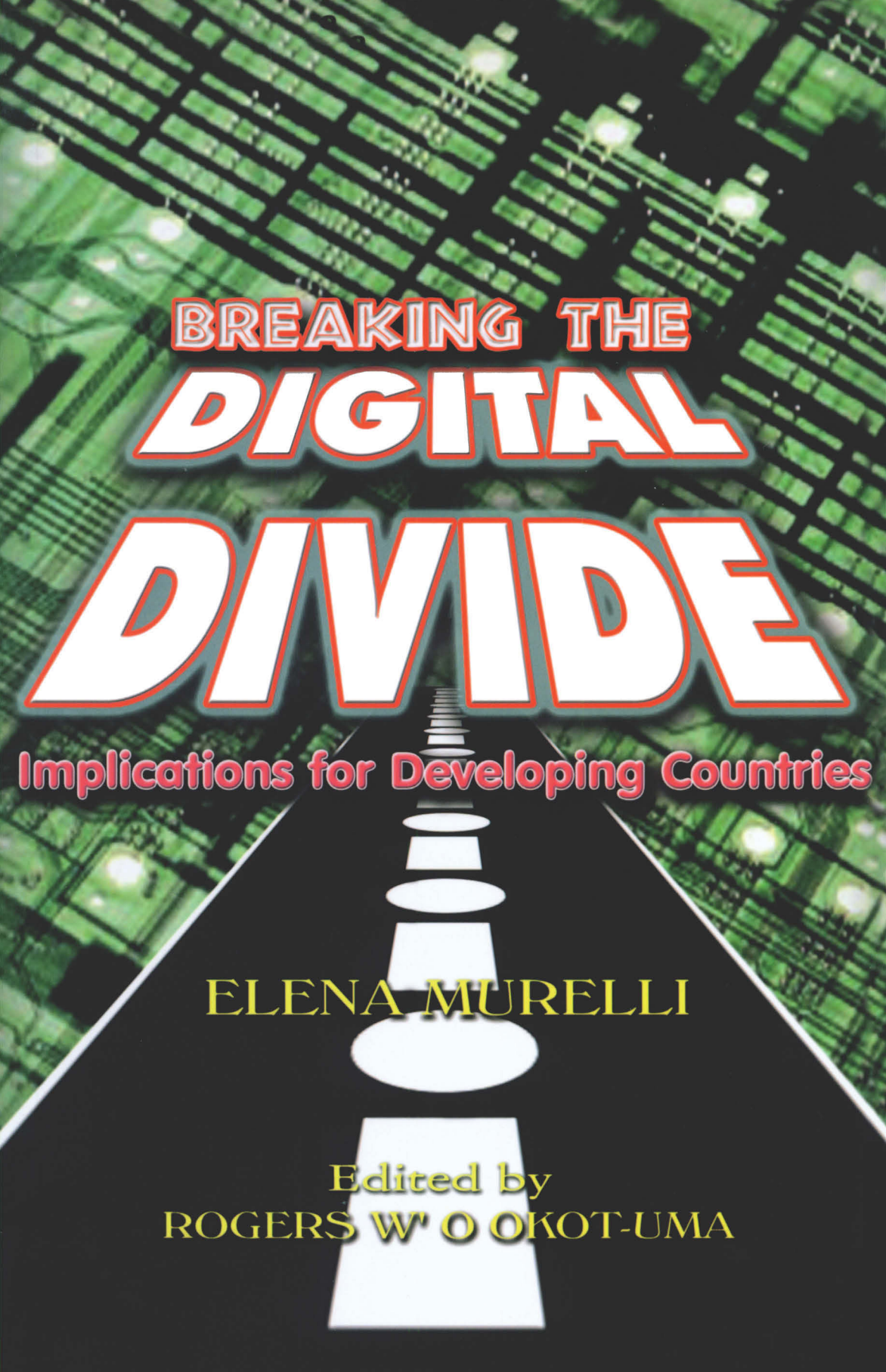

BREAKING THE
DIGITAL
DIVIDE
Implications for Developing Countries
ELENA MURELLI
Edited by
ROGERS W' O OKOT-UMA

BREAKING THE DIGITAL DIVIDE:
Implications for Developing Countries

ELENA MURELLI

Edited and with a Foreword by
ROGERS W'O OKOT-UMA

The Commonwealth Secretariat is an autonomous inter-governmental organisation dedicated to work as a trusted partner for all Commonwealth people (i) as a *force* for peace, democracy, equality and good governance; (ii) as a *catalyst* for global consensus building; and (iii) as a *source of practical help* for sustainable development and poverty eradication. Under the auspices of its Governance and Institutional Development Division (GIDD), the Commonwealth Secretariat supports short- and long- term training programmes, institution building, advisory services and publications relating to good practice guides in various areas of development, including public sector informatics, incorporating National eStrategies, eGovernance, skills for ICT development and knowledge management. Funding support for all development-oriented activities is provided by the Commonwealth Fund for Technical Co-operation (CFTC).

SFI Publishing is a *not-for-profit* publishing service-provider organisation committed to making publishing more accessible to individuals and groups by facilitating the publication of works by individuals and groups, the neophyte and the professional alike, who too often fail to envision the potential of their intellectual creativity and/or research or, more often than not, are discouraged by the complexity and exclusivity of the dictum of the old traditional world order of the conventional publishing process and mode of practice. With its network of specialist editorial support encompassing various areas of human concern, SFI Publishing is able, among others, to forge partnership with organisations with similar objectives and to provide independent professional and specialist advice, reviews and critiques on manuscripts and published works

Published by: Commonwealth Secretariat and SFI Publishing

Citation: Commonwealth Secretariat 2002, Elena Murelli Rogers W'O Okot-Uma (Editor). ***Breaking the Digital Divide: Implications for Developing Countries*** xxii + 168pp (ppk)

ISBN: 0-85092-672-6 (Commonwealth Secretariat)
1-901127-16-8 (SFI Publishing)

TYPESETTING COVER DESIGN & PRINTING
BY
PAULTARZUS
www.paultarzus.com

DISCLAIMER

The views expressed in this publication are those of the author(s) and do not in any way reflect the opinion of the publisher or that of its agents or collaborators. No responsibility is assumed by the publisher or its agents for any injury and/or damage to persons or groups of persons or property resulting from any inaccuracy or inadvertent omission in the book, or as a matter of products liability, negligence or otherwise or operation and /or applications of any methods, products, instructions or ideas contained in the material herein.

TABLE OF CONTENTS

FOREWORD

The Challenge of the Digital Divide

For several years now, the impact of information technology as an instrument of reform in the process of government and delivery of *comparative advantage* in public sector management, in the process of organisational change and the delivery of *competitive advantage* in private sector management, and in the process of capability development in the nurturing of *civil society empowerment*, have been widely acknowledged.

Government which, in turn, is increasingly perceived as one essential prime mover of national development in developing countries, and which continues to be the single most significant force to influence the future in the facilitating, nurturing and deployment of the new information and communications technologies, is perceived as a *catalyst* for the accelerated diffusion of information technology in a country, including *uptake by the civil society* and *stimulation of the private sector.*

The rapid development, deployment and proliferation of the new and emerging information and communications technologies (ICTs), herald new opportunities for growth and development in countries around the world. In particular, information and communications technology applications promise significant benefits such as *improved health care*, *easier access to public services*, *improved and new access to training and work*, *new commercial, leisure and entertainment opportunities* and, above all, *good governance*. Governments worldwide are seeking to harness the potential offered by these new technologies to create new dimensions of economic and social progress.

The majority of Developing Countries have, to date, not yet taken full advantage of the opportunities offered by the new information and communications technologies, nor adequately prepared themselves to meet the challenges. The main reasons for this lack of preparedness appear to be a 'mix' of *operational, contextual* and *strategy* problems, including, specifically the following:

- Lack of the *full appreciation* of the potentials, benefits and impacts *of IT,* against value systems and concepts of rationality for implementation of systems;

- *Deficiencies* in the *IT* physical infrastructure, hardware and software;
- Lack of *skills and capacities* to implement computerisation, electronic networking and data communications;
- D*eficiencies* in the formulation and implementation of policy frameworks for the new information and communications technologies (ICTs).

All these are factors that relate to an embedded, more fundamental phenomenon called the *Digital Divide*. The Digital Divide may be defined to be the relative differential in access *to information and communications technologies (ICTs)* ***between*** *and* ***within*** regional groupings (economic or political), *markets, countries, sectors (say, primary, secondary and tertiary), localities or communities, together with the consequential relative effects and impacts of the differential access.*

The Digital Divide can, therefore, be perceived to manifest in many forms, namely:

- *Between* ***regional groupings***, articulating the relative gap between, for example, the world's richest economic and/or political groupings and the rest of the world, including some of the least resource-endowed;
- *Between* ***national economies,*** highlighting the gap within the context of developed, newly-industrialising and developing economies;
- Within ***countries,*** which are diverse and include relative differentials: (i) between and within firms, or between and within sectors, or between and within markets; or (ii) between the urban and the rural sectors of the national economy; or (iii) between different income/social groups including different age-groups; between the rich and the poor; between different gender-groups; between different literacy level groups and between different ethnic groups.

The potential of the massive presence of the Internet in the Developing Countries provide **opportunities**, real and potential, for improving the human condition in these countries as, for example, it would make it easy to have access to fundamental information and it would also make the co-ordination of humanitarian assistance in the wake of natural disaster more efficient. There are two kinds of basic information that must be held into consideration when considerating benefits (real or potential) in relation to Developing Countries, namely:

- Information emanating from the Developing Countries themselves, which is useful for addressing, in the best way, supporting interventions; and
- Information emanating from the Developed Countries, which would add value to existing information and might include, for example, such information as updates on new medicines, which are useful for the doctors operating in disaster-stricken areas.

In *Breaking the Digital Divide: Implications for Developing Countries*, Elena Murelli ably and formidably succeeds in presenting an analytical exposition, a critical context, and an integrative synthesis of the various dimensions of the Digital Divide, with implications for Developing Countries. The work is the result of focused efforts aimed at articulating issues and problems within the context of the Digital Divide, and actions that Developing Countries can take in efforts seeking to facilitate progress, growth and development, within and between countries. For the Developing Countries, the rapidly widening Digital Divide must be narrowed, bridged, broken, mitigated or transcended to avoid long-term consequential effects and impacts. The pains of inaction will be greater than the trials and tribulations of action aimed at making the transition to an *information society* within a *knowledge economy.*

ROGERS W'O OKOT-UMA
Chief Programme Officer (Specialist)
Commonwealth Public Sector Informatics
Advisory Services Group
Governance and Institutional Development Division, (GIDD)
Commonwealth Secretariat
London, September, 2002

ACKNOWLEDGEMENTS

By the Author ...

The 29th of March 1999 is an important date in my life, a date I will never forget because of the emotion and the happiness evoked in me by the discussion of my degree thesis. The most urgent concern for me was to publish (at that time, at least in part) the research I had carried out on a theme nobody had ever thought of dealing with until that moment.

The idea to deal with such a delicate and contemporaneous subject like 'Internet: a new medium for the developing countries' (this is the original title of my degree thesis) came to me on a snowy morning in January 1998. It was due to my strong passion for reading, travelling and gathering information on the situation of these countries and to the great readiness shown by Prof. Luca Delgrossi, under whose mentor I undertook the Computer Science II course. I was able to begin this research thesis thanks to the power of the Internet and of the new technologies and to Prof. Delgrossi's support in the area of computing.

The year 2000 had a vast amount of sites within easy reach of surfing, a large amount of information to be read, numerous e-mail messages to be sent and received, things to be discovered and knowledge to be acquired day by day. This represents a glimpse of the kind of satisfaction I found myself endowed with, giving me a determination to make a mark of my existence for Posterity to ponder. This book, arising from the subsequent idea of publishing my research, originates exactly from the possibility to communicate to the world the true and actual situation of the development of the Internet in those areas of the planet that are isolated and hardly taken into consideration but that are trying, however, to advance by exploiting, to the extent possible, their available resources.

Like the advanced countries these nations - the developing nations - too have the right to enter the age of globalisation, with same advantages. I wish the peoples in these nations good luck, hoping that their dreams will be heard and put into practice by the Governments and by the international organisations at the earliest possible opportunity.

My dreams became a reality when this book was published! The whole work would not have been possible without the help and support by many

people whom I would like to thank in these few lines.

First of all, I would like to thank my parents, Mario and Wilma, who have always taught me the highest human and social values; without them I could not have cultivated my interests and I would not have been born! My gratitude to you Silvia, my perfect sister, whom I really love; Davide, the most important person of my life! My grandmother Celestina, my grandparents, my aunts and uncles, who have always supported me while I was growing up; Olivia, the most sincere and special friend, who supported me in every moment.

Again, thank you to Domenico (Dom), his 'old' CRATOS and his newborn MiNE, thank you for everything you are doing for us; Gianfranco and his really precious advice; my new MiNERs friends: Franca, Paola, Betta, Fran, Gianni, Eugenio, Roberto and Deanna.

I would like to thank all my friends too: Pinuccia, Vico, Nicola, Liara, Stefy, Chiara (all of them!), Rossella, Simona, Andrea, Diego, Susy, Sara, Ivan, Paola, Giacomo and my fellow students starting from the academic year 1994/1995 who shared with me these years of learning: Cervo, Roberto, Cristian, Elisa, Chiara, Nadia, Barbara, Nico, Davide.

Thank you to Team Sony-Caripiacenza Baseball, Rossella, Lucy, Sara (all of them), Cristina and to all the girls who watch the matches in all weather. In particular, a big thanks to Stefania Bernazzani who has translated all this work into English.

Finally, I would like to thank all the people I met all around the world (Canada, Africa, Switzerland, Ethiopia, Australia) after the discussion of my degree thesis and the people who encouraged me, in particular Maurizio, Nicholas, Claire, and Andrea. My last, not the least, gratitude goes to that infatigable international technocrat Rogers W'O Okot-Uma who had trust in my work and the Commonwealth Secretariat entrusted him with the task of editing the manuscript for the Commonwealth audience and the wider worldwide community and for writing the Foreword to the book.

Thanks a lot to all of you.

Elena Murelli

By the Mentor ...

First of all I would like to thank the author of this book, Elena Murelli. Elena emerged from among the students of the Computer Science II course to a state of notable intellectual brilliancy. Her deep and real interest in the Internet technology and in particular in the new and unexpected opportunities it can offer to humanity, now and in a future, while improving our lives, is a notable attribute.

When Elena proposed to carry out research on the Internet with focus on the developing countries, I was really enthusiastic and I had no doubt that she would be able to do it with distinction even if she was very young. Her passion for the subject and her undoubted qualities have supported her during the research. My contribution was limited to a few pieces of advice and to some elements of encouragement.

I have all the optimism that Elena will grow into a researcher of high standing, if she would like to, and I am sure, as far as I know her, that many of her researches will be aimed at helping the weakest and the poorest peoples. Among many things I learnt from this research is that the lack of information is not less worrying than the other more known kinds of poverty.

I wish to pay tribute to Domenico Ferrari for having created, founded and managed, always in an exemplary way, 'our' research centre CRATOS. CRATOS sometimes seems to me to be like an island or a landing-place, a place that has few equals in our country; a place where we try to carry out a true kind of research, for the society and the context in which the CRATOS is operating. Even if the history of CRATOS is very short - in fact it was founded in 1996 - a first great result that was reached is certainly in the fact it has been a fertile ground for researchers like Elena and several others over the years. I thank Domenico for many other things - that I will not mention here - especially because he is always and constantly an example, unfortunately inimitable, of cleverness, honesty and steadiness. Every day spent with him means improvement and great satisfaction for me.

After Domenico, I thank one by one all the friends of CRATOS (http://cratos.pc.unicatt.it) and of the newborn MINE programme (http://mine.pc.unicatt.it) and I wish everyone the same good luck I wish for this book.

Luca Delgrossi

PREFACE

Ever since the invention of telephony, nearly 800 million telephone lines have been installed worldwide. But to date, nearly 50% of the world population has never used the telephone in their life. On the other hand, proximity has generally been remote, as the nearest telephone can be more than half-a-day's walk from one's house: making a simple phone call (supposing that it is useful) would imply at least an overnight stay.

In the last ten years nearly 400 million mobile telephones have been manufactured and sold all over the world. But during the recent floods in Madagascar and in Mozambique (and also in some parts of the much more advanced Zimbabwe and South Africa) it was not possible to communicate in any way with the isolated flood victims for many days. This inadequacy prevented, for example, sending the necessary instructions to deal with emergency in the affected communities.

According to the latest estimates, the availability of the PC in the world stands at more than 400 million units. But most of the world population has never seen a PC; they are oblivious of netsurfing nor do they have access to basic information even for everyday life that are within the click of the mouse for the Western society.

Thanks to advances in the new Information and Communications Technologies (ICTs). The development of new knowledge as well as its propagation has increased at a rate of growth that could not have been conceived a few years ago. Only the invention of the press in the 15th Century has probably given rise to a change in the 'cycle of the knowledge' comparable to that of the ICT revolution has taken the modern world by storm. But all this 'passes over the head' of the majority of the developing countries; for them the increase in growth and in the diffusion of knowledge is very limited; and where knowledge is deficient or missing, where it does not grow or improve, or where it does not have the possibility or unlimited opportunity for spreading, the peoples subsequently get into the spiral of a more and more serious underdevelopment. The relatively low level of development of Brazil, for example, compared with other areas of South America, is considered to be due to the late diffusion of the press in that country - the first printing-press became significant only at the beginning of the 19th Century – owing to the predominance, in part, of political obstacles.

The richer nations of the world must act to promote the diffusion of ICTs in the nations. These observations have been stated and re-stated anew many times over the years, particularly when dealing with some much more evident gaps than the one provoked by the extended diffusion of ICTs in the more developed nations. It is imperative that concrete measures are undertaken to ameliorate poverty in the majority of the developing nations.

It is evident that in the developing countries the cost of technology is incompatible with the citizens' effective pecuniary resources: in the least resourced countries the yearly per capita GNP can be compared with the typical subscriber's telephone bill in the same period. It is also clear that without a plan for the diffusion of the ICTs in the developing countries the economic situation of the countries can just worsen. Inability to maximise on the development of ICTs will mean being cut off from the economic, trading and financial world flux: most of the peoples will not be able to apply the poor but dignified subsistence economy, which is typical of most of the less developed world.

This exposition by Elena Murelli, collaborating with Luca Delgrossi, represents a first analysis of the technological situation (that is, of the ICTs) in the developing countries and - implicitly - of the short and long-term consequences of the inadequate diffusion of ICTs in these countries. It is also one of the first analyses made nearly totally on the internet, thanks to the same technological means that constitute the subject of the underlying research: without a *medium* like the Internet it would not have been possible - for the student and for her teacher - to carry out such a study in a time period that is commensurate with the available time horizon for preparing a degree thesis. The information collected and interpreted by the author is various and varied, the vast amount which could not have been gathered through a pre-organised research. The vast information can be perceived to have had provenance in the slight and omnipresent noise in cyberspace, subjected through the agency of intelligent exploitation of the 'search engines'. The author has been able to select information for us in a clever way, by making reference to what the search engines had selected automatically somewhat 'en-masse'. The author has also able to write successfully and brilliantly a study about a subject that is usually not so charming for the reader.

A traditional academic of course could observe that the research has not

been looked into in a uniform way when dealing with various arguments and that the quality of the collected data is not homogeneous. This is not a fault at all: it is just typical of the researches 'made through Internet'. On the Net one can only find what forms part of the Net's content and the entities that are missing obviously cannot be found. If the author has caught too many basses, a few golden maids and no mullets it is because today the sea has offered us these kinds of fish. We do not know if tomorrow it will offer more, less or a little of either. We have to get used to this new kind of research. Even more, we must be ready to catch the sudden suggestions sometimes rising exactly from the variety of the contents of cyberspace and from the anisotropy of the investigation.

It would be interesting to continue the research in the future and to compare the new results with the results of the current study. We could probably draw some useful conclusions, not only about the evolution of the Internet in the developing countries, but also and in particular about the evolution of knowledge on the Internet.

But this would be a completely different investigation.

Gianfranco Prini
Milan, 21 March 2000

P. S. *While this book was going to print, something happened that must be reported here, a postscript: Iridium Consortium, which launched and made operative the homonymous constellation of low-height telecommunication satellites, was poised for closure. It is not a tragedy: how many PC manufacturers could be said to have shared the same destiny during the first years of the development of computing? Nevertheless the PC had its own glory. The same thing could happen (and probably it will happen) also for the constellations of satellites. In the story of Iridium something dramatic will happen: the constellation will be destroyed by the very same consortium that put it into practice. A well-known situation is happening one more time: on the one hand, there are people dying of starvation in less-resourced countries of the world; on the other hand, people elsewhere are destroying the overproduction of food. The ICT emergency for the developing countries would suggest to keep the constellation operating and to supply its services to someone who urgently needs them. The cost of doing so would not be prohibitive at all, if this is implemented within the auspices of international co-operation between countries. How can it be that we transform such a precious good into none but an artificial St. Laurence's Night?*

Gfp

INTRODUCTION

We open Chapter One of *Breaking the Digital Divide: Implications for Developing Countries* with an introduction on the Digital Divide. In order to capture the spirit of the Net, in Chapter Two we analyse the problems of valuation of the growth, which started at the beginning of the 1980s, by considering three kinds of studies: one provided by OECD, which every year writes a report about technology; another by the number of on-line users registered by NUA in all continents; and finally, Network Wizard checks on the number of hosts in the world every six months, as reported by RIPE on Europe every month. We will compare the hosts number worldwide with the American and the European hosts in order to underscore the large development of the Internet and its usage in the industrialised countries.

In Chapter Three we introduce the problem of underdevelopment: we identify the countries which fall under this category, so as to reduce the risk of misunderstandings for the reader. Then we focus on the diffusion of the Internet in these areas of the planet by underlining the obstacles to its growth. We then look into the issue of the telecommunications infrastructure, which is essential for the existence of the Net; in particular, we study the world of the satellites, as an alternative to the installation of cables in large areas with really low population density. Then we analyse two other important elements for the access to the cyberspace: Internet Service Providers and the computer industry in the Developing Countries. Finally, we analyse the limits of this market and the economic aspect, by comparing the costs of the various means of telecommunication.

In Chapter Four to Six we analyse the present situation of the Developing Countries from the point of view of the many applications of the Internet in the various economic sectors, applications that are now exploited in some depressed areas of the planet and which could promote the economic and social development of these areas. We examine some of the more significant examples in the education, health, agricultural, industrial and the services sectors, examples which have been chosen according to the large availability of material and by favouring the cases which, in our opinion, are useful to solve the underdevelopment and poverty problems of these countries.

Chapter Seven, finally, deals with the issue of the regulation of the

Internet. In particular, we deal with the problems of *censorship* and *privacy*, which are remarkable, especially in the Developing Countries, because of the influence of the Government on telecommunications and the Internet. Then we consider the various international projects that have been implemented to date, thanks to the collaboration of the industrialised countrieswith aims to solve problems of isolation and lack of information and of knowledge.

Finally, anticipating just one of the conclusions of this study, we briefly state that the advanced economies have to date contributed a lot to the growth of telecommunications in the Developing Countries. A lot needs to be done, however, in order to provide these countries with the participation and the involvement necessary for the realisation of a 'global village' where poverty and underdevelopment will be just a memory consigned to posterity.

CHAPTER I

INTRODUCING THE DIGITAL DIVIDE

Is the Internet going to increase or reduce the gap between the rich countries and the poor ones in the world?

1.1 Introduction

The Internet has to date been one of the most extraordinary human creations and even may be one single most important inheritance of the 20th Century. It had never been imagined before the invention of the Internet that it would become a simple reality to communicate directly with millions of men and women at practically any location on Earth and beyond; nor was it imaginable that it would become a manifested reality to exchange information, documents, opinions with the rapidity and the kind of freedom that are typical of on-line communication.

The growth of the Internet has been surprising both because of its rapidity and because of the anarchic and puzzled, still extremely successful, way in which it has developed. Without this spontaneous impulse, probably it could have never been possible to create a network of such potential. Furthermore, if this task had been assigned to the international governments, the kind of unprecedented rapidity achieved to date would still be lagging, perhaps along the way to a possible realisation of a global web.

The Internet, like all great innovations, implies a new culture and a new language. This new way of communicating will bring huge advantages to those people and organisations that are able to exploit the opportunities provided by the Internet; while it will probably penalise the people who will not be able to come to terms with the new culture. This conclusion has recently led some authoritative voices to think that the Net is going to create new and different kinds of illiteracy; and even more, that all the people who are not able to use the information and telecommunications

technologies and those who have difficulties in communicating in English, the language increasingly establishing as the global 'lingua franca' of the planet, will be soon considered the new illiterate.

1.2 The Digital Divide

The National Telecommunications and Information Administration (NTIA) of the US Department of Commerce published in 1999 a series of reports called *'Falling through the Net: Defining the Digital Divide'* [NTIA99]. These reports dealt with the situation in the USA with regard to the possibility of all American families being afforded access to telephones, computers and the Internet. The problem of the Digital Divide is perceived to be one of most important issues in economics and in the matter of the citizens' rights.

The Digital Divide may be perceived to be the *gap between those people who have access to the new information and communications technologies and those who cannot.* The report shows the existence, even in the United States, of this gap, which is apparently increasing. There are diverse *ethnic minorities, low income families, low literacy level families, rural area dwellers,* all of whom have unsatisfactory or no access to the resources of the Net. For instance, between 1997 and 1998, the gap between people with high-level education and people with relatively low-level education has been estimated to have increased by 25%, while the gap between people with high income and people with low income has increased by 29% in the same interval of time.

In the United States the Government has set up initiatives in the promotion of the new information and communications technologies in all sectors of society. To this end, it has promoted a great number of activities, many of which are concentrated on the ***local communities***, such as *schools, libraries and public access-points* to the Net as attempts towards narrowing the gap.

In this book we will deal with another kind of Digital Divide, specifically with *the divide between the economically advanced countries and the developing ones.* Traditionally, the developing countries have always tended to base their progress on the capacity to absorb the technological innovations created in the more advanced countries and to this end have always been faced with the unsurmountable obstacle of the high expenses necessary to carry out this process of assimilation.

The developing countries would have to learn soon the new culture and the new way of operation imposed by the Net, otherwise they would keep on losing ground, with the result that the gap between them and the more advanced countries would tend to rapidly increase. For this reason, the aim of this book has been to attempt to collect and analyse information on and about the diffussion of the Internet in the Developing Countries and also about the activities and plans in progress in initiatives aimed at narrowing of the Digital Divide.

From the very beginning we have realised how Internet technology is offering a series of opportunities that can make it easier to participate and/or develop the Net in completely new contexts. The relative costs involved make it possible to adapt/adopt the technology at different levels of resource availability. Above all, the Internet can become a *crucial channel for the diffusion of essential information in those places where poverty implies not only lack of economic means but also lack of accurate information*

1.3 The Global Society

We are living in a global society. The transformation of the world into a global village has provoked some revolutionary changes in the concrete and social infrastuctures, changes that make almost incomparable to think of the changes brought about by the Industrial Revolution.

The emergence of the new information and communications technologies is complementary, perhaps a prime mover, to the process of globalisation. By virtue of the role of the inherent radical changes in the communication process, geographical closeness is no more a necessary requirement for collaboration and interaction in the development of the various economic and social activities. Globalisation of the information and communications technologies makes it possible to create new kinds of organisations, influencing both the business efficiency in firms, governments and public sector organisations and also the citizen's quality of life. The evolution of these technologies and their adoption in all countries will make it possible for countries to have, practically, *access to information and to knowledge from any place in the world, from any system, including mobile systems.* The global society is anticipated to routinely live in a world independent of space and time: information will be available for all the people wherever they are.

The Internet and the new information and communications technologies are helping the process of globalisation to a very large extent. It is to be remembered, however, that a global society with no differences would be a lost cause: for this reason the Net is envisaged to try and connect all the peoples, wherever they are, striving to keep their own cultural identities intact, keeping their dignities untouched and respecting their own traditions. To date hundreds of people in diverse communities around the world are living in abject poverty. A banal illness like dysentery, for which a cure was found many centuries ago, keeps on striking millions of children just because of their parents' lack of awareness of the cure. *Being poor means not only having limited resources, but also little or no adequate knowledge.* The Developing Countries (DCs), which traditionally took advantage of being recipients of consumer goods from the Developed Countries, would not now be able to take the same advantages for software and microprocessors. To date a country can learn and appreciate the potentials of the new information and communications technologies and, by consequence, become a member of the 'global village' only if a minimal threshold of requisite education and knowledge can be demonstrated in the majority of its population. To note is that the acquisition of such requisite knowledge can be really expensive, because of the need of continuous requalification and refreshing, which is generally within the reach of the Developed Countries and less so for the Developing Countries, which would generally have difficulties keeping pace with the Developed Countries.

Knowledge has now become a powerful factor of polarisation, hence increasing the inequities, a factor which acts counter to narrowing of the gap between the North and the South. By making use of the new information and communications technologies, Developing Countries can acquire knowledge from elsewhere or create it by themselves.

The Internet is a new *medium* spreading with an extraordinary rapidity in every country of the world, and through which large and diverse amounts of information can be found and accessed for various purposes, aims and uses as solution systems for large or small, social or economic problems, of the countries. With the rapid spread of this phenomenon, we can reasonably hope for a world where knowledge and power will not be the exclusive domain of a limited group of people. This, in essence, introduces the main theme of the work under the auspices of this publication. The publication is the product of two different concerns:

(i) *the new information and communications technologies (ICTs),* in particular relation to the Internet, the Big Net or simply the Net and its new applications, and

(ii) *the Developing Countries,* to which the mass media have always paid a lot of attention in order to convince the world at large of the need to help these countries and their peoples.

1.4 Internet

The Internet, seen as a communication medium, has a number of features that distinguish it from the other media. It provides a way of communicating which is not one-way oriented but an interactive one. The user is no more a passive consumer: the user can receive any kind of information, including information necessary for the purchase of goods and services. One can talk about a *friction-free capitalism model, namely, a market in which the spread of the Internet will offer more choices to the consumers and will make it possible to reduce the costs by locating and buying directly the goods from the producer, avoiding the commercial middle-persons.* According to some scholars, however, the Internet can be percieved as *'a more level playing field',* a playing field for everyone because it reduces the access barriers that can be found in the other markets, without provoking the middle-persons disappearance, but only their specialisation in the services as a support in the activity of a firm, specialisation which is not directly connected with the final consumer.

The main potential of the Internet is, according to Giuseppe Richieri [Medi 95a], *'in the capacity of collecting messages of every kind actually coming from all over the world in one exchange network.'* This enables people to communicate, to exchange opinions and comments with other users, who can be sometimes unknown, while comfortably sitting in front of their own computers. From these observations it can be seen that the phenomenon of the Net implies different cultural dimensions, as it involves, on the one hand, politics, economics, and technological development; and on the other, everyday-life problems.

How does social identity change on the Net or, how can social identity be preserved on the Net? *Social identity on the Net is established by the communities. On the Net the notion of community is linked with the notion of communication* and so one has a certain identity because one can communicate through the Internet. *Unfamiliarity with the new*

information and communications technologies is one of the serious problems that have to be solved in order to create no further social differences among peoples and to avoid the fragmentation of society by the new technologies.

Do the new technologies represent an incentive to economic development? Or do they provoke a crisis in some kind of society or in the old jobs? According to Fausto Colombo [Medi 96a] *'investment in the new technologies and in the opportunities they provide is increasing, and certainly this increase is partially or totally in an even greater proportion to the advantages and it can create disadvantages for the employment and for the investments'.*

CHAPTER II

GROWTH OF THE INTERNET

How is the Net spreading? Can we measure its growth?

2.1 The Expectations

The massive presence of the Internet in the Developing Countries have potentials for improving the human condition in these countries as, for example, it would make it easy to have access to basic information and it would also make the co-ordination of humanitarian assistance in the wake of natural disasters more efficient. There are two kinds of basic information that must be held into consideration when considerating benefits (real or potential) in relation to Developing Countries, namely:

- *Information emanating from the Developing Countries* themselves, which is useful for addressing, in the best way, supporting interventions; and
- *Information emanating from the Developed Countries,* which would add value to existing information and might include, for example, such information as updates on new medicines, which are useful for the doctors operating in disaster-stricken areas.

In order to understand fully how the Internet could diffuse in the Developing Countries, it is important to analyse the phenomenon of the growth of the Net in the global sense. From this standpoint it would be interesting both to value the spreading of the Internet with regard to its development in the last few years and to identify the economic, political and social factors that have encouraged or prevented its growth.

This chapter deals with the problem of estimating the growth of the Internet, by describing the most used methods of measurement in this area, and the standards adopted to obtain the valuations. Furthermore, a series of data will be provided, which can help understanding the various aspects that are pertinent to the spreading of the Net. The summary of the

situation is, apparently, very simple: *only 10% of the world population, that is, the population living in the more economically advanced countries, can exploit this essential resource.*

2.2 Indicators for Measuring Growth of the Internet

The graphs representing the phenomenon of the diffusion of the Internet, which have been recently published in newspapers, magazines and reviews, show that the growth of the Net has had an 'exponential' increase in the last few years. In practice, however, it is difficult to expect this kind of trend to continue as such. It is universally known that the economic and social attributes are not generally represented by linear or exponential graphs, but rather by the 'Gauss Semi-bell' graphs or 'S Curve' sinusoidal graphs. Which graph could actually represent the growth of the Internet? That is the question.

The German researcher Mario Hilgemeier [Dami 98], [Livr 97], in his study about the concepts and principles regulating chaotic systems or non-linear evolutions, defines what he calls 'Mario's Scenarios', where he draws some projections following the classical logistic curve or 'S curve'. Two of these projections concern the expansion of the Net.

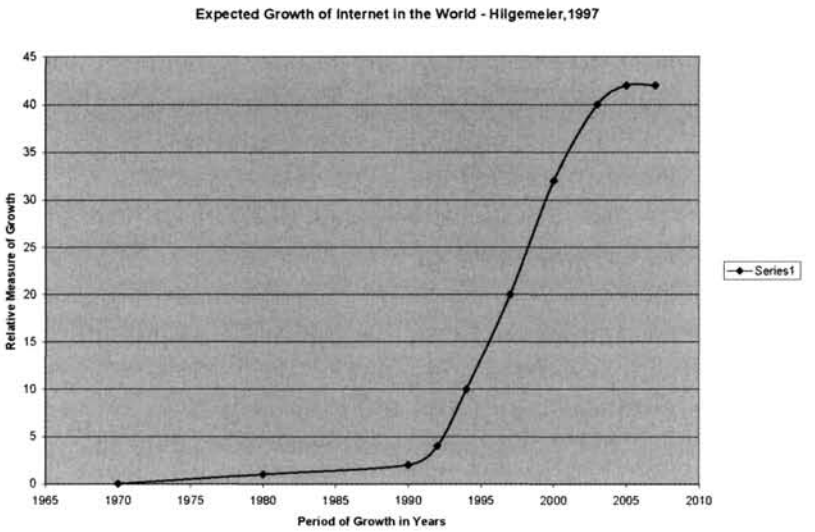


FIGURE 2-1: Real and Expected Internet Growth worldwide - Hilgemeier, 1997.

The first projection studies the increase of the rate of hosts connected to

the Internet world-wide. Hilgemeier comments that *'the emphasis has finished, today we have a much more realistic vision of the Internet'* and he states that the point of maximum growth increase was reached in June 1997. His analysis foresees a redoubling in five years and a levelling on 38 million hosts between 2001 and 2003 against an actual 19 million, that is, giving an average annual increase of 13%.

The second projection shows the situation of Europe, with the point of highest growth in October 1997, settling in 2001 to a level of 11 million hosts, giving an average annual increase of 15%.

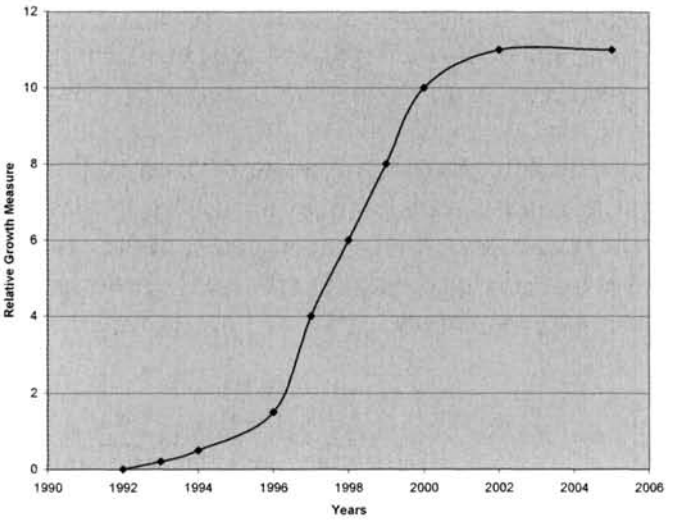


FIGURE 2.2: Expected Growth of Internet in Europe for the period 1992 - 2005 Hilgemeier 1997.

Hilgemeier's projections seem to be more reasonable than the first hypothesis of exponential growth, as they take essentially into consideration three important factors:

- The growth of similar phenomena is not linear;
- Fast growth phases are followed by decreasing phases;
- The impulse that gave way to a fast growth in the last few years is now losing its initial strength.

In any case, in spite of the tendencies described by Hilgemeier, in reality

something new could give way to new evolutions and impulses, as the Net is not a unitarian phenomenon, but the result of the crossing of a great deal of various phenomena and behaviours. But how can we measure the growth of the Net with precision? It is not easy to answer this question because it is not clear what method of measurement should be used. The Net is a complex phenomenon and many different standards can be considered to measure its development:

- The *amount of investment in Information Technology* provides a first level indicator about the degree of importance that the Net has acquired in the various countries. It is, however, an interesting indicator, as it offers some reasons for the advancement or retrogression in the diffusion of the Net.

