The Digital Divide Still An Issue

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Edited. Dec./ 2007

Abstract
Globalisation has enabled new opportunities for individuals to navigate information and communications technologies (ICTs) in the new information society. Numerous factors, however, have decreased the opportunity to realise the goal of mass participation in the new digital world. Beyond connection and literacy factors, there should exist a better definition of indicators where cultural aspects should also be included. Bridging the digital divide must also take into account the diffusion of innovations theory of E. Rogers; otherwise, it would be difficult to reach this goal. Some models have already been formulated, but no one is transferable to each community and country, as every community has to elaborate a plan with its own specific needs. The international community has made many efforts to find ways to overcome the digital divide, but this question still remains very problematic. Further efforts are required, particularly in developing countries. There are also NGOs, who have done much in those poor countries to help support important initiatives. Even if a redefinition of the indicators is conceivable, one must recognise that developing countries are the less connected and the more excluded. From an ethical point of view, the international community should undertake more in order to help the developing world connect to and participate in the new information society.

Introduction
The 'digital divide' has often been discussed in the last decade, and the new dynamic of an international society has created an existing gap in society as well. It is, therefore, not a surprise that this same international community has tried via many mechanisms to solve this growing problem. But it is not only the duty of the international community to find solutions. Many other organisations have tried to find ways to close the gap as well. Even if this issue has been discussed everywhere, there is no doubt that developing countries are the ones who continue to suffer from the problem. This article will attempt to index the factors of the digital divide while considering the efforts which have been undertaken thus far, and it will also illustrate the future of new ICTs, especially in developing countries.

1. Digital divide: definition and critic

1.1. Definition
The digital divide has been defined by the OECD[1] as the gap between different individuals, households, businesses and geographical areas at different social-economic levels with regard to their opportunities to access IT and their use of the Internet. (OECD, 2001)

For Capurro,

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[1] The OECD (Organization for Economic Cooperation and Development) is a group of 30 countries member sharing a commitment to democratic government and the market economy.

"the term digital divide is a label for a situation with explosive force. It refers, at first sight, to the technological gap between those who are networked and those who (for a variety of reasons) already are and most likely will remain excluded. Being online does not simply mean - as the case in the 20th century mass media – to have access to a plenitude of broadcast stations, rather it implies the ability to participate actively in information and communication processes".[2] (http://www.capurro.de/augsburg2-programm.htm#call%20german)

The digital divide can be seen as connection and knowledge gap between communities or countries. As Capurro said, to be connected to the internet is not only the matter. So for Michel (2001), the digital gap can generally be defined as an inequality in relation to the possibilities of reaching and of contributing to information, knowledge and the networks, such as profiting from the major capacities of development offered by ICTs. These elements are some of the most visible in the digital gap, which actually results in a combination of vast socio-economic factors, in particular the insufficiencies of the infrastructures, the high cost of the access, the lack of local creation of contents and the unequal capacity to benefit, on economic and social levels, of activities with strong intensity of information.

As new ICTs become a firm component of everyday life, they enable many people to lead more productive and rewarding lives. But while they can help societies to solve long-standing economic and social problems, they also bring new challenges. Those who have no access to IT skills and knowledge gradually become less and less capable of participating in the new information society. This has resulted in a so-called "digital divide" within our society.

Today, many countries acknowledge the digital divide as a real social problem resulting from a clash between cultural and social systems and newly emerging communications technologies. Such disparities might be created by factors such as limited understanding and mastery of these technologies, or by limited opportunities to learn about and use new media. While many countries are trying to bridge the gap between the information-rich and the information-poor, there are still great differences in access and usage, as well as social behaviour between developed and less developed countries, and within these countries themselves.

1.2. A critical view about the digital divide

Ahmed (2005) criticises the tendencies to measure the progress towards the information society by the use of quantitative and statistical indicators elaborated by "neo-liberal" international organizations based mainly on criteria of computers and telecommunications equipments. Ahmed thinks that in order to determine the extent of the digital divide, a new range of indicators, such as the Digital Access Index (DAI) of the International Union of Telecommunications (ITU), should be applied to the arrangements of the World Summit on the information society (WSIS Geneva, 2003), or to those of the World Bank's Network Readiness of Economies in which telematic equipment is made as a reference. Even though it seems true that the connection criteria are necessary, they are certainly not a sufficient condition to implement the information society. (See Graphics (DAI) in Appendix)

Ahmed rejects this unified conceptualization of the information society and declines the standard measures of the digital gap. The reasons are that they are noticeably technical and market–oriented; comparative measures, such as DAI of the ITU, dissimilate the terms of the

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[2] http://www.capurro.de/augsburg2-programm.htm

information society as defined by the declaration of principles and the action plan of the WSIS. The image that this society should be culturally influential via the libraries and not by the domination of cables and electronic chips draws a miserable portrait of African countries by ITU's index in which the two thirds of these countries lie at the bottom of the Ranking.

Based on objective matters, according to Ahmed, that consider the value of informational culture and literacy, it can alternatively be proposed that indicators focus on the frequent use of libraries in order to estimate the preparation to the Information Society, or the "e-readiness".

Taking into account that the indicators of behaviour and cultural practices facilitates the description of the information society in a more rational way and considering the criteria of reading and informational culture, Africa would reveal a better image of a culturally rich and promising continent. Through the divergence of the two ideological and methodological views, one can show the close liaison between the digital divide and the "statistical gap" as established by the international neo-liberalism.

2. The factors of the digital divide

Among the many known barriers that Gartner (2000) assumes can be subsumed under socio-economic status are four key issues that need much more attention, and which are not dependant on socio-economic status alone. Any attempt to deal with the digital divide must take these potential barriers into account if it is to succeed. These four key issues are: physical access to ICTs, ICT skills and support, attitudes and content.

