness of healthcare and its coverage.

New development model based on ICT

This model should be considered as a generalization of the examples in *Box 1*. It sets out ways in which ICT could contribute to a lasting, integrated development process. The model (see *Figure 1*) is mainly based on offering high local added-value proximity services, unlike the standard use of the Internet in the industrialized countries. Here the term "e-commerce" refers to local trade, such as the activities of producers and fishermen using Manobi services, while the term "Tele Medicine" highlights the benefits of the "Pésinet" service offered by Senegal's St. Louis hospital to those in the poorest areas.

This development model shows how both local players and local residents can achieve a genuine "leap forward" economically, politically and socially, based on two converging virtuous circles.

What does this model show?

- Firstly, it is a reminder that a lack of infrastructure and illiteracy are two prime causes of sustained poverty; access to information to take care of oneself, feed oneself, communicate with one's peers, develop one's own projects, and so on, then appears like a breath of fresh air for isolated communities.
- ICT is unquestionably the most realistic investment in communication because of the quicker return on

investment compared with alternative costly infrastructures. The Internet may never replace the roads that are so sadly lacking, but suitable Internet services will make it possible to make better use of what few means of transport are available.

- Economically, ICT will help to create local, more transparent marketing channels, so limiting speculation and the risk of artificial shortages and improving the distribution of margins between the various links in the value chain of each sector, from producer through to consumer. Time and money saved in this way can be ploughed back into productive new activities, helping to boost the local economy and leading to the creation of jobs. This will, in turn, justify more communication resources, and so on. This is the first virtuous circle.
- The second virtuous circle is of a social and political nature, in which ICT can be used as a tool to support the implementation of health program initiatives in which information campaigns are so important. In the areas of education and how society works, the Internet has the potential to improve communication between public authorities and local people, as well as between central authorities and local authorities. It will facilitate greater transparency in how institutions are run, so moving towards the objective of good governance.

Factors Favoring the Distribution of ICT

Implementing the above development model requires a favorable regulatory framework, the innovative application of new technologies (in particular, wireless access solutions), innovative content and services suited to local requirements, and the implementation of collective access facilities to enable as many people as possible to use the services.

Regulatory framework favoring the development of ICT

The telecommunication world has undergone a profound change, triggered by deregulation and sustained by the high growth in information traffic carried by telecommunication networks. In developing countries, telecom liberalization has improved the provision of network access (telephony and Internet) as a result of the involvement of dynamic private players seeking a good return on their investments.

However, the benefits of liberalization have remained limited to the urban areas, as private players have generally considered that rural access offers little in the way of profit. Universal network access is therefore far from a reality in most developing countries. This is the challenge that the young telecommunication regulation authorities in these countries must take up. It is worth remembering that telecommunication liberalization in the developed countries took place at a time when universal access (at least in terms of the fixed-line telephony element) was already a reality.

Setting up a regulatory system to promote dynamic network development in both urban and rural areas requires an independent regulatory authority with adequate decision-making and sanctioning powers. It is also important that there should be at least one player on the telecom landscape powerful enough to ensure the necessary interconnection between networks and with the financial strength needed to contribute to a national universal access policy involving both public and private contributors.

“Unforeseen” boom in mobile telephony

The boom in mobile telephone networks, mostly based on the Global System for Mobile Communication (GSM) standard, has meant that in many developing countries there are now more mobile phone lines than fixed lines. There are a number of reasons for this unexpected boom in mobile networks. Without a doubt, the use of cellphones is better suited to the difficult situation in developing countries and requires less investment than a fixed infrastructure. In addition, a wireless infrastructure has more “mobility” than a fixed infrastructure, in which at least the part of the access network closest to the user is dedicated to specific locations, and its profitability depends on the use made of this access by that household or business. Mobile networks don’t suffer from this limitation; their use can be shared and reassigned much more easily, and they can become profitable more rapidly. Also, the use of prepaid cards rather than monthly subscriptions by around 90% of subscribers in some

countries, enables users to keep better control of their expenses and greatly simplifies the operator’s management of the customer base. Lastly, the mobility service is better suited to the people’s way of life, particularly in rural and suburban areas, as well as in large villages and small towns.

The above reasons are worth remembering in view of the emergence of new wireless access technologies, such as WiFi and WiMax, which are expected to bring considerable benefits to developing countries both in terms of cost and their potential for combined telephony (using the Internet Protocol) and Internet access. The technology is undeniably important, but the factors associated with its use are of equal or greater importance. Note that developing countries have benefited from GSM being a rugged technology, for which the research and development costs have been amortized thanks to a subscriber base of more than a billion users.

Great Internet craze

The attraction of the Internet can be seen by any traveler visiting a developing country, no matter how poor it might be. Contrary to popular belief, Internet access affects every member of society, including those seemingly most remote from the technology.