- The *number of users is, perhaps, a more precise indicator.* It has its own limitations: the indicator is very difficult to be validated: who are the Internet users? For instance, we could call users all the people who have used the Internet at least once, or all the people who have used it in the last few months. Furthermore, once the users are defined precisely, the problem of calculating their number still remains.

- Finally, the growth of the Net can be measured in terms of the *number of hosts connected to it;* this index can be calculated with a certain precision, but there is no direct link between the number of hosts and the number of actual users.

In general, there is no reliable metric which can be used to characterise the Net exactly and reliably.

2.2.1 The Amount of Investment in Information Technology

The first method consists of *measuring the development of the Internet in terms of the amount of investment in Information Technology linked in relation to on-line activities.* In a report by the Organisation for Economic Co-operation and Development (OECD) called *'Technology, Productivity and Job Creation: Best Policy Practices'*, the Internet market for International Data Corporation (IDC) has been defined as *'the market made by the proceeds of sales from the purchase of goods and services connected with the architecture of the Internet and Intranet; with regard*

to the investment for hardware and software; with regard to the investment for transmission and telecommunication services; with regard to the subscription rate for access to the Internet and to the eventual circuits; with regard to the investment for related services; with regard to the implementing and the managing of a site Internet/Intranet; with regard to the planning, the implementing and managing, and the defining of the contents of Web pages; with regard to the investment in respect of consulting and integrating services for information and telecommunications systems' [LaPo 98] , [Oecd 98a].

The report by OECD observes every country from different points of view: first, it studies the *institutional background* in which the defining and the carrying out of a development strategy have to be accomplished, then it moves to the *leading function in the scientific area,* which can be put into practice through the flexibility in the research structures and through incentives to the co-operation between University and Industry. Other aspects are concerned with the *economic incentives to industrial research and development,* with the strategies and initiatives to spread technology, promote new firms working in the technology domain and, finally, encouraging actions for the growth of a new demand for technology, both general and based on the Internet.

From the data of the report it comes out that globally, countries can be categorised into three groups:

- The first group comprises those countries with 'a broad agenda of political reforms with a strategic time horizon' and includes all the new states which have become members of the European Union, including the Czech Republic, Hungary, Greece and Ireland, which all have less experience in this sector; and Austria and Italy, which have some problems of political co-ordination.

Countries	Political Reform			Scientific Sector			Industrial R & D			Technology Diffusion			Technological Action			Technology (Internet) Demand			Technology (General) Demand		
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Australia	x	x	-	x	x	-	x	-	-	x	x	-	-	x	-	x	x	-	-	x	-
Austria	-	-	x	-	x	-	-	x	-	x	x	-	-	-	x	-	x	-	-	x	-
Belgium	-	-	x	-	x	-	-	-	x	-	-	-	-	-	x	-	x	-	-	-	x
Canada	x	x	-	x	x	-	x	-	x	x	x	-	x	x	-	x	-	-	x	-	-
Denmark	-	x	-	x	-	-	-	x	-	x	x	-	-	x	-	-	x	-	-	x	-
Finland	x	-	-	x	-	-	x	x	-	-	x	x	x	-	-	x	-	-	x	-	-
France	-	x	-	-	-	x	x	-	x	x	x	-	x	-	x	-	x	-	-	x	-
Germany	-	x	-	-	x	-	-	x	-	x	x	-	x	x	-	-	x	-	-	x	-
Greece	-	-	x	-	-	x	-	-	x	x	-	x	-	-	x	-	-	x	-	-	x
Ireland	-	x	-	x	-	-	-	x	-	-	x	-	-	x	-	-	-	x	-	-	x
Italy	-	-	x	-	-	x	-	-	x	-	-	-	-	x	-	-	-	x	-	-	x
Japan	-	-	x	-	x	-	-	-	x	x	x	-	-	-	x	x	x	-	x	-	-
Korea	-	-	-	-	-	x	-	x	-	x	-	x	-	-	x	-	x	-	-	-	x
Mexico	-	-	x	-	-	x	x	-	x	-	-	x	-	-	x	-	x	-	-	-	x
Netherlands	x	x	-	x	-	-	-	x	-	x	x	-	x	-	x	x	-	-	x	-	-
Norway	-	x	-	-	x	-	-	x	-	x	-	-	-	x	-	-	x	-	x	-	-
Poland	-	-	x	-	-	x	-	-	x	-	x	-	-	-	x	-	x	-	-	x	-
Portugal	-	-	x	-	x	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-	x
Spain	-	-	x	x	-	x	-	-	x	x	-	x	-	-	x	-	-	x	-	-	x
Sweden	-	x	-	x	x	-	-	x	-	-	x	-	-	-	x	x	x	-	x	-	-
Switzerland	-	x	-	-	x	-	x	x	-	x	-	x	-	-	x	-	x	-	-	x	-
Turkey	-	-	x	-	-	x	-	x	-	-	x	-	-	-	-	-	-	x	-	-	x
UK	-	x	-	x	x	-	x	x	-	-	-	-	-	x	-	x	-	-	-	x	-
USA	-	-	x	x	x	-	x	x	-	x	-	x	x	-	-	x	-	-	x	-	x

A= Best Adapted Politics; B= Needs Little Advice; C= Great Political Weakness

TABLE 1: OECD Report about 1998 Technology

- In the second group, called 'par excellence' countries, including the US and the UK, the technological sector has a predominant place in the economy.

- In the third group are included the other countries, which encompass a combination strong and weak attributes, such as Japan, Mexico, Turkey and others.

TABLE 1 reports the judgment by OECD about a selected number of countries worldwide. The symbols have the following meanings: Best Adopted Politics (A), Needs Little Advice (B), Great Political Weakness (C).

2.2.2 The Number of Internet Users

The second metric for the growth of the Internet is based on the valuation of the number of users. In general, 'users' are considered to be *all the people who have used the Net in the last three months, independent of whether they have subscribed a contract with a provider of Internet services or not (for instance, students at university, employees in the*

firms, and so on). This metric is less than clear, as it is based on statistical inferences and not on a census; in fact, it is relatively difficult to classify periodically users of the Net because of the increasing number of hosts connected to it and because of the unknown number of their users. In effect, this metric has no precise data. They, however, are often interesting for the simple reason that they are amenable to frequent revision and are provided by organisations that are carefully studying the Net.

According to *NUA Internet Surveys* the total of Internet users in the world were estimated to be about 153.5 million in February 1999; of these, about 57% were in the US and Canada, 22% in Europe, 17.3% in Asia-Pacific, 3% in South America, 0.74% in Africa and 0.51% in the Middle East (TABLE 2):

Country	Number of Users
USA & Canada	87.00 million
Europe	33.71 million
Asia-Pacific	26.55 million
South America	4.50 million
Africa	1.14 million
Middle East	0.78 million
Worldwide	153.50 million

TABLE 2: Internet Users in the World By Geographical Areas - NUA, 1999

How does NUA measure the number of on-line users? In an interview with Bernadette Burke, one of the delegates of this organisation, the answer to this question was: 'What we do is take the most recent reports, either use the one we believe is the most reliable or take the average of existing reports to calculate the number of on-line users for a given country. The grand total is reached by adding the figures of each country together'. In few words, the valuation is not made directly by NUA; it is based on the data published on the Net.

In the item 'How Many On-Line?' of NUA Home Page [Nua 98a], the method used to compute the data is explained more in detail. According to NUA, *a user of the Internet is a person who has access to the Net, but he/she is not necessarily a possessor of an Internet account.* When the only information available is the number of subscriptions to the Internet, this number is multiplied by a factor of three in order to obtain the number

of Internet users. Furthermore, it has to be predicated that the number of on-line links represents both adults and children who have access to the Net at least once during the three months preceding the report by NUA.

When many reports on a country are available, NUA considers the average of reports or, if it deems a report to be more reliable than another, a number of others that are available, then it takes into greater consideration the more reliable of the reports, which may thereafter be taken as the representative report for the country in question.

The data available in the NUA site and used for the purpose of this chapter the reports synthesised during different periods from 1997 to 1999 through various research studies carried out during that time as per the various continents. Each data table illustrates the number of users per state, the date, the number of users, the percentage as a proportion of the total population and the source of the information. The figure representing the number of users in Asia-Pacific includes both Australia and New Zealand.

Other pieces of information about the number of Internet users in the various countries of the world can be found, deploying the same sources used by NUA. It is beneficial to note that there exists, almost invariably, in most countries an organisation that is able to collect information on the Net, which enables a measurement of the number of Internet users within their own national jurisdictions. An interesting example is provided by *South Africa On-line,* a South African Internet provider that, with the collaboration of the research centre *The House of SYNERGY,* has made the first Internet User Survey On-line through the use of the Web in South Africa. The users who connect to the provider must complete a questionnaire which will stay on-line for the following two months. After this period *The House of SYNERGY* collects all the data and elaborates and/or interprets them. The first survey was carried out in 1997 on a sample of 700 people, then it was repeated in January 1998 on a sample of 1,400 South Africans and the third was scheduled to be carried out by the end of the year 1999.

From the survey data of 1997 [Sao 97] some significant conclusions can be drawn about the profile of a typical Internet user in South Africa: the typical user is a married man, between 26 and 30 years of age, speaks English, has finished secondary school education and has often taken a degree. He works and earns about 10,000 to 19,000 Rand[2] in a month. He

has been usually using Internet both while working and whilst at home for about a year or two.

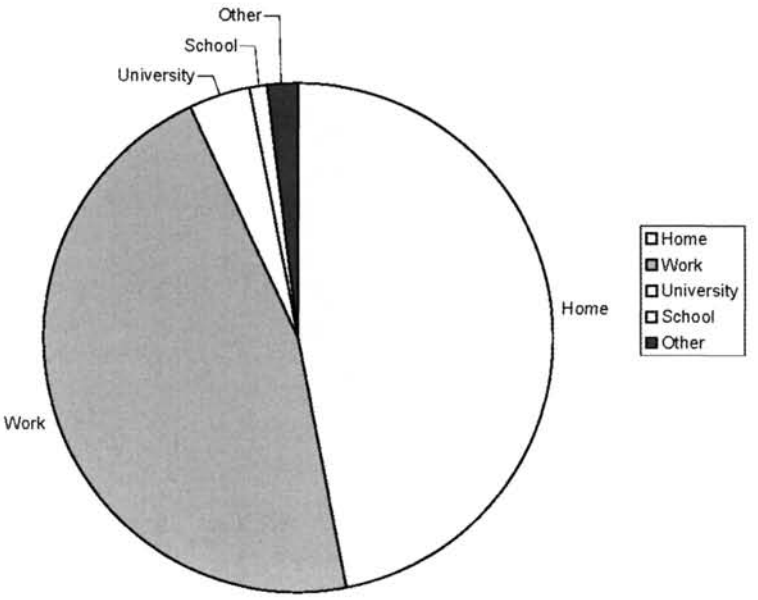


FIGURE 2-3: Main Places from which South African Users have Access to the Net - South Africa On-line, 1997.

The data of the second report made in January 1998 [Sao 98] show that the percentage of women using the Net had increased from 16% in 1997 to 19% in1998, while the average age approximated 35. A proportion of 35% of the users were aged between 20 and 30 (1997: 38%), a proportion of 26% were aged between 31 and 40 (1997: 25%) and a proportion of 21% aged between 41 and 50(1997: 15%). The Internet users under 21 years of age amounted to a proportion of the total users of only 8%; those over 50 amounted to a proportion of 11% , which compares identically with the 1997 data survey.

The reports show that the Net user is not an unmarried person using the Internet as a means for social life. In fact, 56% of the users indicated their marital status as Married or Cohabiting, while 6% of the users indicated their marital status as Divorced and a proportion of 37% indicated their marital status as Single or Living Alone. The average income level approximated 11,000 Rand. A most surprising and striking result of the survey was that 81% of the people interviewed indicated the frequency of use of the Net as Daily.

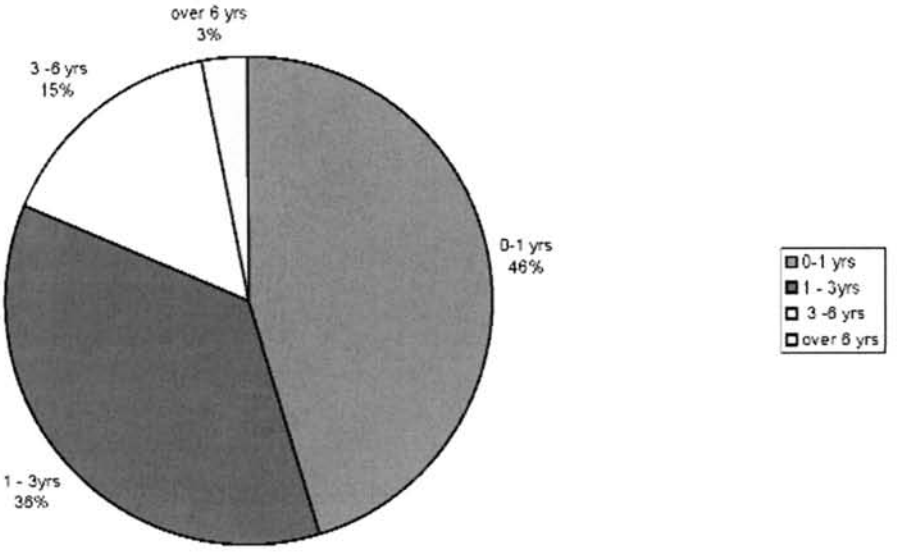


FIGURE 2-4: How long have South African users been Using the Internet? - South Africa On-line, 1997

In Latin America the situation is not different: a study made in 1997 by NAZCO, the partner of Saatchi & Saatchi Worldwide in Latin America [Nua 97a], showed that the use of the Net was rapidly growing in these countries at about twice the rate in the other countries. The percentage of users had increased by a remarkable 788% between 1995 and 1997. A proportion of 90% of users were typically of the middle-upper class of the population and 81% had no problems in visiting an Internet site in English. The survey revealed that women constituted the majority of the new Internet users and, for the first time, their number had surpassed the number of men (50% of the women revealed that it was the first time they had used the Internet, against 31% of men).

Date	Hosts Number	Number of Users
January 1996	17,429	170,429
July 1996	50,746	500,746
December 1996	74,458	740,458
January 1997	77,342	-
June 1997	-	1,110,624
July 1997	115,458	1,150,458
December 1997	131,001	1,310,001

TABLE 3: Hosts and Internet users number in Brazil - The Brazilian Internet Steering Committee, 1997

In Brazil the rate of growth of the number of users is monitored and controlled by the organisation CG. In a survey dated 31st of December 1997, the Brazilian Internet Steering Committee [CG 97] counted a total of 1,310,000 users, about ten times more than the number registered in 1996, when the total of users was only 170,429. Today (early 2000) the development of the Net in Brazil is in the 18th place in the world and in the 3rd place in America.

In Asia and the Middle East, the statistics about the number of Internet users are studied by many organisations: for instance, in Israel a report made by the Minister of the Sciences Micheal Eitan [Zdne 98a] to the Israeli Cabinet stated that the number of users of the Net as at 1998 was 500,000, that is 10% of the population.

The Australian Bureau of Statistics [ABS 98] in August 1998 counted 1,245,000 families connected to the Internet in Australia; this represented about 18% of the Australian families, with an increase by 28% if compared to May 1998 data (971,000 families) and by 46% if compared to February 1998 data (854,000 families). The number of adult on-line users was 4.2 million Australians both at work (73%) and at home 27%. According to a study made in June 1998 by the Roy Morgan Research Centre [Roym 98] Western Australians use the Internet more regularly than the Australians in the other states (27%), followed by the South Australians (23%), New South Wales (23%), Victorians (22%), Tasmanians (19%), Queensland (18%), and the inhabitants of Darwin and Alice Springs (18%). Furthermore, the report underlines the main reasons why the Australian people use the Net, namely, for e-mail communication (15%) and for Net-surfing (10%). Other reasons for motivation to use the Net included need for access to academic information (8%), researches (6%), personal information (6%), business information (6%), chat rooms (4%), sport information (3%), and shopping (1%).

In July 1998, according to China Economic Times [Tech 98], the number of Internet users in China was 1.2 million people: this is only just a small proportion of the total population of China. The number of Internet users was predicted to increase to 7 million by 2001. In Hong Kong, on the contrary, the use of the Net is more widely spread: according to ACNielsen Internet User Survey [Acni 98] a study made through the telephone in April 1998 on a sample of 2,000 people in the age group between 15 and 54 revealed that more than a half of the families in Hong Kong had a computer and 25% of these was connected to the Net; this

meant that about 850,000 people in Hong Kong were on line.

These are just some of the sources which NUA uses in order to calculate the Internet Users' Metric worldwide: As we have seen, the majority of these values are made through telephone interviews on samples of people in the various countries. Of course it is not a perfect method; it is nevertheless a practical way of calculating to a good approximation the number of Internet users.

2.2.3 The Number of Connected Hosts

Finally, the most used metric for assessing the growth of the Net is the *number of host computers.* There is no direct connection between the number of users and the number of hosts (for instance, in more advanced markets, such as the American market, there are three users per host, while in Italy there are about two hosts per user).

The naming domain for the Internet hosts is organised following a hierarchic and distributed method called **Domain Name System** (DNS). It collects the hosts from an administrative point of view according to official ranks that make it possible to distribute the Net addresses. DNS has an important advantage: *its use does not need a list, kept at the top, recording the hosts names in the Net addresses.* The US and the European Union have recently created a private non-profit and non-governing organisation, called **Internet Corporation for Assigned Names and Numbers** (ICANN), for the purpose of administering the names and the addresses [Chia 98] and [Nua 98b].

In the DNS naming methodology the suffixes represent the kind of domain which can be generally connected with an organisation or a geographical place. The case of the US is an exception: the domain names in the US have no national suffixes because historically DNS naming convention only existed in the USA, and so it was not useful to give a geographical definition. Hence the naming convention comprising **'.edu'** for research organisations and universities; **'.com'** for trade organisations; **'.gov'** for government institutions; **'.mil'** for military organisations; '**.net**' for the organisations for the management of the Net, **'.org'** for the organisations not belonging to the previous categories, such as non-profit associations.

Elsewhere the suffixes now operating relate to national jurisdictions of countries, such as, for instance, **'.it'** for Italy, and **'.fr'** for France. Certain suffixes, initially operating in the US have continued to be used in these jurisdictions without national suffixes. These include **'.org', '.net', and recently, '.int', '.biz',** etc

Recent considerations in the domain naming convention could lead to the inclusion of: **'.firm'** for firm sites, **'.store'** for commercial services and for on-line sales; **'.web'** for the organisations for WWW development; **'.arts'** for the sites dedicated to art and culture; **'.rec'** for entertainment sites; **'.info'** for information sites and **'.nom'** for personal sites.

Data survey on the real dimensions of the Internet is carried out by Domain Name Servers (DNS), that is, by special computers managing the naming domain. Since 1987 experts of the Network Wizard [NetW 98a] have been making surveys that followed the same methodology, using a functional program that analysed the hierarchy of domain names starting from domain names at a more external level, such as **'.com', '.de' or '.it'** and then converging to the more internal ones, such as **'.tecnet',** and asked every DNS server for the list of the computers and the sub-domains it was serving. The data collected were then elaborated on and interpreted for the purpose of eliminating multiple names corresponding to identical addresses. In the last few years, however, the increase of security precautions taken by the organisations connected to the Net has made this method of valuation harder and harder to be used, as many DNS servers of private domains did not accept the requests coming from out of the domain.

The survey carried out by Network Wizard in July 1997 pertained to about only 75% of Internet domains, and as a result the data that had been obtained had been less than reliable. In order to solve this problem Network Wizard has elaborated a different method based on the query inverse concept: *every DNS server is asked for the name corresponding to all possible IP addresses of its domain. When the names server answers one of these requests it means that its domain contains the host corresponding to that address.* The previous method counted the number of domains to which an IP address had been assigned. The New Internet Domain Survey counts all the addresses which have been given a name, and that is a partial valuation of the number of computers really connected with Internet. Through this method the requests addressed to the DNS servers for the survey cannot be distinguished from the normal ones, and

so the keepers of the domains cannot object to the the survey because of security reasons, as it used to happen with the previous method.

Finally, 1% of the computers counted as 'potentially present' are interviewed on line through the protocol **'ping'**[3] and the percentage of answers is used to value the number of computers really operating in Internet.

FIGURE 2-5 [NetW98d] shows the different surveys made deploying the two methods. The new technique used by Network Wizard appears to be more effective than the previous one, and its only limitation is the incorporation in the methodology of the use of 'ping', as it is not necessarily true that all the hosts are operating when the request is made. Consequently, the recorded number of computers operating on the Internet will be different according to the moment when the survey is carried out.
This metric or count is indeed not completely precise, but these are, perhaps, the most reliable data that are available for defining in a substantial way the growth level of the Net in every country of the world.

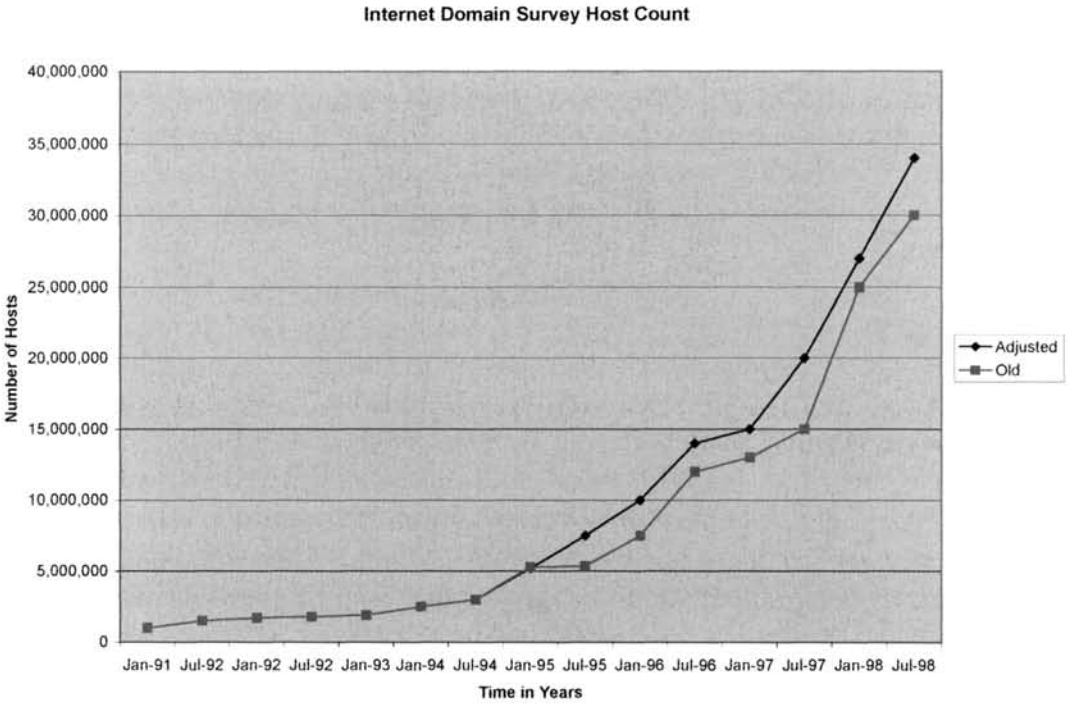


FIGURE 2-5: Internet Domain Survey Hosts Count Worldwide for the Period 1995 - 1998 - Network Wizard, 1999.

2.2.4 The Valuations by Network Wizard

Network Wizard makes its surveys on the Net every six months. Through the use of the second method it counted 29,670,000 hosts in January 1999, while the test through 'ping' calculated a total of 5,331,640 operating computers [NetW 98b]. Even if the data cannot be compared because of the different methods of valuation, it has to be remarked that in the previous study, in July 1997, the number of hosts counted through 'ping' was 4,314,410.

The second valuation, in July 1998, has counted 39,739,000 hosts, that corresponds to a six-monthly increase by 23.8% and to an annual increase by 41% [Net W 98c]. The last valuation made in January 1999 counts 43,230,000 on-line hosts and 8,426,000 counted through 'ping' [NetW 99].

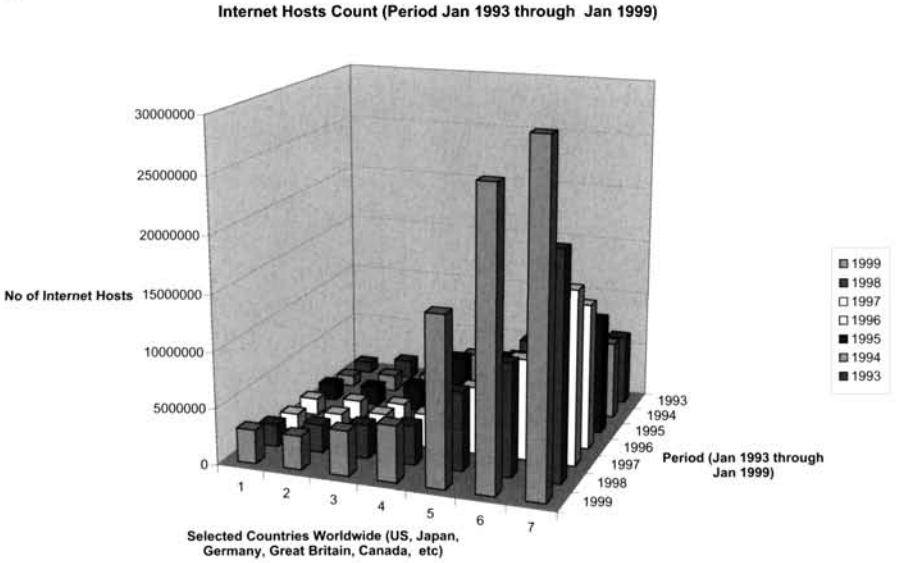


FIGURE 2-6: Host Count from January 1993 to January 1999 - Network Wizard, 1999.

The new method of valuation, however, has not changed the main result, which puts in evidence the predominance of the USA over the rest of the world. In fact, the first and more relevant information coming out of the new analysis is that, against all expectations, contrary to all expectations the digital gap between the USA and the rest of the world would appear to be increasing.

From FIGURE 2-7 it can be noticed that 70% of Internet hosts is just in

one country, the USA, with less than 5% of the world population; 80% is situated in four countries (Japan, Germany, Great Britain and Canada) which have less than 10% of the world population; so, 90% of the hosts is concentrated in just ten countries, with 12% of the world population, while 10% is in the rest of the world, which has nearly 90% of the world population.

From the data it comes out that the growth of the Net is still at a formative phase: even if the count of Internet users is not really reliable as it is based on valuations, 98% of the human beings are still excluded from this new communication *medium*.

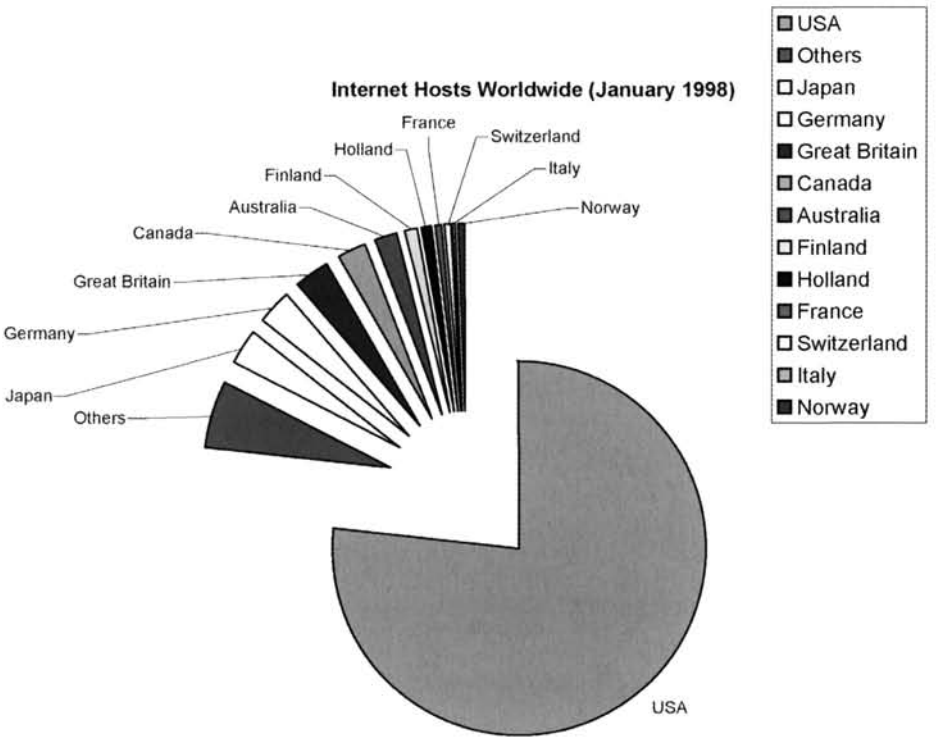


FIGURE 2-7: Hosts Internet in the Worldwide By Proportion January 1998– Network Wizard,1998.

By analysing the density, that is, the number of hosts per 1,000 inhabitants (as the FIGURE 2-8 shows) we can notice again the predominance of the USA, surpassed just a little by the traditional primacy of Finland.

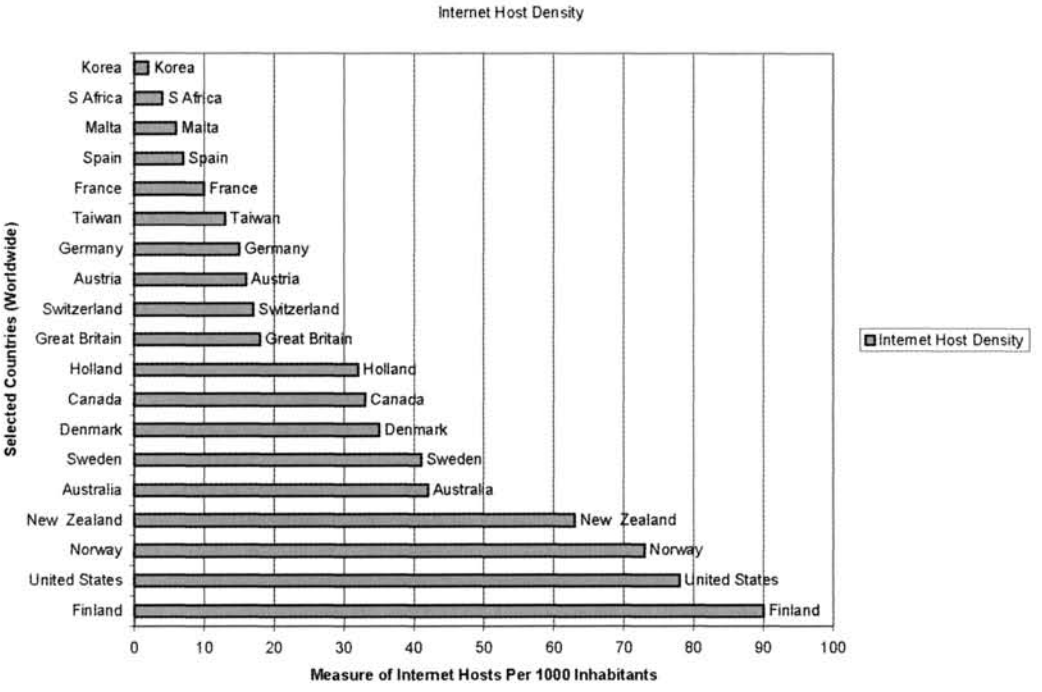


FIGURE 2-8: Internet Hosts Worldwide per 1,000 Inhabitants - Network Wizard, 1998.

The density or number of Internet hosts per 1,000 inhabitants per geographical area or region, worldwide, is represented in FIGURE 2-9. It can be observed that the Net has higher growth and/or spread in the industrialised countries, such as the USA, Canada and Europe (in particular Finland, Sweden and Norway) than in the Developing Countries. The density levels of the Internet in the Developing Countries are relatively lower compared to density levels in the Developed Countries.

The far future could see a levelling or an inversion of this tendency, but at the moment the Digital Divide appears to be increasing. Why? That is the question. The question will be partially responded to in relation to a discussion about the primacy of the USA and of Finland, for Europe, in the following paragraphs.

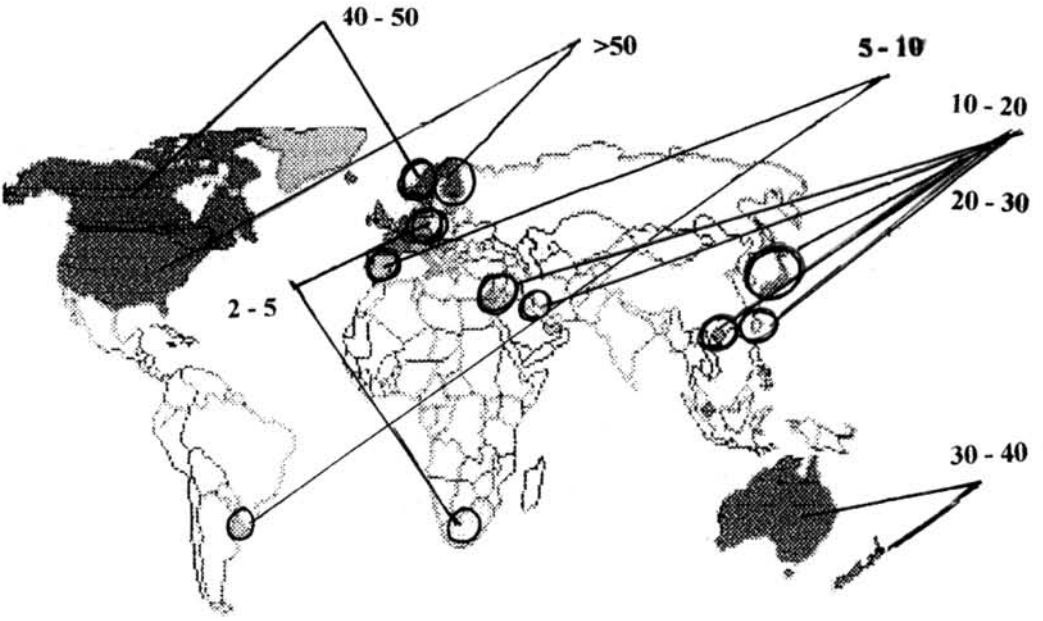


FIGURE 2-9: Internet Host Density in the Worldwide - Network Wizard, 1998.

2.3 Development of the Internet in the USA

The last survey by Network Wizard (July 1998) [NetW98c], shows that 95% of Northern American hosts are in the USA (FIGURE 2-10), while just six months before the corresponding percentage was 70%. The use of the Net seems to be evolving into a regular habit in the USA, mainly as a result of the encouragement given by social and cultural factors, such as the use of the e-mail by families, and deployment of the Net in economic and commercial activities, such as on-line marketing and eCommerce. This phenomenon is confirmed by several sources even if there are still strong differences among the various valuations of the Internet User Number, which in the USA varies between 40 and 60 million.

According to a study by IntelliQuest [Nua 98c], a quarter of the on-line population connected to the Net for the first time in 1997. The newcomers are the laggards (late entrants), that is, the American middle population, whose presence on the Net was once hardly remarkable. These people have school and income levels a little lower than the traditional users: this implies a new conception of the Net as an usual *medium* for common people.

Cyberdialogue [Nua 98c] says that the presence of the Americans on line has increased by 21% starting from the second semester of 1997, reaching 41.5 million and it observes: *'The use of Internet will keep on growing in the next five years, but the market will become more fragmented; the medium will spread and the preferences will be more diverse'.*

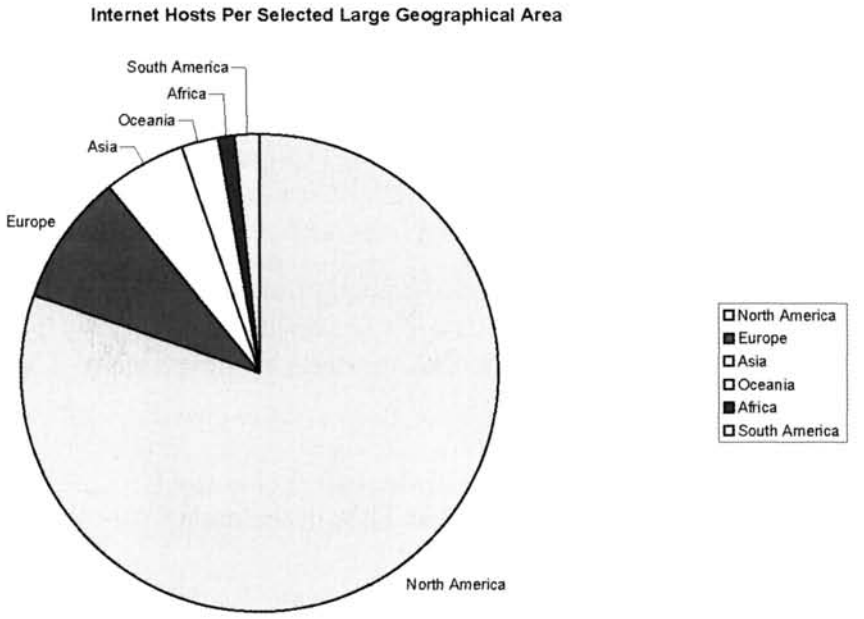


FIGURE 2-10: Internet Hosts Per Selected Large Geographical Areas - Network Wizard, 1998.