2.1. The connecting factors or physical access to ICTs

The connecting infrastructures (PC, phone and cable system, software, hardware, etc.), are among the main barriers identified under a lack of physical access to a robust telecommunications infrastructure with sufficient reliable band-width for Internet connections. In countries where the telecommunications industry is privately owned, the industry is visibly is reluctant to make a substantial investment in markets which represent a tiny percentage of the revenue stream. Technical problems are likely therefore to continue to inhibit access in rural communities for some time to come, while the cost of both the equipment, and especially monthly charges, remains an issue within lower socio-economic groups in both rural and urban areas.

Physical access also includes provision of access for people with disabilities. It is a critical question to make the Internet accessible to allow all people in the community full participation in communications systems, education, employment and other economic opportunities, regardless of their physical capacity. Demand for access to the Internet by people with disabilities is steadily increasing, and such access is now regarded as a human rights issue. While physical disabilities inhibit keyboard use, visual impairment inhibits screen use and learning disabilities prevent large numbers of users from participating in the benefits of the Internet and its rich resources.

2.2 Using factors or lack of ICT skills and support

Lack of ICT skills and support is another significant factor in preventing certain groups of users from using the Internet. Many people are often prevented from making use of ICTs because of low levels of computing and technology skills, and also, very importantly, literacy skills. Whereas people in business or professional occupations acquire skills as part of their employment, manual workers and the unemployed are less likely to be exposed to such learning opportunities.

The interaction of factors such as: cost, restricting access to equipment; low educational achievement; and cultural-, age- or gender-based exclusion from literacy and computing skills counteracts against the dissemination of such skills in disadvantaged communities. Educational programmes intended to bring these skills to such groups must overcome a range of such barriers.

2.3. Cultural or attitudinal factors

Closely aligned with lack of skill and support are cultural and behavioural attitudes towards technology. There exists concern over the lack of security of personal information or the notion that computers are 'unsafe' for families because of the amount of unsuitable material on the Internet. Although in developed societies the disparities between Internet access by gender are not large, disparities between male and female use of ICTs, and therefore access to the Internet, are much greater in developing countries. The involvement of women may be as low as 5% in some areas (United Nations. ECOSOC, 2000). This has serious implications for women's participation in a growing global economy.

For Cullen (2001) attitudinal barriers can also be culturally based. In many cultures which place high value on oral culture, personal communication and strong family and kinship networks, the use of computers for communication purposes will not be a high priority. Such barriers may apply to the lowest socioeconomic groups of developed nations, to strongly networked cultural minorities, to indigenous groups emerging from an oral culture, and non-literate rural communities throughout the world.

2.4. Content

One significant reason why some groups choose not to access the Internet is because the content is not relevant or interesting to them. This may apply to specific groups in society, such as the elderly, or women, but more significantly again, to cultural or ethnic groups outside the predominantly Western culture of the Internet.

2.5 Other factors
- Electricity supply: Without electricity it difficult to use the new ICTs.
- Fees: The partially higher connection fees are an obstacle particularly in developing countries.
- Income: People with low income are less connected. High-income countries account for 16% of the world's population and 90% have Internet host computers. By the end of 2003, some 47.5 million European families were connected to Internet. In India, despite having the second-largest population of English speaking scientific professionals in the world after the United States, the number of Internet hosts per 1,000 is just 6.8 (India) as compared to 179.1 (USA). The telephone connectivity in Germany, the USA etc. is 90%, computer saturation is over 50% and home-based Internet connectivity is 50%, in Africa and South America it is 5%. In Asia, China, Indonesia, etc. (80% of the world's population), telephone connectivity is only measured at about 3%. According to United Nations Human Development Report, there were only 38 telephone connections and 6 per mobile phone per thousand population by the end of 2001. Many Indian villages have never even made a single call. (Kumar, 2004)
- Residency: Residency is also a main factor. People with a residence in the city or downtown are more connected than those in rural areas.

- Social origin or ethnicity: Surveys Bridges (2000) have shown that the African American population in the USA is less connected to the Internet than Caucasians.
- Illiteracy: This is a main obstacle in developing countries. The majority of the population in developing nations is illiterate; therefore, it is difficult to introduce such technology into those countries.
- Language: Another handicap of Internet usage is language literacy. Over 60% of the websites worldwide are available in English. In addition, very few people in developing countries are able to speak the official language such as English, French, Spanish or Portuguese – the language barrier is too much. In India, there are officially 18 languages, but only some people can read and understand English instructions on computers. Very few websites are in other languages, especially in Indian languages. Very few business organisations there have corporate websites except for a few rich companies and corporations. (Kumar, 2004)

While content development is not often seen as a primary factor in Internet uptake, inappropriate or inaccessible content continues to be a major deterrent. The use of English as the main language of the Internet is far more inhibiting than English speakers realise. However, despite its dominance in cyberspace, English is, in fact, declining in terms of the number of speakers, as cultures using other languages grow more rapidly. The development of local content and more widespread use of automatic translation systems are necessary to address this issue. The example of China is often given, and the fact that only when the Internet in China was developed in Chinese characters did the 95% of the population who do not read English show any interest in connecting to the Internet. Usage multiplied immediately 10-fold and continues to grow at the same rate. The same rapid expansion was experienced in Russia after the introduction of Cyrillic letters to the Web interface. If we wish to accelerate the adoption of the Internet as a new technology innovation, relevant content in the vernacular or language of each community is a key issue in persuading users of the relative advantage of the technology, and reducing the complexity involved in its use. (Cullen, 2001)

Cullen (2001) resumes these barriers in the statement below:

> "*A number of research and policy papers addressing the issue of the Digital Divide identify specific groups of people as being especially disadvantaged in their uptake of ICTs. These include: people on low incomes, people with few educational qualifications or with low literacy levels, the unemployed, elderly people, people in isolated or rural areas, people with disabilities, sole parents, elderly, women and girls. Because they are often already disadvantaged in terms of education, income and health status, and also because of their profound cultural differences from the dominant Western culture of the developed world, many indigenous peoples, and some migrant and ethnic minority groups, are identified as having a very low uptake of ICTs. In the United States, therefore, Afro-Americans, Latinos, as well as North American Indian nations are identified as needing targeted programmes to increase their participation in the digital economy.*"