In the developing countries, the Internet has quickly emerged as one of the most useful means of communication, definitely far more useful than the telephone! In practice, the Internet adds more services, many of which are especially appreciated in areas of extreme poverty where people are isolated from health, government, education and other facilities, making access to information crucial (see case studies in *Box 1*). In practical and economic terms, a document sent by e-mail costs significantly less than a fax, while international telephone calls made via the Internet enable expatriates to be contacted at very low cost.

Lastly, cable (see *Box 2*) and satellite infrastructures can (or will in the future) bring isolated areas, like Africa, out of the wilderness and connect them to the world’s high speed communication backbones. So the challenge is how to develop universal access to make these infrastructures available to as many people as possible.

Collective access facilities

Collective access to the telephone or Internet is the most appropriate solution for users who have low incomes, make little use of these facilities, and are often unfamiliar with the use of ICT. Some operators in developing countries (e.g. Senegal, Yemen) have successfully experimented with subcontracting these collective access locations out to small private entrepreneurs. This ensures that the facility is kept up to date and minimizes the risk taken by the operator; it also offers a service that is better suited to the local culture (e.g. location, human contact).

Box 2: SAT3/WASC Submarine Cable

This project, which was designed and implemented by Alcatel on behalf of a consortium of African operators, is an example of a communication infrastructure for reducing the digital divide between countries in Africa and Europe.

The SAT 3/WASC submarine system is an optical fiber cable linking Europe to Africa via the west coast from Portugal and Spain, and serving the Canary Islands, Senegal, the Ivory Coast, Ghana, Benin, Nigeria, Cameroon, Gabon, Angola and South Africa. This 15 000 km long cable is extended to Asia via the SAFE cable linking

South Africa to Malaysia, providing an alternative route to cables linking Europe to Asia, such as SMW 3.

This system, which was cut over in 2002, uses Dense Wavelength Division Multiplexing (DWDM) technology; it was designed to support transmission at 4 x 2.5 Gbit/s over links serving the African countries and at 5 x 10 Gbit/s for the link between Portugal and South Africa. The first type of connection is designed to meet the regional telecom requirements for voice and data, while the second offers a direct broadband link between Europe and South Africa.

Developing countries have also experimented - often with development agency financing - with a "multipurpose community telecenters" model whereby a public access facility provides a variety of ICT-related services: telephony, Internet access, office automation workstation, photocopying, etc. Although the idea appears promising, there have been bitterly disappointing failures. The causes of these failures are generally the same: financing by donations with insufficient commitment from the local private players involved, absence of targets except for the commendable one of popularizing ICT, lack of interest in the proposed Internet access services, and so on.

These few failures should be seen as lessons in how to make such collective access sustainable. There are no miracle recipes, just a few common sense elements: ensure that local players are involved, ensure that the pilot phase (during which aid money is available) is used to lay the foundations for a viable business plan without external aid and, more importantly, the innovative use of ICT to provide useful, not to say essential, services to local people.

Towards Universal Access

The first WSIS summit adopted a declaration and an action plan¹ to make ICT accessible to everyone in the interests of development. The declaration emphasizes ICT's role as a development tool and enshrines the objective of universal access to ICT in the wider context of the United Nation's Millennium Development Goals (MDG)².

WSIS adopted an inclusive approach, opening up participation beyond governments to all the players concerned: international and non-governmental organizations, civilian society and the private sector. The participation of the private sector in WSIS was particularly encouraged by the summit's secretariat in recognition of the primary role it will have in achieving the summit's goals. Alcatel was an active participant at WSIS and contributed a number of concrete proposals to the discussions.

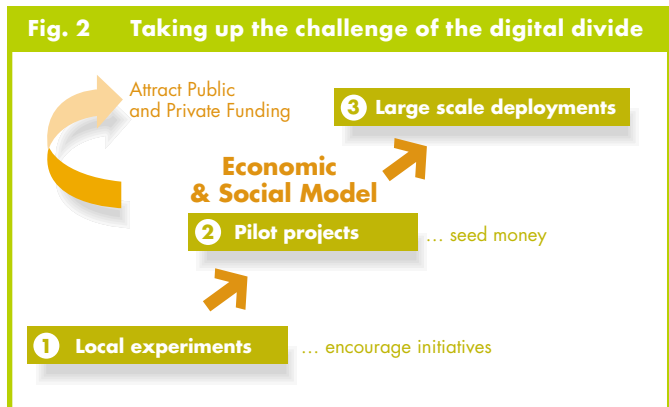
WSIS created a positive dynamic, and a large number of public and private players have been mobilized to achieve its objectives. A second summit is scheduled for Tunis in November 2005, but it would be fanciful to imagine that the digital divide could be bridged in two years! However, a realistic goal can be set for Tunis where the best practices will be explained so that they can be more widely adopted in the years to come. Alcatel's initiative to bridge the digital divide currently falls within this context.