All these considerations lead to contrasting conclusions: on the one hand, the Digital Divide between the leading country, the US, in Internet deployment and the rest of the world ison the increase, especially with regard to those countries that are late in the deployment of the Internet, such as, for instance Italy. This observation depends not only on the time factor, but also on various other reasons, including the following:

- **Quantity Reasons,** because the number of people, firms and organisations on the Net is relatively larger in the US than elsewhere. Furthermore, the main nodes of the Net are nearly all in the USA;
- **Structural Differences** of the Market and of Society, and the habits: In the US in companion with usage in other jurisdictions the habit of buying by catalogue or by mail order has spread for a long time, so the introduction of eCommerce has not been something

new, but only something different, more practical and efficient;

- **Habitual Use of Credit Cards,** even for cheap purchases. There is some difference about using credit cards in the US in comparison with usage in other jurisdictions. The fear that the card numbers could be intercepted is relatively less compared with other contexts and jurisdictions where the use of credit cards is not so usual;

- **Level of Development of the New Information and Communications Technologies:** The habitual use of the computer in the US for, practically, every kind of activity, both personal and for work, is hugely superior;

- **Social Phenomena,** such as the habit of sending children to colleges far away from their families: These phenomena make the e-mail a nearly necessary medium, thus assisting acculturation to a Net culture;

- **The Country of Creation of the Internet is the USA:** As such the Net's features reflect American taste in the main;

- **The Gradual Diffusion of the Net in the Social Classes** in the USA perhaps represents a model for the development of the Net in other countries;

- **Problems in the Use of the Net** can come from the bureaucracy and from incompatibility in the law, which sometimes cannot be easily overcome elsewhere.

On the other hand, a wide diffusion of the Net in the USA can give rise to a *traction effect* on those countries, which often make exchanges with the USA; and this fact could imply an increase of the use of the Net in the rest of the world. In conclusion, the American case is a reference point that has to be held into consideration, even if with some caution, as it could be dangerous to try copying it in a passive way.

2.4 Development of the Internet in Europe

A recent data collected by RIPE (Réseaux IP Européens) about the number of Internet hosts in Europe and in the Mediterranean area refer to October 1998 and they confirm that the evolution of the Net is discontinuous and not so homogeneous, but they show a positive tendency that has been in the making and establishing.

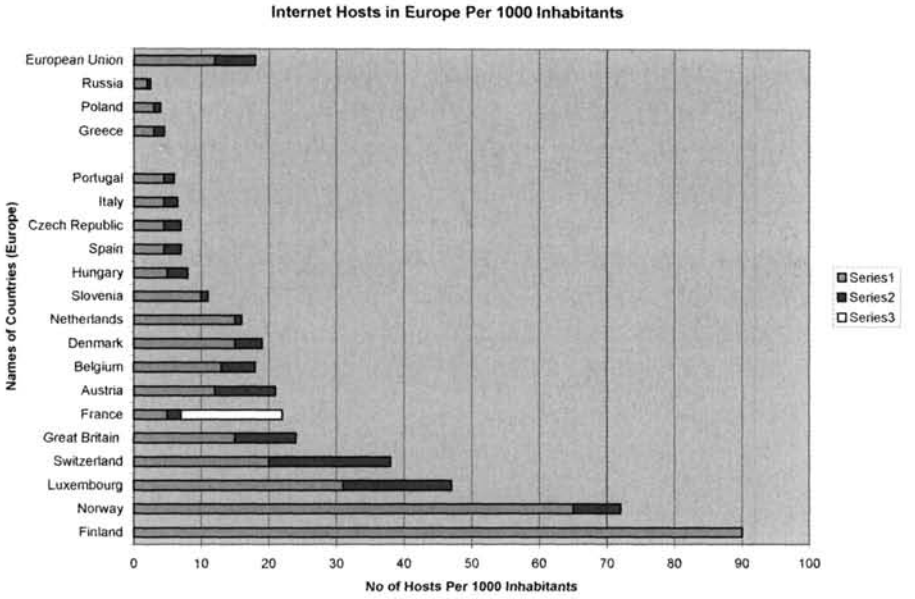


FIGURE 2-11: Internet Hosts in Europe per 1000 Inhabitants - RIPE, 1998.

This organisation computes the number of hosts in Europe every month through the use of a query tool host DNS, that is, a local server interviewing the various on-line hosts; this server is managed by Eric Wassenaar who is the Director of NIKHEF, the *Dutch National Institute for Nuclear and High Energy Physics Location* [Ripe 98b].

By interpreting the RIPE data, it can be seen that 24% of the countries in the Europe have more than 20,000 hosts and a density superior to 1 (FIGURE 2-11). One part of the histogram refers to the increase in a year, from November 1997 to November 1998. Another part of the bar in France is an approximate valuation of the *Minitel factor.* Yet another refers to the total number of hosts in the European Union as at November 1997 [Ripe 98a].

From the graph it can be observed that Great Britain has only minimally

surpassed Germany, but this fact is considered to be normal as, according to the oldest data, there have always been some small oscilllations in data values. If we consider, instead, the differences of population and of incomes, the United Kingdom is the strongest European presence on the Net. In recent months there has been a substantial increase in Denmark with a variation of 52.86%, while Spain has surpassed Italy for the first time in the *per capita* density, even if it is relatively low in the density metric relating to the population and the incomes of the other countries of the G8. Italy, however, is now showing a really dynamic tendency, which, if it is confirmed in the next months, will give rise to an important development phase for the country; this development could make Italy approach in a few years 12-13% over the European total, which represents the balance with regard to its economic role in Europe (FIGURE 2-12).

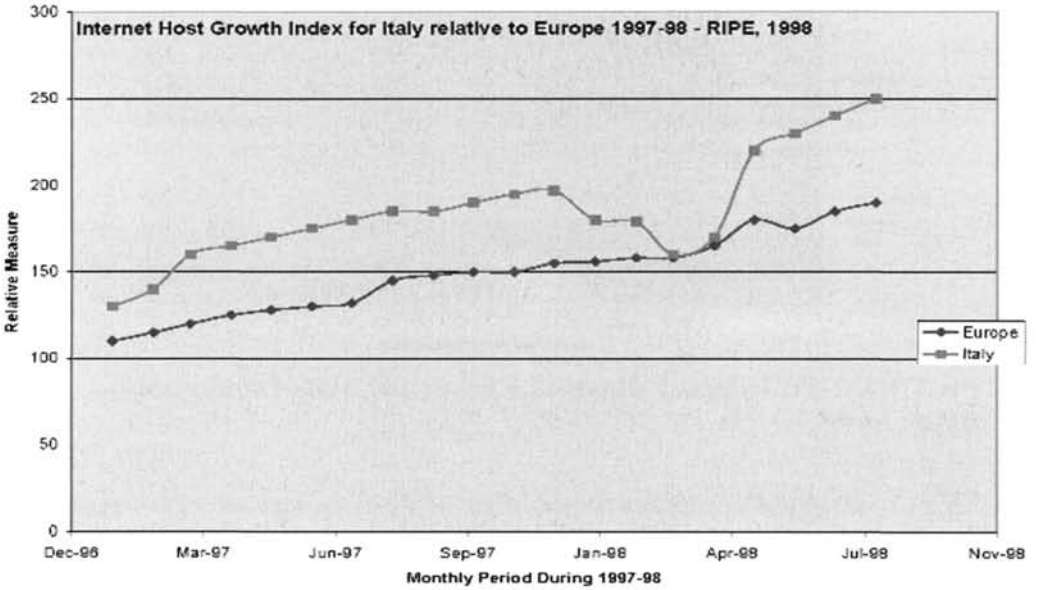


FIGURE 2-12: Internet Hosts Growth Index: Italy-Europe 1997-98 - RIPE,1998.

The growth percentages of the most advanced countries in Europe, such as Finland, Sweden and Norway, are lower. This does not mean that the saturation point of the market has been reached. On the contrary, it is exactly in these Northern countries that the Net is most used. Why? Different explanations could be provided for this phenomenon. An article by NUA [Nua 98d], explains that the 'polar' climate makes it difficult to meet people outside; this factor would appear to be over-simplistic, but that is probably what really prevails. There are, however, some cold countries, such as Russia, where the use of the Net is much less diffused.

The low density of population could be a second reason, as in Canada and in Australia, but there are countries with a high population density that use the Net a lot such as, for instance, Holland or the European developing countries with low population density; as can be seen in FIGURE 2-13, in these countries the use of Internet is really low, if not absent.

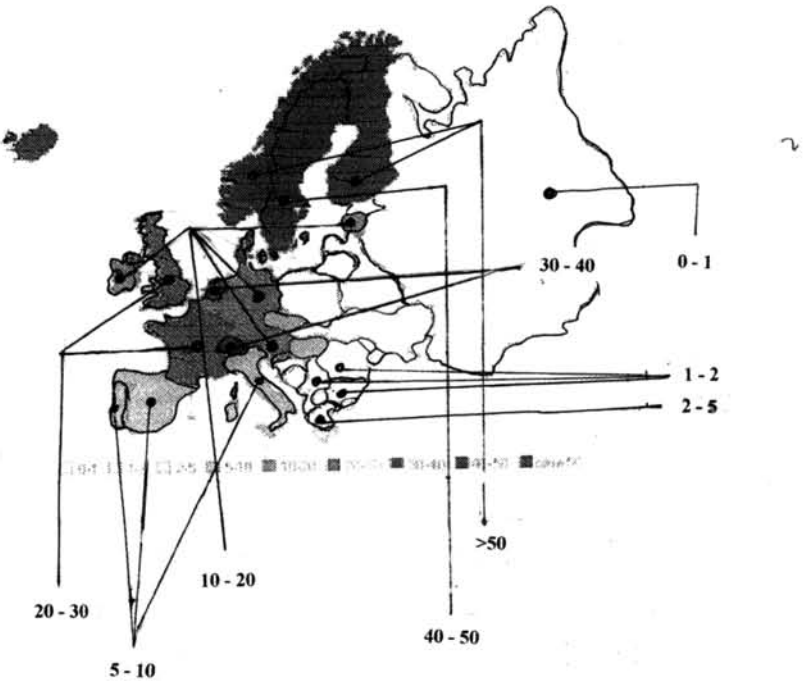


FIGURE 2-13: Internet Density in Europe - RIPE, 1998.

Finland, on the contrary, has a strong social status and a strong public spirit, as a Finnish gives nearly half of his/her own income to the Government, which redeploys this amount of money for public works, such as the construction of a perfect electronic Net of communication; in fact, the Finnish telecommunications systems are among the fastest in Europe. This different trend can be noticed even by considering the GNP (FIGURE 2-14). The habits of the inhabitants of these countries can influence the use of the Net: the Finnish like talking in small groups, they are discreet and shy and they prefer writing instead of talking openly. The Internet is an excellent *medium* for this kind of communication, as chats and e-mail work well in small groups of people.

According to a Gallup telephone poll, 41% of the Finnish use the Net at least once a year; 35% at least once in a week and 12% every two days, while according to a study by Taloustutkimus the Finnish habitually using

the Net are 37% [Nua 98d]. The reasons, therefore, for the development and growth of the Net in the Northern countries of Europe, in particular in Finland, seem to be *the habits, the character of the population, the climate and, above all, the distance separating the cities.*

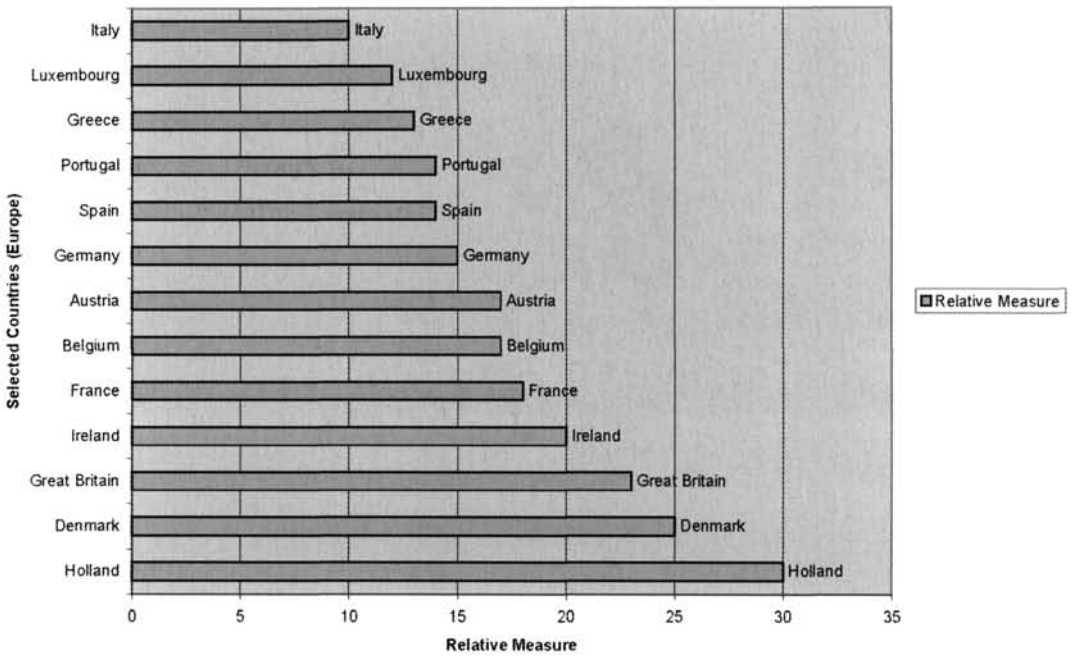


FIGURE 2-14: Internet Growth with regard to GNP in the European Union - RIPE, 1998.

The situation in France is valued in a wrong way, as the data do not consider the French anomaly: the broad diffusion of Minitel. In many countries there are some telecommunication activities that are not considered to be an integral part of the Internet activities, such as the internal nets (Intranet) of great firms and organisations; the community networks or the big or small BBS- Bulletin Board System, that is, electronic bulletins.

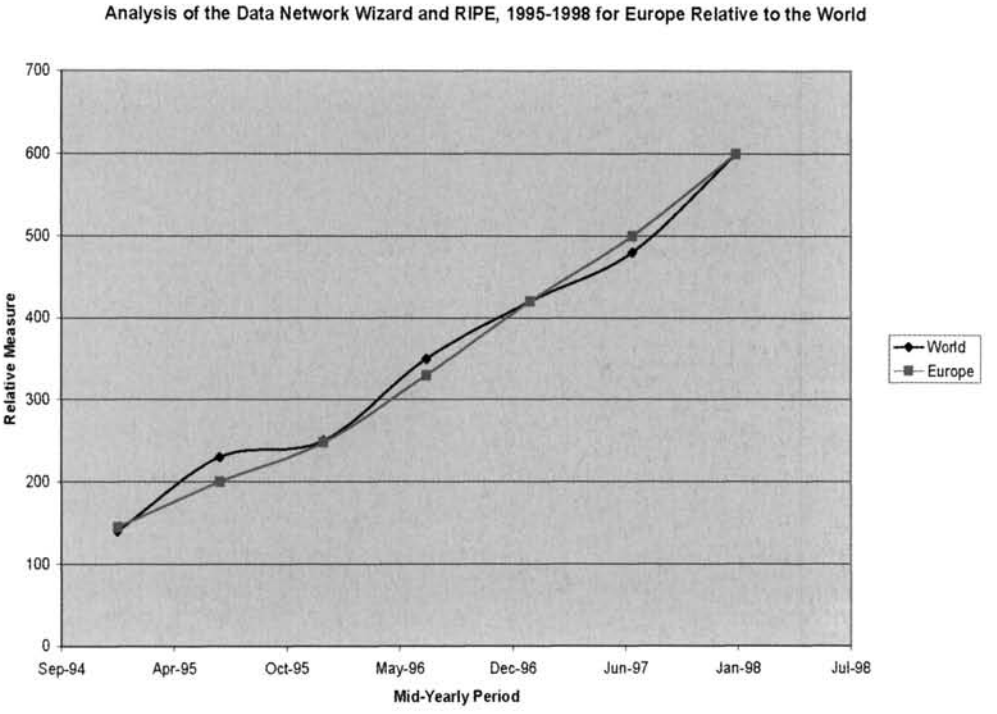


FIGURE 2-15: Analysis of the Data by Network Wizard and RIPE, 1995-1998 For Europe Relative to the World.

In France there is a phenomenon with a really broad diffusion, that is Minitel which, according to some valuations, is used in the ratio 14: 1, namely, that for every 14 users in the French population using Minitel, only one user is connected to the Internet. France, therefore, could have a global telecommunications activity which is superior to the Finnish one.

By analysing the data by Network Wizard and RIPE (FIGURE 2-15), taking cognisance of the fact that the two series cannot be adequately compared because of the different methods of counting the users, it can be said that that the development and growth of the Net in the European and Mediterranean areas has a trend that is really similar to the global trend. Europe does not seem to be gaining or losing ground if compared to the rest of the world, but the analysis of the European data confirms that there are some rather relevant differences in the development of the various countries. It can finally be said that this fact particularly depends on the human components and on the ability of the Governments and of the cultural, social and economic system to understand and to do what should be done in order to satisfy the citizens'needs.

CHAPTER III

THE INTERNET IN THE DEVELOPING COUNTRIES

What are the Obstacles to the Growth of the Internet in the Developing Countries?

3.1 The Causes of Underdevelopment of the Internet

The most recurring question about the development of the Internet is: *'Can the Net and the new information and communications technologies be directly applied to all the social and economic realities in the world?'*. The most banal answer is in the affirmative, as the Internet can be used by everyone and in any organisational context. In reality, however, we must keep in mind the wide gaps between the small number of rich, advanced and industrialised countries, on the one hand, and the large number of poor, somewhat backward and underdeveloped countries, on the other. In order to understand the extent of this gap, one needs, in traditional terms, to consider data pertaining to the *Gross National Product* (GNP), that is, *the value of the goods and services produced in one year in a country.* The more advanced countries, with a total population of not more than 20% of the world population, produce more than 80% of the world GNP, while the *per capita* income in the rich countries is 100 times higher than the per capita income in the poor countries.

The analysis of the wealth distribution worldwide shows that, with the exception of Australia and New Zealand, all the most advanced countries are in the Northern hemisphere, over the thirtieth parallel, while all the poor countries are under this latitude. For this reason, the subject of underdevelopment can be dealt with by referring to the North and the South. This definition has gradually substituted the term 'The Third World Countries'[4] which, until a few years ago, was used to describe all the countries belonging neither to the First World, made of the

industrialised countries and with a capitalist economy, nor belonging to the Second World, made of the countries with a planned economy in Socialist Europe. Today, after the end of the socialist governments in Europe, this definition is no more adequate and, furthermore, the reality of the underdevelopment is much diverse in the various countries. TABLE 9 in the Appendix represents the subdivision adopted by the United Nations to classify the various countries of the world in three groups: *industrialised countries, developing countries and countries with a minimum or less advanced development.* [UNDP 98].

How is the Internet growing in these countries? What are the obstacles to its development? This question and others will be addressed in this chapter, by looking carefully into the development of the *telecommunications* as necessary infrastructures for implementing of the Net; the *satellite technologies,* which are to date used to transfer both sound and data; the *ISP and the information technology factories that are now developing in these countries.*

3.1.1 The Growth of Internet in the Developing Countries

The installing and the use of the Internet are increasing faster and faster in the Developing Countries in comparison with the other countries, the Industrialised Countries (ICs) and the Less Advanced, or Less Developed Countries, but the Net can still be exploited just by a small part of the population. According to the data by International Data Corporation (IDC), the number of Internet users in Africa, Latin America, Central America and in Central-Eastern Europe will quadruple from 7.6 million in March 1998 to 25.6 millions in 2001; while in the USA the Users Number metric will just redouble, from 51.6 million to 106.8 million; the growth in Western Europe will be similar: from 23.7 million to 56 million in 2001 [IDC 98].

In some of the Developing Countries the development and/or growth of the Net is much faster than in the other countries: for instance, in Argentina, Brazil, Paraguay and Uruguay the new connections to the Internet have increased by 352% between January 1996 and January 1997.

The valuations of the Internet User metric must be read with a certain caution and sometimes with skepticism because of the nature of the method of measurement that is used to obtain the metric. For example,

the valuations about the rapid growth in Africa hide the fact that the development of the Net has occurred, in particular, predominantlty just in a few states: South Africa, for example, has about 48,00-50,000 Internet hosts and it is at the 16th place in the world for the Internet hosts number [Pano 98a].

Below is an illustration of the data by Network Wizard of January and July 1998, by considering the top 12 Non OECD Countries with more than 50 million of inhabitants, more than 1,000 Internet hosts, but a really low density in the use of the Internet:

Countries	Host Number	% Growth Between January and July 1998
Brazil	163.890	+39,8%
Russia	150.466	+28,4%
Mexico	83.949	+101,5%
Turkey	27.861	+12,4%
Thailand	25.459	+77,1%
China (without Hong Kong)	19.313	+18,3%
Ukraine	13.271	+44,6%
Indonesia	10.691	+11,3%
India	10.436	+45,8%
Philippine	7.602	+76,3%
Egypt	2.043	+1,5%
Pakistan	1.923	+48,9%

TABLE 4: The Top 12 Non OECD Countries with more than 50 million of Inhabitants and more than 1,000 hosts - Data Elaboration by Network Wizard, 1998

By analysing the density, that is the number of hosts per 1,000 inhabitants, these countries can be classified into two groups: seven countries with a density index between 0.1 and 1.2 hosts per 1,000 inhabitants (FIGURE 3-1) and five countries with a density index between 0.01 and 0.06 (FIGURE 3-2); we do not take into consideration the other countries with less than 1,000 hosts and that are nearly isolated.

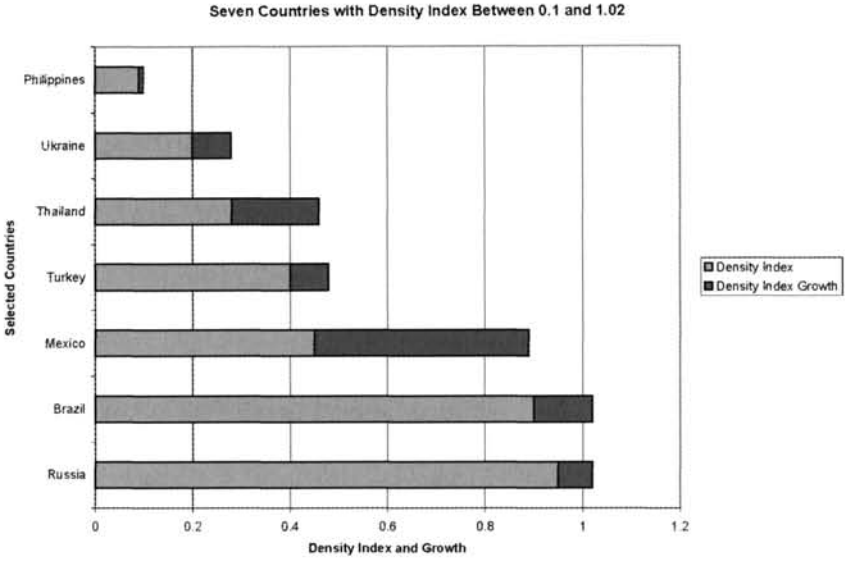


FIGURE 3-1: Seven Countries with Density between 0.1 and 1.02 - Data Elaboration by Network Wizard, 1998.

In the first group one finds countries with a really rapid growth, such as Mexico and Brazil. Russia is likely to follow similar trends, but its presence in the Net is still inferior compared to that of Mexico or Brazil (the green part represents the growth in 1998).

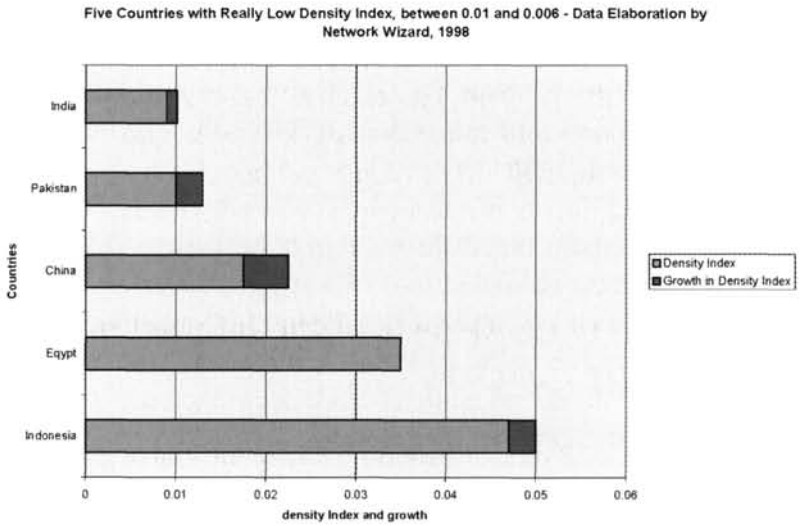


FIGURE 3-2: Five Countries with Really Low Density Index, between 0.01 and 0.006 - Data Elaboration by Network Wizard, 1998.

In order to compare the graphs, it has to be remembered that in the second group (FIGURE 3-2) the scale is 1/20 of the first one (FIGURE 3-1). The situation in China and India is similar to the one in 1997: in China the density increase is a result of the annexation of Hong Kong, in fact 2/3 of the hosts are from Hong Kong, while the rest are from Peking, Shanghai and a few other towns.

India has a population approximating 900 million inhabitants, but its presence on the Net is smaller than the that of of Estonia.

Other countries are in a situation of nearly total isolation: 264 Internet hosts in Iran, 91 in Nigeria, 76 in Ethiopia, and 25 in Vietnam.

There are marked differences even in the big continents like Africa: for example, there are some countries, such as Namibia and Botswana with a density of 0.4 hosts per 1,000 inhabitants, a figure relatively higher if compared with the 0.02 of Kenya and Senegal. In Northern Africa the low density of Egypt and Morocco, which is only 0.03, appears to be high if compared with Tunisia (0.006) and Algeria (0.001). Network Wizard has found just one host in Libya, Liberia, Gabon and Congo, while it has not found any on-line presence in Sudan, Somalia, Rwanda, Guinea, Chad or Eritrea.

Finally, the Net is really not adequately diffused in the Developing Countries. What are the reasons for this situation? The main obstacles, as will be expounded below, are three: *the low tempo of life*, deficiencies in infrastructure for the telecommunications and the *incompatibility of culture, besides the unpredictability of the economic and political* situation of these countries, all of which militate against using the new information and communications technologies with ease.

3.1.2 Obstacles to the Growth of the Internet in Developing Countries

Does the high level of human development help the emancipation towards the Net? Or does the presence of the Internet increase human development? These two questions opened the Fifth Session of INET 98 [Inet 98a], a conference about the world of the Internet that was held during 1998 in Geneva: INET 98 tried to compare the different evolutions of the Net in the Industrialised Countries and in the

Developing Countries. The conclusion that can be drawn from the INET 98 report is clear: the Developing Countries have more problems in respect electronic connectivity in relation to the Net. Various explanations can be given in respect of this apparent to this apparent gap between the North and the South.

- The first problem is *the low wealth* of the Developing Countries. This means that the necessary resource to survive is not directly available and that the Internet is not an indispensable object.

- The second factor is in the *general lack of available requisite information and communications infrastructure,* which constitute both an **obstacle** and an **impulse,** as many less resourced countries have limited telecommunications networks and the Internet totally depends on the existence of a minimal requisite connectivity infrastructure.
- The third factor is represented by *the education, the language, and the culture* of these countries. Many Internet users are young people, exactly the ones who are usually keen on the application of the new technologies. In 1995, 17% of the population of the Developing Countries was under the age of 14, as opposed to just 9% of the population in the industrialised countries. The low education level in these countries does not help significantly towards support in respect of the introduction of the technology. In 1993 more than a half of the population of the low wealth countries had no opportunity to attend secondary schools both because of their low income and the lack of schools. According to ITU, the International Communication Union [ITU 97], except for India and China, the number of young people who cannot attend secondary school increased to 75% of the population of these countries; in the industrialised countries, instead, the percentage of the people attending a secondary school is 97%.

English, on which most of on-line communication is based, is certainly an obstacle in the majority Developing Countries, as it is not the main language in the majority of these countries. India has to be excluded from these countries; India's population comprises 100-200 million of people who speak English, are culturally advanced and professionally prepared in many sectors. According to a report by Panos Institute called *'The Internet and Poverty'* [Pano 98a], *the development of Internet in the*

Developing Countries will possibly depend more on the capacity of this population to educate the young rather than on the technologies and on the costs.

Many people studying the communications, such as Giancarlo Livraghi [Medi 97a], state that *'the technologies are just a means, what counts is the human and social culture'*. In order to exploit completely the human, civil and social potentiality of the networks a cultural growth, not just of few people but extended to all social categories, is necessary. To date the wealth of nations cannot be valued only in terms of money, but they have to be considered also in terms of the means of access to information .

The aim of the recent European ministerial conference called *'Global Information Networks: Realising the Potential'* [Conf 98], held in Bonn from the 6th to the 8th of July 1998, with the participation of the representatives of many countries of the EU and of other nations, among which USA, Canada, Russia and Japan, was to spread information about the use of the Global Information Networks, in order to identify the limits in their use, to discuss some possible solutions and start an open dialogue about possible potential European and international co-operations.

A quote of some important passages of a ministerial declaration, which was published a few days later, will illustrate the advantages provided by Internet to education: *'The Global Networks represent a powerful influence in the social, cultural and education areas; by giving more power to the teachers' education means, by reducing the access barriers for the creation and the spreading of contents of different languages, by eliminating the distance effect for the remote users and by providing the users with richer and richer sources of information... they make the freedom of speech and of access to the information become concrete'*.

The Internet can be a useful medium to give a lot of impulses to the development of education in the Developing Countries, as an efficient telecommunications network could provide them with a pool of information and education resources; these could make it possible for thousands of people to attend university and specialisation courses from geographically disparate locations at relatively low costs, compared with the traditional modes of *in situ* education and training.

3.2 The Telecommunications Infrastructure

The situation of the telecommunications infrastructure represents an obstacle to the development of the Internet. In this section it will be illustrated how the various telecommunications infrastructure becomes necessary for the transmission of data and of voice, in relation to the status of diffusion in the Developing Countries.

3.2.1 The Fixed Telephone Service

A measurement termed **teledensity,** is used by ITU - *International Telecommunications Union* [ITU 97] to define the metric which corresponds *to the number of telephone lines per 100 people.* The teledensity for the Developing Countries, on average, is equal to just 1.5. In the low-wealth countries, such as Afghanistan, Guinea, Liberia, Niger and Somalia, the figure falls down to 0.002, implying that in these countries, on average, there is just one telephone for every 500 people. While in Cambodia, Chad, and Zaire there is, on average, just one telephone for every 1,000 inhabitants. On the contrary, the situation in the USA corresponds to 57 telephones lines per 100 inhabitants whilst in in Sweden for Europe,the corresponding result is 68 telephone lines for every 100 inhabitants of the population.

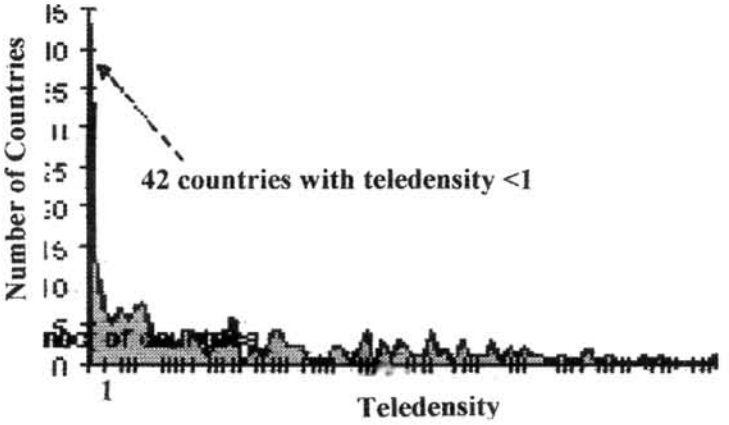


FIGURE 3-3: Teledensity in the world -
ITU World Telecommunication Indicators Database, 1998.

FIGURE 3-3 shows that in 42 countries the teledensity is less than 1, while FIGURE 3-4 shows the teledensity in the various countries with regard to the world population:

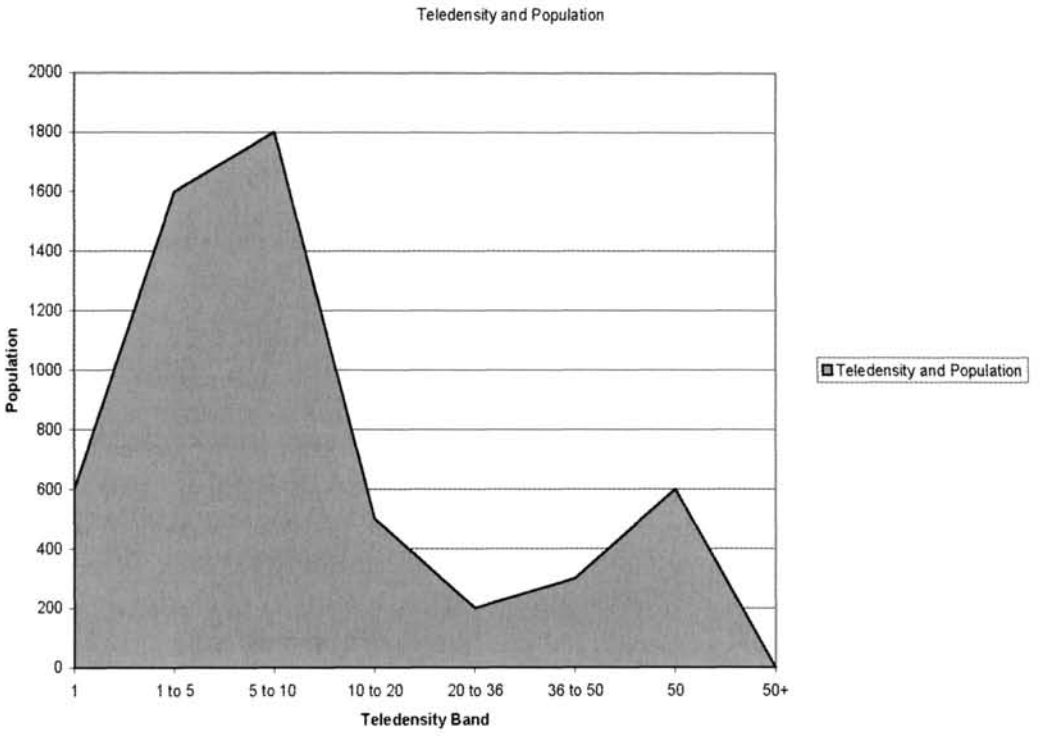


FIGURE 3-4: Teledensity and Population - ITU World Telecommunication Indicators Database, 1998.

According to an article by Hudson Heather [Huds 97], *about 80% of the world population has no access to the telecommunications networks, while 75% of the telephone lines are only in eight industrialised countries.* In order to address the difference between the North and the South, an agreement was signed in Geneva in February 1997 among the 39 countries controlling 90% of the world telecommunications traffic. The agreement, signed at the WTO - *World Trade Organisation* [WTO 97], the organisation for the control of the world trade, *establishes the liberalisation of the global telecommunications, so that the national telecommunications services can operate in new foreign markets.* This agreement marked the formal start of the age of competition in the telecommunications markets where the monopoly of the State was scheduled to give way to competition not only among national operators, but also among the foreign investors .

The WTO pact promises a happy marriage of interests between the *telecommunications operators/service providers* and the *telecommunications infrastructure firms* that are routinely responsible for

building the infrastructures to provide the various services in both the Industrialised Countries and the Developing Countries. The telecommunications operators want to invest in these new and profitable markets and the telecommunications infrastructure firms will be supported in their work of supplying more and more advanced telecommunication infrastructure.

In the report by *Panos Institute* [Pano 98a] some critics have expressed caution and doubt in respect of the WTO Agreement, as they believe foreign operators could provide sophisticated telecommunications infrastructures that would contribute to the realisation of greater towns and cities, but could exclude from civilisation the poor and rural little villages in near or far neighbouhoods. The latter have already been excluded from the supplying of the essential telephone services for decades. Also, the WTO Agreement could further increase the difference between the North and the South as the foreign investor firms will find it easier to enter these markets than the local firms

Nevertheless, an efficient telecommunications network would make the economic development of any country easier, for instance:

- By transforming the business prospects of the big or small-middle enterprises, which can communicate with the rest of the world both to buy raw materials from new suppliers, and also to sell their own goods to new customers;

- By giving to the Farmers' Unions and to the Individual Farmer access to information on the of the crop in the various markets to enable them adjust their own prices based on market trends;

- By providing for facilities to enable rescue under disaster or emergency conditions through easy consultation channels between experts including doctors at geographically disparate locations .

These are but a few of the uses of this technology, which could help the development of new ideas and new activities for the improvement of peoples' conditions of life, and could even create a real globalisation of the world communication.

3.2.2. The Mobile Telephones

The wireless communication, namely, mobile telephony in particular, is to date becoming more and more diffused: world-wide, a new user out of six has a mobile telephone. As at June 1998, a total of 22 million new mobile telephones had been bought all over the world [ITU 98a]; globally, the estimated number of possessors of mobile telephones is 248,934,766.

FIGURE 3-5 demonstrates the number of mobile telephones per continent and the growth of the possessors of mobile telephones over 3 months, from January 1998 until March 1998.

Geographical Area	March 1998	June 1998
North America	62,256,250	66,481,132
Central Europe	60,969,595	68,501,443
Asia-Pacific	44,822,860	50,209,642
Japan	31,524,900	34,076,300
Latin America	14,829,177	16,306,372
Middle East	5,775,300	6,465,383
Eastern Europe	3,989,923	4,756,013
Africa	2,441,329	3,166,481
TOTAL	226,609,334	248,934,766

FIGURE 3-5: Number of mobile telephones per geographical areas - ITU Global Mobile, 1998.

Even in the Developing Countries this kind of communication is evolving more and more rapidly, as it makes it possible to avoid the problems of costs implied in the installation of cables that form characteristic features of the fixed line telecommunications infrastructure in these countries. The use of mobile telephones is increasing, perhaps, more rapidly in the Developing Countries than in the Industrialised Countries, especially in the South-East Asia and in Latin America. In some of the countries whilst a lot of distant villages still use the traditional fixed-line network, the big cities, such as Sao Paulo in Brazil, use the mobile network more than Paris.