Figure 1. ICT Factors
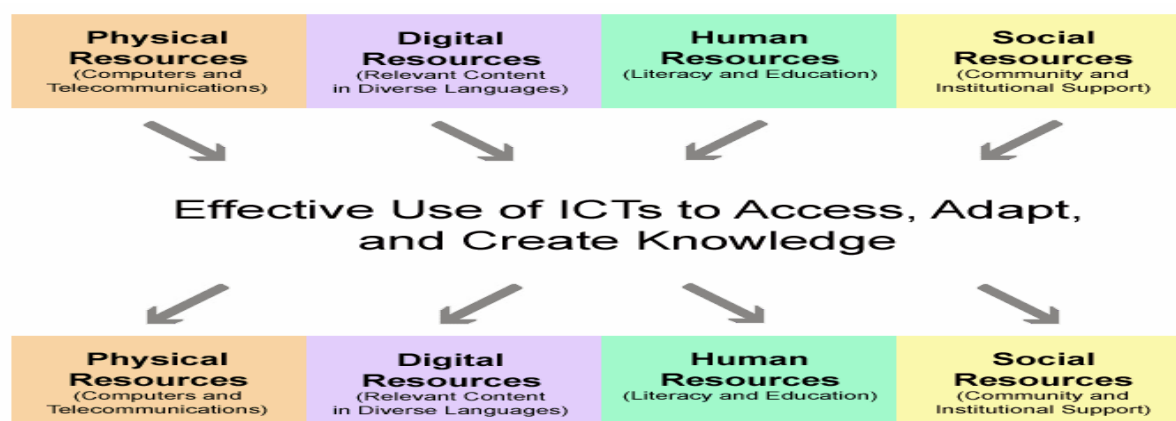
Source: Warschauer, (2002) available at
http://www.firstmonday.org/issues/issue7_7/warschauer/

3. Reasons of closing the gap

According to Kumar (2004), the Internet is growing faster than all the other technologies that have preceded it, e.g. radio, which existed for 38 years before. Fifty million people were listening to it. TV took only 13 years to reach this mark and the Internet only four years. Internet use is increasing dramatically, and by 2002 less than 5% of world population was unable to access the Internet. (See Figure 1. below)

Figure 2. E-readiness Ranking 2005 and 2006
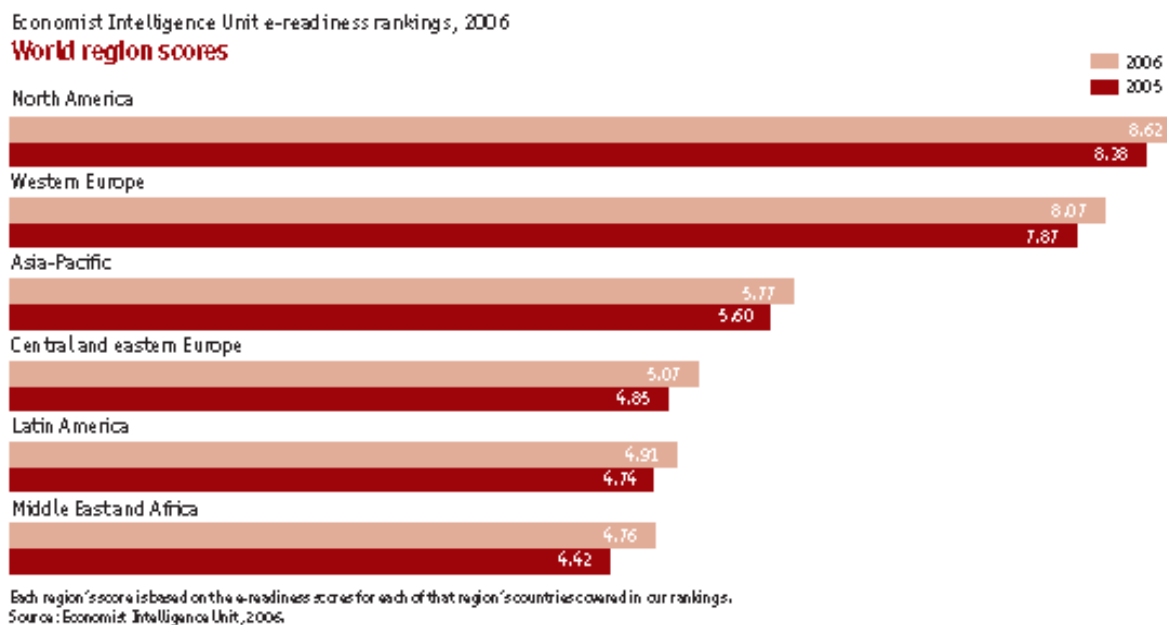
Technologies can exert a powerful influence on the lifelong learning process, as well as to help overcome various inequalities in society. Ready access to IT enables people to increase their potential income, and therefore enables them to afford still newer technologies. The already well educated, in general, have access to better services. There is thus a risk that the

educated and information-rich may become richer while the less educated and the information-poor become poorer, thus widening the "digital divide".