Alcatel will physically implement its approach in cooperation with other organizations - multilateral aid institutions, international organizations and local authorities - to achieve the goals set out by the WSIS plan of action and bring concrete examples of success to the Tunis summit.

Infrastructure implementation strategy based on usage

In the developing countries, the main barrier to setting up telecommunication infrastructures lies in the lack of available investment; this problem is even more crucial in rural areas which are still very poorly served. Thus an approach is required based primarily on usage and services, and in which the technology is not considered as an end in itself but more as a tool. There is enormous potential in this area, comprising a multitude of initiatives based on individual competences or small creative and dynamic organizations that can develop new proximity services. Such initiatives warrant support and mentoring

¹ The texts of the declaration and the action plan adopted in Geneva are available on the WSIS site: <http://www.wsis.org>.
² The list of millennium goals can be viewed on the United Nations Internet site at <http://www.un.org/millenniumgoals>.



Box 3: Alcatel partnership centers

Aware of the importance of high local added value applications, Alcatel has launched its “partnership center” concept, the first instance of which was inaugurated at Alcatel’s Tunisia premises in Tunis in December 2003. The partnership center principle is based on Alcatel supplying a platform for developing innovative communication applications and services designed for mobile networks, but also suitable for Internet access providers. It is a true incubation center open to anyone with an idea for a project. Alcatel provides developers with the logistical support they need to access the resources required to firm up their ideas for communication services.

To be relevant, such services must respond to local needs and meet the constraints imposed by the local environment. The challenge is therefore to develop proximity services based on high local added value information content. For this reason, Alcatel is encouraging any relevant initiative pointed in the direction proposed by the local players: future partners

who, solidly grounded in the local fabric, are best placed to take up this challenge.

Partners are selected on the basis of their proposal based on a set of criteria, the most important of which are, in order of priority: the relevance of the innovative idea in terms of communication services, the credibility of the project as a whole, and the technical and methodological competences. Each partner is trained in the use of the Alcatel platform and supported when implementing the main tasks of developing, integrating and testing the applications and services.

At the end of this period, the chosen partners will be certified by Alcatel, which will offer them closer collaboration. This might, for example, consist in designing joint product offerings for local communication network and service operators, or for export, or even for companies and government agencies. In all cases, the partners remain the owners of their ideas and responsible for the applications they have developed.

The Tunis center is the first of a series that will be deployed by Alcatel in various developing countries.

(see *Box 3*). To this end, the public authorities will have a key role in creating conditions that favor the lasting emergence of such potential.

The second step is to nurture the most promising initiatives and set up larger scale trials or pilot projects. This type of project could be usefully financed by public startup funds, possibly in partnership with private financing through Public-Private Partnership (PPP) schemes. A pilot project’s essential goal must be to study the economic viability of the proposed service platforms if balanced business plans are to be drawn up.

Lastly, when as many “demonstration pieces” as possible have been set up through the pilot projects, potential investors (public or private) can commit to the large scale deployment of infrastructures based on conventional cost-effectiveness criteria.

This approach to fighting the digital divide is illustrated in *Figure 2*.

Conclusion

Those excluded from universal access, no matter how poor they are, will pay for ICT services if they help to improve living conditions. Universal access therefore promises growth for

everyone involved, provided that the problem is posed correctly and resolved wisely. In this light, bringing access to ICT “for the greatest number” in the developing countries no longer seems like a pipe dream!

The key success factor lies in devising relevant uses for ICT in the local context. Services suited to the local community will satisfy the users who will be able to use this new communication tool to improve their level of



development and living standards. As their incomes increase, they will enjoy access to new resources enabling them to further advance their businesses and their well-being.

Proven technical solutions exist to realize telecom networks at appropriate costs; these will be even more economically viable if they are judiciously tailored to local requirements and usage. It will then be possible to attract

public and private investors since these will find, each according to its own criteria, the justification for their commitment in light of the potential “return on investment”. Thus, a proven economically and socially “profitable” usage will make it possible to release sufficient funds to finance appropriate communication services and the construction of suitably dimensioned telecommunication infrastructures.



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Abbreviations

- SMSI** Sommet Mondial sur la Société de l'Information
- WSIS** World Summit on the Information Society
- ODM** Objectifs de Développement du Millénaire
- MDG** Millennium Development Goals
- TIC** Technologies de l'Information et de la Communication
- ICT** Information and Communication Technologies
- PPP** Partenariat Public Privé
- PPP** Public Private Partnership

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