In April 1998 *Nortel - Northern Telecom* and *United Utilities* announced the birth of a joint venture aimed at the development and the selling all over the world of the innovative solution called **Digital Power Line** (DPL): this will make it possible to *use the electrical lines for the transmission of data and the access to the Internet* with a speed 10 times

faster than the best digital link now available on the market [IDG 98a]. This technology will give the electric companies worldwide, including those in the Developing Countries, where the electric network is much more widely diffused than the fixed-line telecommunications infrastructure, the possibility of becoming a new group of ISPs worldwide. This will be able to provide Internet users with high-quality services through smaller investsments compared to corresponding investments needed by traditional kinds of network.

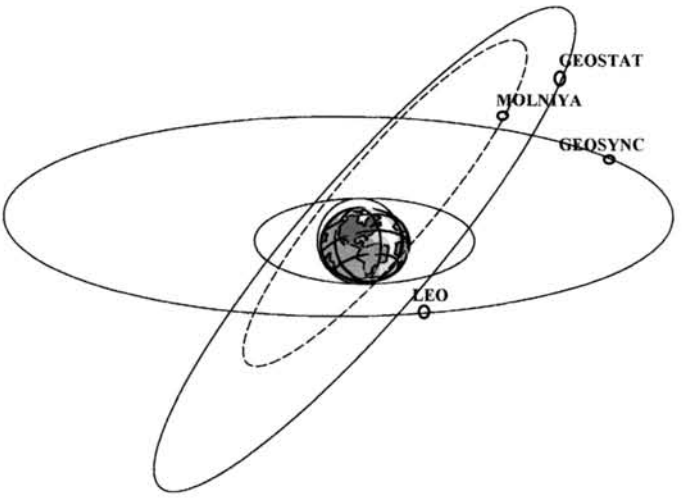
3.2.3 Satellite Technology

The installation of cables in the Developing Countries will take a long time, and high costs and will somewhat be difficult because of the conditions of the environment. In order to reach the rural population spread in the vast territories of Africa, Asia, or South America, an up-to-date *medium* such as the satellite has been used: it is flexible, reliable, safe and it does not need any fixed networks of cables or recall signals.

The satellite was born because of the need of the great nations to conquer space. In particular, the first satellites were launched in the 1950s and 1960's by the Russians (in 1965 the first satellite called 'Early Bird' was launched); then the US appropriated large sums of money to launch projects such as the INTELSAT with the first intercontinental satellites covering the Northern hemisphere.

A geostationary satellite is an object with a mass of up to 2,000 kg and it is launched into orbit at a distance of 400 km from the Earth by a rocket. The satellite is equipped with an engine by means which the satellite is enabled to move into the 'Clarke's band': the main feature of this band is its distance from the Equator, which is 36,000 km[5]. A satellite is called *geostationary* or *geosynchronous* as it is *synchronised with the rotation of the Earth:* it is designed always to turn in the same direction as that of the Earth's rotation, so that it can always be seen from the same point on Earth or from any place.

In order to calculate satellite orbit positions, a full revolution of 360 degrees is divided into parts of two degree sectors, obtaining in this way 180 sectors. In every orbit pole, various satellites are placed to form a kind of fleet. Some of these fleets refer to a territorial coverage, as for instance, at the 13 degree latitude East there is the fleet called EUTELSAT and at the 19 degrees latitude east there the fleet called ASTRA, both fleets being for the European territory.



There are four kinds of orbits used for satellite communication [Gomo 93], as FIGURE 3-6 shows:

- **Geostationary** (GEO): Here, apogee and perigee, namely, the maximum and minimum distance from the Earth corresponds to 35,786 km. A satellite in this band takes 23 h and 56 m (sidereal day) to turn around the Earth. The angle between the orbit plane and the Earth's eclliptic of the Earth, is equal to 0. The Doppler effect, proportional to the change rate of the distance between the satellite and the station on Earth, can be ignored;

- **Geosynchronous:** In this case apogee and perigee are the same and equal to 35,786 km, with a period of time of 23 h and 56 m. The angle goes from 0 to 90°, while the Doppler effect is limited;

- **Molniya:** Here the apogee is 39,400 km, while the perigee is 1,000km. The necessary time to turn around the Earth is 11 h and 58 m. The angle is 62.9° and the Doppler effect is high;

- **Low orbit** (LEO): In this case the apogee is less than 1,400 km while the perigee is greater than 500 km. The period of time is 1.5-2 h, while the angle goes from 0 to 90°. In this kind of orbit the Doppler effect is really high.

To date the applications to which satellites are applied are varied and various: telephony, telecasting and data communication. For instance, it is possible to transmit bank or financial data, journalistic news or data from the oilrigs. Again, it is possible to communicate through mobile means, not vocal, but through a small screen. It is the case of the 'flots' of the lorries, through which two elements can be determined: the position of the lorry with a precision of nearly 90 metres and the possibility to communicate with the driver: All these things imply a substantial improvement in the communication technology for transport.

The first important innovation comes from EUTELSAT which, ever since 1995, with the collaboration of industrial partners and research institutes, has been developing digital platforms to offer services such as the Internet and the transmission of data via satellite. Any person who has used the Net has certainly noticed the substantial problem of slowness of the system in receiving video images or pictures. Through the use of satellite communication it will be possible to transfer with a high quality all these data to the final user.

Projects that deploy satellite application are made not only for Europe or for the big industrialised countries, but also for the Developing Countries. The projects now in progress can be schematically represented in TABLE 11 in Appendix II, which refers to:

- The name of the project;
- The kind of project;
- The date of realisation or the expected one;
- The services provided and the prices;
- The features;
- The covered area;
- The promoters; and
- The backers.

There are, however, some disadvantages that have to be considered:

- First, for the final user the *cost of the telephone call* via satellite is about 1-3 US Dollars a minute, which is more expensive than the terrestrial telephone system.

- The second problem concerns the companies which invest hundreds of millions not in providing the Developing Countries with telecommunications, but in order to develop, for money, the market of the urban areas and of the industrial centres. A report by Panos Institute [Pano 98a] remarks that *satellites can be used in those countries where there are competent technicians, with requisite education, knowledge, and skills about the new information and communications technologies.*

To illustrate the cost-implication of using satellite communication, it may be observed, for instance, that at the moment Internet connection in Chile is via satellite; implying that the cost of the dial-up connection reaches 60 US Dollars per month and the speed of connection reaches 9 kbits per second, equivalent to that of a small ISP in the USA. The people, however, are really enthusiastic about the Internet and connect at night or early in the morning. In order to solve this problem, however, Chile is planning to install cables all over the country so that the speed will increase by 200% and the connection will no more be disturbed by the weather [Nua 97b]. This example shows that *the best kind of telecommunications infrastructure that can be adopted by a state varies according to the area and also on the different environmental conditions.*

Another problem concerning satellite communication is the *reception quality.* In fact, once a satellite has been launched into the orbit in order to supply the Developing Countries with communication systems, these countries must be provided with the devices to receive the information. The English company Hermes Data Communications International Ltd. [Herm 98a], previously working for the defunct Soviet Union, supply its systems for satellite reception to the end users and the international organisations in Africa and Eastern Asia. In their site (http://www.hermes.datacomms.co.uk) information is available about their products and the projects they have developed in the Developing Countries in the last few years [Herm 98b].

3.3 ISP in the Developing Countries

ISPs are companies which, through investsment, aim at the installation of the necessary devices for connection to the Net, and offer to the users the possibility to connect to the Internet through payment of subscription. The development of the Internet represents a source of profit for the ISP, as supplying users of the Internet with various services produces additional

income for these companies. In general, this happens in markets with middle-class users and where the telephone connections are good.

None of the above conditions is satisfied in the rural areas of the Developing Counries. The development of the ISP in the Developing Countries are generally up against many difficulties because of the inadequacy of the telecommunications networks. In the rural areas, in particular, the request for connection to the Net is practically non-existent. *'Internet is not our priority in the sector of telecommunications'*, says Dr Abdul Mejid Hussein, Minister of the Transport and Telecommunications in Ethiopia, in an interview recorded in the report by *Panos Institute* [Pano 98a], *'but we give the right of priority to supplying our people with a telephone line'.*

A lot of scholars, among others, Professor Mohammed Yunus, founder of the *Grameen Bank* in Bangladesh [Yunu 97], think that providing connection to the Internet would imply for the Developing Countries both business opportunities and, with the passing of time, the satisfying of social needs. An example is provided by Prof. Yunus who, through his bank, issues loans at low interest to women in the rural areas of Bangladesh and in other Developing Countries. He is trying to promote the *GrameenPhone*, a mobile telephone service at a low cost for every village in Bangladesh. This is but a *medium* to make women be in a position to have access to the internet and look for jobs or even seen to work via the Net.

The obstacles still remain huge, as even when the rural areas have the telephone lines the rural end-users will have to pay much more than the urban-dwellers for the same time of connection. In order to solve this problem, *Sonatel* in Senegal, the local telecommunications company, has fixed one price rate for the whole country. *Sonatel* is planning to build an Internet backbone of its own, while *Metissacan,* an ISP in Dakar and Ziguinchor, is looking for funds to provide the most distant and isolated areas of the country with computers [Hump 97].

The new technologies, in particular the **wireless technologies,** can make it easier for the rural areas to connect to the Internet. For instance, *in mid 1997,* a pilot project launched in Arua, a small town in the North of Uganda, provided Internet services through a wireless radio system connected to a satellite. The system, provided by *Uganda Connection and World Food Programme,* is aimed at giving help hospitals, to agricultural

projects and various missions in the region [Pano 98a].

If one looks at some of the most important countries of the developing nations in respect of provision of Internet services, one cannot fail to notice that the ISPs were once mostly under the control of the State, or that the market was monopolised by one company providing the users with few and expensive services. In India, for instance, until September 1997, [Wired 97], the ISP market was a monopoly: *Videsh Sanchar Nigam Ltd.* provided the service from Delhi to Bombay at 64 Kbps for 1 million Rupees per year; the users paid 83 cents per minute and they were required to have a subscription of at least 500 hours of connection. In September 1997 the Indian government finally realised that this kind of ISP cost administration for connecting was expensive and decided to liberalise the market by allowing an unlimited number of ISPs to offer Internet services. The aim of this decision, according to Dewang Metha, Executive Director of the *National Association of Software and Service Companies (NASSCOM),* was to transform the Internet into a national phenomenon and to reach 1.5 million users within three years. In February 1998 [Nua 98f] the Indian government was accused by *Telecom Regulatory Authority of India* (TRAI) of preventing the development of the Internet in India. The market laws for ISP operating in India were rewritten. At the end of the year privatisation increased the interests and the competition; about 30 ISPs were scheduled to compete for the market, with a strong reduction of the connection costs: TRAI promised cuts in expenditure from 60% to 90% in order to catch many new users. DoT *(Department of Telecom)* was scheduled to launch its Internet services in March 1998, with 25 POPs in 25 towns that would allow it to offer dial-in connections to 106 places in India. The private ISP *Saytam Infoway* made an alliance with Intel Asia to offer its connection services and software products to the consumers of Intel by building services through the Intel-based desktop. According to Kanwaljit Singh, Marketing Manager of *Intel Asia Electronics,* this *'will make both Saytam and Intel enter more easily the computer market in India'* [Indi 98].

In **China** the only Chinese provider of telephone services and the main provider of access to the Internet was *China Telecom,* which was rather expensive for the ordinary end-user. At the end of 1998, a young student of Nanchino University, Huang Zhenjiang, [Dea 98a], made a web page against the monopoly of the on-line services of this ISP, as he percieved that the high telephone rates of *China Telecom* were the main reason for the insufficient development of the Internet in China. According to

Huang, the average Chinese could spend up to US$27 for 20 hours of connection to the Internet, as this actually meant 25% of a worker's monthly salary. A few days later the promoter of this campaign sent a message offering his apologies to all users for the problems caused by his action. In this case, Huang's plan seemed to have stopped because of the pressure by authorities that had ordered a stop to what they deemed to be illegal activities. The reality was that Huang did not seem to have given up and, through the facilitation of communication by a group fighting for the civil rights in China, with its headquarters in Hong Kong, he set to promote a one-day strike against the State telephone company [Dea 98b]. From a technical point of view, China Telecom has not the monopoly of the Internet services, but in reality most of the local ISPs were obliged to have access to the international backbones and gateways through China Telecom, whose costs for these services were monopolistic and protectionist. Subsequently most ISPs sought to complain about the situation most of the private service providers seemed to be making a loss in their operations. In a short time the telecommunications sector was poised to be reformed in China with the restructuring of China Telecom, whose operations should be probably divided following some business directions, by separating the telephone services, mobile telephones, data transmission, the long-distance transmission, and the international services.

In **Kenya,** till June 1998 [Nua 98g], there had been five ISP licences, all operating under the control of the *East African Internet Association,* which had about 150 partners in Kenya, Uganda and Tanzania. Kenya's main ISP was KPTC - *Kenya Posts and Telecommunications Corporation,* the State telecommunications company. '*The use of the Internet in Kenya is really spread',* according to Suchindranath Aiyer, President of the *East African Association, 'even if the users belong to a kind of élite, because of the high costs'.* With regard to the low band connection and to the frequent poor performances of the Net, the connection costs operated at about US$ 10,800 a month at 64 Kbps connectivity, and the licence fees started from US$ 13,900, of which KPTC took a 1% share over the total entry of every ISP in the country.

In **Sri Lanka** the situation started off on a better footing [News 98]: during the year 1999 the number of users had increased to 14,000 and was deemed to increase to 50,000 by 2000. This rapid change in Internet use was attributed to the liberalisation of the telecommunications sector during the previous three years and because two new operators, *Lanka*

Bell and Suntel, obtained ISP licences during the previous two years. The favourable starting conditions made it possible to install, rapidly, new telephone lines and, thanks to the abolition of the import duties on hardware and software in 1997, many people had the opportunity to buy computers and computer equipment affordable prices. *Sri Lanka Telecom* (SLT) increased the number of new telephones after the Government, in 1997, sold 35% of its profits to *Japan's Nippon Telephone and Telegraph.* The official data show that as a result of this, a total of 160,000 new telephones were installed, of which 110,000 installations were by SLT. The rise occurred almost exclusively in the capital of Sri Lanka, Colombo, and on its outskirts, but 30% of the market had already been covered. The ISP community, totalling seven in 1998, was planning to make an interconnection agreement for the transmission of data in the country through servers in the US and other nations. At the time of writing, all e-mails must pass through an overseas server before arriving at their destination.

Saudi Arabia, one of the richest countries in the world, has a population of 20 million people, of which 120,000 were awaiting taking a subscription for the Internet within a year of 1998 [Nua 98h]. In fact, in October 1998 the Government finally decided to give the licences for ISP operation: about 40 companies were waiting for passing a selection. A proviso for ISP operation was that the Government would control the market and all the information on the Net. Furthermore, in November 1998 KATCST - *The King Abdulaziz City for Science and Technology* [Nua 98i] announced the prices that all ISPs would have to apply: the minimum cost per hour of connection would be between 0.40 US$ and 1.20 US$; the monthly cost would be from 27 to 40 US$. Only users with a dial-up account would pay these costs and the state connection taxes. The ISPs were not satisfied with this decision: some deemed the minimum cost to be too high, others deemed the State should not have any control over these costs.

3.4 The Information and Communications Technology Industry

The problem of access to the telecommunications networks becomes secondary if one considers that in order to use the Internet it is necessary first of all to have a computer or at least the possibility of using one. According to ITU - *International Telecommunication Union* [Pano 98a],

a person living in a rich, Industrialised Country has a higher probability of access to a television compared to a person living in a poor, Developing Country; his/her access to a telephone line is 25 times easier and the access to an Internet host computer is 8000 times easier.

In the Industrialised Countries every Internet host serves 3 or 4 computer-users, while in the Developing Countries every host serves about 100 users [ITU 97]. The analysts state that the costs that should be paid to install a computer in every house, or to establish the necessary telecommunications infrastructure or to provide every house with electricity are too high. Even the price of a computer is much higher in the Developing Countries: for instance, the average price of a PC (personal computer) in Ethiopia is 15 times the per-capita monthly income [ITU 98b]. Furthermore, the import duties on the computers make the access to Internet even more expensive: in India, for example, the taxes on the computers reach even 120% [Pano 98a].

In 1996 more computers were sold than television sets and this trend of increasing demand is becoming predominant in the Developing Countries.. The demand for Information Technology (IT) products is increasing by 12% a year in Africa and at the beginning of 1997 Microsoft opened the first of a series of 12 shops in Africa in order to meet the demand for its products [UAE 97] and [Pano 98a].

In **Israel,** *'About 15% of the development of the Internet comes from Israel', says Alan Meckler of Mecklermedia, 'because our country has always been famous for its IT industries and our population is one of the most technologically advanced. Furthermore, Israel has the highest percentage (40%) of PC purchases.'* [Nua 98e].

In **Latin America,** according to a report by *Gartner Group* [Nua 98j], more than 950,000 PCs were bought in the first four months of 1998, more than 10.6% than in 1997; even the small computer suppliers have increased their sales, 24.6% more than in 1997. The company *Compaq* has increased its sales by 18% and until November 1997 Compaq represented the greatest PC distributor in Latin America; IBM kept the second place and *Acer* the third one [Nua 97]. *Gartner Group* predicts that this rise in the number of computers purchased is due to the low prices that will make it possible for the education sector to enter the market and will increase opportunities for the people. The demand for PCs, however, varies from country to country: the rise occurred in

particular in Mexico and in Argentina, while Chile, Colombia, and Venezuela have a negative record of demand for PCs and, finally, Brazil and Peru showed a minimum increase in the demand.

The computer market in the **Middle East** keeps on increasing with a surprising speed: the development rate is twice the world average. The introduction of the Internet, according to the experts, makes one think that this huge development is destined to go on without limit. The figures obtained at the electronics exhibition Gitex in Dubai show a total increase by 25% every year in the region and an increase that in some Arab states reaches even 40% [Dea 98i].

From the above information, good news can be drawn for Internet users and for the potential buyers of computers and computer equipment in the Developing Countries: this is attributed to the *widening of the market,* to a strong import and to the *effort of the information technology industries of these countries, and decreasing trend in the price of the PC.* This does not mean that all the economically - disadvantaged people of the Developing Countries will have the opportunity to buy a PC, but it will be easier for them to use it in regional or national organisations.

3.4.1 Costs and Limits of the Market

Information technology without limits could become reality within the decade of the year 2000. This, in effect, is partially what came out of the agreement for the cutting of prices, which was subscribed at the *Ministerial Conference of the World Trade Organisation (WTO),* held in Singapore in December 1996. It was adopted in Geneva in March 1997 by 39 countries representing more than 90% of a market with a yearly income of nearly more than 600 billion of dollars [WTO 97].

The WTO pact implies a trend towards the progressive reduction of the cost-limits in four phases, starting from July 1997 until the total elimination in 2000, at least in theory. Some Developing Countries have obtained a concession establishing the total removal of taxes by 2005. The elimination of the taxes could mean for the end users a saving of between 10 and 15 billion dollars per year. The pact concerns 300 categories of products: hardware, software, telecommunications equipment, scientific instruments, semiconductors, but excludes the consumer electronics, on which there are average taxes of 14%. This is not a serious matter, as the multimedia technologies gradually make the difference between

information technology products and consumer electronics products become smaller and smaller.

'It is a new success of the multilateral trade system' said the General Manager of WTO, Renato Ruggiero, *'which will take to a reduction of the prices for the consumers and to a reduction of the customs barriers; all this will make the diffusion of the technology easier'* [Sold 97].

In addition to the costs for the purchase of these products end users who are connected to the Internet or those who would like to be connected to the Internet must pay some connection costs. Even with regard to Internet connectivity, there has been a great improvement, as the Governments are finally realising the importance of this new *medium.*

The **Sudanese government,** for instance, in November 1998 established the costs the national ISPs can apply to Internet connections. According to the official news the cost for users for an hour of connection should correspond to about US$0.18, and under no circumstance should the cost of a connection be over US$0.89. [Dea 98h].

In **Brazil** the authorities have reduced in the last few years the connection costs from 17.26 Centavos in 1985 to 6.04 Centavos for two minutes of connection to the Internet [CG 98].

Internet access costs in some regions of Africa are represented in FIGURE 3-7. The annual costs are in US Dollars and include the cost of 5 hours of local calls per month [Mike 98].

In order to provide Internet services, satellite technology can be used instead of cable. Below is a comparison of some evaluations relating to the costs of the various telecommunications infrastructure announced by TELEDESIC at the beginning of the project, keeping in mind that the cost is 4 cents of US$ a minute and per 16 Kbps channel:

Cost of the Band:

- **Local interconnection:** the cost is equal to US $0.45 a day; the total cost over 5 years is US$815;

- **Fixed telecommunications:** the cost is equal to US$0.45 a day, which in five years becomes US$1.6 million as the multiplication

of the band by the distance is constant and equal to US$1.80 within 100 km;

- **Satellite telecommunications:** the cost is equal to US$2.20 a day (including interconnection), which means US$7.2 billion amortised over 5 years, divided over 2 million simultaneous users;

Tax on the Band:

- **Urban calls:** US$16 a day;
- **Long-distance calls:** US$147 a day;
- **Urban mobile telephone:** US$181 a day;
- **Intercontinental distances:** US$65 a day;
- **Satellite telephones:** US$47 a day.

Below the economic aspects of three projects of LEO satellite constellations are addressed as an example:

- **GLOBALSTAR:** the phone/data per minute service can be provided at 2.4/9.6 Kbps at the cost of 1.25-1.5 US Dollars. The download of a newspaper (equal to 1 MB) is made in 0.9 hours with a cost of 260-320 US Dollars;

- **IRIDIUM:** the phone service per minute at 2.4 Kbps is provided at a cost of 2-5.5 US Dollars, while the download of a newspaper (1 MB) is made in 3.5 hours with a cost equal to 420 - 1,150 US Dollars;

- **TELEDESIC:** it provides a phone / data per minute service at 16/64 Kbps/Mbps at a cost of 0.04 US Dollars, while the download of a newspaper (1 MB) is made in 4 seconds with a cost of 32 cents.

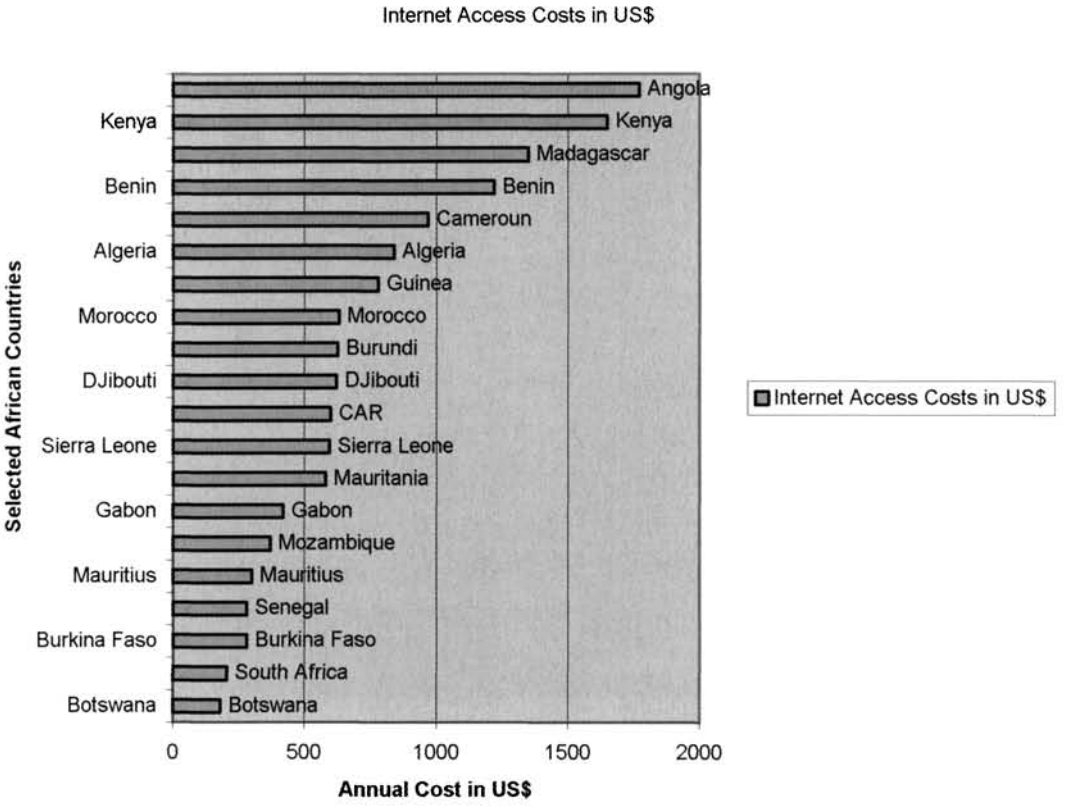


FIGURE 3-7: African Internet Access Costs (US $) - Data elaboration by Mike Jensen, 1998.

All these costs can be compared with the phone service per minute provided to date, for example, by the local ISPs in Tanzania and Kenya, which charge on average 8.95 US Dollars, plus a percentage tax amounting to 25%. This means that in the near future satellite transmission will make it possible for many Developing Countries to communicate with the whole world, by paying relatively low costs and without the problems of the vagaries of the weather or of natural disasters, which are prevalent in many of the Developing Countries.

There is to date an apparent tendency towards progressive saturation of the ground networks. The impossibility to use them in certain geographical areas give relative advantage to the observation that satellite communication can play a relevant role in the context of access to, and deployment of, the Internet.

Furthermore, irrespective of the costs associated with access and

deployment of the Internet in the Developing Countries, there are huge differences between its growth in the rural areas and in the big urban metropolitan centres. Some Developing Countries are already using the Net both in social and economic contexts, bringing in this way advantages and improvements to the community. This is exactly the topic we are going to deal with in the next chapters: What are the advantages that the Internet can give to the growth and development of the Developing Countries?

CHAPTER IV

THE ON-LINE EDUCATION PARADIGM

How Can the Net be Used in the Education Context in the Developing Countries?

4.1 Social Progress

The social or human development of a nation is a process of widening the possibilities of choice for the people that can be obtained through the widening of human capacities. At every level of development the three essential categories for the improvement of the human condition may be categorised as: *Living a Long and Healthy Life, Being Educated, and having Access to the Necessary Resources for a Decent Standard of Living.* The income is of course one of the main means to broaden the choices and the welfare of the people, but it is not possible for everyone to have an income sufficient to satisfy their needs, especially the primary and the vital ones.

Ever since 1990 the *United Nations Development Program* (UNDP) has been preparing every year a *'Report on the Human Development'* addressing various topics relating to human development. One of the topics addressed in a recent report was, for instance, *'The Unequal Consumptions'*, which was the subject of 1998 Report. Ever since its first appearance, the report has tried to measure social progress through some indexes represented in TABLE 12 and TABLE 13 in the Appendix [UNDP 98].

From the 1998 Report, one can draw some important information relating to the state of progress of human development in the Developing Countries: they are useful to understand the present social situation of these countries and how it has evolved in the last few years. From the

evaluations on the hope of living, today a child in a Developing Country could live 16 years longer than a child who was born 35 years ago. In fact owing to recent progress in the new advancements in medicine and food technology, the Developing Countries have have made more progress in the process of human development in the last 30 years than the Industrialised Countries did in more than a century.

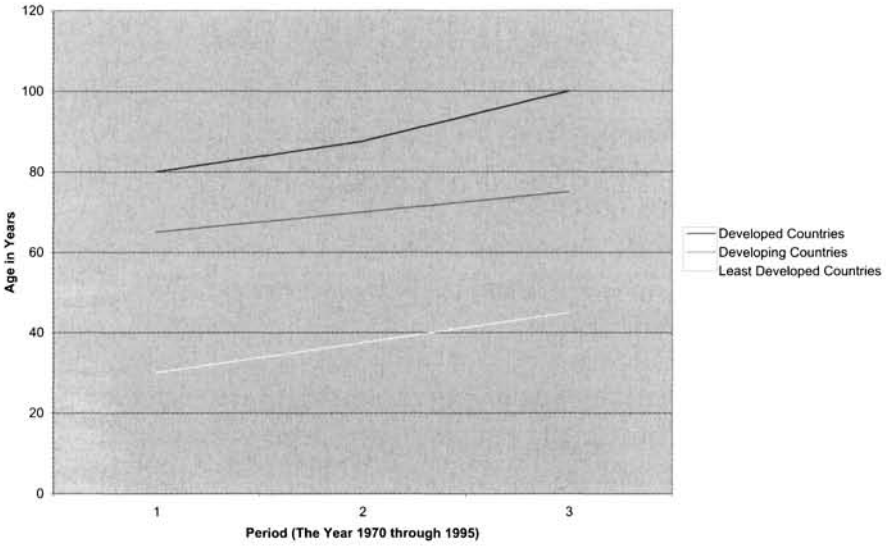


FIGURE 4-1: Hope of Living in the Various Countries - UNDP, 1998.

Infant mortality rate in the Developing Countries has halved since 1960. The lives of more than 3 million children have been saved every year thanks to the improvement of the basic immunisation system and to the easier access to the information media. The infant malnutrition rates have decreased by 25%. The rate of enrolments to the primary and secondary school is more than redoubled and the percentage of rural families with the access to the drinkable water has increased a lot, changing from 10% to 60%.

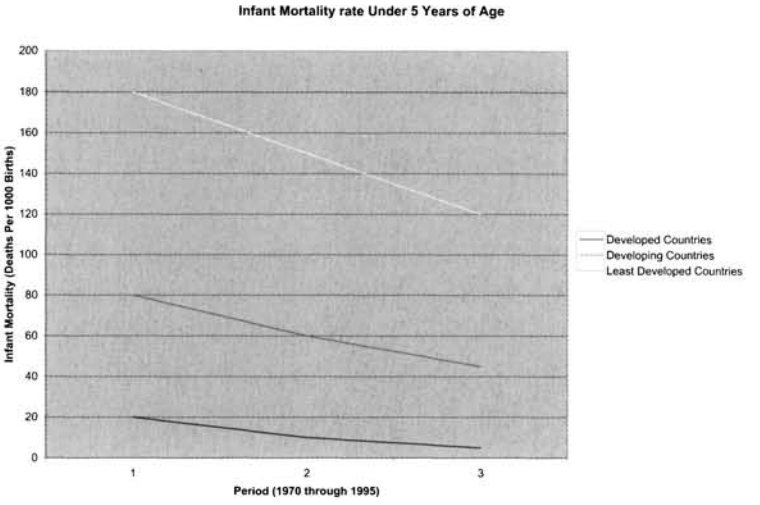


FIGURE 4-2: Infant Mortality Rate under 5 Years of Age - UNDP, 1998.

The **Index of Human Development** (IHD) for the 1998 UNDP was calculated over 174 countries, comprising both industrialised and developing countries, which have data that can be compared in order to measure the global progress of a nation according to the three dimensions of the human development: **Education, Health, and Decent Standard of Living.** In the 1998 report, the UNDP recorded the indexes surveyed in 1995. These indexes are reported in TABLES 12 and 13 in the Appendix.

From these data we can notice that the Industrialised Countries, such as Canada, France, Norway and USA are high up the list. There are a number of Developing Countries, such as Cyprus and Barbados, which are in a good position, with an index of human development of 0.913 and 0.909 respectively. Other Developing Countries are a little way down the IHD league. Among the 174 countries, 98 have reached a higher level of the IHD than corresponding levels in the per-capita GNP. *This shows that they have actually succeeded in transforming the economic welfare into human resources.* This fact is significant, particularly for the countries with low income, such as Lesotho, Madagascar, Tanzania and Vietnam. The contrary has happened for 73 countries that were not able to improve the standard of living of their populations; this concern cuts across both the richer Developing Countries, such as Kuwait, Mauritius, Brunei Darusalaam and Quatar; and the poorer Developing Countries, such as Angola, Iraq, Laos, Senegal, and Uganda.

The progress of human development measured through these indexes can be further clarified through an analysis of two of its essential dimensions, namely, Education and Health.

4.1.1 The Internet and Education

In an information society everyone needs **Learning** in general and as a result a *basic culture* and a *technical preparation* to be able to use at best the new technologies and to take from them the maximum advantage. All this requires a high instruction level for anyone who wants to have a quality job. The only way to reach this aim is to provide adequate education for everyone: not only to children, but also to adults, as the instruction has to be constantly revised. Furthermore, none has to be left behind when learning new knowledge, as there has not to be a society where some people have the means to have access to information at the expense of the others. *In other words, it is necessary to fight to reduce the digital divide among the individuals.*

The **Adult Literacy Rates** in the Developing Countries during the period between 1970 to 1995 increased by about one half, passing from 48% to 70%, with maximum points of 90% reached in the South-East of Asia and the Pacific, in Latin America and Caribbean and of 51% in the South of Asia. The **Female Literacy Rate** increased by more than 67% over 20 years while in the in the Arab states the rate more than doubled, passing from 20% in 1970 to 44% in 1995 [UNDP 98]. This progress in the Literacy Rate can be attributed to the remarkable improvements in the School Enrolments Rates: between 1960 and 1991 the **School Enrolments Rate,** according to UNDP, increased from 48% to 77%, while the Secondary School Enrolments Rate increased from 35% to 47%. In South Asia the increases were in the primary and secondary school, while in the East of Asia, in Latin America and in the Caribbean the increases were at the secondary school and tertiary college enrolment levels. These data are reported in TABLE 14 of the Appendix.

4.2 The Use of the Internet in Education

The Internet brings the means for learning and for amusement, by providing information, including on-line texts written by some of the best experts in order to help both the teachers reach the students through the courses and those people who need more detailed information. Some experts think that the Internet and the new Information and

Communications Technologies (ICTs) cannot solve the problem of illiteracy in the Developing Countries. For instance, Steve Jobs, Co-founder of Apple Computer, in an interview quoted in the report by *Panos Institute* [Panp 98b] declares: *'I've probably spearheaded giving away more computer equipment to schools than anybody else on the planet. But I've had to come to the inevitable conclusion that the problem is not one that technology can hope to solve. What's wrong with education cannot be fixed with technology'.*

On the contrary, in many Developing Countries the potentialities of the Net in the area of Education have already been discovered and have made it possible to put into practice some education projects that previously we could only think of. Philemon Kotsokoane, Headmaster of the Secondary School *Micha-Kgasi,* which is in a rural area of South Africa, is enthusiastic about the connection to the Net for the deployment of e-mail. The school has a *Pentium* 100 PC, a deskjet printer and a data/ fax for a mobile telephone; all these have made it possible for *Micha-Kgasi* to send messages all over the world and are used to:

- ❑ Communicate with St. Hildas for the donation of computer equipment;
- ❑ Put into practice a water project in collaboration with an NGO in New Jersey;
- ❑ Make searches for a project about violence;
- ❑ Search for reports on the use of mobile telephones;
- ❑ Write the quarterly forms for every class;
- ❑ Develop a project called *'Where on the globe is Roger?';*
- ❑ Put into practice a project on the comparison of various prices;
- ❑ Send and receive e-mail;
- ❑ Take part in conferences in Hungary and Spain.

Only some of the schools of the rural villages of South Africa have such facilities and just some of the headmasters of these schools have the chance to take part in an international conference. *Micha-Kgasi* school was the main focus of a six-month project by the *International Development Research Centre* (IDRC). The aim of the project was to underline usefulness of the mobile telephones for the connection of two schools in two rural villages of South Africa, 50 km away from Pretoria: they both wanted to enter *PreNet - Pretoria Education Network,* an

association of schools founding their education on the use of the e-mail and of Internet [IDRC 97].

4.2.1 Some Experiences in Argentina

In **Argentina** the use of the Internet is difficult to be interpreted: on the one hand the Government has declared that access to the Net constitutes a really relevant matter and has planned its deployment for the development of education, culture and medecine; on the other hand, connection to the Net is not possible in all rural areas of the country. Furthermore, in the State schools teachers seem to be worried more about obtaining higher salaries from the Government than about teaching, say, Net-surfing.

The lack of resources and the predominance of various obstacles, however, have not prevented experimenting on the Internet in various schools. In Buenos Aires in the State elementary school *Ricardo Rojas* the first Website was built in July 1996: it cost about 1,000 US$ and was sponsored by the students' parents. The students were really fascinated by the new technology and worked really well with the support of their computer studies teacher Paula Rapado. Unfortunately, the first problems rose when the children did some research through the Internet on sea monsters: as they could not find anything in Spanish, they had to work with the support of an English teacher. Then the parents started complaining that their children did not study, but they looked for irrelevant and dangerous things on the Net. The last straw was reached when the students tried to publish on their Website two articles they had written about drugs and police violence. At this point the school authorities put a stop to the publishing effort and closed the project. The headmaster, Mrs Dora de Sao Caledonio, explained that *'once the ten to twelve year-old children's opinions did not go out of the schools, now they can circulate with the name of the school through the Internet. This is not right, the students cannot be totally free as they do not know enough, they have to be controlled by adults.'* [Pano 98c].

In Argentina, however, there are other projects that seem to be working really well. For instance, 210 schools in Buenos Aires are working for a multimedia newspaper called *'La Nave, Tripulantes del Caos'*, meaning *'The Ship, the Crew of Chaos'*, which is supported by the State authorities and an ISP. The students of the participating schools built a home page where they publish poems, drawings, articles about the subjects they have

studied, about their school and extra-school activities, and about information on Argentina; all is in Spanish and not in English [Pano 98c]. In the town of Monte Grande, 25 km away from Buenos Aires, a secondary school has began to communicate with the rest of the world through e-mail, while in Mendoza nearly 93 secondary schools are connected to the Internet. The home pages are built not only for the schools and by the students, but there are also sites created by teachers, such as, for instance, *Nueva Alejandra,* an educational Website in Spanish created by independent teachers; in its directory there are the addresses of 159 schools all over Latin America that have a Website or e-mail. The Scientific Communication Centre of the University of Buenos Aires has created a mailing list that serves about 200 teachers and institutions, while the Ministry for Culture and Education has created a Website where the teachers can find information of any kind and can also receive news about the latest national editorial publications [Pano 98c].