These figures dramatically show the urgent need to tackle the "digital divide" and to raise the question of how the problem can be dealt with at the international level. The "digital divide" is becoming more of a recognized reality as technology makes phenomenal progress in the new information age. The United Nations Human Development Report (2001) illustrates that:

- High income (OECD) countries, with only 14% of the world's population, are home to 79% of all Internet users;

Only 0.4% of people in South Asia are online although the region is home to one-fifth

- of the world's population;
- Increasing social inequality: More than ever society is divided because of this new gap;
- New illiteracy: In this new age, it is no longer sufficient to simply know how to read and write. Managing new ICTs is the main issue;
- Accentuation of the gap between industrialized countries and developing countries. According to Kumar et al, (2004) "Digital divide is chiefly responsible for information illiteracy in a digital environment";
- Freedom of Information: Everyone should have the right to communicate;
- Supporting Democracy: As Cullen (2001) says: "Internet for everybody", must be a reality;
- Using advantages of new ICTs such as E-Learning, Telemedicine, Training, etc;
- Improvement of flexibility and speed in the economy's production process;
- Promotion and acceleration of development

3.1. Declaration of principles (WSIS)

First of all, to see the importance of new ICTs or the fight against the digital divide, it is interesting to refer to the declaration of principles for the WSIS[3]. Chapter one of this declaration states:

> "*We, the representatives of the peoples of the world, assembled in Geneva from 10-12 December 2003 for the first phase of the World Summit on the Information Society,* declare our common desire and commitment to build a people-centred, inclusive and development-oriented Information Society, where everyone can create, access, utilize and share information and knowledge, enabling individuals, communities and peoples to achieve their full potential in promoting their sustainable development and improving their quality of life, premised on the purposes and principles of the Charter of the United Nations and respecting fully and upholding the Universal Declaration of Human Rights*".

And in chapter four:

> "*We reaffirm,* as an essential foundation of the Information Society, and as outlined in Article 19 of the Universal Declaration of Human Rights, that everyone has the right to freedom of opinion and expression; that this right includes freedom to hold opinions without interference and to seek, receive and impart information and ideas through

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[3] World Summit of the International Society Geneva 2003 – Tunis 2005 available at
http://www.itu.int/wsis/docs/geneva/official/dop.html

any media and regardless of frontiers. Communication is a fundamental social process, a basic human need and the foundation of all social organization. It is central to the Information Society. Everyone, everywhere, should have the opportunity to participate and no one should be excluded from the benefits the Information Society offers".

These quotes from the declaration of principles demonstrate that the international Community is aware of the problem and is ready to find solutions. They further indicate, therefore, that it is more than a duty to create a real solution; it is also a matter of ethics. Everyone must have the opportunity to share the benefits of the new information society. No person should be excluded.

As Tambini (2000) said, new ICTs offer opportunities for renewing democracy, fostering innovation, opportunity and economic development, and provide resources and opportunities which were not possible in the past decade. For example, children who have few books at home could use the virtual libraries, ensuring access to publicly owned digital education resources. Citizens could be empowered by easier access to government services and those who provide them. And workers could develop skills necessary to perform in the new economy, thereby benefiting themselves and the broader society in the process.

## 4. Solutions and bridging measures

How realistic is the prospect to offer everyone the opportunity to use new ICTs? This chapter will explain possible solutions and also analyse what has been concretely done so far to combat the digital divide.

4.1. Diffusion of innovation theory

According to Rogers (1995), diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system. Given that decisions are not authoritative or collective, each member of the social system faces his/her own innovation-decision that follows a 5-step process: (See Figure 2. below)

1) Knowledge – the person becomes aware of an innovation and has some idea of how it functions

2) Persuasion – the person forms a favorable or unfavorable attitude toward the innovation

3) Decision – the person engages in activities that lead to a choice to adopt or reject the innovation

4) Implementation – the person puts an innovation into use

5) Confirmation – the person evaluates the results of an innovation-decision already made

Figure 3. Diffusion of Innovation Theory (Rogers, 1995)
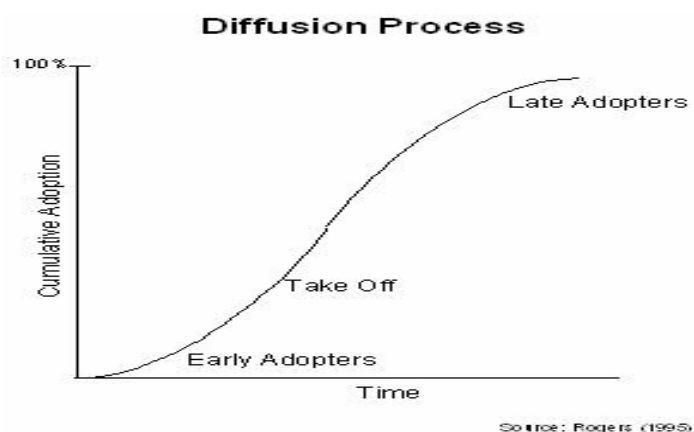
The research of solutions must take into account the diffusion of innovation theory of (Rogers, 1995). According to Rogers, the five characteristics are: relative advantage, compatibility, complexity, trialability, and observability. Cullen (2001) thinks that some of the research into the digital divide, in particular barriers to the adoption of the Internet by groups, can be interpreted in the perspective of this well tested and useful theory. The relative advantage of the innovation over previous means of obtaining information, education and communicating with friends and family must be demonstrated to potential users, and must outweigh any disadvantages inherent in the technology. Keeping in touch with family is definitely one of the advantages for older people in New Zealand. Compatibility of the technology with other cultural norms is also important. For example, when using a machine to communicate, dependence on reading/writing as the basis of communication is often not compatible with cultural norms that focus on oral culture. In addition, information on the Internet inhabits an uncontrolled environment where cultural sanctions cannot protect it. This has been a major issue for the New Zealand Maori, for instance, whose often sacred information and icons may be displayed on the Internet without their permission, just as it is for religious groups whose icons and images are inappropriately used.

Uptake of innovations also depends on trialability and observability. Whereas in wealthier communities people can learn the technology at work and assess its value to them in a domestic setting, unemployed and manual workers may not have this same opportunity. Lack of knowledge in the community affects the exposure of individuals to Internet-based technologies, as well as their ability to observe and employ the technology. In order to ensure a successful outcome, any solution to the problems of the digital divide must take these factors into account and build them into projects intended to reduce the divide. (Cullen, 2001). Nevertheless, there are some important strategies which should concretely help to close the gap:
- Guarantee of connectivity conditions: price reductions, more favourable or free software
- Modernization of cable systems and extension in rural areas
- Training of experts
- Creation of basic legal conditions
- Adjustment for local needs (touchscreen, local language...)
- Plans to fight illiteracy
- Improvement in the electricity supply
- Development of, and more efficient execution of, policy
- Privatisation of the telecommunications sector and intensified competition

- Definition of clear and transparent rules
- Improvement of the connection to the public
- Improvement of Internet connectivity

4.2. What has been done so far to overcome the digital divide

According to Cullen, (2001) in his report to ECOSOC, the Secretary General of the UN focused on some key points that need to be addressed in order to help developing nations increase their adoption of the Internet in their own communities and enhance their participation in the global economy. Many of these involve international development initiatives and collaborative efforts between governments, donor organisations, and NGOs. He calls for a more effective transfer of knowledge from the rich Northern hemisphere to the South, and he notes the increasing number of scientific and research publications appearing on the World Wide Web, a development which brings more benefits to the developing South than to researchers in the North who have other forms of access. The importance of information flows from South–South, and South-North should also be recognised and fostered so that expertise in successful planning and implementation of ICT development projects can be shared and resources are not ultimately wasted.

4.2.1 The Botha Model

The Botha report also looked at several other community access models, analysing the potential of each to address the problems of rural communities in New Zealand. The models identified were: the social service model, the free market model, the extension model (based on existing community services in schools and libraries), the SeniorNet model, and the mobile model (Botha, 2001, pp25-26).

Several examples of free market model community access programmes were identified in both urban and rural areas across North America and Europe, known either as telecentres or telecottages. These are usually based on the concept of a salaried manager, offering access and training within the community on a semi-commercial, self-sustaining basis. Few of these have had the major success of the Canadian initiative, and they are often not sustainable beyond the expiry of their initial subsidy. The success of the Canadian model is assumed to be due to visionary leadership, a highly effective national coordination committee aligned with strong community participation, and a successful strategy that combines financial and training incentives for communities and community leaders, as well as effective utilisation of technology to maximise resources and minimise bureaucracy. (Botha, 2001, p41)

The Botha report's analysis of the success and failure of a large number of initiatives around the world in sustaining such community access centres reaches the following conclusions:
- financially self-sustaining access centres seem to be unworkable in rural areas – the failure rate in most parts of the world is high;
- coordination teams promoting such ventures nationally should ideally be independent of any one government agency, but should act as a catalyst among government agencies, businesses and the community;
- community access centres need to be community-driven, have high community participation, and focus on community needs rather than on technology;
- training in ICT and other skills that people value are essential for community involvement;
- clear incentives are required to foster the development of such centres, and cooperation between community groups, businesses and schools. (Botha, 2001, p48))

4.2.2 UN and ITU

Within the UN system, the International Telecommunications Union (ITU) plays a key role in the area of telecommunications: setting standards for frequency spectrum management, interconnection standards, telecommunications regulatory issues, accounting rates, etc. Through its Telecommunications Development Bureau, the ITU also provides technical assistance to its developing country members. The ITU coordinated, on behalf of the UN system, the preparation of the World Summit on Information Society, which was to be organised in two phases, the first one in Geneva in 2003 and the second one in Tunis in 2005. OECD, (2001). These two world summits of Information Society justify the commitment of the International community to narrow the digital divide.

The main initiative, apart from the declaration of principles, is the solidarity fund. This solidarity fund has not been successful, however, because several developed countries did not agree to pay for the poorer countries. As Kuhlen, (2004) said, the WSIS should therefore originally be a world summit for development under the special technical and medial conditions of the information society. The countries of the south required a financially equipped solidarity fund. The states of the west and the north, however, were rather sceptical. In the final explanation, the requirement for such a solidarity fund was recognized, but at the same time, so was the necessity to measure the basic conditions for a fund requirement through the use of the Digital Solidarity Agenda (DSA).(http://www.wissensgesellschaft.org/themen/wissensoekonomie/Kuhlen_nachhaltigkeit_wsis.p df)

4.2.3. Other organisations

Several other international organisations are active in ICT issues within their respective guidelines. In 1996, the WTO adopted an Agreement on Trade in Information Technology Products to provide for the elimination of duties on a large number of IT products. There are currently 55 signatories to this agreement. Developing countries have been granted extended transitional periods for some products. The WTO concluded in 1997 an agreement on telecommunications services that opened the market for investments and introduced pro-competitive regulatory frameworks in a number of countries, countries acceding the WTO afterwards (which represents all developing countries) also adopted this model. In 1998, the WTO adopted a declaration introducing a moratorium on customs duties for electronic supplies. It also launched a work programme to study the application of trade rules to e-commerce, including its impact on developing countries. Since the beginning of 2000, the WTO has embarked upon negotiations for all services to further liberalisation and investment. (OECD, 2001).

In 1998, the OECD introduced the so-called Taxation Framework Conditions for e-commerce among its members. UNESCO and WHO are exploring the role of ICT in education and health, respectively. Of the UN Economic Commissions, the Economic Commission for Africa has been particularly active in supporting analytic work and policy formulation in the context of the African Information Society Initiative. Building partly on this work, the New African Initiative that was launched by a group of five African Leaders in July 2001 called for African states to "extricate themselves and the continent from underdevelopment and exclusion in a globalising world". ICTs feature explicitly as part of the overall strategy. The World Economic Forum, the think tank of world leaders meeting regularly in Davos, launched in 2000 a Global Digital Initiative to transform the digital divide into an opportunity for growth. The Task Force created for this purpose has been very active, particularly in connection with the G8 process.

On the occasion of its millennium session, the UN General Assembly paid special attention to ICTs on the basis of a report by a high-level panel of experts. It acknowledged the existence of a widening digital divide and the need to narrow the gap between developed and developing countries. A UN ICT Task Force has thus been created as a practical step aimed at strengthening the UN system's role and leadership and in developing effective partnerships with the private sector, civil society and other relevant stakeholders. The July 2001 ECOSOC session revisited the theme of ICTs with a special emphasis on knowledge networks. A very important participant is also the World Bank. Its wide and diversified portfolio of activities include support for telecom reform, the financing of innovative pilot projects (InfoDev)[4], applications for distance education (e.g. African Virtual University, cofinanced by the EC) and the creation of knowledge tools (Global Development Gateway)[5].