4.2.2 Some Experiences in the Middle East and the Arab Countries

On-line learning is spreading not only in South America, but also other Developing Countries are experimenting with the Net in this sector. In Dubai (**Saudi Arabia**), for instance, in 1998 the first *Arabic Educational Website Development Contest* was opened to promote the style of learning through the Internet all over the world, by offering awards to the best teams of the region. The competition was launched by the magazine *'Internet Al Alam Al Arabi'* (IAW), one of the issues of *Dabbagh Information Technology Group* (DIT). The Director of IAW, Abdel-Kader Al Kamil, declared: *'Learning through the Net is an exciting and interactive kind of education, which is already used in the schools of USA and Europe. This competion will encourage Arab students to use constantly the Internet as a source of information enriching language and culture.'*

In the competition, the participants must make teams of 2-3 students and create their own Websites based on one or two of the subjects suggested (the categories are: art, literature, science, maths, history and geography). The official language must be Arabic, but English can be used as the second language. Every team will have its own password for access to the DIT server. At the end, the completed Website projects are judged by a panel of experts and the best project is announced. The winning prize for the 1999 contest was awarded at the *COMDEX Egypt 99* Exhibition in El

Cairo. Every member of the winning team received hardware and software products of the supporting companies: *Microsoft Corporation Middle East, Compaq Computer MAMEA, IBM, and Sun Microsystems* [DIDN 98a].

4.3 Distance Learning

In a private secondary school inside the University of Ankara in Turkey the students are sitting in classrooms equipped with TV sets and satellite connection, through which a teacher of the Kaplan school, which is in New York, prepares them to pass the SAT test: this is an examination that helps the students qualify for the first University Courses in America (US Undergraduate University courses). This is a great example of the way technology makes it possible for students to receive adequate learning by spending less than traditionally buying books and paying skilled teachers in Turkey.

The foregoing is just an example of how distance learning can, to date, be promoted through the Net. The Developing Countries have *now new opportunities for having access to knowledge and for enriching their own human capital.* Technology has greatly contributed to the transformation of distance learning, not only as a result of the potentialities of the radio and the television technologies, but now as a result of deployment of the Internet and of the satellite communications technology. The new information and communications technologies have transformed the world into an arena for education. As we have seen, however, many developing countries have limited access to these new technologies, especially because of the lack of the telecommunications infrastructure and of the requisite information systems.

Distance Learning is used in many different ways: universities use it to increase the number of their students; firms use it to teach their employees, to specialise them and to bring themselves constantly up to date about the new production processes and the new technologies; people use it to improve their job performances and to increase their opportunities to gain advancement; finally, Governemnts use it to bring their employees and teachers up to date, to improve the quality of the secondary schools and to provide education in the rural areas of the country, which could not be supplied in any other way.

The universities providing exclusively distance learning are called **Open**

Universities. There are, however, other universities, which offer both distance and traditional learning. The mega-universities are big Open Universities with over 100,000 students a year. The first and most famous Open University is the United Kingdom's Open University [POTC 98].

There are a number of **Conventional Universities** that are providing distance learning for a certain period of time or are trying it out: this is mostly due to the fact that they are not able to meet completely and efficiently the great demand for learning. There are even *élite Universities* that had never taken into consideration the idea of distance learning until a few time ago. To date such universities are offering courses at various levels including Masters programmes. One example is *Johns Hopkins University*, USA, which offers health management courses by using digital video technologies, as part of their Business of Medicine Certificate Program, while *Duke University* offers a Global Executive Masters in Business Administration (MBA) to students of Europe, Latin America and Asia, by using technologies that make it possible for them to communicate and to implement the course.

Furthermore, completely new structures have been built to increase the advantages provided by the Internet and the new technologies; these are called **Virtual Universities:** these comprise universities with no headquarters. They use the Internet and satellite technology to send their courses all over the world. In 1989 the first Virtual University of *Monterrey Institute of Technology* was launched in Mexico; it was a joint effort realised by an association of universitites, among which 13 were not Mexican. It counts about 9,000 graduates and 35,000 enrolments a year coming from Mexico and from the countries of Latin America. The courses are provided through a combination of written tests, videotapes or live lessons between the faculty and the students. Every course is given a teacher, full-time working, for every 50 students enrolled for the same course. The *World Bank* has created the first **Virtual University in Africa.** This project has been implemented at really low costs in order to provide for the lack of learning material and the low level of interaction in the African universities.

Virtual teaching using the Internet is used not only by the universities, but also by firms in order to increase the professional knowledge of their own employees. An example is provided by *Hewlett-Packard* which through high-technology teaching equipment, broadcasts TV programmes for its employees in about 100 firms in Europe and in the USA. Other

companies, on the contrary, turn to external organisations, such as the *US-Based Technological University,* to promote the professional development of their own employees.

The use of distance learning is significant both from the standpoint of bringing teachers up to date, especially in the Developing Countries where teachers are generally disadvantaged from the viewpoint of lack of continuing professional development that is necessary for the improvement of teaching quality in the secondary schools of the rural villages. For instance, in Mexico the programme *Mexico's Telesecundaria* teaches through the TV about 700,000 students living in small and distant areas of the country. In Africa, Latin America and Asia at the beginning of the Seventies one-way radios were implemented, mainly as a result of the predominance of the low cost of the radio service suitable for spreading education in the rural areas. The *Interactive Radio Instruction* (IRI), as this service was named, uses one-way radios to send the basic activities that the students have to do during the lesson and to communicate the lessons and complete the reading with various activities through a *'radio teacher'*: they have to answer some questions, make some drawings, sing and do their homework. The IRI programme is used, in general, as a support for those schools with a low level of instructional capacity or with limited resources for making their work.

4.3.1 Costs and Advantages of Distance Learning

Many studies have been made to measure the advantages of **Distance Learning,** even if none of these has been made on Internet-based training. More than 70 years of research on print-based correspondence courses have been constantly reported to make a comparison with the traditional courses. Many reports on radio learning show that the advantages for students increase with the use of this kind of learning. Other researches show that the pre-packaged computer-based training for adults make it possible to learn better, in some cases even more rapidly and with low costs, rather than the traditional courses taught in classrooms by teachers [CAPP 90].

Distance Learning Programmes, however, are considered to be more expensive than the traditional ones; some studies show that this is true only if the enrolment is at a sufficiently high level of expenditure and taxes. In particular, a study on the actual costs of the mega-universities has stated that the cost per student varies between 5% and 50% more than

the traditional universities [Dani 96]. The main mega-universities, taken into consideration in the study, are illustrated below [TABLE 5], in terms of foundation year; number of students enrolled and of graduates; and budget in US$ (million). In some of the countries, the percentage of the budget coming from the taxes paid by the students corresponds to more than 50%, starting from a minimum of 0% in *China TV University System,* to a maximum of 87% at *Iran Payame Noor University.* The actual costs of Distance Learning become evident in a comparison of the number of enrolments and the cost for each student in these Universities with the American traditional Universities: a total of 3,500 colleges and universities in the USA serve 14 million students with an average annual cost of about 12,500 US$ per student. A total of 11 mega-Universities, instead, serve 2.8 million students with an average annual cost equal to just 350 US$ per student [Dani 96]. The taxes on the courses at the mega-Universities are lower than the taxes on the traditional Universities, and the annual cost per student is much higher than 350 US$, as evaluated by J S Daniels [POTC 98]. *This is due to two factors: the number of enrolments and the supporting services provided to the students. There is a direct proportional relationship between the two: the cost of the services rises with the increase of the enrolments. Again, the providing of a limited number of courses keeps the costs low, but when their number increases, the costs of the distance courses become more expensive than the traditional ones.*

Country	Name of Institution	Year Founded	Number of Graduates	Number of Subscriptions	Building Infrastructure US$(million)	% Tuition Fees	% Governments	Unit Cost
China	China TV University	1979	530,000	101, 000	1.2	0	75	40
France	Centre National D'Enseignement a Distance	1939	184,614	28,000	56	60	30	50
India	Indira Gandhi National Open University	1985	242,000	9,250	10	42	58	35
Indonesia	Univrsitas Terbuka	1984	353,000	28,000	21	70	30	15
Iran	Payame Noor University	1987	117,000	7,583	13.3	87	13	25
Korea	Korea National Open University	1982	210,578	11,000	79	64	36	5
South Africa	University of South Africa	1873	130,000	10,000	128	39	60	50
Spain	Universidad Nacional de Education a Distancia	1972	110,000	2,753	129	60	40	40
Thailand	Sukhothai Thammathr irat Open University	1978	216,800	12,583	46	73.5	26.5	30
Turkey	Anadolu University	1982	577,804	26,321	30	76	6	10
United Kingdom	Open University	1969	157,450	18,359	300	31	60	50

TABLE 5: Mega -University - J S Daniels, 1996.

For instance, an Open University spends more than 3 years for the organisation of a new course and it invests more than a million pounds, in particular to implement the technologies. The *printed materials, the audiocassettes,* and the *TV lessons* use low-cost technologies for a small number of students (less than 250), while the *radio broadcasting* needs at least 1,000 students to maintain the unit cost at a minimum. Lectures via *computers* have low costs and make it possible for interactions between the teacher and the students, but *live interactive broadcasts and the video conferencing* deploy advanced technologies which are generally expensive, particularly with the rise in the number of enrolments.

In TABLE 6 the average cost per students' groups (from 50 to 1,250) are underlined for every technology used in the process of Distance Learning.

Technologies	Cost/50 Students (US$)	Cost/125 Students (US$)	Cost/250 Students (US$)	Cost/625 Students (US$)	Cost/1250 Students (US$)
UNI-DIRECTIONAL					
Printing	-	2.61	-	0.63	0.37
Videotape	-	3.51	-	1.30	1.02
TV Course:					
- 25 courses	7.71	3.09	1.54	0.61	0.31
- 10 courses	7.95	3.18	1.59	0.63	0.31
- 1 course	18.76	7.50	3.39	1.50	0.75
Radio	-				
TV Education	-				
Learning on Computer					
- Low Level	59.25	18.75	11.25	6.75	4.50
- High Level	322.50	130.50	66.75	28.50	15.75
BI-DIRECTIONAL					
Audio Conferences	-	7.12	-		
Interactive Lessons On Air	-	67.24	50.14	4.11	3.67
Videoconference at 340Kb/s	56.74	22.17	16.78	34.36	29.00
Dual-mode Conference On Computer					
- Institutions	1.45	1.12	1.09	0.99	0.93
- Students	0.69	0.69	0.69	0.69	0.69
- Combine	2.55	1.81	1.80	1.69	1.68

TABLE 6: Average Costs Per Number of Students of Every Technology Used in Distance Learning – J S Daniel, 1996

Trends and changes in Distance Learning are spreading more and more in all countries, having been imbued with renewed vigour enhanced by the help of the Internet. The main role in this process of transformation is played by the *World Bank*, which has decided to enlarge its distance learning programmes and its training activities and to help the members create their own abilities in this sector. With this aim the organisation has created a new Website for distance education called *Educationnet* (EdNet), in order to provide the politicians, the education experts and the people who make investments with information service of high-level quality. It is organising a series of regional workshops about distance learning in the countries and it is launching projects to improve the learning capacities of these countries. Furthermore, the Bank is launching its global programme of teaching in order to spread knowledge all over the world through its offices in the various nations and a large network of infrastructure.

Donor organisations, such as the *World Bank,* and other institutions invest in the Internet in order to spread education in the Developing Countries, but the education systems of these countries often lack access to the necessary information needed to make it possible to put the projects into practice. The Web can play a more relevant role in making this gap decrease and can also provide the necessary information to increase the population's knowledge. The Internet provides not only education through courses for students, teachers or employees, but also makes it possible to transfer the cultural inheritance of the world and to share it amongst individuals, communities and nations. In Egypt, for instance, a Website has been devoted to the Egyptian Museum (http://www.idsc.gov.eg/culture/egy-mus.htm): here one can find information on the thousands of years of civilisation that prevailed in Ancient Eqypt.

The diffusion of the Internet worldwide has literally changed the traditional structure of the school and, as it can be noticed from the previous examples, it is doing it in many different ways that are more and more interesting. It must not be forgotten, of course, that parents keep on worrying about the fact their children's opinions are circulating all over the world and that this could mean danger and repression for them; psychologists frequently remind users and non-users alike of the problem of the images of pornography and violence on the children that can be found on the Net. These anxieties, however, cannot erase the advantages coming from the introduction of this new technology into the educational area.

CHAPTER V

THE NET AND HEALTH INFORMATICS

What Advantages Does the Use of the Internet Bring in the Health Area and Medicine?

5.1 Medicine

During the last two decades or so the **life expectancy** for people living in the Developing Countries has increased, on average, from 42 to 62 years. The most rapid progress in the improvement occurred in Oman, Yemen, Saudi Arabia and in Vietnam; while in Uganda, Zimbabwe and Zambia the same factor has decreased to less than 50 years, primarily because of the spread of the HIV virus. The **infant mortality rate** in the Developing Countries has halved during the same period, passing from 149 deaths every 1000 babies born alive in 1960 to just 65 in 1996 [Undp 98].

The above progress has been reached mainly as a result of improved larger **access** to the health services, and drinkable water, improvement of the hygienic conditions, the diffusion of vaccination, and most significantly, to a broader diffusion of the medical and health information. The need for rapidity and easy access to medical and health information are essential conditions for the quality of the help rendered to patients, and for the medical researchers who must keep abreast of developments in the health service and profession. In many areas of the Developing Countries, however, it is an uphill struggle, if not impossible, to obtain some information because of the poor telecommunications infrastructure in most of the countries, the weak economic conditions in some of the countries and the frequent occurrence of natural disasters in some of the countries.

Many doctors, nurses, and scientific researchers in the Developing Countries work in a context where access to information is one of several problems: the partial or total **lack of technical means,** sometimes even

basic requirements, such as rubber gloves, medical equipment, or the **inadequate availability** of medicines, such as aspirins, **lack of specialist courses** and **insufficient remuneration** to the best doctors, nurses and paramedics.

In the report by *Panos Institute* [Pano 98b] Dr Ruhakana Rugunda, an ex-Minister for Health in Uganda, declared that the information service in these countries is really poor: *'the textbooks are out-of-date, and access to information on the latest scientific discoveries, on the development and sale of new medicines, or preventive practices is really limited. The doctors are isolated as they cannot receive advise about the way a diagnosis can be done, or they cannot find detailed information on the nature of treatments already applied for a determined kind of case'.*

From the very beginning the Internet gave rise to the potential for resources that are amenable for use in providing solutions to pertinent problems in these countries. In particular, the health area has been one of the first sectors to use the Net in order to have access to new information sources. The change has been radical and to date, through the use of inexpensive methods, such as e-mail and newsgroups, human lives can be saved, isolation can be reduced, doctors can take more informed decisions.

5.2 HealthNet

The American non-profit organisation *SatelLife/HealthNet* was founded in 1989 with the aim to promote computer networking in the Developing Countries through the application of the new information and communications technologies in health, medicine and environment [Sate 98]. The aim has been realised by collecting funds that were sufficient to launch into orbit two small satellites: **HealthSat I** (UoSAT-3) in 1991 and **HealthSat II** in 1993, both belonging to a family of 12 microsatellites designed and built by *Surrey Satellite Techology Limited* (SSTL).

HealthNet is a telecommunications system composed of: a system of Low Earth Orbit (LEO) satellites, a simple ground station and a network of computers connected via radio and telephone. This system without 'links' works really well and with low cost even in areas where there are no telecommunications infrastructure at all or where their presence is limited [Heal 98a]. The users are connected to the Net through the *HealthNet* nodes, and Terminal Node Controllers (TNCs) in every country where

the organisation works. TNCs are electronic distribution centres: computers sending and receiving messages from or to every point of the network, for instance, in a post office, which receives and distributes mail.

The strategy of *SatelLife* is based on the principle of off-line communication, since in geographically or topographically dispersed areas communications infrastructure is lacking, deficient or inadequate, is of low quality or very expensive, and the most efficient way to communicate is by using digital messages, rather than by direct voice in real time or by fax connectivity. *SatelLife* has used two other means in order to implement its own telecommunications system in the most effective way [Heal 98c]:

- **The Telephone:** *Fidonet* has developed a very cheap alternative to complete connection via the Internet. The FIDO networks transfer e-mail through a series of plannned telephone calls. The nodes are connected just in time to transfer the messages. The evolution of *HealthNet* has made it possible to create a big network of FIDO network nodes: some of them use the LEO satellites of *SatelLife* and others are directly connected to the corporate office of the organisation in Boston, where a central Internet gateway is operating. This service is considered to be very reliable in the Developing Countries, as the cost of the calls to the office in Boston is treated as American - local. The organisation, however, is transforming these telecommunication costs and related costs into independent costs of *HealthNet.*

- **The Internet:** In 1994 *SatelLife* tried to join the e-mail service between *HealthNet* and the Internet, by enabling its users to send and to receive e-mail to and from the users on the Net. This has been made possible owing to the diffusion of the new information and communications technologies and of the Internet worldwide including their manifestations in the Developing Countries. The high costs of connectivity, however, made it possible to have the priority of the service limited to the private sector and in the state financial institutions. *SatelLife* has, however, had the best

opportunity to help institutions working in the public sector, in particular health and education, by providing secure connectivity. In fact, the community of *HealthNet* users has access to the Internet as a group through a single access point, and in this way it can negotiate more successfully with commercial ISPs. *SatelLife* has also introduced an easier solution for Net-surfing, called *GetWeb,* with enables those users who do not have a direct connection to the Internet to acquire texts from Web documents simply through e-mail.

In conclusion, *HealthNet* is the telecommunications system based on the *SatelLIfe* computers, which makes it possible to connect health operatives and professionals all over the world and to have access to the latest medical and health information,through e-mail connection, to Web conferences and to other services conceived for its users. *HealthNet* is also a network of people serving about 4,000 health operatives and professionals, doctors, nurses and scientific researchers, in more than 30 countries worldwide, 22 of which are in Africa (see TABLE 7).

Continent	Countries where *HealthNet works*
Africa	Botswana, Burkina Faso, Cameroon, Eritrea, Ethiopia, Gabon, The Gambia, Ghana, Kenya, Malawi, Mali, Mozambique, Nigeria, South Africa, Senegal, Sierra Leone, Sudan, Tanzania, Uganda, DRC, Zambia, Zimbabwe.
Asia	China, Indonesia, Myanmar, Nepal, The Philippines.
Latin America	Bolivia, Colombia.
Next activation	Bangladesh, Cambodia, Haiti, Madagascar.

TABLE 7: Countries where *HealthNet* is operating, HealthNet, 1998

Which are the services *HealthNet* provides the scientific community with? When the potential users, namely, hospitals, nursing homes, doctors, nurses, medical researchers, universities, health organisations and libraries, subscribe to *HealthNet*, they are supplied with the following services:

- **Greater Information Access:** *HealthNet* makes it possible to broaden access to the various information sources through the availability of online medical bulletins, online libraries, and

electronic conference facilities. Subscription to the service enables users to receive *HealthNet News*, the electronic publications by *SatelLife*, which report the latest medical researches of relevance to the Developing Countries *(AIDS Bullettin, CBR News, Child Health Dialogue, Emerging Infection Diseases, Morbidity and Mortality Weekly Report*, and so on). The Net makes it possible also to have access to the database of the *US National Library of Medicine;*

- **Saving Human Lives:** The reports of the organisation say that *HealthNet* helps save many human lives and that it helps supply the best medical treatments in isolated areas;

- **Connectivity to Libraries:** *The Library Partnership Program* promoted by *SatelLife* makes it possible for users to subscribe to libraries of both the Developed Countries and the Developing Countries, by helping the users receive the complete or detailed texts of medical research and practice articles. Furthermore, the program enables the libraries of the Developing Countries to gain new knowledge and share relevant experiences;

- **More Rapid Response in case of Epidemics and Emergencies:** The greater access to the information sources enables doctors and paramedics to react more rapidly in case of an epidemic. Also, *SatelLife* encourages the giving and the sharing of information about emerging diseases through a Web conference entitled ProMED - *Program for Monitoring Emerging Diseases* and other newsgroups, opened to anybody through e-mail, such as ProCAARE - *Program for Collaboration Against AIDS and Related Epidemics.*

- **Affordable Costs:** *HealthNet* uses a technology for which all scientific operatives and professionals in medicine and related areas and medical institutions can pay, as and when the ground station is installed. The operational costs are only a small portion of the costs of a telephone or fax connection. At the moment the world health community uses the services provided by *HealthNet* in various ways. Some concrete examples of the numberless applications of the Internet in the health area include the following [Heal 98b]:

❑ Surgeons in Mozambique, Tanzania and Uganda use *HealthNet* to exchange opinions about treatments for patients and surgery techniques of reconsrtuction;

❑ Through *HealthNet* scientific operatives in The Gambia no longer have to travel over 700 km in order to collect data on medical tests; this information is transferred from one computer to another another in seconds;

❑ Doctors in Ethiopia use *HealthNet* in order to plan consultants and references, which are necessary for potentially critically-ill people who cannot travel through long distances or are not sure to find a doctor;

❑ The medical operatives of Vanga Hospital in DRC use *HealthNet* to send regularly news to other parts of Africa, to South America and to institutions of the North about progress of research on Trypanosomiasis[1];

❑ In order to fight the epidemic of cholera in Zambia, the University library of the University of Zambia was able to obtain relevant books through a partner university in the United States, the University of Florida, then provided relevant information to all *HealthNet* users of the region;

❑ In the North of Ghana, researchers on malaria have daily communicated through *HealthNet* with the *London School of Hygiene and Tropical Medicine* and the *Tropical Disease Research Centre* in Geneva, enabling a sharing of knowledge and experiences in critical areas of medical theory and practice;

❑ Researchers, in co-operation with the *Dain Fosse Gorilla Foundation* in Rwanda, routinely use *HealthNet* to take gorillas back to their natural environment. The data collected by these researchers are accordingly made accessible further afield;

❑ Mailing lists over *HealthNet* keep users up-to-date about the latest developments in many areas. ProMED mailing list, for instance, aims at keeping the doctors up-to-date on the

eventual outburst of infectious diseases, from the very beginning, and aims at providing early warnings in respect of concerned areas [Prom 98];

❑ The *Health Professional Database* enables *HealthNet* users to search for the profiles of thousands of medical and health operatives and professionals that have common concerns and interests for a sharing of the lessons of experience within the context of communities of interest, communities of expertise, or communities of interdependence.

The website for *HealthNet* (http://www.healthnet.org) provides more information about the profile of the organisation, the way it started operating in every country, the way the various services are used and about the future of *HealthNet.*

The eventual decision to subscribe to HealthNet must take into consideration the figures reported in TABLE 8, which shows the typical costs in Africa, valued in US$ for the health expenditure and for some new technologies, if they were exploited in the various health contexts.

TYPE OF SERVICE	**COSTS (US$)**
Average Medical Service Received Per Person per Year	10
Average Monthly Service Rendered Per Doctor	150
Three-Minuite Telephone Call from Burundi to Botswana	23
Six fax pages from Mali to Zambia	180
Individual Monthly Connection to the Internet	100
Monthly Connection to *HealthNet* (local tariff for connection plus a nominal tax for subscription)	10

TABLE 8: Comparisons among Some Costs in Africa - HealthNet, 1998

From the examples of the various uses of *HealthNet* the great advantages offered by the Internet in this sector can be understood. Nevertheless, the points of view about the services provided by *HealthNet* and making use of the Internet in the health area are really different: some people think that rapid and cheap access to the various medical sources has completely

changed the way of working in the hospitals; others more skeptically consider the Net just a waste of energy and resources. Talking about this argument, Dr Peter LeJacq, M M., of *Bugando Hospital* in Mwanza, Tanzania, [Pano 98b], has stated that *'cheap access to the communication network and e-mail service has made the fortune of one of the hospitals in Tanzania. In fact, our 800 beds of the Catholic Teaching Hospital were once used for about 7 million people; we had to search for funds, donations and materials through the telephone or fax. At the end of every year the expenditures for these services cost about US$ 5,000. Since beginning* ***HealthNet*** *we have increased our ability to find funds, recruit staff and buy goods'.*

HealthNet reaches people in the remotest places of the planet. Mohan Pradhan, the operative responsible for the *HealthNet* program in Nepal, in an interview by Panos Institute [Pano 98b] explains that this kind of service has been thought right for the developing countries, as the information that can be found on the Net through the commercial ISP deal with health information, such as the curative aspects of modern medicine, in an incomplete way.

The services of *HealthNet* have been criticised for being not so reliable and flexible, but Dr. Buddha Basnet, specialist in mountain diseases in Nepal, replies that *'HealthNet offers its services at a low price and enables [users] to have access to several information, which are useful for the Developing Countries'.* He connects with mountain medicine experts in the United States and exchanges opinions with them about the research he is carrying out: 'The effects of the altitude on the porters carrying trekking equipment and the ones for the expeditions to the mountains in Nepal' [Pano 98b].

5.3 Further Examples

Even if *HealthNet* is maybe the best example in which E-mail and Internet have been successfully applied to the health sector in the South, we must not forget other facilities, such as, for instance, *The Latin American Health Information Centre* (BIREME), operating in Sao Paulo, Brazil. It has been created in order to make it easier for the scientific operatives of Latin America to have access to the information and to the best literature in health and medicine and also to promote the diffusion and the application of the scientific productivity of these countries. BIREME was one of the first health organisations in the world to

introduce the CD ROM technology into the productivity sector.

In Latin America there are four other innovations geographically covering the whole that have been promoted in order to solve the specific situation of a nation or for inter-national aims with Latin America:

- **BELRANO HOSPITAL SYSTEM:** *The Belgrano Hospital System* comprises a computer-controlled system aimed at the promotion of a self-governed group. The systems are relatively known and are habitually deployed in the industrialised countries. The situation in the Developing Countries, however, is completely different, especially for the public institutions helping the poor in environments with insufficient or no national health service. The situation of *Belgrano Hospital* demonstrates how the introduction of a computer-controlled system into an average institution has been part of a process that has both sociological engineering implications. The aim of the idea has been to offer the best possibilities of treatment to the patients of the centre and to improve the efficiency and the efforts of the groups of workers and professionals. This goal has been realised with very limited resources, but with a high degree of diligence and enthusiasm.

- **SMED-BITNIS:** *SMED-BITNIS* affordably links Chile, Brazil and Argentina to world-class medical knowledge. Over the years the countries of Latin America have had many difficulties in keeping pace with progress in medicine because of several reasons, amongst which are the high costs of access and utilisation of the telecommunications systems. Nevertheless, the lack of resources has positively contributed to the stimulation of the creativity of human vitality. This has been an impetus for the creation of the *SMED-BITNIS* system, which combines the recent diffusion of the Internet in these countries with the very generous policy of the *US National Library of Medicine*, which has offered *MEDLARS,* the biggest 'store' of medical knowledge, to the professionals of Latin America. The SMED software and the BITNIS code have been created at the University of Chile in order to provide medical information at the cost of a local call all over Latin America. *Medical Informatics Foundation (FIM)* - is one of the three distributors of the service.

- **CLAP:** *Latin American Perinatology Center (CLAP) in*

Montevideo specialises in perinatology medicine and medical treatment during pregnancy. This is very significant in Latin America, where birth and childhood are fundamental in the context of the predominantly large young population living in social and economic conditions that are not satisfactory. *CLAP* is a centre situated in the *University Hospital of Montevideo in the capital of Uruguay.* It has been one of the pioneers of the development of standardised medical methods to provide pregnant women with adequate treatment. *CLAP* is the first centre in Latin America to use computers to analyse available perinatological data and is an international leader in the training of scientific operatives for the research of informatics and telematics-controlled methods in perinatology.

FIGURE 5-2: HealthNet in South America - HealthNet, 1998.

- **HEALTH TELEMATICS:** The development of informatics and of telematics in the health area in Peru has taken provenance from existing national projects of the health and medical authorities and the work done by *Cayetano Heredia University* and building on electronic connectivity with regard to hospitals, comprising varied capacity building initiatives ranging from the introduction of the e-mail to the installation of computers in the libraries of medicine.

5.4 How to Value Support by the Internet

The importance of the use of the Internet for medical and health purposes is the main theme of the researches carried out by the *Health On the Net Foundation (HON)* every six months for the purpose of estimating the level, the value and the degree of easiness of using the Net.

The researches on *'Use of the Internet for Medical/Health Purposes'* have been carried out through the help of a form filled-in on-line by the participants who have been interviewed through e-mail, newsgroups and related methodologies. The questions are about the possibility and the degree of easiness with which to find medical information on the Internet, about their quality and the actual use of the Net by doctors or nurses [Hon 98a].

The third research, carried out in May/June 1998, showed that 93% of those interviewed had found really interesting information on the Net. The results confirm the usefulness of the Internet and the quality of the information, including information in languages other than their own. A total of 68% find access to information on the Net "easy", against 60% in the previous survey. The results concerning the usefulness of Internet for doctors and nurses are similar to the 1997 results, save that in this survey research more patients had filled-in the survey form (64% against 40%). A total of 1863 people responded to the survey questionnaire. The users connect to the Net mainly from home, nearly 73%, of whom 42% are professional doctors who habitually look for information both for their patients (53%) and for themselves (68%); there is a significant presence of women on the Net, about 58%, of whom about 40% are recorded as having been using the Internet for less than one year [Hon 98b].

The *World Health Organisation (WHO)* has recently launched a new project to control a condition termed *Management of Tropical Education and Understanding (MANTEAU). MANTEAU* focuses on the learning and on the improvement, even through the use of electronic networks, of the abilities of the scientific operatives and of the administrators, both at a national and international level, to prepare and spread concrete, technical knowledge in the medical field. The WHO has also founded *The Association for Health Information and Libraries in Africa Networks (AhilaNet),* which has promoted various on-line activities among its members all over the African continent - such as the newsgroups through e-mail.

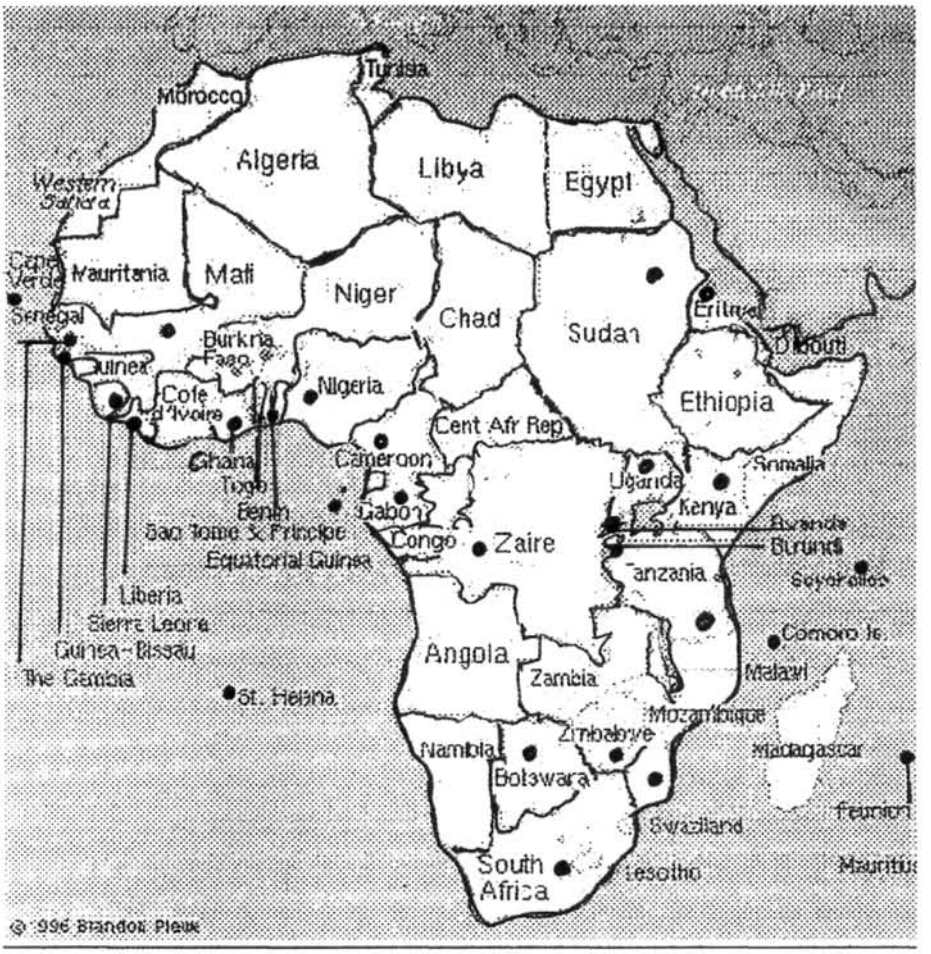


FIGURE 5-3: HealthNet in Africa - HealthNet, 1998.

The Internet and medicine in the Developing Countries, as we have seen, are not two completely different worlds. The list of information and communications technology activities in the health sector of all Developing Countries is very significant. When we take into consideration the introduction of the Internet into this sector we have to remember that 40% of medicine arises from an initial exchange of information. The main point is not to decide whether the Internet and the science of computing should be introduced into these countries or not; the main problem is to decide how to adjust the resources between information and communications technology initiatives on the one hand and medicines and medical equipment and other related paraphernaliae on

the other. According to the WHO - *World Health Organisation - the priority of investing in the information technology is clear: 'The development of an adequate and reliable telecommunications infrastructure can help fill in the gap between those countries having the necessary medical treatments and the ones that do not have them'* [Whop 97].

CHAPTER VI

THE NET AND THE ECONOMY OF THE DEVELOPING COUNTRIES

How Can We Exploit the Resources of the Net in the Main Sectors of the Economy?

6.1 The Internet as a Development Factor

Unlike social progress, the *economic development of a country* can be analysed by considering the growth of three main sectors of the economy: **agriculture, industry** and **services** sectors, corresponding to the primary, secondary and tertiary sectors of the traditional national economic development. The distribution in the three areas is different depending on the country because of various reasons:

- The characteristics of **agriculture** in the various national economies are influenced by several natural factors, such as climate, morphology, and water resources, among others; but also by historical, economic and human factors, such as the means and the techniques for the cultivation, the prices of machinery and of the fertilizers and the costs of the products;

- The characteristics of the **industrial sector** in the various national economies show a disproportionate distribution pattern. There are regions and countries with a very high industrial concentration and there are regions and countries where industrialisation is not highly significant and industrial areas are remote. Furthermore, the most industrialised areas do not all have similar features: there are regions that developed many years ago, there are regions

where the first industrial development is a recent occurrence; there are also regions where a very rapid and impetuous modernisation process of the production systems is occurring now;

- The **services sector** constitute a sector that is hugely growing in the Developing Countries, not only as a support to emerging industrial activities but also as a producer of independent services aimed at improving the people's welfare.

The complexity of the economies of the various countries and the strong relationships among the economic systems have made it necessary for circulation, in the contemporary world, not only of goods and of people, but also of information. In our analysis of economic progress, we would like to focus exactly on this point, as through the availability of information, the primary, the secondary and the tertiary sectors can grow and promote the economic development of a country, by removing the gaps created with the passing of time.

The globalisation of the markets is giving rise to a need for detailed and precise information, which can be obtained only through deployment of the new information ans communications technologies. In the following pages we will analyse what kind of contribution the Net could give to support the economy of the Developing Countries.

6.2 Agriculture

Agriculture has been the main economic activity of human societies for many centuries and even today it is the primary, if not the only one, source of income for most Developing Countries. In these countries, two types of agricultural systems are essentially exploited: *subsistence agriculture and plantation agriculture. Subsistence agriculture* applies to agricultural practice on limited land area, for the benefit of a family, group of families or small population of a village. Agricultural mode deployed in subsistence agriculture is generally manual, and sometimes, with the assistance of animal power, as the farmers are not able to secure sufficient capital to invest into irrigation works or into the purchase of machinery or of fertilizers. Under these conditions, the income levels are really low and are sufficient only for the survival of the farmer and of his family. Even animal breeding is sufficient just for family subsistence, as the animals, for the most part bovines and caprines, are bred in their natural state and their products are destined for family consumption or are exchanged with

cereals and legumes and other food crops produced by the farmers.
In the Developing Countries, in addition to subsistence agriculture, agriculture and commercial activity may be undertaken by big local landowners and by big, foreign multinational companies. Modern means and techniques of production and the relatively low labour-cost provided by the local population enable cultivation of extensive fields for just one product: coffee, tea, cocoa, peanut, pineapple, banana, or cotton, all invariably destined for export to the world's richest countries. This mode of agriculture constitutes plantation agriculture.

The majority of the world's Developing Countries are situated in the tropical, sub-tropical and monsoon areas, so there are different climatic regions where various kinds of crops are grown according to the different natural factors.

In the torrid zone, between the tropics, there are distinct areas from the point of view of the climate and of the environment; here different agricultural systems and various productions can be found:

- The **Equatorial Zone** has consistently high temperatures with heavy and regular rains during the year, which favours the growth of the pluvial forest. The equatorial zone is located around the Rio of the Amazons in South America, the Congo in Africa and in the South-East of Asia. In this climatic zone, agriculture is practiced just along the coasts of the rivers, owing to the general impasse imposed by the high costs of transport and of the communication routes;

- In the areas of the African and South American **Equatorial Forest,** along the coasts of the Gulf of Guinea and of Brazil, in some areas of the South-East of Asia and of Central America the two types of agriculture, namely, subsistence agriculture and the plantation agriculture, coexist. Subsistence agriculture in these regions are extremely primitive and are generally based on the cultivation of such crops as manioc, yam, and tubers from which carbohydrate-rich food is derived as the basic food of the local population. Plantation agriculture is extensive, comprising such commercial plantation crops as cocoa, coffee, sugar-cane, and oil-palm, which represent the main source of income for the people;

- Far from the equator is **Tropical Savanna Zone,** with its dry

farming. Dry farming is an extremely poor mode of agriculture, which exploits the very few months of rains for the cultivation of food crops, such as sorghum and millet. The production levels under dry farming, however, are really low and are often inadequate for the nutrition of the people;

- The **Monsoon Zone** is located along the coasts of South-East of Africa, the coasts of the Indian peninsula, all the Indo-Chinese peninsula, Japan and the South-East of China. All these areas are, more or less directly, under the influence of violent seasonal rains brought about by the monsoons which, during the rainy season, blow from the sea towards the land and taking heavy rains to the landmass. The monsoon rains provide a relevant source and supply of water, which makes it possible to cultivate rice and other plantations.