In recent years, the UNDP (United Nations Development Programme) has also shown itself to be a creative and proactive player by launching several initiatives and partnerships with the private sector and foundations. It also implemented country-level assistance to build national strategies and it contributed to the general policy debate. The 2001 Human Development Report focuses on the role of new technologies in development.

Another active forum for discussion is the G8. At the Okinawa Summit of July 2000, the G8 produced the 'Okinawa Charter' on the global information society and created a 'Digital Opportunity Task Force'. The 'DOT Force', as it is colloquially known, produced a report, *'Digital Opportunities for all: meeting the challenge'*, that was submitted to the G8 Summit in Genoa in July 2001. The report is the result of a unique international collaboration effort over several months among representatives of the G8 countries plus the European Commission, nine developing countries, multilateral organisations, and both the private sector and non-governmental organisations. It has charted the roles and responsibilities of the various participants - national governments, the private sector, civil society organisations, international organisations - in creating digital opportunities for all.

The DOT Force[6] report concluded that, when wisely applied, ICTs offer enormous opportunities to narrow social and economic inequalities and support sustainable local wealth creation, and thus help to achieve the broader development goals that the international community has set. The report acknowledged that ICTs are no panacea for all development problems, but by improving communication and exchange of information, they can create powerful social and economic networks, which in turn provide the basis for major advances in development. (OECD, 2001)

- UN-Economic Commissions: Under the UN Economic Commissions, the Economic Commission for Africa was particularly active and supported analytic activities as well as the definition of the policy in the context of the African Information Society Initiative.
- The African Information Society Initiative (AISI) is an action framework that has been the basis for information and communication activities in Africa since 1996. AISI is not about technology; it is about giving Africans the means to improve the quality of their lives and fight against poverty. AISI was launched as Africa needed a common vision for its quest not only to bridge the digital divide between Africa and the rest of

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[4] *info*Dev works to promote better understanding and effective use of information and communication technologies (ICTs) as tools of poverty reduction and broad-based, sustainable development.
[5] Portal for development information and knowledge sharing worldwide. The tools on the Web site bring together people and organizations around the globe who are working to improve life in developing countries.
[6] The Digital Opportunity Task Force (DOT Force) was launched by the G8 government leaders to look at how Information and Communication Technology (ICT) can bring digitally enabled opportunities to developing communities and help bridge the widening global socio-economic divide.

the world but, more importantly, to create effective digital opportunities to be developed by Africans and their partners, and to speed the continent's entry into the information and knowledge global economy. Support was provided to 28 African countries to develop their own national information and communication infrastructure (NICI) policies, plans and strategies (http://www.uneca.org/aisi/)

- Partnership for Information and Communication Technologies in Africa (PICTA) The Connect Africa Summit which took place in Kigali, Rwanda, on 29th – 30th October 2007, ended with the adoption of five goals to bridge the digital divide in Africa.
  - o Goal 1: Interconnect all African capitals and major cities with ICT broadband infrastructure and strengthen connectivity to the rest of the world by 2012.
  - o Goal 2: Connect African villages to broadband ICT services by 2015 and implement shared access initiatives such as community telecentres and village phones.
  - o Goal 3: Adopt key regulatory measures that promote affordable, widespread access to a full range of broadband ICT services, including technology and service neutral licensing/authorization practices, allocating spectrum for multiple, competitive broadband wireless service providers, creating national Internet Exchange Points (IXPs) and implementing competition in the provision of international Internet connectivity.
  - o Goal 4: Support the development of a critical mass of ICT skills required by the knowledge economy, notably through the establishment of a network of ICT Centres of Excellence in each sub-region of Africa and ICT capacity-building and training centres in each country, with the aim of achieving a broad network of inter-linked physical and virtual centres, while ensuring coordination between academia and industry by 2015.
  - o Goal 5: Adopt a national e-strategy, including a cyber security framework, and deploy at least one flagship e-government service as well as e-education, e-commerce and e-health services using accessible technologies in each country in Africa by 2012, with the aim of making multiple e-government and other e-services widely available by 2015.
    (http://www.uneca.org/aisi/picta/pictabulletin/pb66.htm)

4.2.4. The role of NGOs

Several NGOs such as SchoolNet, Acacia Initiatives, Bridges and others have been looking for ways or solutions to especially help people in developing countries. So far, various governments, in collaboration with associations and NGOs, have implemented specific initiatives, including:

- Conducting surveys to monitor IT adoption
- Enhancing the use of IT in education
- Education policy - A new education policy could be a big advantage for IT teaching in schools. Digital technologies are changing the role of teachers as well as our understanding of the learning process. These technologies give learners direct access to vast bodies of knowledge, as well as the necessary tools to search for and analyse information as well as to teach students. To eliminate the potential risk of a "digital divide" in future generations, IT teaching in schools is crucial.)
- Increasing the number of Internet connections for schools, as children are a society's future assets. In addition to the traditional curriculum, the government must encourage continuous learning through different media such as the Internet, with proper guidance

from teachers. To encourage and enable students to use the Internet for self-learning at school, the government must provide recurrent grants to enable schools to connect to the Internet. This enables teachers and students to share information, and to tap into the wealth of knowledge available from various electronic networks worldwide.

- Providing free computer facilities for public use, improving computer access for the under-privileged
- Free access to IT facilities
- Offering free IT awareness courses
- Enhancing web accessibility
- Making telecommunications connections available at affordable prices

5. Possible solutions

5.1 For the global digital divide

For Cullen (2001), there are no quick or easy solutions to the problem of the digital divide, either within or between nations. The disadvantaged in both rich and poor nations have too little cash to attract the attention of multi-national computer and telecommunications giants for long, and profits are likely to be made in higher band-width and new technologies. However, in the plethora of UN, government and commercial reports concerning the digital divide, there are a range of proposed solutions, and some of them specifically address the barriers to Internet use which we noted earlier: lack of physical access to ICTs, lack of ICT skills and support, negative attitudes, and lack of relevant content.

But the lack of physical telecommunications infrastructure is not the key problem in many parts of the developing world where mobile technology is already well developed. Internet access for mobile telephone owners was predicted to reach nearly 1 billion people by 2003, although as we noted earlier this does not guarantee access in areas remote from normal transmission services. However, mobile technology is developing rapidly and these problems may well be resolved in the next few years. A more intractable issue is the fact that 98% of Internet Protocol bandwidth globally connects to and from North America. The US operates as the hub of Internet traffic and countries must make payments for traffic exchange and connectivity to US telecommunications carriers. Not only does this require foreign exchange payments in prohibitively high US dollars, which developing countries can barely afford, it reverses the accounting system for telephone traffic where the cash flow is from the developed to the developing world. As more and more users transfer land telephone systems to the Internet, not only do developing nations lose cash income, they must also pay increased charges for this connectivity. Careful renegotiation of existing global telecommunications agreements and a restructuring of the World Wide Web, a difficult task when the Web has no formal governance structure, will be needed to address these issues.

At the country level, one of the most important issues raised in the UN report is the success that has been achieved in developing local community access centres, whether these are established in existing community centres, schools, meeting houses etc, or brought to the community in mobile units, not unlike mobile libraries.

5.2. For the developing countries

The UN Secretary General's report refers to an example cited in the report of the expert panel, of mobile Internet units in Cost Rica, known as LINCOS (Little Intelligent Communities) which are multipurpose multimedia mobile units housed in cargo containers and powered by a generator. LINCOS offer Internet access, e-mail, and training in ICT as well as banking

facilities, telemedicine, soil testing and FM radio and TV in a small setting. Cargo containers have been used for telephone centres in Africa for some years, and container-based Multipurpose Community Telecentres are being set up in several African states on a trial basis as part of an African Information Society Initiative (www.bellanet.org/partners/ aisi/telepro2.htm). This is perhaps a solution for the poorest communities across Africa, which has the lowest levels of connectivity in the world, but only where existing literacy levels are adequate for advantage to be taken of the rich resource being offered.

In all the factors listed above the well tested principles of Diffusion of Innovations Theory are evident, and can be shown to be the underlying principles lying behind the success or failure of the various initiatives. Critical success factors identified by Botha et al mirror the five factors of Diffusion of Innovations. Assisting communities in developing their own access and training facilities, and using subsidies and incentives, enables the relative advantage of promoting and acquiring ICT skills in the community to be explored and demonstrated within that community; prompting communities to take the initiative within the parameters of a national scheme ensures the compatibility with community values and activities; the use of low-cost access to initial training and the use of volunteers and members of the community to carry out the programmes and assist each other reduces the apparent complexity of the innovation, and it provides a non-threatening environment in which the application of ICT is both observable and trialable. Affordability of telecommunications services policies must be on the agenda for governments to provide a favorable environment in which information and communication technologies may become widely adopted in the community.

5. 3. Other conceivable/possible or alternative solutions
Affordable routine access is essential for participation in this new information age. While access is not dependant on home ownership, but can be severely constrained in the workplace, there are also constraints on the type of activity that can be carried out in the public environment of a community access centre or cyber-café.

More remote areas remain outside normal mobile telephone service, and development of mobile services in remote areas is regarded as prohibitively expensive. Satellite services, also promoted as a solution, solve only part of the problem since although they allow high bandwidth traffic inwards, they are unlikely to support a very high level of outward connectivity. Other technical solutions on the horizon, such as Internet access through cable TV, are also likely to exclude those in the lowest socio-economic groups. They are already the least likely group to subscribe to cable TV systems. It must also be recognised that all of these technical solutions carry costs which must either be borne by consumers, or by central government or local authorities and passed on through taxes.

6. Future of the Digital divide
Because of all the difficulties which surround the development of ICTs, particularly in the developing countries, great and positive results are not yet to be expected in every country. Weiland, (2002) thinks that the digital divide accents in particularly striking way the gap between developed and developing countries. It cannot be denied that new information and communications technologies point to completely new ways and possibilities for democratic formation in the global context up through the notion of cyberdemocracy. Also in cooperative development, special efforts have been undertaken to share with partner countries the programs for the e-Learning and e-Government. But the increasing technological imbalance and the solid, global commercialization pressure in the communication sector point out that the participation chances of the poor population majority worsen rather than improve. To that extent, the democratising effects proceeding from this kind of cooperative medium should be

seen sceptically. With the concentration on modern technology and the activities running in parallel with international conferences and in international organizations, it is feared that in order to manufacture rules for the application of the communication technologies, hard work already completed on this basis will be neglected.

Experience teaches us that development does not only serve to address and modify a small Internet elite within itself. In view of permanent technical innovations in the data communication area and the associated high application costs, the digital divide will continue to increase for the time being, without having a direct effect on the population of poorer countries. In addition, this means that high democratization effects from this technology should not to be expected. The efforts of developmental policy should also not neglect the classical media broadcast, TV, and press with their democracy-promoting effects. (http://www.cameco.org/mez/pdf/2weiland.pdf)

But the last surveys and facts underscore the notion that there is progress toward ICT in developing countries. The efforts of several governments of poor countries in collaboration with NGOs have had some positive results and are even mentioned by the ITU. Information and Communication Technologies offer both challenges and promises for social and economic development and this is nowhere more apparent than in the world's poorest countries. ICTs offer enormous opportunities to decrease social and economic inequalities and to support sustainable local wealth creation, thus helping achieve the broader development goals. On the other hand, misapplied ICTs might result in a further marginalisation of the poor and disaffected, thus adding a digital dimension to the existing social and economic inequalities in and amongst developing countries.