Expounded above represents a global overview of agriculture in the Developing Countries, from which the urgent matter of information on the different farming techniques and on the use of the various means becomes essential. In fact, modern agriculture in the most industrialised countries has introduced some relevant changes into the world farming system that can be adapted to the various agricultural environments, according to the different needs and the natural backgrounds.

A problem pertaining to agricultural production in some African countries relates to the invasion of agricultural crops by grasshoppers: grasshopper invasion results in destruction of crops by the grasshoppers. It seems a really urgent problem, but scientific knowledge developed in recent years both in the Developing Countries and in industrialised countries can solve it in many ways, including a deployment of bacteriological and biological methods. This problem and many others in the Developing Countries can be linked to the lack of information relating to agriculture and the scientific method. The Internet can fill in this gap in an easier way by making it possible for the Developing Countries to be updated on all the scientific knowledge developed and applied in the industrialised countries.

6.2.1 Support to Farmers

Farmers can make use of the new information and communications technologies (ICTs) to collect up-to-date information about the prices of

the raw materials and of the products, and even about the production trend of the various countries.

In Sri Lanka there is the example of a rural farm selling cocoa and exotic fruits to a dealer from the capital (Colombo) which, until recently, had to accept the price suggested by the seller. By installing a telephone line and connecting to the Net, the farm is to date able to know in real time the price of his products in the local market, and subsequently able to establish the selling price for the dealer. The farm is thus sure of selling its products at competitive prices and has, in fact, been able to redouble its profit on the local commodity market [Pano 97].

On the Internet we can find vast amounts of information on farming practices and research provided by big organisations, such as the *Consultative Group on International Agriculture Research (CGAIR),* which deals with researches on various areas, including environment, agricultural production, biodiversity and biotechnology. Together with the latest news about farming and the environment, CGAIR provides practitioners with the latest researches and with connections to other sites where various themes, their annual reports and various pertinent studies can be found. TABLE 8 illustrates a list of organisations, distributed worldwide, especially in the Developing Countries, that provide, like CGAIR, their consultancy and research in agriculture and related areas for the support of faming practices [Cgia 98]:

ORGANISATION	DESCRIPTION
CIAT	**International Centre for Tropical Agriculture:** centre in Latin America. Focuses on tropical agriculture. The users can receive news, use the library and the link to other data base.
CIFOR	**Centre for International Forestry Research:** research centre for the management of forests, including, degradation. Provides a reference point for scientists and for developers interested in the future of the world forests.
CIMMYT	**International Centre for the Improvement of Maize and Wheat:** focuses on collection of information related to maize and wheat: surveys, new technologies, sowing and harvesting, practices etc.
CIP	**International Potato Centre:** specialises in every kind of potato worldwide.
ICARDA	**International Centre for Agricultural Research in the Dry Areas:** researches on aridity, desertification and land degradation
ICLARM	**International Centre for Living Aquatic Resources Management:** devoted research on aquatic resources worldwide and in particular to the fish breeding in different areas of the planet.
ICRAF	**International Centre for Research in Agro-Forestry:** specialises on agro-forestry research, including agricultural practices carried out in forest regimes, for the purpose of both food production for local consumption and wood and other forest products for the export market.
ICRISAT	**International Crops Research Institute for Seeds:** specialises in research for the improvement of seed varieties for use in various environmental regimes.
IIMI	**International Irrigation Management Institute:** specialises in research on irrigation techniques and management practices.
IITA	**International Institute of Tropical Agriculture:** dedicated to researches relating to agriculture, to plant health and the management of crops within the context of the tropical climatic regime.
ILRI	**International Livestock Research Institute:** specialises in research on the breeding of livestock, focusing on genetic and health research and on tight collaboration with national research agricultural systems.
IPGRI	**International Plant Genetic Resources Institute:** spearheads international research on plant genetic resources.
IRRI	**International Rice Research Institute:** dedicated to reserach on rice varieties worldwide. The institute's Rice Web provides a wide information resource about this cereal.
ISNAR	**International Service for National Agricultural Research:** focuses on agricultural systems and laws of every nation.

TABLE 8: Main Organisations - CGAIR, 1998

From these examples a conclusion can be drawn, namely, that even in the agricultural sector, the Internet has become an important source of information for all experts and practitioners in the sector and related

areas. Everyday websites on agriculture are visited more and more and new activities are promoted. WARDA - West Africa Rice Development Association , for example, only recently created its website, which will be dedicated to the provision of information to researchers and rice growers in West Africa. WARDA is an association dedicated to the cultivation of rice in West Africa [Cgia 98].

6.3 The Enterprises

The industrialised areas of the world are distributed in a disproportionate way worldwide: there are regions where industrialisation plants are predominant in spread and there are those regions where the presence of the industrialisation is rare. The distribution of the industrialised areas worldwide underlines, in significant measure, the difference between the North and the South: large industrialised areas are concentrated almost predominantly in the Northern hemisphere, while in the Southern hemisphere industrialisation is but a recent reality, having just begun to spread.

In fact, in the Southern hemisphere there are only a few countries with industrialised areas of significant importance; they are essentially small areas of recent creation situated in predominantly agricultural territories. They are called the Newly Industrialising Countries (NICs) and include, in most general terms, the following countries: Mexico, Chile, Argentina, Brazil and India, where Government intervention has led to a positive turning-point for national industrial development. It has not been easy, however, for these countries to make ingress into a world industrial context with a solid foundation and comprising large companies and enterprises characterised by large capital, solid scientific and technical knowledge, advanced entrepreneurial abilities and qualified labour, of the type found in most industrialised countries. However, progress has been possible, mainly due to the existence of certain conditions (donations, sponsors, and so on) and the participation of the industrialised countries or their multinational companies.

Many of these countries have been chosen by multinational companies for the installation of new factories, both because of the *low cost of the land for factories, and other installations, and because of the low cost and the relative abundance of the labour force.* Many countries of South-East Asia belong to this category of NICs, which includes Southern Korea, Taiwan, Singapore, Malaysia, The Philippines and Thailand.

A second important group of the Newly Industrialising Countries comprises those countries that have been fortunate to exploit large quantities of mineral and energy resources of the subsoil, such as oil, for instance. Some of these countries have used the income generated from the exploitation and export of these raw materials to promote a process for the construction of basic manufacturing plants: this is the case for Venezuela, Mexico, Indonesia, Nigeria and also most of the Arab states in the Middle East and the Gulf. Nevertheless, the development of the firms in these countries has been limited to very narrow areas, which have not succeeded in alleviating, through their production, the condition of general poverty of the population.

From this global survey on the industrialisation level of the Developing Countries, it can be remarked that the economic progress of these countries is still connected to the economies of the industrialised countries, because of the exports of raw materials and of the presence of the multinationals.

6.3.1 The Lack of Information

One of the main problems for people in the Developing Countries is the lack of adequate information. The improvement of the telecommunication infrastructure can increase the level of business of the small, ,medium and large enterprise as it definitively reduces the cost of the information and promotes new ways of organising the various sectors and enterprises.

The Internet and the new information and communications technologies make it possible for business enterprises to increase their profits through exposure to the global market worldwide. Past experiences have shown that technologies can change the methods of distribution of the goods and of the services, and can provide the most advanced firms with new opportunities to improve on the efficiency of distribution and to offer goods at competitive price levels to the consumer, using, for instance, telephone orders or 24-hour dispatch services.

To date the most important industrial sector is an economic sector which is backed by deployment and exploitation of the new information and communications technologies (ICTs). In November 1998, for instance, Prime Minister Atal Bihari Vajpayee (India) officially opened the first hi-tech park near Hyderabad, a central area of the Indian continent. In the high-tech park, an Indian "Silicon Valley" will be built over a land area of

160 acres with a planned expenditure of about 4 million US Dollars [Dea 98c]. This is not, however, the only experience in the area of the new information and communications technologies for India. India, a predominantly agricultural country has, in recent years, become dominantly competitive in the creation, transformation and the management of the distance programs, particularly in the area of software development. According to the National Association of the Service and the Informatics Engineering Societies this sector is the most successful in the Indian exports: about 50% per year, nearly the double in comparison with the exports of the world market in this sector.

All this has been possible due to the presence of the big information technology companies: *IBM, Digital, Hewlett Packard, Texas Instruments, Novell, Motorola, Bull, Sun and Oracle,* which all installed their offices in India after the opening of the commercial barriers in 1991, following decades of total protectionism. But the success of the Indian exports and industry does not come exclusively from the ICT sector related industry; since 1831 British businessmen, who had their own colonies in India, have decided to give rise to a national industry. At the beginning of the 19th century Jamshedji Nasarwanji Tata, founder of one of the Indian greatest industrial dynasties, installed a hydro-electric power plant and founded the Indian Science Institute. After independence in 1947 Prime Minister Jawaharlal Nehru dreamed of transforming Bangalore into the intellectual capital of his nation and transformed it, in less than two decades, into the town of the future in the sectors of aeronautics, electronics, weapons and telecommunications [Mond 97].

6.3.2 Advantages for Enterprises

Why does the Internet represent an important technology for enterprises in the Developing Countries? What advantages can Developing Countries derive from its use? The Internet has given rise to a revolution in the economic data in favour of a globalisation of the markets and of the improvement of knowledge. In fact, the Internet represents for the enterprises a new competitive *medium*, which can be exploited in many ways:

- **Advertising and Marketing**: The Net is the ideal medium to promote a company and its activities and to study the market where it operates or it would like to enter through its several applications, including sending messages to the various forums or newsgroups;

effecting a presence through construction of corporate web pages, thus attracting consumers' attention in the virtual marketspace. The Internet actually offers all the advantages of a permanent diffusion of a numberless quantity of information concerning products and services, and at relatively competitive costs compared with traditional marketing techniques;

❑ **Communication:** E-mail is to date probably the most used application on the Net, not only by a individual users, but also by the companies. E-mail can be easily adopted to respond to existing traditional corporate and organisational policies, as it can be made to be useful both within firms for workgroup collaboration and outside firms for communication with corporate partners, suppliers, brokers and customers. E-mail makes it possible to communicate at a regional, national or international level at competitive unit costs compared to some traditional means, including telephone communication or fax communication. Even the automatic mail server enables a company to distribute, automatically and on demand, brochures or other documents describing a company's products and services, especially to those users having just e-mail, which is a typical situation in the Developing Countries. Furthermore, there there is the need for consideration for deployment of the new on-line applications through the telephone or video-conferencing: these enable managers to take part in meetings with participants situated in real-time at geographically disparate locations worldwide, while comfortably sitting in front of their own computers at home or in their own offices;

❑ **Research, Diffusion and Exchange of Information in the Industrial Sector:** 'The Net' is easily the largest data bank in the world, as it contains data and information concerning all sectors of national development, including politics, economics, society, culture and science. *FTP* and *Gopher* applications, for example, enable access to these sources of information. Also, *Newsgroups* favour debates and meetings on specific themes among international experts. Some international organisations or the big multinationals regularly publish their works on the Internet such as, for instance, the World Bank, WTO or IBM;

❑ **Management and Recruiting of Staff:** The Net makes it easier to decentralise the work of a firm, say through the teleworking revolution, with all its economic and productive advantages. According to a survey by *Dataquest* [Datq 98], more than 60% of the American employers of enterprises of any size are connected to the Internet and have allowed

employees working under their responsibility to have access to it. This has potentials for adaptation or adoption in the Developing Countries, where many multinationals are known to recruit their staff through the Net.

The Internet, however, is used by the enterprises in particular for eCommerce. This new kind of commerce on a world scale could make it possible for Developing Countries to enter the large, competitive markets of the industrialised countries.

For the new and emerging operators, such as the majority of enterprises of the Developing Countries that would like to use the Internet as a selling channel, it is important to know that the users, namely, the potential customers, are encouraged to buy on line by the services offered, by virtue of lower price differentials, and also especially by the greater convenience of buying directly from the comfort of an armchair at home and by the possibility of finding a larger offer. On the Internet, the consumer can be provided with a relevant improvement of the service, as:

- It is possible to order and to pay at all hours from any computer connected on the Net;
- The selection among the various products in the virtual shop can be made in the same manner as a traditional physical shop, namely, by looking into all the kinds of goods and services offered;
- The comparison among the alternatives proposed by multiple points of sale requires less effort and is deemed more successful, as it does not oblige the consumer to move physically; and
- The products are delivered directly to the consumer's house.

6.3.3 Obstacles to the Diffusion of eCommerce

In spite of the foregoing advantages, one of the most relevant barriers to eCommerce the world over is the degree of insecurity connected with on-line transactions. Furthermore, in the Developing Countries the scarce availability of credit cards and the difficulty in buying, especially because of the language or of the low level of literacy, have an inhibiting influence on the diffusion of eCommerce.

According to a research made by Internet Arab World (IAW) [Didn98b] about the state of eCommerce in the Arab world, only 4% of Internet users in the Arab world buy products through the Net per year. *'This is due'*, the experts say in the study, *'to the lack of a large mass of users of the Net in these countries and to the impossibility to guarantee the security of the transactions'*. Abdul Kader Kamli, Chief Editor of IAW, says that *'If the Internet is likened to an informatics motorway, a lot of work has to be done in this road in the Arab world, especially if the information is exchanged with money'*.

The research shows that Internet users in these countries are really cautious in sending their credit card numbers through the Net. Most of the interviewed people (92%) made their purchases in firms that are not in the Middle East. They generally bought computer software (23%), books (22%), and various presents (10%). The amount of money spent by a single buyer ranges from US$50 toUS$ 4,000. A proportion of the interviewed people use the credit card for the transactions, but only few of them send this information on-line: 27% of them send credit card numbers through the telephone, 31% via fax, and 15% via e-mail.

Apart from the problem of security, the technology providers mention other reasons contributing to the low diffusion of eCommerce. Some give more emphasis to certain reasons rather than to others according to the service they provide. For instance, only 50% of the ISPs interviewed mention the *critical mass of Internet users* against 71% mentioning the software companies. Many information technology multinationals consider the *low level of connectivity* against just 5% of the ISP. A few providers take into consideration the *high costs of construction and of managing the Web sites:* in fact, a small site has an average cost of US$ 500, but this cost is percieved to grow in an exponential way if one decides to open an average or big site, which costs US$10,500 US$35,000 respectively.

The future of eCommerce in the Arab world, however, is promising: in Egypt the ISP community expects a growth of 1,000%, while the multinational companies expect their sales to rise by 100% within the next 12 months through this innovative commercial solution.

In Uganda a research was made on the existing situation of eCommerce in the country [Chas 98a]. The survey is based on the analysis of 100 Websites of factories, banks, ISPs, travel agencies and cultural services.

The results show that:

- 16% of the enterprises expect an increase of their sales through the Net;
- 4% of the sites pay for advertisements on the Net;
- 44% of the companies give a detailed description of their own products and services on the Net;
- 42% of the enterprises include both a description of the products information on the prices; and
- 55% of the companies respond to consumers through e-mail.

The research also values the percentage of buyers who have used on-line services to buy products and services. This is also the state of practice in countries such as Uruguay, the USA and the United Kingdom. In 1998 this figure was equal to 1% in the Southern American country of Uruguay, while it rose to 325% in the USA and to 47% in the UK [Chas 98b].

This new *medium*, which totally transforms traditional commerce through an embedding of the new information and communications technologies, has also developed and progressed in Asia: here there are organisations, such as Electronic Markets, studying the prevailing situation of projects and regulation policies to promote the diffusion of eCommerce in the region and also the strategies to deploy the medium successfully use in the local firms [Elec 98].

The relatively low diffusion of eCommerce in the Developing Countries, however, is not necessarily a disadvantage, from the point of view of a single enterprise or organisation, as *ab initio* the opening to new roads or to new markets is bound to face diverse types of impasse, but can also constitute a relevant advantage within the context of competition. The possibilities of success in a global market are varied and various, even for the enterprises. In order to reach good results, however, Developing Countries must take three different roads to making the transition to eCommerce:

- Understanding, from the point of view of the enterprises, the situation of the other countries and exploiting the occasions given to them by the big global market. It is a great world, really competitive too, which must be entered with a well-defined and qualified identity, or a world where a particular corner must be chosen;

- Understanding what possibilities can be found in the local market place, different from the advanced markets, but not necessarily impenetrable. Innovative and original methods have to be found in order to open the doors even of the crowded sectors to the international market;

- Understanding other national markets in their individuality: from those with the largest degree of diffusion on the Net to some of the least developed, backward ones where it could be interesting to play the role of 'pioneers' in the sectors considered to be the most promising by the enterprise.

6.4 The Services: the Banks and Tourism

To date banks offer many services to their customers through the Net: *payment services, home banking, account balances, information on the loans* and many more. Some of the big banks operating in the Developing Countries also use the Internet to send information to all their accounts subscribers who have access to the Net. Some examples are provided by *Banco do Brasil, Banco de Plaza Argentina, Bank of China, Industrial Commercial Bank of China, Central Bank of Kenya, and Banque Commerciale du Rwanda,* all of which to date give information on their own products and services and also offer the latest financial and monetary news on their corporate Web sites. Furthermore, on the Net there are not only commercial banks, but also organisations, like *Grameen Bank,* giving micro-loans to the poor people [Yunu 97]. This institution founded by Muhammad Yunus, lends money only to the poorest, that is, to those people who have nothing to offer as a guarantee and for this reason are not accepted by the traditional credit institutions. Owing to this policy, with low rates of discount offered to thousands of people (10% of the population of Bangladesh), women for the most part, got onto the path to alleviating poverty and gradually increased their income, finding in this way the courage to manage their own destiny. The bank has been operating also on-line for some years, so that it can help people in need worldwide, by introducing this new economic policy, which reviews all the traditional methods, into the industrialised countries, for the benefit of the poverty-stricken statum of population.

Another sector that exploits the Net in the Developing Countries is **tourism,** without which the economies of these countries would be at really low levels. With the deployment of the Internet it is possible to have

tourist information concerning any part of the world made available to anyone anytime anyplace. A person who would like to make a journey to one of these countries can find relevant information, not only on the flight time-tables or on the booking of the flight tickets, but also on other means of transport, hotels, villages, restaurants and tourist routes in the various countries. All this information can be found not only in the websites of the Ministries of Tourism of the various countries, but also in the Websites of local tourist operators such as, for instance, *AsiaTour (www.asiatour.org),* TourismWorld *(www.tourismworld.com.au)* or TradePage *(www.tradepage.co.za/).* In this way the tourist can plan his/her holiday in detail while comfortably sitting in front of his computer at home or office.

The Net provides also hundreds of other services, which we will not mention or analyse, that are not employed in a large measure in the Developing Countries, primarily because of lack of concomitant infrastructure. The relative underdevelopment of the enterprises of these countries in exploiting the Net for the commercial exploitation of their own products and services and for all the other applications can be interpreted in two somewhat diametrically opposite ways, namely: *a problem that cannot be solved or a chance to open new roads for the development* of the country. It has to be considered, however, that the road to success is not based on general formulae or on repetitive models, but on creativity, flexibility, patience, constant research and checks.

CHAPTER VII

THE REGULATION OF THE INTERNET

What is the Role of the State in the Development of the Internet? What are the International Projects for the Developing Countries?

7.1 Internet Governance: The Role of the State

The Internet is, by definition, an open Net. For this reason some of its applications, such as the development of business relationships or the organisation of private information services, gives rise to the problem of *privacy in relation to transactions and data and also to the problem of control in relation to access to information and data.* The issue of privacy and information access concerns not only the industrialised countries where deployment of the Net has already significantly diffused, but also to countries in the developing world where utilisation of the Internet is only formative in character and where the new information and communications technologies and the telecommunications infrastructure are equally at a low level of development.

At the Telecom Summit of 1996, Fausto Colombo [Medi 96a] underscored the importance of the *ethical dimension of the Internet: any significant cultural change implies new rules for the people's behaviour.* This provokes the rise of new problems, but also evokes the need for a more critical analysis of the old problems: for example, talking about social control, there is the problem of controlling or not controlling the users. How far, for example, is the Internet allowed to enter the users' privacy? Furthermore, the world is characterised by a plurality of ethics and *'it is difficult to think of erasing this multiplicity, but we can think of finding a global ethical dimension, that is a collective concern, which contains the various local ethics and which would enable them to survive'.*

The political dimension plays a relevant role as a government is necessary, which would rule the economy of the new media at an international level. *'The problem of the big organisations'*, Umberto Colombo *explains* [Medi96], *'such as, for instance, the United Nations, is the search for the solutions to try and reduce this huge difference of welfare among countries and to face the main problems for the realisation of development in the world'.*

In this chapter we will deal, more from the point of view of the need for a legal framework within the context of deployment of the new information and communications technologies, in the path to development of the Internet in the Developing Countries, by focusing in particular on the issue of the governance of the Net, which has implications in the Developing Countries in relation to the need for the law about privacy. Privacy in relation to personal data is a civil right of every citizen-user in any nation. In addition, we will analyse various projects that have been put into practice or that are still in progress in the Developing Countries for implementation with the collaboration of industrialised countries (eg projects aimed at building the telecommunications infrastructure). Finally, we will list the priorities that have to be considered by the Developing Countries with the co-operation of the advanced countries for the diffusion of the Internet in their territory.

'Internet Governance currently represents the underdeveloped world'. This marked the beginning of the session of INET 98 [Inet 98a] on the subject of the globalisation and the regulation of the Net. During the conference held in Geneva in July 1998, some contrasting opinions about the governance of the Net emerged. Kenneth Cukier of *Communications Week states that 'the governing power has to be changed and the regional representatives, mostly constituted during the regulation process, have to be improved. The information society needs Internet Diplomats to support it in a more equal way than the legislative systems'.* On the contrary, according to Milton Muller *'by using Internet Governance to solve the problems, there is the risk of creating a governance agenda against internetworking'.* Muller thinks that regulation of the Net tends to favour the power of the Governments, while the Internet Society must be deregulated. Robert Shaw of ITU adds that *'self regulation is not sufficient for the Internet as it needs some control and balance'.*

The problem of a controlled and regulated Net is fundamental and concerns all the countries of the world, independently from their

economic growth, as the diffusion of the Internet is progressively explosive. Furthermore, telecommunications networks are needed in order to deploy the Internet, thus encouraging countries worldwide to consider changing their traditional, often predominantly monopolistic policies on telecommunications. Both in the US and in Western Europe the telecommunications policies have been traditionally based on the notion of 'public' or of 'universal service' for the citizens'. For many decades there have been some differences between the national regulations and the international regulations in providing an equal and reliable telecommunications service to all the people and the social categories. This can be explained, for example, with regard to the difference between the TV world in Europe and the TV world in the US: while in the US broadcasting is typically characterised by a free market, in Europe, until recently, TV broadcasting was a public service provided by the State, with a strong emphasis on political, cultural and religious values [Cuil 98].

The communications world has radically changed during the last decade. The modern information and telecommunications technologies have put an end to the lack of communications transfers and have transformed the world into a global village where information is a necessary and a critical resource. Through these developments previous, traditional telecommunications policies have changed, especially in Western Europe, where the notion of public service has been substituted by a policy of competition, innovation and access.

In the Developing Countries with domestic-oriented and import-substitution strategies, the policies for the telecommunications and the technology sectors have been studied in relation to their national priorities. In the less developed regimes the communications services were considered to be a public utility or a luxury entity for the consumers and emphasis on import-oriented strategies of industrialisation made telecommunications useful for the railways, the roads, the power and other utilities in the important role of a national infrastructure. Their specific role in the progress and development of these countries was limited to the increase in the distribution of services and the administrative efficiency with the rise of the production.

Recent evolutions in the world of the communications technologies policies have changed the terms of the regulations in these countries. The transformation into the global regime of the new information and

communications technologies worked to seek to change the development strategies of the Developing Countries, effecting strategy transformations from import-substitution strategies to research for dynamic and competitive advantages in the global economy. These advantages deal with the ability for creating successful 'comers' in the marketplace of the global village through the application of the technologies. Some big Developing Countries, such as Brazil, Mexico, India and China, are particularly inclined to support the global division of labour mainly as a result of their huge and the not-yet saturated markets and to the high professional capacities of their labour force. All these characteristics combine to attract international investments for business enterprise development. Also, the advanced telecommunications infrastructures, together with workers' experience and ability to deliver results make it possible to substitute the low cost of labour and to provide for the lack of natural resources; the advanced telecommunication infrastructures become the key for making ingress into the global market, as they represent a resource of competitive advantage.

In the Developing Countries the regulation of the telecommunications and of the Internet is necessarily a reactive process in response to the imperative of taking advantage of the global evolution of the communication technologies. This is in contrast to the conditions in the industrialised countries, where regulation is a pro-active process, based on the goals of the telecommunications and the new information and communications technologies companies in order to catch up with the global market. All this implies that the promotion of the communications technologies is not routinely included in the development goals of the countries, but is a response to the global configuration. According to Manuel Castells [Doke 98] global integration through the deployment of the new information and communications technologies could give rise to a wrong and an unbalanced evolution, by providing some areas with extensive emphasis and condemning the others to stay insignificant and underdeveloped. Nevertheless, a regulation of the telecommunications and of the Internet, based on the ability of the political mechanisms to negotiate on globalisation by granting national goals for progress can represent the index of success of these countries.

The role of the state is fundamental for the growth of the Net in the Developing Countries, as its contribution is essential for the support of an equal and balanced development in these areas of the world. In a report by OECD [Oecd 98a] Paul Twomey, President of the *National Office for*

the Information Economy (NOIE) in Australia, explains that self-regulation is the most appropriate way to govern the Internet, and that the role of Government should be limited to a minimum level of support on some specific problems such as, for instance, the provision of equal access and of security on the Net. Self-regulation is praised as it makes it possible to be more flexible in meeting the users' demand and because it is more successful owing to the existence of qualified knowledge about the sector.

The creation of an 'international industry' with a governing base has been suggested to solve problems arising because of the global spirit of the Internet. The main mission of every organisation would be develop a simple regulation structure, which could protect users against anti-competitive actions and could guarantee an open and equal competition in the global market of the Net. The organisations would be responsible for any illegitimate content ignoring or disturbing its members' concerns. These directions clearly suggest that Government should be implied in creating the various organising groups and even that its role should be limited to some relevant matters such as, for instance, the election of the members, the legal structure and the distribution of the various functions; but at the same time the Government is not allowed to make any operating laws or any procedures for the organisations.

In the same survey referred to above, Toru Takahashi, President of the *Internet Association of Japan and the Executive Council of APNIC,* stated that self-regulation is an appropriate structure of governance for the Internet, as the interactive community has always been self-managed ever since the beginning of the Internet; while the role of the Government must be the promoting of this kind of structure and it can take part only in the legislative matters about eCommerce and ownership rights.

The main problem is to promote this self-regulation in all the organisations, which are at the base of this global Net. An example is provided by the constitution of the new *Internet Corporation for Assigned Names and Numbers Authority* (ICANN), in which self-regulation level is still insufficient and and hence the structure and the procedures would have to be redefined.

7.2 Censorship of the Internet in the Developing Countries

The Internet is a powerful medium for the promotion of freedom. According to the Economist Pedro Schwartz, teacher of History of the Economic Doctrines at the University of Madrid and President of *Fundesco* (the Foundation for the Spanish Telephone Service) [Card 98], the network of nets is, in Friedrich von Hayek's words, *'a spontaneous order that will increase individual autonomy and political freedom. So, the Internet is a rising, not planned order, with a spontaneous diffusion of the institutional laws and no central authority, where knowledge is distributed and applications can be pre-determined'.*

The new information technologies increase both individual and public freedom, but how far can we express our opinions on the Net? In many Developing Countries Governments have created competent authorities, which censor articles published by the local or international Web magazines, banners for the advertisement of products, activities or Web sites. How far can such situations be accepted, sometimes in the face of the violation of human rights?

A Web newspaper editor in Cameroon published an article about an African President and was sentenced to two years in prison [Znde 98b]. In China an informatics engineer, Lin Hai, was arrested 25th of March 1998 for sending 30,000 e-mail addresses to VIP References, a pro-democracy Internet newsletter distributing reports on dissidents' activities, on human rights and other information to nearly 250,000 e-mail addresses in the whole country. He was jailed for two years. A physician, Wang Youcai, in December 1998, was sentenced to eleven years of imprisonment for being the leader of a pro-democracy protest in 1989, for organising a pacific opposition called China Democratic Party and for sending e-mail messages to some dissidents in the USA [Dfn 99]. Nearly 1 million Chinese have access to the Internet. The Government encourages connection the Net to promote national progress, but at the same time seeks to control the use of the Internet, especially as far as political proposals are concerned.

The *Middle East Times* has never obtained the licence to be published in Egypt and the Egyptian laws allow the Minister for Information to censor any newspaper that is published outside Egypt before being allowed entry into the country. This happens even for the Web pages of these

newspapers, which like *The Middle East Times,* publish news coming from all over the world. The competent authority for censorship checks all the information before distribution in the traditional way or through the Net. If any censor does not like any articles, paragraphs or sentences are censored, the newspaper has to erase them and to substitute them with blank space. Furthermore, the editor cannot use this space to explain the reason for the censorship.

The main reasons for censoring the news are generally the following:

- Reports on violation on human rights;
- Criticism on the President or on his family;
- Criticism on the army;
- Underscoring violences suffered by the Egyptians in the Arab states, especially in Saudi Arabia;
- A modern and not orthodox interpretation of Islam; and
- Reports on discriminations against the Coptic Christians.

Such censorship, however, is very arbitrary as these same pieces of information are sometimes authorised, while at other times censored [Dfn 97a].

Lutfi Abdel Kaber, Chief of the Censoring Authority, in an interview of *The Middle East Times,* declared that censorship in Egypt has been abolished after a decision taken by President Sadat in 1974. Ever since that date the task of the authority had been simply to check what is written about the Egyptian situation [Dfn 97b]. This statement is in contrast with reality: 11 Amendments of Censorship were declared in 1992, when Law #38 substituted the previous Law #430 of 1955 [Dfn 97c]:

- Representing the spreading of atheism, denying religious opinions and encouraging superstition;
- Representing the Prophet Mohammed and all the prophets directly or symbolically;
- Showing naked parts of the body in ways contradicting folklore and the traditions of society; also, actors' dresses must not be at variance with the Egyptian and the traditions of society and must not let the body be shown to embarrass the audience;
- Filming sexual acts or any gestures or words suggesting these acts;
- Filming any dance stimulating the senses;

- Representing alcohol dependence or drug administrations and lotteries or games as a source of income;
- Filming deaths, tortures or violent deeds;
- Representing suicide as a solution for human problems;
- Joking about national events or symbols;
- Representing in unacceptable ways any foreign country or population having good relationships with Egypt;
- Representing social problems in a way that could create despair or division among social classes, ignite ethnic wars or compromise unity of the country.

The punishment for those people who violate any point of Article XIX has increased from a minimum of one month and a maximum of six months of imprisonment to a minimum of two years, while the fines have increased from a minimum of E£200 and a maximum of E£500 to a minimum of E£5000 and a maximum of E£10,000.

The freedom of speech, both through traditional means and the Internet, is in danger not only in Egypt but also in other countries of the world. **Saudi Arabia,** for instance, is poised to introduce its own version of an information network with no objectionable material. The Chief Executive of King Abdel-Aziz City for Science and Technology (KACST) has recently explained that a study has been made about how to stop any objectionable material against the religious and moral values of the nation, before it can enter the country through the Internet. The internet was introduced in the country but the declaration did not tell which kind of material would be censored. It has to be noted, however, that in a country where there are Islamic Sharia Laws, rigid control and censorship of publications before being authorised for distribution in the country is an imperative [Znde 98c]. This kind of Internet usage will not certainly be so much open as, according to a manager of one of the ISP companies the country; the mechanism of connection to the global network is peculiar: in order to have access to the Net all providers will have to connect their own computers to a central megacomputer, situated in the capital. The national network will pass through a firewall able to prevent access to those sites that seem to be objectionable to Saudi Government, which has a conservative Islamic tradition [Dea 98i].

The future of the Internet has been recently considered by the oldest counsellor, Ayatollah Ali Kamenei of **Iran**. At the moment access to the Net is just for government organisations and, with special permission,

such organisations as the Journalists' Association. All other users cannot connect to the Net because of the low capacity of the telephone lines. At the time of writing during late 1999 through early 2000, the Government was considering to change the situation and to supply the service also for domestic applications with, however, particular precautions in order to prevent any possible debilitating effect. Until 1995 Iranians have been provided with email service through Neda Rayaneh, a partner of the municipal company of Teheran and through some private companies. Now it is possible to have access to the local Webs which can be used to search databases, to read newspapers or to exchange information. The authorities, however, seek to control the Net in order to encourage users not to use bad language or spread negative political messages. These local networks are allowed to supply only texts and no graphics [Nua 98k].

As far as **Asia** is concerned, it is sufficient to know its historical and political evolution in order to understand that in **China, Mongolia, Korea, Laos, Vietnam, Thailand and Malaysia** censorship is predominant; or rather, here the behaviour towards the Net is completely different from the Western mode of behavioral scope on the Net.

In **Malaysia** the Prime Minister has warned the young people against *'the dangerous consequences of the amoral technologies'*, and has imposed on the cybercafés to pay a deposit of US $5,100 to guarantee the total absence of politically and culturally incorrect material in their sites. If a pornographic site is found to be operating in their websites, the Authority would confiscate the deposit [Wired 99].

In **China** the Government wants to control all citizens using the Net and so has imposed on all users, both individuals having their own home pages and businessmen exploiting the Net to communicate with the world, to register with the police authority [Neog96]. This poses some difficulties because Internet users are perfectly aware that there is no precise and sure way to keep order on the Net, as anyone having a computer or a modem can send his own messages anywhere. Furthermore, we have to consider that the Internet is a technology enabling anyone, in China in this case, to communicate with the rest of the world in a free way and without restrictions, and this fact is a worry to the authorities. Even servers of the Ministry of Information cannot stop all the news. Most of the citizens can, in fact, find in American, Japanese and Australian Web sites, the Chinese newspapers not collaborating with, the oligarchic power of Peking.

In **Vietnam** a special committee met in Ho Chi Minh City to consider the possibility of imposing restrictions on the use of the Net. The same committee would be empowered to check that the main rules decided by the Government about the Internet are respected, while the Ministry for Culture, in collaboration with the Police, would prevent indecorous material entering the country through the Internet. In 1996 a new Web site was launched against this violation of human rights, with the goal of fighting the repression of the freedom of speech by publishing censored or prohibited documents. *Digital Freedom Network (DFN)* is an international non-partisan partnership organisation working with some associations, such as the Committee for the Protection of Journalists, Focus on Justice, Index on Censorship, Journalists without Frontiers, Cubanet, and the Network for the Defence of Independent Media in Africa, and seeks to promote human rights and freedom of expression. The Director of the site, Bobson Wong, explains that the main rule for the organisation is that *'the freedom of speech of an individual can be limited only when it is dangerous for the rights of other people'* [Wired 98]. The organisation has recently launched a campaign for the release of four dissidents, members of an association for the human rights in Cuba, called *Internal Dissidence Working Group.* The members were however, subsequently arrested after their publication of an article entitled *'The Homeland Belongs to Us All';* it was about the violations of human rights, the corruption of the Cuban government and it demanded an economic improvement for the Communist countries. DFN has provided delegates dealing with human rights, through their own Web sites, with a limited number of free Internet-based phone calls. In this way the users are encouraged to use their own resources to support the release of these dissidents. *'This is a way for people to use the Internet to make a difference in the world'*, President Wong declared.

The site of DFN contains also works by some lawyers about human rights of 17 countries and many letters by political prisoners [Znde 98d].

There is, however, a kind of censorship on the Net that can be accepted, as it derives from a morally correct reason: the **nannyware**, that is the *censorship of the Internet for the children's sake in order to prevent them watching pornographic or violent images.* In fact, some countries are considering to introduce servers to filter the images and prevent children entering those sites that are only for adults. An example is provided by **Singapore,** where the local ISPs were invited by the Government to offer a server-level filtering among their services by the end of 1998, in order

to keep children out of on-line pornographic images. The country has enacted severe laws against pornography, movies, and books on the Internet. The Authority for Communications has already forbidden nearly 100 Web sites promoting pornography, violence or the religious and racial discrimination from operating [Wired 99].

In Vientiane, **Laos,** the first provider in the country of the Northern part of the Asiatic Siam began its activity in about early 2000. This country borders Vietnam and shares with it the fear for the Internet and for the political contents it can offer to its citizens. For this reason *Globenet,* the first ISP in Laos, provides access to the Net together with the deployment of filters, through which Government hopes to censor the Internet [Dea 98e].

In order to solve the Internet Governance problem the *World Wide Web Consortium* decided to install a new *Platform for Internet Content Selection* (PICS) [W3or 99]. The PICS platform is one of the several means used to filter on-line material. At the beginning it was conceived to help parents and teachers control access to the Internet by children, but it is now also used in the firms, so that the employees cannot visit inappropriate Web sites while working and also by some Governments in order to control the entry of material that is deemed to be illegal in their own countries.

The PICS platform has been studied not only to prevent the youngest users having access to inappropriate information, but also to inform the individuals about the level of security, both from the point of view of the protection of information and of the software codes granted by the sites.

A coalition of groups fighting Internet censorship has recently asked the WWW Consortium not to approve the bills that have been added to the platform, as they would make this system too much restrictive, because of the difficulty of creating a rating system that would be adequate to the flexible and diverse nature of the Net. The associations think that the new characteristics would risk making no distinctions among the forbidden sites, by making the access to information and the communication more difficult [IDG 98b].

7.3 The Law about Privacy

'It is time to have clear rules in the Internet. No more juridical

compromises or solutions provided by self-regulation, but a series of precise laws, which can give impulse to the activities of the Net'. These are, in a few words, the conclusions drawn from the meeting *'Internet and Privacy. Which Rules?'* [Mina 98], organised in Rome May 1998 by the Authority for the Protection of Personal Data. The protection of privacy on the Net is fundamental, as it shows in many occasions: when a user hides behind anonymity by taking different identities in order to have access to some kinds of sites and when there is the risk of being controlled by special software conceived to study the user's concerns. Traces left behind by individual users in cyberspace can easily be stored in various data banks, capturing the habits and the curiosities, which can be put to use for commercial aims. The Net must thus have some rules respecting the Net user's private life, by *providing anonymity, privacy, the possibility of expressing one's own opinions without being controlled, or the possibility of buying without being overwhelmed by the advertisements.*

The risks for the unsuspecting electronic citizen on the Net have been described by Yves Poulet of the University of Namur [mina 98], and can be categorised into two categories:

- **Evident risks:** risks associated with the global dimension of Internet or with the availability of personal information communicated to several and various individuals on line;

- **Invisible risks:** risks relating to cookies, which are the programmes sent to the browser habitually used by the user, and may result in spamming of the unsuspecting user.

A recent survey in the US by the *Graphic Visualization and Usability Center of the Georgia Institute of Technology* in Atlanta has found that, for the first time, *users of the Net would willingly renounce some freedom of speech for more privacy about personal data.* In fact, 39% of those interviewed agreed with this statement, while 33% said they agreed with enacting laws about the privacy of information and only 7% said they were against initiatives limiting the freedom of speech on the Internet [IDG 98b].

On the Web there are organisations that deal with solving the problem of privacy for Internet users. One of these is *Privacy International (PI),* which has been operating since 1990; it is in the United Kingdom, but it has an office also in Washington [Priv 99]. PI has promoted some

campaigns in Europe, Asia, and Northern America to fight the violations of privacy such as, for instance, those practised in relation to telephony, the deployment of personal data in ID cards, control by video, the gathering of personal data, and the information systems of the police and doctors. In PI's home page you can read the latest news about advancements in privacy in various countries. Talking about the Developing Countries we have seen that several Governments are acting really cautiously, while others are faster in taking decisions on the subject. An example is provided by **South Korea,** where the Government passed, in December 1999, the law on *wire-tapping* and also on *intercepting through email.* The new law limits intercepting and establishes punishments for illegal interception of personal communication, by individuals or organisations utility.

A scandal for wire-tapping and interceptions even through Internet broke in **Brazil,** where many authorities, such as the Minister for Communications, the President of the *Brasilian Development Bank,* the Chief of the Foreign Trade Council, and the international business director of *Banco do Brasil* gave their resignations after the publishing of alleged interceptions showing interference of the Government with the privatisation of the telecommunications.

Another initiative reported in the PI site is the *Global Internet Liberty Campaign,* in which a report, written by PI and the Open Society Institute, entitled *'Privacy and Human Rights'* [Gilc 98] provides a useful *expose* linking privacy and human rights. Privacy is a fundamental human right stated by the *United Nations Declaration of Human Rights,* by the *International Covenant on Civil and Political Human Rights* and by *other national and international treaties;* the main aim of the report is to make the authorities and the readers think about the great and growing importance and about the diversity and the complexity of this right. The report provides some details about the situation of privacy in 15 countries worldwide; it underlines the constitutional and legal conditions of the protection of privacy and explains the most relevant problems and events concerning this matter. Most of the countries worldwide state explicitly the right of privacy in their constitutions. Such statements include at least the right of the inviolability of one's house and of the secrecy of personal communications. Some recent constitutions, such as the *South African* constitution or the *Hungarian*, include specific rights for access and the control over personal information through the new information and telecommunications technologies, including the Internet.

In other countries where privacy is not explicitly recognised in the constitution, as in the **USA,** in **Ireland** and in **India,** the *courts have formulated this right somewhere else.* In many countries due cognisance is given to international covenants recognising this right, such as, for instance, the *International Covenant on Civil and Political Rights or the European Convention on Human Rights,* which have both been approved as laws.

There are three main reasons encouraging Governments of nations to adopt a clear law about *privacy* and the *protection* of personal data:

- **To remedy the injustices of the past:** several countries, especially in Central Europe, in South America and in Southern Africa, have adopted some laws to remedy the violations of privacy that had occurred under previous dictatorial regimes;

- **Promote eCommerce**: many nations, especially in Asia, but also in North America, have developed or are now developing some laws aiming at the promotion of eCommerce. These regions recognise that consumers are worried about the fact their personal information can circulate unauthorised and unprotected worldwide. The laws about privacy have been introduced as a part of series of laws with the aim of making eCommerce easier through the application of uniform laws;

- **Ensure that National laws are coherent with International and other Laws such as the *Pan-European Laws:*** several countries in Central and Eastern Europe have adopted new laws based on the *Council of Europe Convention and the European Union Data Protection Directive.* Many of these countries hope to become members of the the European Union in the near future. Other countries, such as **Canada,** are introducing new laws in order to ensure that commerce is not jeopadised by the requirements of the European directive.

The whole report *Privacy and Human Rights* is available in the site http://www.gilc.org/privacy where the original text of the session of the report by PI dealing with the laws about privacy in the Developing Countries can be found. The main improvements of the laws about privacy as a human right in **Argentina, Brazil, Chile, South Korea,**

Hong Kong, India and **Israel** are explained in English.

On the Net there is a related association, for promoting **'electronic democracy'** that is, the creation of infrastructures and of connected rules, which respect the first Amendment of the American constitution for the USA and the creation of other laws about privacy all over the world. The **Electronic Frontier Foundation (EFF)** was founded in July 1990 with the purpose of seeking to guarantee that with the emergence of the new information and communications technologies the *principles of freedom of speech and of information exchange are really respected* [effo 99].

The aims of the Electronic Frontier Organisation (EFF) include the promotion of the following:

- Laws protecting citizens' rights while using the new information and communications technologies;
- Shared laws for all network providers assuring total freedom of speech without discrimination;
- A national public system where voice, data, and video services can be afforded by all citizens without distinction; and
- A varied and diverse community enabling everybody to express his/her own opinions in the new global society of information.

EFF also provides legal assistance whenever electronic communication freedom of any user is violated. It also offers an on-line consulting service for those people having some questions about their own communication rights; EFF produces, gathers and distributes texts and information dealing with interactive communication freedom and with the development of electronic communities. Finally, it talks with the legislators, the legal associations and the universities about the communication freedom and rights. EFF has recently spread worldwide through some independent institutions and associations working in several countries for the attainment of same or similar goals.

7.4 Governments and the Telecommunications

An adequate regulation for the development of telecommunications in a country is essential as an enabler for the promotion of the country's economy. In the industrialised countries a revolution has actually occurred in the telecommunications sector: the application of the innovations of the electronic and information industry to the field of

telecommunications has made it possible for the rapid rise and diffusion of the telecommunication networks. Consequently, Governments of the various countries have variously set to reconsider their own policies on telecommunications with the view to, among others, liberalising the market in order to enable private companies to provide customers with compettitive and personalised services.

In the Developing Countries the Governments have only recently realised the incentives that the telecommunications sector can make to the progress of the countries; for this reason, state monopoly is slowly disappearing in favour of the liberalisation of the sector, which will imply an increase in the diffusion of the Net in the countries. Till recently the telecommunications utility has been controlled by the State provider, which was often not able to provide a reliable service.

The Indian Prime Minister Atal Behari Vajpayee declared that the Government is going to forget the problem of the licences for the telephone service and to launch a campaign for the installation of cables in the country. He explained, in particular, that *'the problems of the telecommunications sector cannot be solved through the existing dangerous regulation of the licences, which is based on the State monopoly. So, we will have to adopt immediately some radical solutions and to increase the growth of the sector'*. The Indian Prime Minister holds the suggestion that the collaboration among cable TV, Internet, broadcasting industries and the telephone service is a key-element, which the Executive was considering. One of the most relevant problems for India are the perspectives of the companies that invested a lot of money in the telecommunications sector: these firms are penalised inside the market by the existing regulations. Although the Indian Government declared the end of the State monopoly of the telecommunications in 1994, ever since that date the operating system of licences has somewhat progressed for the better, *albeit* not significantly especially because the private initiative has not been sufficiently promoted, and that, in the main, the private companies have rented the communication infrastructures [Dea 98 f].

In **Saudi Arabia,** in November 1998, a list of companies were given the permission by the Government to supply Internet services in the country. This represents a crucial turning point for this nation which, till then, had been not been in favour of the diffusion of the internet because of matters of cultural incompatibility. The authorities are said to have authorised 40 different companies to join the State company, the Saudi

Telecommunications Company, the only provider [Dea 98i] in the competitive initiative to provide Internet service.

In **Egypt** the Governement has realised the disadvantages that can be taken by a low and/or slow development of the internet since 1995 the number of Internet Service providers has increased to 30, by enabling the provision of nearly 40,000 users with access to the Internet. The local ISPs need more telephone lines and an improved better quality, so the authorities are considering some possible solutions sush as, for instance, the deployment of satellites for the communications [Nua 98l].

After focusing on the great importance of telecommunications at the **Summit of the Americas,** held in Santiago, Chile, in April 1998 [Usia 98], 34 leaders approved the *launch of the negotiations to create a Free Trade Area of the Americas* (FTAA), an active market of 800 million people, spanning Alaska to Argentina. One of the main points of the FTAA negotiations was concerned with the need for supporting growth through the new information and communications technologies. The initiatives are encouraging the private sector to develop a global communications infrastructure, which would make it possible to use the Internet in all sectors of everyday life and in the social, economic, political and medical areas. The leaders undertook to keep the following promises:

- The first important step made in collaboration with the private sector, the Inter-American Development Bank and the World Bank, deals with the use of the site http://www.Americas-edu.org to increase distance learning and to provide peoples of the Americas with education services;

- Reinforcing the abilities of the countries to take advantage of the basic knowledge of the global economy by promoting, even through other actions, telecommunications as a central point of `the national and regional integration;

- Working with the private sector for the rapid diffusion of telecommunication networks and adopting strategies to make it possible for everyone to have access to basic telephone services;

- Working with the private sector to develop applications for electronic networks that would support education, health, agriculture and eCommerce while taking into

consideration the differences of language and the social and economic factors.

On 9 and 10 June, 1998 OCSE and Osaka University, and the School of International Public Policy (OSIPP) organised, a workshop entitled *'The Internet: Convergence and Self-governance'*. A total of 70 among the most influencial authorities of business, the academia and the political world took part. The main goal of the workshop was to focus on the problems of the developing economies in relation to the new Internet services and the impact of the Net on the legislative structures.

The report of the workshop provides a synthesis of the various sessions and the main points developed during the debate. Robert M Pepper, Chief of the Office of Plans and Policy of the Federal Communications Commission (FCC), explained the explosive rise of the Internet and analysed the main issues concerning regulation promoting a substantial diffusion of eCommerce worldwide. He remarked that many of the problems connected with the telecommunications infrastructure arose in most of the countries, as a result the strong and growing demand for bandwidth to support heavy traffic and reduce the times of response for the users. Pepper underlined the fundamental importance of competition in answering the demand for bandwidth, including the competition between the various ISPs and the network technologies. Pepper suggested the following leading principles for the regulation policies for the purpose of increasing the diffusion of eCommerce:

- ❑ Promoting competition;
- ❑ Isolating services from regulation;
- ❑ Giving incentives for technological innovations;
- ❑ Reconsidering social welfare through consumers' protection and supply of reliable access; and
- ❑ Encouraging industrial co-operation.

Professor Shoichiro Asano of the *National Center for Science Information System* (NACSIS) has underlined the importance of the development of the Internet market, which is becoming more and more oligopolistic, with big ISPs progressively increasing more and more of their own shares. Professor Shoichiro Asano has suggested the following principles for Governments:

- ❑ Promoting the evolution of Internet technologies;

- Promoting a competitive mechanism of Intenet access costs;
- Providing a self-regulation structure;
- Promoting eCommerce in order to encourage implementation of bidirectional transactions.

On the subject of ISPs and the regulation of telecommunications, Lee Jong-Soon, Chief Executive Manager of Asia-Pacific Telecommunity, has suggested that *'in order to support the growth of the Internet the tensions in the market between the Process Technologies Organisations* (PTOs) *and the ISPs must be removed'. 'This cannot be reached by introducing new rules',* adds Eric Lee of the *Commercial Internet Exchange* (CIX), a world association of ISPs, *'as the number of providers could decrease aftera substantial increase due to the liberalization of the market in many countries'.* He suggests that the *ideal regulation structure for the ISPs should include some principles of open competition, open and equal access and, above all, a minimum regulation by the Government.*

The actual tension between the PTOs and the ISPs is due, according to Jim Dixon, President of EuroISPA, a confederation of European trade associations made of nearly 500 ISPs, to two factors:

- The anti-competitive methods, which give obstacles an open market; and
- The inefficiencies in the international system of Internet access costs.

The high access costs of telecommunications among the European countries, like in many other nations, such as in Asia, are an obvious consequence of the fact that Internet traffic ISPs in these countries has to pass through the USA rather than directly through the intervening countries. This implies the transfer of huge amounts of money to the telecommunications companies of North America, which impacts negatively on the speed of development of the Internet 'industry' in these nations.

In the regions of the Asia/Pacific the various regulations and the implications for business turning around Internet traffic exchange are explained by Yoshikazu Ikeda, Director of the Multimedia Department and President of the Japan Internet Exchange Co Ltd. (JPIX). He explains that for quite sometime the Internet has been in the countries of Asia/Pacific through an American Central Network, where all the main

elements, such as the flux of traffic, and, the registration of domain names, are concentrated. This concentration of traffic provokes the need for relevant alterations in both the type of network and in the nature of traffic exchange; it also gives rise to the need for consideration of significant issues about the validity of the asymmetrical interconnection bonds, where the total cost of the network is totally paid by the ISPs that are not American. The localisation of Internet traffic exchange by developing regional backbones in Asia/Pacific as well as national Internet exchange points has been suggested as a possible solution for addressing the problem. Ikeda's Department has already provided the Asian regions with backbone linkages, while JPIX has built an Internet exchange point in Japan. The proportion of traffic between the American ISPs and the Asian ISPs has decreased from 1:4 in 1996 to 1:3 in 1997. This is expected to imply a more equitable share in Internet traffic between American and Asian ISPs. Some benefits are likely to accrue from direct traffic coming , for instance, from the applications of the eCommerce.

Roger Hicks, Director and Vice-President of the Asia & Pacific Internet Association, explains that while studying the possible future developments of national and international traffic on the Net the main points that have to be considered should include the following:

- Traffic exchange projects do not have to limit the future services of the ISPs;
- Benefits must be gained by both parties without arbitrary agreements and complex invoicing;
- Unequal and anti-competitive behaviour must be avoided in order to warrant transparency and to promote open and flexible solutions.

7.5 International Development Projects

Many initiatives about the information society have been suggested by international organisations and groupings, such as the ITU and the OECD, and by the industrialised countries, such as the USA, Japan, Canada and the G8 or by the European Union. All these initiatives have shown that the telecommunications sector is not only a dynamic and unique sector, but also an important key of the new global society. These international organisations and groupings did not begin to pay attention to the matter of development of the Internet and of the telecommunications

infrastructure in the Developing Countries as a consequence of the great rise of the Information Technology market and of the Internet in the industrialised countries. In December 1984 the ITU published the report of the Maitland Committee entitled *'The Missing Link'*, which attracted the attention of Governments, of the institutional operators and of the international agencies to the problem of the gap in the telecommunications sector (infrastructure) between the North and the South [Ispo 98]. It has observed, for example, that there are more telephone lines in Tokyo than in the whole of the African continent! The report underscored the importance of telecommunications in the process of economic and social progress. Above all, the report recommended that from 1984 onwards the development programmes of any country should take into account a complete and adequate role of the telecommunications.

The publication of the Maitland Report gave rise to an increasing number of international actions for the development of the telecommunications sector. This led to the World Conference on Telecommunications organised by the ITU in Buenos Aires from 21 to 29 March, 1994. The conference analysed the progress of the sector and underscored that the inequities of the 1980s had not disappeared, inspite of various initiatives over the past decade done. The average presence of telephone lines over 100 inhabitants is equal to 18 in Central and Eastern Europe, just 8 in Latin America and merely 5 in Asia. Africa is clearly the least developed of the regions, with only 1.6 lines per 100 inhabitants. A plan of action was adopted for the improvement of the telecommunications sector for the least developed countries. The last declaration of the conference stated the need to encourage this development in an open and competitive economy.

After the conclusion of the Buenos Aires Conference the main industrialised countries promised to put into practice the good intentions formulated during the debate. In America Vice-President Al Gore suggested the constitution of a Global Information Infrastructure (GII), as a network of networks which includes the industrialised countries and the Developing Countries in a global village. Al Gore's vision is that the 'GII' would provide an infrastructure architecture on which access to the Internet would be facilitated worldwide. The Net would make it possible to have information access, to connect and to communicate like a global community. Realisation of the GII would imply significant economic progress, enhanced democracy, and better solutions for local and global

problems. The GII is based on five principles, namely:

- ❑ Encouraging *private investments;*
- ❑ Promoting *competition;*
- ❑ Creating a series of *flexible laws,* which can adapt to the rapid changes of the telecommunication market;
- ❑ Supplying all information providers and all users with *open access* to the Net;
- ❑ Providing a *global service:* every member of our society will have access to the GII.

In February 1995 the American administration issued the Agenda for Co-operation, based on the five GII principles. Under the auspices, of the Agenda the US aims to put into practice the GII in co-operation with other countries. This memorandum was, for example, signed by Chile in July 1994 and by Argentina in October of the same year.

The European Union has launched a number of initiatives to support the development of a society based on telecommunication access and on access to information by countries with transition economies and also the Developing Countries:

❑ **Dialogues** have been initiated with Developing Countries or with groupings belonging to these countries, such as the League of Arab States, or MERCOSUR, a group comprising Argentina, Brazil, Uruguay and Paraguay. A convention on mobile digital communication, attended by the League of Arab States and by Modarabtel in 1993, led to the adoption of the GSM standard (Global System for Mobile - digital cellular mobile telephone) in Saudi Arabia. Another meeting held in March 1995 together with MERCOSUR led to the signing of a co-operation agreement between the European Community and the members of MERCOSUR.

❑ **The European Investment Bank** (EIB) is an independent financial institution through which the European Community lends money to 12 countries of the Mediterranean region with which it has signed bilateral agreements and to those countries belonging to the ACP/OCT. Ever since 1982, EIB has financed investments amounting to a total sum of 1,062 million ECU in the telecommunication sector. EIB contributed 80 million ECU to assist the spread of the Moroccan International Links through satellites and cables. In 1995 EIB granted a loan of 8 million ECU to Eritrea to enable it create its own national

network and its own international connection. The loan was given through a regional programme covering Ethiopia and Djibouti. Since 1993 the international activities of the EIB have also comprised countries of Latin America and Asia, with which three-year co-operation agreements were signed. The main activity of the EIB was, launched in Chile in 1995. The EIB gave a loan of 75 million ECU for the implementation of connectivity for its EIB 400,000 new subscribers in 2 years.

❑ **Co-operation for Economic Development:** The European Community launched programmes to promote industrial co-operation and investment, with the aim of increasing commerce, technological transfer, and know-how. In Asia it launched the TACIS programme with a total sum of 15 million ECU having the following priorities: *to reform legislation,* and *to reconstruct the sector.* In Latin America the programme ALINVEST was launched with the same goals. The Developing Countries are also provided with the facilities of the EC International Investment Partners, launched in 1986 with the aim to promote the implemention of joint ventures in these countries. Since 1966 a total of 16 projects have been implemented in the telecommunications sector, corresponding to a total sum of 2.5 million ECU. Other projects are deemed for Brazil, Mexico, and Argentina under the auspices of the Business Council Network (BC-NET). This organisation provides information on the opportunities for joint ventures or technical co-operation with some European partners.

❑ **Co-operation for Development:** The European Community with ACP/OCT seeks to enhance the communications infrastructure that still represents a crucial problem in many of these countries. The Lomé Convention is the biggest collective agreement with the Developing Countries. The fourth Convention of this kind was signed in 1990 between the Community and the countries supporting the ACP/OCT for a period of 10 years. Financial assistance is established every 5 years under the auspices of the financial protocol. Implementation is carried out under the aegis of the European Development Fund (EDF). For Lomé IV the first protocol (1991-95) established a budget of 12,000 million ECU, of which 1,250 million ECU pertained to various regional co-operations. A good example of regional co-operation comes from the South Pacific region, where the European Community and other partners, such as UNDP, Australia, New Zealand, ITU, United Kingdom have worked hard to improve and adapt the telecommunications infrastructure to international standards and to provide most of the people with easy access

to services. Dealing with the Lomé I the community has financed the installation of a high-tech service of telephones and telefax in the Fiji Islands, Tonga and Samoa (formerly Western Samoa) and has also built the ground station for INTELSAT in Samoa. A similar satellite project was implemented in Kiribati and Papua New Guinea through the Lomé II Convention, while the Fiji Islands, Tuvalu, Vanuatu and Samoa were given various kinds of assistance for connection to the international networks. Lomé III and IV were aimed at the promotion of communications in the sea via radio and satellites in 7 countries of the Pacific. Other activities were launched within the framework of the same structure of programmes of financial and technical co-operation with the countries of Latin America. In 1991 a project of regional assistance in the telecommunications sector was launched for the countries of Central America; the Community has made a contribution 13.8 million ECU.

❑ **Scientific and Technological Co-operation:** One of the main activities of the European Community comprises scientific and technological training for co-operation with the Developing Countries. Another activity is concerned with specific programmes of development for research on communications technologies and telematics. Since 1988 scientific and technological co-operation has been supported to a total sum of 53 million ECU, of which 30 million ECU was allocated to the Asian region, to countries such as China and India, while the remaining 23 million ECU was destined to countries of Central and Western Europe.

Bridge to Asia, a non-profit organisation providing information to schools and to research centres in the Developing Countries of Asia, developed, in 1995, a project to help China and South-East of Asia have access to the best information sources worldwide. It is based on the creation of 8 stations, called *Internet-based information-transfer stations (ITS),* one for each country. They are all connected via the Internet to some main stations in Beijing, Shanghai, Guangzhou, Manila, Hanoi, Phom Penh, Bangkok and Jakarta.

The aim of *Bridge to Asia* project is to increase and make more solid the relationships between individuals and institutions, in China and South East Asia. An ITS has several functions: it researches, consults and sends documents. It receives users' requests and elaborates on them according to the needs; it finds the information sources and connects the users directly to the sources; finally, it assists transfer of information to the user.

A prototype of an ITS has been tested in a small group of schools in Beijing and then on 100 lawyers in China. The cost of the complete system will be approximately US$2 million per year and it will be supported by a mix of donations, subventions and subscriptions by the users. Some stations will be connected to the universities and their cost will be incorporated into the institutional budgets. The start-up funds came from some foundations and institutions in the USA and in Hong Kong [Isoc95b] and [Brid99].

In the *Plan of Action* signed by 30 Presidents during the 9 - 11 of December 1994 at the *Summit of the Americas*, held in Miami, Florida, there was a chapter dealing with telecommunications and the information infrastructure: the Governments of the Americas recognised that the information infrastructure is an essential component of the politics, of the economy and of the social and economic development of a country. The authorities promised to take more responsibilities, including enabling access to the Net for universities, libraries, hospitals and enabling agencies, through the OAS/RedHUCyT project [Isoc95a].

The OAS/RedHUCyT project was launched in 1991, when the Organisation of American States (OAS) approved a project called *'Hemisphere-Wide Inter-University Scientific and Technological Information Network'* or, in terms of to a Spanish acronym, RedHUCyT. The aim of the project is to connect the nations participating in the Summit to the Internet, to integrate eCommerce for the exchange of specialised information among various academic and scientific institutions. It deploys high-tech equipment, provides technical support and specialised training, and supports meetings and technical workshops in the region in order to prepare the technical capacity, to enhance skills, keep up to date with technical knowledge and train network managers.

The activities and successful project goals of RedHUCyT have to date included following [Isoc 95a]:

1. **Conferences and Workshops:** RedHUCyT supports conferences and workshops REUNA '94, a workshop held in Chile in 1994 was attended by about 400 people.

2. **Caribbean Academic Scientific and Technological Network (CUNet):** OAS and the University of Puerto Rico organised the first Caribbean Academic and Scientific Network Workshop in September

1991, during which the CUNet project was formally launched with the objective to establish an electronic information network among the universities of the Caribbean. A total of more than 25 nodes connecting over 2,000 users has been established under the auspices of CUNet.

3. **Jamaican Electronic Network (JAMNet):** Under the auspices of the CUNet project, funding allocation has been used to implement JAMNet, which enables Jamaica to connect to the Net through a 64 Kbps satellite connection between Kingston and USA.

4. **Central American Project (RedCACyT):** In Central America resources have been used for the construction of a backbone of interconnected institutions, by creating the *CRNet-Costa Rica National Research Network,* which is connected to the Net through a 128 Kbps satellite connection between Costa Rica and Florida. In the second part of the project other activities have been implemented, scientific and technological, including, *RAIN-Nicaragua Academic Network, PANNet-Panamanian Academic Network,* and *HOUNDUNet-National Network of Honduras.*

5. **The Countries of MERCOSUR and Chile:** OAS has supported a project by the Department of Science and Technology aimed at improving the operativity and the efficiency of the *Science and Technological Network (RECyT).* RECyT has grown to comprise over 300 nodes, serving thousands of users, with an average monthly traffic of 200 MegaBytes, transferred exclusively via e-mail. After the inauguration of *RECyT* and the connection to the Internet of the national provider TELINTAR, the Argentina project component has had an explosive growth, and so the same ideas have been cascaded to other countries of Latin America.

6. **The Andes, Mexico and Brazil:** In Ecuador a project of the Ecuadorian Information Corporation (EcuaNet) has been implemented. EcuaNet is a not-for-profit organisation offering free connection to the Net to all universities. In Bolivia the *BOLINet-Bolivian Data Network* for the connection of Bolivia to the Net was completed in June 1995. Peru was finally connected to the Net in March 1994 thanks to the *Peruvian Scientific Network* (RCP), an association of 100 scientific institutions. The network uses a satellite station for communication, and a radio-frequency equipment.

7. **Latin America and Caribbean Scientific and Technological Information Web (INFOCyT):** REUNA '95 was held in Santiago, Chile, as a Pilot Program Workshop, encompassing the introduction of scientific and technological databases, over the Internet, in Argentina, Brazil, Costa Rica, Chile, Mexico, Peru, Uruguay and Venezuela. The main goal of the workshop was to carry out a valuation of the various alternatives for easy access of scientific and technological information through the Net. The Peruvian Scientific Network then implemented, mainly as a result of the continuous support of the other nations, a specific home page, which enables easy access to the regional databases, by using pointers provided by the national networks of every region. The Website has the following address: http://www.rcp.Net.pe/INFOCYT/infocyt.html.

In April 1997 a project was launched by ITU - International Telecommunications Union, and UNESCO - *United Nations Educational Scientific and Cultural Organisation,* as a support to the AISI/HITD. *The AISI (African Information Society Initiative) Sub-programme on Connectivity* was conceived to accelerate an international effort focusing on the co-operation of all African countries to implement a minimum connectivity level during a period of 3 years [Bell 97]. The programme is supported by the United Nations Special Initiative on Africa's Harnessing Information Technology for Development (HITD) and will be integrated into the other projects of AISI. The main aim of the special initiative is to develop flexible regulation, and encourage market mechanisms to provide the necessary connectivity environment for users. This is pursued through the following activities:

- Development of national regulations;
- Elaboration of a project called NICI - National Information and Communications Infrastructure;
- Regional co-operation to increase the efficiency and the quality of access to the Net, especially through interconnectivity and resources coming from the African operators and the ISPs.

It is a truism that great projects are in progress and many others are being planned or experimented on. The big problem that emerges is, however, the restricted availability of funds, adequate availability of which is essential for the realisation of the real needs of Developing Countries, especially for the construction of the basic telecommunications

infrastructure. Organisations and Governments of the industrialised countries and the Developing Countries alike must be prepared to address this problem in order to take a more active role for co-operation and partnerships among themselves as well as with the private sector and business.

7.6 The Priorities

In order to implement adequate telecommunication networks the Developing Countries, in co-operation with the industrialised countries, must try and put in place the following priorities, *inter alia:*

- *Promoting research in every nation* so as to acquire adequate capacity and capability, that will help to facilitate an articulation of adequate strategies for the promotion of the new information and communications technologies. There is, in addition, the need to put in place and in practice on-going mechanisms for the sharing of new knowledge and experiences within and between countries.

- *Developing access-points and promoting communication services in secondary towns and in rural areas* through the training of users, provision of equipment and installation of systems. The implementing of shared telecenters and the promotion and support of alternative wireless connections where necessary, for example, could provide one possible niche for sharing experiences. Supporting technical training for the creation of new operators in computer systems and the improvement of knowledge of existing operators could be initiated, by using store & forward technologies. Individual sessions and national workshops are necessary for the training of people, and the identifying and promoting of low cost education centres.

- *Supporting administrative and business knowledge, increases the services provided by the ISPs;*

- *Supporting the implementing of local cross-sectorial national Internet working groups and technical assistance in the Developing Countries* with the objective to develop national projects for the development of the Internet infrastructure as well as an inventory of the local resources. These groups could be connected to all Information Technology groups worldwide. These groups may function as communities of practice with shared visions;

❑ *Promoting low-cost information* to create Internet/Intranet hosts in every sector;

❑ *Encouraging the development of general connections in the sub-regional areas* and especially among the nations which are culturally and economically connected;

❑ *Providing the telecommunications operators with technical assistance in order to increase the bandwidth of the local infrastructures* through the promotion of innovative methods to improve the existing circuits, by transforming them from analogic to digital, and to use wireless communication where necessary;

❑ *Identifying the resources that can support the local initiatives* for existing regional and global projects;

❑ *Identifying and promoting resources* that can be destined to buy second-hand computers, hardware and software at low costs, but also to train people to use these pieces of paraphernaliae;

❑ *Identifying financial resources,* such as local initiatives and international partners who would like to implement some joint ventures in these countries;

❑ *Supporting the implementing of centres for the administration of the IP addresses, independent numeration systems and of direct services in all continents,* such as, for instance, RIPE, already operating for Europe, AsiaNIC for Asia and InterNIC;

❑ *Supporting the growing collaboration for international assistance projects* in order to create strong local hosts and to increase the efficiency of Internet projects;

❑ *Providing ISP with technical assistance* in order to encourage the use of methods reducing the black-out of the international connections through the installation of caching servers and mirror sites;

❑ *Supporting the analysis of traffic partners* in order to support the planning of the topology of the Net, the size of the provision of the band and the tariff mechanism to distribute the use especially during the day;

- *Promoting the use of data-broadcasting digital satellites* to make the congestion decrease and also to provide the final users with high-quality band services;

- *Considering alternative suggestions for ISPs* coming from the private sector;

- *Encouraging national Goverments to reduce customs duty or import duties* on ICT equipment;

- *Providing national, provincial and municipal authorities with technical assistance to implement the Net* and to take their information systems, which may generally be sometimes, closed and out-of-date, towards an open and modern Net;

- *Encouraging international agencies to use local ISPs* instead of their independent communication systems;

- *Promoting the use of interfaces for the illiterate or people with a modest educational level:* for instance, recorded texts, touch screens, the web TV, voice recognition, and increasing the number of translators in many languages;

- *Encouraging the rise of service centres, connected, if possible, to the ISPs,* that can provide the development of Web sites for local other services, such as audio/video servers and CD ROMs;

- *Supporting the participation of these countries* in the international process of development in the sector of the regulation for the rights of ownership, the laws on information, the laws about privacy;

- *Convincing the conservative and narrow-minded politicians of the opportunities that can be derived from the use of the Internet* (education, medicine, agriculture, industry, services, etc).

These are the main priorities that have been found out by the IDRC study [IDRC 96] for the growth of the Internet in Africa; they can be adapted to individual Developing Countries trying to develop an adequate telecommunications infrastructure in order to reduce the gap between the North and the South.

Conclusions

'I have always been convinced of the fact that erasing poverty from the Earth is more a matter of will-power rather than of money. Nowadays we do not pay enough attention to this problem yet, maybe because we are not directly involved by it; we keep the problem distant by saying that if the poor worked harder, they would not be poor. When we want to help the poor, we give alms to them. But the only effect of charity is to perpetuate problems, while depriving the poor of the spirit of initiative. We are the only ones to take advantage of this situation: after giving our money to them, we feel relieved and think we have done our duty. If we wanted to be fair, we all should be at the same level, so that everyone is provided with the same opportunities in a spirit of equity and equality.' [Yunu 97].

If the Internet, and all the information and the knowledge, is available to everybody, even for the poorest and the most illiterate, this gap between the North and the South could decrease at any moment and at a relatively low cost. The communication among the people would be as easy and direct as possible. The schools and the universities would become centres for the diffusion of the information, so that everyone would have the opportunity to have information about any subject and in the most proper language.

We would not be surprised, then, to discover that the most brillant student of Harward University, or of Università Cattolica of Piacenza or of any other university lives in a rural village in a remote area of the planet. Health organisations would exchange information and they will collaborate to fight infectious, sporadic or epidemic diseases, such as the HIV virus, Ebola, cancer, but also malnutrition or dysentery, which all hit the peoples in distant places of the globe because of lack of knowledge.

The economy of these countries would require some advantages, as the globalisation of the markets would enable the free circulation of goods, capital and people. Through the support of the Internet many companies, even multinationals or joint ventures, would be able to establish their offices in rural areas, provididing the young people living in the villages with the opportunity of putting their knowledge at the disposal of companies working on an international scale. Thanks to the emergence of eCommerce: larger markets would open for the local enterprises and they

would have the opportunity to express their abilities and to develop their potentialities without being isolated in small markets.

In this cyberspace context the Developing Countries, combination of the recent inventions in the context national and cultural values, will have easy access to information and knowledge, which are useful for the development of a country and to erase the gap between the rich peoples and the poor. By saying this we do not mean that the international organisations or the Governments of the industrialised countries must abandon all the other initiatives aimed at removing poverty in the world; on the contrary the countries must co-operate in order to arrive at practical solutions to the problem situation. The Net helps the process of globalisation, but what frightens the public authorities is the fact it escapes any kind of control. The states and the powerful businessmen cannot control the flux of on-line information, irrespective of the nature of the data.

The road that has to be followed is the co-operation between the world of the telecommunication infrastructures and the world of the regulations, in order to define a platform enabling everyone to have access to,and to use contents in a flexible and transparent way, without violating anyone's human rights. More specifically, *'self-regulation, not censorship of the Net'* will have to be reached. Internet is just a medium enabling people to free their own dreams, to communicate with the rest of the world by being no more isolated; but it also helps the poorest and the most unfortunate give dignity, respect and a meaning to their own lives.

'In the future world the national identities, the cultures and the traditions must keep on having their own roles: all the religious, political and cultural, regional or local, communities must be able to express themselves in a free way, respecting other people and with no ambitious aims.' [Yunu 97]. We agree with Professor Muhammad Yunus's statement and, like him, *'we think that in a civil and respectable society there is no room for poverty.'* This is not a utopia and we hope that it will soon turn into reality through the help of these new technologies, the new information and communications technology (ICTs) in all its manifestation.

Appendix I

TABLE 10: Great World Groups - UNDP, 1998

Industrialised Countries	Developing Countries I	Developing Countries II	Counties with a Minimum Level of Development
Albania, Armenia, Australia, Austria, Azerbaijan, Belgium, Byelorussia, Bulgaria, Canada, Denmark, Estonia, Finland, France, Georgia, Germany, Japan, United Kingdom, Greece, Ireland, Israel, Italy, Kazakhstan, Leetonia, Lithuania, Luxemburg, Malta, Moldova, New Zealand, Norway, Netherlands, Poland, Portugal, Czech Republic, Romania, Russia, Slovania, Spain, United States, Sweden, Switzerland, Tajikistan, Turkmenistan, Ukraine, Hungary, Uzbekistan	Algeria, Antigua & Barbuda, Saudi Arabia, Argentina, Bahamas, Bahrain, Barbados, Belize, Bolivia, Botsawana, Brazil, Brunei Darussalam, Cameroun, Chile, China, Cyprus, Colombia, The Congo, North Korea, South Korea, Costa Rica, Cote d'Ivoire, Cuba, Dominica Ecuador, Egitto El Salvador, Emirati Arabi Uniti, Fiji, Filippine, Gabon Ghana, Giamaica Giordania, Grenada, Guatemala,Guyana, Honduras, Hong Kong, India, Indonesia, Iran, Iraq, Solomon Islands, Kenya Kuwait, Lesotho, Lebanon, Liberia	Libya, Malaysia, Morocco, Mauritius, Mexico, Mongolia,Namibia, Nicaragua, Nigeria, Oman, Pakistan, Panama, Papua New Guinea, Paraguay, Peru, St Kitts & Nevis, St Lucia, St Vincent & The Grenadines, Senegal, Seychelles, Singapore, Syria, Sri Lanka, South Africa, Suriname, Swaziland, Thailand, Togo, Trinidad & Tobago Tunisia, Turkey Uruguay, Venezuela, Viet Nam, Zambia.	Afghanistan, Angola, Bangladesh, Benin, Bhutan, Burkina Faso, Burundi, Cambodia, Cape Verde, Central African Republic, Chad, Comoros, Eritrea, Ethiopia, The Gambia, Djibouti, Guinea, Guinea-Bissau, Equatorial Guinea, Haiti, Kiribati, Laos, Lesotho, Liberia, Madagascar, Malawi, The Maldives, Mali, Mauritania, Mozambique, Myanmar, Nepal, Niger, Democratic republic of the Congo (DRC), Rwanda, Samoa, Sao Tome & Principe, Sierra Leone, Somalia, Sudan, Tanzania, Togo, Tuvalu, Uganda, Vanuatu, Yemen, Zimbabwe.