As with other development challenges, the decision to embrace these new opportunities belongs to developing countries themselves and the relevant stakeholders, notably the local communities. Ownership by them is indispensable. For its part, the international community can play an active role, by pointing to the potential benefits of new policies and assisting interested countries in designing appropriate policies in function of their situation and priorities. (OECD, 2001)

Conclusion
The Digital divide cannot be abolished as long as preconditions as the electricity supply, for example, are not fulfilled. The fight against the digital divide is a chance for developing countries to improve determined ranges of their infrastructures such as electricity supply, roads, and their education policies. It has been said that ICTs are not a universal remedy for all developmental problems; they can, however, by improvement in communication and information exchange, create high performance social and economical nets which form the basis for substantial progress in such development. The ICT politics should enable a broader strategy which promotes fair economic development, neutral trade formation, and improves the development of capacities and the supply of social services which can be revalued by ICTs.

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Abbreviations
DOI: Diffusion Of Innovations
ICT: Information and Communications Technologies
IT: Information Technologies
NGO: Non – Government Organisation
DAI: Digital Access Index
ITU: International Telecommunications Union
WSIS: World Summit on the Information Society
ECOSOC: Economic and Social Council
DSA: Digital Solidarity Agenda
UN: United Nations
ECA: The Economic Commission for Africa (established by the ECOSOC of the United Nations in 1958 as one of the United Nation's five regional commissions). The ECA's mandate is to promote the economic and social development of its member States, foster intra-regional integration, and promote international cooperation for Africa's development.
WHO: World Health Organisation
EC: European Community
InfoDev: Information for Development Program
UNDP: United Nations Development Programme

Appendix List of Graphics
Digital Access Index (DAI) Source: ITU

High-access (0.7 and above)

Countries	Sweden	Denmark	Iceland	Korea	Norway	Nether lands	Hong Kong	Finland	Taiwan	Canada	USA	UK	Switzer land
DAI	0.85	0.83	0.82	0.82	0.79	0.79	0.79	0.79	0.79	0.78	0.78	0.77	0.76

Countries	Singapore	Japan	Luxem bourg	Austria	Germany	Australia	Belgium	New Zealand	Italy	France	Slovenia	Israel
DAI	0.75	0.75	0.75	0.75	0.74	0.74	0.74	0.72	0.72	0.72	0.72	0.70

Upper access (0.5 – 0.69)

Counties	Ireland	Cyprus	Estonia	Spain	Malta	Czech Rep	Greece	Portu gal	UAE	Macao	Hun gary	Baha mas	St. Kitts Nevis	Poland	Slovak Rep.	Croa tia	Bahrain	Chile	Antigua and Barbuda	Barbados
DAI	0.69	0.68	0.67	0.67	0.67	0.66	0.66	0.65	0.64	0.64	0.63	0.62	0.60	0.59	0.59	0.59	0.58	0.58	0.57	0.57

Countries	Malay sia	Lithua nia	Qatar	Bru nei	Latvia	Uru guay	Sey chelles	Domi nica	Argen tina	Trini dad Tobago	Bul garia	Jamai ca	Costa Rica	St. Lucia	Ku wait	Gre nada	Mauri tius	Rus sia	Mexi co	Brazil
DAI	0.57	0.56	0.55	0.55	0.54	0.54	0.54	0.54	0.53	0.53	0.53	0.53	0.52	0.52	0.51	0.51	0.50	0.50	0.50	0.50

Middle-access (0.3-0.49)

Countries	Belarus	Lebanon	Thailand	Romania	Turkey	Macedonia	Panama	Venezuela	Belize	St. Vincent	Bosnia	Suriname	South Africa	Colombia	Jordan	Serbia Mont.	Saudi Arabia	Peru	China	Fiji
DAI	0.49	0.48	0.48	0.48	0.48	0.48	0.47	0.47	0.47	0.46	0.46	0.46	0.45	0.45	0.45	0.45	0.44	0.44	0.43	0.43

Countries	Botswana	Iran (I.R.)	Ukraine	Guyana	Philippines	Oman	Maldives	Libya	Dominican Rep	Tunisia	Ecuador	Kazakhstan	Egypt	Cape Verde	Albania	Paraguay	Namibia	Guatemala	Salvador	Palestine
DAI	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.42	0.42	0.41	0.41	0.41	0.40	0.39	0.39	0.39	0.39	0.38	0.38	0.38

Countries	Sri Lanka	Bolivia	Cuba	Samoa	Algeria	Turkmenistan	Georgia	Swaziland	Moldova	Mongolia	Indonesia	Gabon	Morocco	India	Kyrgyzstan	Uzbekistan	Viet Nam	Armenia
DAI	0.38	0.38	0.38	0.37	0.37	0.37	0.37	0.37	0.37	0.35	0.34	0.34	0.33	0.32	0.32	0.31	0.31	0.30

Low access (0.29 an below)

Countries	Zimbabwe	Honduras	Syria	Papua New Guinea	Vanuatu	Pakistan	Azerbaijan	S. Tome Principe	Tajikistan	Equatorial Guinea	Kenya	Nicaragua	Lesotho	Nepal	Bangladesh	Yemen	Togo	Solomon Islands
DAI	0.29	0.29	0.28	0.26	0.24	0.24	0.24	0.23	0.21	0.20	0.19	0.19	0.19	0.19	0.18	0.18	0.18	0.17

Countries	Uganda	Zambia	Myanmar	Congo	Cameroon	Cambodia	Lao P.D.R	Ghana	Malawi	Tanzania	Haiti	Nigeria	Djibouti	Rwanda	Madagascar	Mauritania	Senegal	Gambia
DAI	0.17	0.17	0.17	0.17	0.16	0.16	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.14	0.14	0.13

Countries	Bhutan	Sudan	Comoros	Côte d'Ivoire	Eritrea	D.R. Congo	Benin	Mozambique	Angola	Burundi	Guinea	SierraLeone	CentralAfrican Rep	Ethiopia	GuinaBissau	Chad	Mali	Burkina Faso	Niger
DAI	0.13	0.13	0.13	0.13	0.13	0.12	0.12	0.12	0.11	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.09	0.08	0.04