Table 11: Communications Satellite Projects - February 1999

ACTEL
PROJECT TYPE: Fixed Satellite Mobile REALISATION TIME: 1998 SERVICES & PRICES: voice and data service, for business and for individual users. US$1,50 a US$1,65 per minutes for mobile users. CHARACTERISTICS: 2 Satellites GEO. Services furnished by national operators and ISP. COVERAGE: AFRICA PROMOTERS: Africa Continental Telecommunications (ACTEL) FOUNDING: Subsidiary.
AFRICOM
PROJECT TYPE: Fixed Satellite Mobile REALISATION TIME: 1999 SERVICES & PRICES: Voice and data serviees, for business in the Sub-Saharan Africa Countries that are not serviced with telecommunication network. PROMOTERSI: Africom, Lockheed Martin FOUNDING: Investment costs US$ 650 millions
ASTROLINK
PROJECT TYPE: Satellite Data REALISATION TIME: 2001 SERVICES & PRICES: - CHARACTERISTCS: 9 Satellites GEO COVERAGE: Global PROMOTERS: Lockheed Matin Telecommunications FOUNDING: Investment costs US$ 4 billions
CELESTRI
PROJECT TYPE: Satellites Data REALISATION TIME: 2003 SERVICES & PRICES: data transmission services for users at prices from US$750 to US$3.000 CHARACTERISTCS: 9 Satelliti GEO per broadcast e 63 satelliti LEO per Iatri servizi. COVERAGE: Global PROMOTERS: Motorola FOUNDINGS: Investment costs USUS$14,7 billion.
EAST
PROJECT TYPE: Fixed Satellites Mobile REALISATION TIME: 2001-2002 SERVICES & PRICES: Voice and data services, for mobile users and fixed telephone at US$0,40 per minute CHARACTERISTCS: Satellites GEO COVERAGE: AFRICA PROMOTERS: Matra MarcELLIPSIO
ECCO
PROJECT TYPE: Satellites, Voice, Data and GPS REALISATION TIME: 2001-2002 SERVICES & PRICES: Voice and data services, for business, individual users and rural zones at US$0.50 per minute for mobile service, US$0.12 for fixed network. CHARACTERISTCS: 17 Satellites MEO COVERAGE: Global PROMOTERS: Mobile Communications Holdings Inc. FOUNDINGS: Investment costs US$1.5 billion

Table 11: Communications Satellite Projects - February 1999 (Contd.)

ELLIPSIO
PROJECT TYPE: Satellites, Voice, Data and GPS REALISATION TIME: 2001-2002 SERVICES & PRICES: Voice and data services, for business, individual users and rural zones at US$0,50 per minute for mobile service, US$0,12 for fixed network. CHARACTERISTCS: 17 Satellites MEO COVERAGE: Global PROMOTERS: Mobile Communications Holdings Inc. FOUNDINGS: Investment costs US$1,5 billion
EXPRESS-WAY
PROJECT TYPE: Satellites Data REALISATION TIME: Attivo da Luglio 1997 SERVICES & PRICES: Fast data service for business. CHARACTERISTCS: 14 Satellites LEO COVERAGE: Global PROMOTERS: GM Hughes Electronics FOUNDINGS: Investment costs US$3,9 billion
FAISAT
PROJECT TYPE: Satellites Data REALISATION TIME: 2002 SERVICES & PRICES: Fast data service for business. CHARACTERISTCS: 26 Satellites LEO COVERAGE: Global PROMOTERS: Final Analysis Polyot Enterprises FOUNDINGS: Investment costs US$250 millions
GEMNET
PROJECT TYPE: Satellites Data REALISATION TIME: 1999 SERVICES & PRICES: Low data service. CHARACTERISTCS: 38 Satellites LEO COVERAGE: Global PROMOTERS: CTA Inc. FOUNDINGS: Investment costs US$160 millions
GLOBALSTAR
PROJECT TYPE: GMPCS REALISATION TIME: 1999 SERVICES & PRICES: Voice and data services CHARACTERISTCS: 48 Satellites LEO COVERAGE: Global PROMOTERS: Loral Space & Communic Qualcomm FOUNDINGS: Investment costs US$2,6 billion
ICO
PROJECT TYPE: GMPCS REALISATION TIME: 2000 SERVICES & PRICES: Voice and data services CHARACTERISTCS: 10 Satellites MEO COVERAGE: Global PROMOTERS: Immarsat FOUNDINGS: Investment costs US$4,5 billion

Table 11: Communications Satellite Projects - February 1999 (Contd.)

INMARSAT
PROJECT TYPE: Fixed Satellites Mobile
REALISATION TIME: Attivo dal 1993
SERVICES & PRICES: Voice and data services
CHARACTERISTCS: 5 Satellite GEO
COVERAGE: Global
PROMOTERS: Immarsat
FOUNDINGS:
IRIDIUM
PROJECT TYPE: GMPCS
REALISATION TIME: 1998
SERVICES & PRICES: Voice and data services
CHARACTERISTCS: 66 Satellite LEO
COVERAGE: Global
PROMOTERS: Motorola
FOUNDINGS: Investment costs US$ 4,4 billions
LEO-ONE
PROJECT TYPE: Satellites Data
REALISATION TIME: 2000
SERVICES & PRICES: Low data services
CHARACTERISTCS: 48 Satellites LEO
COVERAGE: Global
PROMOTERS: DBX Corporation
FOUNDINGS: Investment costs US$250 million
ORBCOMM
PROJECT TYPE: Satellites Data
REALISATION TIME: Attivo dal 1998
SERVICES & PRICES: Low data services, for business and institutions at US$0,18 per message.
CHARACTERISTCS: 28 Satellites LEO
COVERAGE: Global
PROMOTERS: Orbital Science
FOUNDINGS: -
SATPHONE
PROJECT TYPE: Fixed Satellites Mobile
REALISATION TIME: 1998-1999
SERVICES & PRICES: Satellite voice service for users with mobile phone and fixed network.
CHARACTERISTCS: 3 satellites GEO
COVERAGE: NORD AFRICA
PROMOTERS: Lockheed Martin Telecommunications
FOUNDINGS: Investment costs US$1,7 billions
SKYBRIDGE
PROJECT TYPE: Satellites Data
REALISATION TIME: 2002
SERVICES & PRICES: data communication for business and local users, Acces cost US$ 30-40 per month.
CHARACTERISTCS: 64 Satelliti LEO.
COVERAGE: Global
PROMOTERS: Alcatel
FOUNDINGS: Investment costs US$3,5 billions

Table 11: Communications Satellite Projects - February 1999 (Contd.)

SPACEWAY
PROJECT TYPE: Satellites Voice and data REALISATION TIME: 1998-2002 SERVICES & PRICES: Voice and data services, for business, consumers, and rural areas. For business the costs are US$100 per month and for consumers are US$40 per month. CHARACTERISTCS: 8 Satelites GEO e 20 Satelites MEO. COVERAGE: Global PROMOTERS: Hughes Communication Inc. FOUNDINGS: Investment costs US$9 billions
VITASAT
PROJECT TYPE: Satellites Data REALISATION TIME: Attivo dal 1997 SERVICES & PRICES: Low data transmission services. CHARACTERISTCS: 2 Satelites LEO COVERAGE: Volontari in Assistenza Tecnica PROMOTERS: - FOUNDINGS: Donations and benefits. Investment costs US$10 million

Appendix III

TABLE 12: UNDP Indexes to Measure Human Development, 1998

Name	Longevity	Knowledge	Life Standard	Participation or Exclusion
ISU: **Human Development Index**	Hope of living	Adult alphabetical rate; Subscription rate	Per capita income	-
ISG: **Gender Development Index**	Hope of living	Adult alphabetical rate; Subscription rate	Income quote gained by men and women.	-
IPU-1: **Human Poverty Index** (Developing Countries)	Percentage of persons with Hope of living <40 years.	Adult alphabetical rate.	**Economic deprivation measured by:** Percentage of persons with no access to water and sanitary services; Percentage of children under weight with ages less than 5 years	-
IPU-2: **Human Poverty Index** (Industrialised Countries)	Percentage of persons with Hope of living <60 years.	Functional adult alphabetical rate.	Percentage of persons that live under the poverty income threshold (50% of the detonable income)	Inoccupation rate for long period (12 months or more)
MEG: **Empowerment Gender Measure**.	-	Grade of the active participation of women in the political and economic life.	-	Opportunity inequality in some areas.

Appendix IV

REGIONAL COMPARISON AMONG THE RATES OF HUMAN DEVELOPMENT

TABLE 13: Regional Comparison among the Rates of Human Development, UNDP 1998

Countries	ISU	ISG	MEG	PIL pro capite
South-Sahara Africa	0,378	0,354	0,339	
Seychelles	0,845	-	-	7.697
Mauritius	0,833	0,754	0,451	13.294
South Africa	0,717	0,680	0,531	4.334
Botswana	0.678	0,657	0,457	5.611
Namibia	0,644	0,620	-	4.054
Swaziland	0,597	0,573	0,406	2.954
Cape Verde	0,591	0,565	0,424	2.612
Gabon	0,568	0,551	-	3.766
Sao Tome	0,563	-	-	1.744
Congo	0,519	0,503	-	2.554
Zimbabwe	0,507	0,497	0,428	2.135
Cameroon	0,481	0,455	0,268	2.355
Ghana	0,473	0,466	-	2.032
Lesotho	0,469	0,457	0,451	1.290
Equatorial Guinea	0,465	0,446	0,256	1.712
Kenya	0,463	0,459	-	1.438
Comoros	0,411	0,402	-	1.317
Nigeria	0,391	0,375	-	1.370
Congo	0.383	0,376	-	355.000
Togo	0,380	0,358	0,183	1.167
Benin	0,378	0,364	-	1.800
Zambia	0,378	0,372	0,304	986.000
Ivory coast	0,368	0,340	-	1.731
Mauritania	0,361	0,346	0,177	1.622
Tanzania	0,358	0,354	-	636.000
Madagascar	0,348	0,345	-	673.000
Central African Republic	0,347	0,340	0,205	1.092
Angola	0,344	0,331	-	1.839
Senegal	0,342	0,326	-	1.815
Uganda	0,340	0,331	-	1.483
Malawi	0,334	0,325	0,256	773.000
Chad	0,318	0,301	-	1.172
Guinea-Bissau	0,295	0,284	-	811.000
The Gambia	0,291	0,277	0,239	948.000
Mozambique	0,281	0,264	0,430	956.000
Guinea	0,277	0,258	-	1.139
Eritrea	0,275	0,269	-	983.000
Ethiopia	0,252	0,241	-	455.000
Burundi	0,241	0,230	-	637.000
Mali	0,236	0,229	0,351	565.000
Burkina Faso	0,219	0,205	0,339	784.000
Niger	0,207	0,196	0,121	765.000
Sierra Leone	0,185	0,165	-	625.000
East Asia	0,766	0,749	0,388	
Hong Kong, China	0,909	0,836	-	22.950
Rep. Korea	0,894	0,826	0,292	11.594
Rep. Dem. Korea	0,766	0,749	-	4.058
Mongolia	0,669	0,658	-	3.916

tABLE 13: Regional Comparison among the Rates of Human Development, UNDP 1998 (Contd.,)

China	0,650	0,641	0,483	2.935
South Asia	0,452	0,412	0,273	
Rep. Islamic Iran	0.758	0,643	0,261	5.480
Sri Lanka	0,716	0,700	0,286	3.408
Maldives	0,683	0,668	0,341	3.540
Pakistan	0,453	0,399	0,179	2.209
India	0,451	0,424	0,228	1.422
Bangladesh	0,371	0,342	0,305	1.382
Nepal	0,351	0,327	-	1.145
Bhutan	0,347	0,330	-	1.382
South-East Asia –Pacific	0,677	0,651	0,421	
Singapore	0.869	0,848	0,467	22.604
Brunei Darussalam	0,889	0,834	-	31.165
Fiji	0,869	0,770	0,332	6.159
Thailand	0,838	0,812	0,421	7.742
Malaysia	0,834	0,785	0,458	9.572
Samoa	0.694	-	-	2.948
Indonesia	0,679	0,651	0,365	3.971
Philippines	0,677	0,661	0,458	2.762
Vietnam	0,560	0,559	-	1.236
Solomon Islands	0,560	0,557	-	2.230
Vanuatu	0,559	-	-	2.507
Papua New Guinea	0,507	0,494	0,254	2.500
Myanmar	0,481	0,478	-	1.130
Rep. Dem. Lao	0,465	0,451	-	2.571
Cambodia	0,422	0,415	-	1.110
Arab States	0,747	0,638	0,258	
Bahrain	0,872	0,746	-	16.751
Emirates	0,855	0,718	0,247	18.008
Kuwait	0,848	0,773	0,345	23.848
Qatar	0,840	0,714	-	19.772
Libyan	0,806	0,664	-	6.309
Lebanon	0,796	0,707	-	4.976
Saudi Arabia	0,778	0,589	-	8.516
Oman	0,771	0,580	-	9.383
Syria	0,749	0,638	0,319	5.378
Algeria	0,746	0,627	0,241	5.618
Tunisia	0,744	0,670	0,345	5.261
Jordan	0,729	0,647	0,211	4.187
Egypt	0,612	0,555	0,258	3.829
Morocco	0,557	0,511	0,302	3.477
Iraq	0,538	0,443	-	3.170
Yemen	0,356	0,336	-	856.000
Sudan	0,343	0,318	0,225	1.110
Djibouti	0,324	-	-	1.300
Latin America and Caribbean	0,839	0,724	0,460	
Barbados	0,909	0,889	0,607	11.306
Antigua e Barbados	0,895	-	-	9.131
Chile	0,893	0,783	0,416	9.930
Bahamas	0,893	0,876	0,649	15.738

tABLE 13: Regional Comparison among the Rates of Human Development, UNDP 1998 (Contd.,)

Costa Rica	0,889	0,818	0,503	5.969
Argentina	0,888	0,777	-	8.498
Uruguay	0,885	0,841	0,422	6.854
Trinidad & Tobago	0,880	0,823	0,608	9.437
Dominican Republic	0,879	-	-	6.424
Panama	0,868	0,804	0,460	6.258
Venezuela	0,860	0,790	0,414	8.090
Mexico	0,855	0,774	0,474	6.769
St. Kitts & Nevis	0,854	-	-	10.150
Grenada	0,851	-	-	5.425
Colombia	0,850	0,810	0,470	6.347
Saint Vincent	0,845	-	-	5.969
Saint Lucia	0,839	-	-	6.350
Brazil	0,809	0,751	0,374	5.928
Belize	0,807	0,689	0,471	5.623
Suriname	0,796	0,735	0,434	4.862
Ecuador	0,767	0,667	0,369	4.602
Jamaica	0,735	0,724	-	3.801
Cuba	0,729	0,705	0,523	3.100
Peru	0,729	0,664	0,433	3.940
Dominica	0,720	0,662	0,424	3.923
Paraguay	0,707	0,651	0,374	3.583
Guyana	0,670	0,630	0,472	3.205
Guatemala	0,615	0,549	0,479	3.682
El Salvador	0,604	0,583	0,480	2.610
Bolivia	0,593	0,557	0,393	2.617
Honduras	0,573	0,544	-	1.977
Nicaragua	0,547	0,526	-	1.837
Haiti	0,340	0,335	0,356	917
All PVS	**0,630**	**0,565**	**0,374**	**3.068**

Appendix V

TABLE 14: Education Gaps, UNDP 1998.

Countries	% Primary School	% Female against Male	% Secondary School	% Female against Male
High human development countries	107	99	59	109
Cyprus	100	100	97	103
Barbados	-	-	-	-
Hong Kong, China	96	102	75	105
Rep. Korea	101	101	101	100
Chile	99	98	69	111
Bahamas	94	99	90	103
Costa Rica	107	99	50	108
Brunei Darusalaam	110	95	78	108
Argentina	113	99	77	111
Uruguay	111	98	82	120
Trinidad	96	112	72	120
Bahrain	108	102	99	103
Fiji	128	99	64	102
Panama	106	-	68	-
Venezuela	94	103	35	141
Emirates	94	96	84	111
Mexico	115	97	58	102
Colombia	114	99	67	116
Kuwait	73	99	64	100
Qatar	89	95	83	101
Thailand	87	-	55	-
Malaysia	91	101	57	107
Mauritius	107	99	62	107
Brazil	112	-	45	-
Belize	121	95	49	111
Libya	106	97	97	-
Middle developed countries (without China)	113 108	96 94	63 58	88 88
Lebanon	109	97	81	109
Turkey	105	95	56	67
Saudi Arabia	78	96	58	87
Oman	80	95	66	94
Ecuador	109	99	50	100
Rep. Islamic Iran	99	93	69	82
Rep. Arabia Syria	101	90	44	85
Algeria	107	89	62	89
Tunisia	116	94	61	94
Jamaica	109	99	80	113
Cuba	105	96	70	105
Peru	123	97	-	93
Jordan	94	101	41	-
Dominican Republic	103	101	82	138
South Africa	117	97	75	116
Sri Lanka	113	98	38	110
Paraguay	109	97	47	103

TABLE 14: Education Gaps, UNDP 1998. (Contd.,)

Samoa	116	98	49	114
Maldives	134	97	49	100
Indonesia	114	96	48	85
Botswana	115	103	56	107
Philippines	116	-	79	-
Guyana	94	98	76	125
Mongolia	88	103	59	136
China	118	98	67	89
Namibia	133	102	62	118
Guatemala	84	87	25	92
Egypt	100	87	74	85
El Salvador	88	101	32	113
Swaziland	122	95	52	96
Cape Verde	131	98	27	93
Honduras	112	101	32	-
Vietnam	114	-	47	-
Solomon Islands	97	87	17	67
Vanuatu	106	102	20	78
Morocco	83	76	39	75
Nicaragua	110	103	47	116
Congo	114	92	53	73
Papua New Guinea	80	85	14	65
Zimbabwe	116	97	44	80
Low developed countries (Without India)	88 75	77 72	34 17	68 72
Myanmar	103	97	30	103
Cameroon	88	90	27	69
Lesotho	99	114	28	155
Ivory Coast	107	74	25	61
Mauritania	85	100	24	85
Rep. Tanzania	74	45	0	-
Yemen	100	82	49	64
Nepal	122	81	27	59
Madagascar	78	84	19	81
Central African Republic	89	79	30	85
Bhutan	72	69	26	59
Angola	118	69	27	34
Sudan	72	57	16	43
Senegal	89	93	28	62
Uganda	73	85	12	60
Malawi	135	90	6	57
Djibouti	38	75	13	73
Chad	55	49	9	27
Guinea-Bissau	64	58	-	-
The Gambia	73	86	22	54
Mozambique	60	71	7	56
Guinea	48	54	12	33
Eritrea	57	81	19	73
Ethiopia	31	62	11	83
Burundi	70	82	7	63

TABLE 14: Education Gaps, UNDP 1998. (Contd.,)

Mali	32	64	9	50
Burkina Faso	38	65	8	55
Niger	29	61	7	44
All PVS	**101**	**87**	**50**	**81**

Appendix VI

Index of the Tables

Appendix VII

Index of the Figures

Appendix VIII

Bibliography

Most of the documents analysed in this book were found through the help of Internet and of its applications. The Readers interested in going deeper in the themes introduced in this work could begin with the following bibliography: near the title of the document the referred web site address is mentioned, when necessary. In the following pages also an index of the main web sites visited and the list of the tables and of the graphs can be found.

All the web sites mentioned in this bibliography were visited from March 1998 until March 1999; some of these addresses could be no more operating when you read this book. Many of the themes we dealt with could represent the beginning of other, more detailed researches in any continent, which we hope to put into practice in a near future.The Internet is a new medium for the diffusion of information and knowledge: it is necessary to exploit its potentialities by respecting the rights of our fellow creatures.

References

[ABS 98] 'Home Internet Use Grows Strongly - ABS Figures', November 1998; http://www.abs.gov.au.

[Acni 98] "Internet Users in Hong Kong Homes approaching One Million", AC Nielsen; http://acnielsen.com.

[Bell 97] 'Draft AISI/HITD Internet Connectivity Su-Programme Framework', ITU project report, in the site http://www.bellanet.org/partners/aisi/proj/itufrom.html.

[Brid 99] 'Information -transfer Stations for Developing Countries in Asia', in the site http://www.bridge.org/its.html.

[Capp 90] "Review of Research on Interactive Videodisc for training", Alexandria Virginia, Institute for Defense Analyses, 1990.

[Card 98] Paolo Carducci, 'Internet o l'utopia positiva', Il Sole 24 Ore, the 2nd of January, 1998.

[CG 97] 'Internet Growth in Brazil (1995-1997)', research of 1997 available in the site http://www.cg.org.br.

[CG 98] 'Brazilian Internet Steering Committee: Mission', Brazilian laws in the site http://www.cg.org.br/docsoficiaisingles/mission.htm.

[Cgia 98] 'CGIAR Publications', in the site http://www.cgiar.org/cgpubs.htm.

[Chas 98a] Stephen Moston, 'Uruguay On.Line: Research Studies', in the site http://www.chasque.apc.org/moston/research.htm.

[Chas 98b] Stephen Moston, 'Electronic Commerce: Levels of Home Shopping', in the site http://www.chasque.apc.org/moston/commerce.htm.

[Chia 98] M. Chiari, 'Dominio dei domini', Internet News, page 90. Tecniche Nuove, December 1998.

[Conf 98] Report Conference in Bonn, available in the site http://www.gandalf.it/mercante/allegati/bonn.htm.

[Cuil 98] Jan van Cuilenburg, 'The Politics and Economics of Access: Issue and Concepts', in the site http://dpub36.pub.sbg.ac.at/ectp/CuilenburgAbstract.htm.

[Dami 98] E. Damiani, 'La lunga marcia', Internet News, page 50, Tecniche Nuove, May 1998.

[Dami 99] E. Damiani, 'Internet e la ricerca italiana:GARR_B', Internet News, page 78, Tecniche Nuove, January 1999.

[Dani 96] "John S. Daniel, "Mega Universities and knowledge Media: Technology Strategies for Higher Education", London Kogan Page, 1996.

[Datq 98] News in the site http://www.gartner.com.

[Dea 98a] 'Wang Xiaobo: eccovi la rete cinese', 11 December 1998, in the site http://www.deandreis.it/pin/news/753/pinews4377.html.

[Dea 98b] 'Clamori: il netstrike cinese!', 27 November 1998, in the site http://www.deandreis.it/pin/news/744/pinews4331.html.

[Dea 98c] 'Nuova Delhi inaugura la sua Silicon valley', 23 November 1998, in the site http://www.deandreis.it/pin/news/740/pinews4297.html.

[Dea 98d] 'In Vietnam arriva la cybercensura', 7 December 1998, in the site http://www.deandreis.it/pin/news/750/pinews34557.html.

[Dea 98e] 'Laos: Internet solo se sotto controllo', 11 November 1998, in the site http://www.deandreis.it/pin/news/753/pinews4376.html.

[Dea98f] 'L'India punta su Internet', 14 December 1998, in the site http://www.deandreis.it/pin/news/754/pinews4384html.

[Dea 98g] 'Parte Internet in Arabia. Con censura di Stato', 4 November 1998, in the site http://www.deandreis.it/pin/news/727/pinews4220html.

[Dea 98h] 'Costi bassi per le connessioni in Arabia Saudita', 11 November 1998, in the site http://www.deandreis.it/pin/news/732/pinews4249html.

[Dea 98i] 'In Medio Oriente il computer corre di più', 2 November 1998, in the site http://www.deandreis.it/pin/news/725/pinews4199html.

[Dfn 97a] 'The Middle East Times', in the site of DFN: http://www.dfn.org/voices/mideast/metimes/metimes/html.htm.

[Dfn 97b] 'Press censor denies censorship', in the site of DFN http://www.dfn.org/Voices/Mideast/metimes/presscensor/presscensor.html.

[Dfn 97c] 'Eleven commandements of censorship', in the site of DFN http://www.dfn.org/Voices/Mideast/metimes/law38/law38.html.

[Dfn 99] 'Two Chinese scientist jailed for using Internet to support democracy', in the site of DFN http://www.dfn.org/Alerts/freesci/freesci.html.

[Didn 98a] 'The first-ever Arabic Educational Web site contest', 4 November 1998, in the site http://www.didnet.co.ae/html/newsnov/newsnov0398.html.

[Didn 98b] 'E-Commerce in the Arab World', 21 April 1998 of IAW, in the site http://www.did.net/html/iawecom.html.

[Doke 98] Anupama Dokeniya, 'Translating Global Niches into National Development: the Role of Regulatory Mechanism', in the site http://dpub36.pub.sbg.ac.at/ectp/DokeniyaAbstract.htm.

[Effo 99] "EFF - Electronic Frontier Foundation", in the site http://www.eff.org/EFFdocs/about_eff_italian.txt.

[Elec 98] "Electronic Commerce in Asia", in the site http://www.electronicmarkets.org/electron...s/electronicmarkets.nsf/pages/em97_2.html.

[Gilc 98] 'Privacy and Human Rights', Global Internet Liberty campaign, report in the site http://www.gilc.org/privacy/survey/exec-summary.html.

[Gomo 93] "Gary D. Gordon & Walter L: Morgan, "Principles of Communications Satellites", John Wiley & Sons. Inc., 1993.

[Guid 97] "E. Guidotti, "Internet e comunicazione", Franco Angeli, 1997.

[Heal 98a] "Global Communications for Health" sul sito http://www.healthnet.org/hnet/hnet.html.

[Heal 98b] "How the international health community is using HealthNet", su http://www.healthnet.org/hnet/variety.html.

[Heal 98c] "Technical Development" in the site http://www.healthnet.org/tech/tech.html.

[Herm 98a] Hermes Datacomms, in the site http://www.hermes-datacomms.co.uk.

[Herm 98b] Hermes Datacomms, 'Case Study: Agroprocessing in central Asia', study available in the site http://www.hermes_datacomms.co.uk/PAGE7.html.

[Hon 98a] 'Metodology', metodology used by HON, in the site http://www.hon.ch/Survey/method.html.

[Hon 98b] 'HON's Third Survey on the usage of the Internet for medical & health Internet purposes (EP8)', study by HON, May 1998, in the site http://www.hon.ch/Library/ParesHON/mednet_survey_mai98.html.

[Huds 97] "Hudson Heather, "Global connections: International Telecommunications Infrastructure and Policy", Von Nostrand Rehinold, 1997.

[Hump97] Stephen Humpries, 'How the Internet benefits Africa', Intermedia May 1997.

[IDC 98] http://www.idcresearch.com.

[IDG98a] 'Navigare a 220 volt', Computerworld, 14 April 1998, IDG Communications Italia,1998.

[IDG98b] 'Meno libertà più sicurezza', Computerworld, 19 January 1998, IDG Communications Italia,1998.

[IDRC 96] 'Bridging the Gaps in Internet development in Africa', report by IDRC, in the site http://www.idrc.ca/acacia/studies/ir-gaps.html.

[IDRC 97] 'Final Report on a Pilot Project into the Use of Cel Data for Connectivity two rural schools in South Africa', report by Yorke Rodda, June 1997, in the site http://www.pta.school.za/rodda/cell/twocell.html.

[Indi 98] 'DoT To Launch Internet Services in March 1999', India Line, 22-29 December 1998, in the site http://www.indialine.com.

[Inet 98a] "Globalisation and internet Governance", session V of INET '98, in the site http://www.isoc.org/inet98/program.shtml.

[Inet 98b] Report Session V: 'The Internet and Global Socio-Economic Development', INET'98 Conference of 23 July 1998, in the site http://www.isoc.org/inet98/program.shtml.

[INT 98a] 'The List', list of the ISP available in the site http://www.internet.com.

[Isoc 95a] "Networking in Latin America and the Caribbean and the OAS/RedHUCyt Project", report in the site http://info.isoc.org:80/HMP/PAPER/168/txt/paper.txt.

[Isoc 95b] "Information-transfer Stations for Developing Countries in Asia", report in the site http://info.org/HMP/PAPER/175/html/paper.html.

[Ispo 98] "European Community Co-operation with Countries in Transition and Developing Countries in Telecommunications and Information Society", report available in the site http://www.ispo.cec.be/infosoc/health/03servan.html.

[ITU 97] "Challenges to the network: Telecoms and the Internet", .report by ITU, 1997, in the site http://www.itu.int.

[ITU 98a] "Global Mobile" - The International Business Newsletter of Mobile Communications Markets, Vol. V, n. 20, 29 October,1998, by Baskerville Communications Corporations, 1998.

[ITU 98b] "Ben Petrazzine, "Internet and Global Information Infrastructure in Africa", ITU, 1998.

[ITU 98c] "Methodological Note on the Choice of Teledensity Bands", study by ITU available in the site http://www.itu.int/plweb-cgi/fastweb?getdoc+view1+www+8513+8++teledensity%20datas.

[LaPo 98] L. LaPosta, "L'OCSE dà la ricetta per l'innovazione", insert of Informatica of Il Sole 24 Ore, page V, 22 May 1998.

[Livr 97] G. Livraghi, "Il mercante in rete", Web Magazine n° 10, available in the sites http://www.gandalf.it and http://www.wmtools.com/mercante.

[Medi 95] "Aspetti economici, politici e sociali dell'informatica", interview with Giuseppe Richeri of 15 May 1995, in the site http://www.mediamente.rai.it/home/bibliote/intervis/r/richeri.html.

[Medi 96a] "Le molteplici dimensioni del mondo delle reti", interview with Fausto Colombo by Mediamente, in the site http://www.mediamente.rai.it/home/bibliote/intervis/c/colombo_f.htm.

[Medi 96b] "Le molteplici dimensioni del mondo delle reti", interview

with Fausto Colombo by Mediamente, in the site http://mediamente.rai.it.

[Medi 96c] "Progresso tecnologico e sviluppo eco-sostenibile", interview with Umberto Colombo of 20 May 1996, in the site http://mediamente.rai.it/home/bibliote/intervis/c/colombo_u.htm.

[Medi 97a] Interview with Giancarlo Livraghi in Mediamente.

[Mike 98] "Mikei Jensen, "African Connectivity Cost Comparision", in the site http://www3.sn.apc.org/africa/afcosts.htm.

[Mina 98] Sabina Minardi, "Rete da legare", Computer Valley n.33, insert of La Repubblica of 28 May.

[Mond 97] Michael Raffoul, "Bangalore, Sillicon Valley à l'indienne", January 1997, Monde Diplomatique in the site http://www.monde diplomatique.fr/1997/01/RAFFOUL/7595.hmtl.

[Neog 96] "China Censorship of the Internet", in the site http://www.neog.com/asianow/Newsgroup/viewercomments/56.html.

[Netw 98a] "The Internet Domain Survey", researches carried out by Network Wizard, http://www.nw.com.

[Netw 98b] "Internet Domain Survey", report of January 1998 by Network Wizard, in the site http://www.nw.com.

[Netw 98c] "Internet Domain Survey", report of July 1998 by Network Wizard, in the site http://www.nw.com.

[Netw 98d] "Internet Domain Survey Host Count", Network Wizard, in the site http://www.nw.com.

[NetW 99] "Internet Domain Survey", report of January 1999 by Network Wizard, in the site http://www.nw.com.

[News 98] "Sri Lanka Net use to boom", 8 September 1998, in the site http://www.news.com/News.

[NTIA 99] "Falling through the Net: Defining the Digital Divide", report by NTIA 1999, in the site http://www.ntia.doc.gov/ntiahome/digitaldivide.

[Nua 97a] "News.Com: Use of the Internet escalates in Latin America", 20 November 1997, in the site of Nua: http://www.nua.ie/surveys.

[Nua 97b] "Dataquest: Latin America PC Market grows", 20 November 1997, in the site of Nua: http://www.nua.ie/surveys.

[Nua 98b] "TechWeb: International Body to Register Domain Names", November 1998, in the site of Nua: http://www.nua.ie/surveys.

[Nua 98c] "Demographic Discrepancies", February 1998, in the site of Nua: http://www.nua.ie/surveys.

[Nua 98d] "Finnish Anomaly", August 1998, in the site of Nua: http://www.nua.ie/surveys/analysis/weekly_editorial/archives/issue1no37.html.

[Nua 98e] "Metodologia di rilevazione di NUA", http://www.nua.ie/surveys/how_many_online/methodology.html.

[Nua 98e] "Embassy of Israel Dublin: Israel's Burgeoning IT Industry", 25 March 1998, in the site of Nua: http://www.nua.ie/surveys.

[Nua 98f] "Las Vegas Sun: India Finally Privatises ISP Market", 2 November 1998, in the site of Nua: http://www.nua.ie/surveys.

[Nua 98g] "Fox News: Kenya on an Information Dir Track", 12 June 1998, in the site of Nua: http://www.nua.ie/surveys.

[Nua 98h] "BBC on-line Network: Saudi Arabia Delays Announcing ISP Licenses", 13 October 1998, in the site of Nua: http://www.nua.ie/surveys.

[Nua 98i] "Internetnews.com: Saudi Arabia Limits ISP Fees", 19 November 1998, in the site of Nua: http://www.nua.ie/surveys.

[Nua 98j] "Gartner Group: PC Sales Up to 10,6 Percente in South Africa", 1 December 1998, in the site of Nua: http://www.nua.ie/surveys.

[Nua 98k] "ArabiaTech: Iran reviews the Global Picture", June 1998, in the site of Nua: http://nua.ie/surveys.

[Nua 98l] "ArabiaTech: Egypt at the telecommunications crossroad", 26 June 1998, in the site of Nua: http://nua.ie/surveys.

[Ocse 98] OECD Report 1998, available in the site http://www.oecd.org/dsti/sti.

[Oecd 98a] "Report on OECD/OSIPP (Osaka University) Workshop: "The Internet: Convergence and self-governance", 9-10 June 1998, available in the site http://www.oecd.org/dsti/sti/it/cm/act/osaka-report.pdf.

[Oecd 98b] "Outlook 1998", OECD Report 1998.

[Pano 97] 'Telecommunications', report by Panos Institute 1997, in the site http://www.oneworld.otg/panos.

[Pano 98a] "The Internet and Poverty", report by Panos Institute 1998, in the site http://www.oneworld.org/panos.

[Pano 98b] "The Internet and Poverty", report by Panos Institute, in the site http://www.oneworld.org/panos.

[Pano 98c] "Internet Brings Controversy to Argentinian Classrooms", article by Laura Kolesnicov and Patricia Kolesnicov, in the site of Panos Institute: http://www.oneworld.org/panos.

[Potc 98] Michael Potashnik & Joanne Capper, "Distance Education: Growth and Diversity", Art. Finance & Development,, article in. March 1998.

[Priv 99] Privacy International, in the site http://www.privacy.org/pi. or in the site http://www.privacyinternational.org.

[Prom 98] News in the site http://www.fas.org/promed/index.html.

[QuMi 94] John S. Quarterman & Smoot Carl-Mitchell, "The Internet Connection", Addison-Wesley Publishing Company, 1994.

[Ripe 98 a] "RIPE Region Hostcount" report by RIPE, November 1999, in the site http://www.ripe.net/statistics/hostcount.html.

[Ripe 98 b] "RIPE Region Hostcount: Method", RIPE methodology, in the site http://www.ripe.net/statistics/hostcount/method.html.

[Roym 98] "More than Five Million Australians Have Accessed the Internet", June 1998, The Roy Morgan Research Centre, in the site http://www.roymorgan.com/pressreleases/19982/inet.html.

[Sao 97] "User Survey", research by South Africa Online, 1997, available in the site http://www.southafrica.co.za/survey_one.

[Sao 98] "The 1998 South Africa Web User Survey", research by South Africa Online, 1998, available in the site http://www.southafrica.co.za/survey_two.

[Sate 98] SatelLife in the site http://www.satellife.org.

[Sold 97] Pierangelo Soldavini, "L'informatica senza barriere diventerà realtà entro il 2000", Il Sole 24 Ore, 27 March 1997.

[Tech 98] "1,2 Million Chinese Now Online", 13 July 1998, in the site http://www.techserver.com/newsroom/ntn/info/071398/info7_4964_noframes.html.

[UAE 97] "The Markets for computers", Business Guide to United Arab Emirates, 1997.

[Undp 98] "Lo sviluppo Umano - I consumi ineguali", report by UNDP, Rosemberg & Seller, 1998.

[Usia 98] "Fact Sheet: Prosperity and free trade at the Santiago Summit", report of the summit in Santiago, Chile, on 19 April 1998, in the site http://www.usia.gov/regional/ar/summit/f4.html.

[W3or 99] "PICS: Internet Access Controls Without Censorship", in the site http://www.w3.org/PICS/iacwev2.htm.

[Whop 97] WHO Press Release, WHO65, WHO Director General Higlights Potential of Telemedicine, September 1997, in the report by Panos Institute, 1998, in the site http://oneworld.org/panos.

[Wired 97] "India Opens Up to private ISPs", Wired News Staff, 16 September 1997, in the http://www.wired.com/news/news/politics/story/6927.html.

[Wired 98] "Uncensoring the world", WIRED, in the site http://www.wired.com/news/news/culture/story/12116.html.

[Wired 99] "Singapore Orders ISP Nannyware", WIRED, in the site http://www.wired.com/news/news/culture/story.html.

[WTO 97] http://www.crocevia.org/videazimut/wto.wto.htm.

[Yunu 97] Muhammad Yunus, "Il Banchiere dei poveri", Feltrinelli 1997.

[Zdne 98a] "Israel set to double its Net population", 6 July 1998, in the site http://www.zdnet.com.

[Zdne 98b] "Site shows censored data from around the globe", ZDNN, in the site http://www.zdnet.com.

[Zdne 98c] "Saudi to introduce censored version of Internet", ZDNN, in

the site http://www.zdnet.com/zdnn.

[Zdne 98d] "Digitale Freedom Network launches campaign for Cuban disidents", ZDNN, in the site http://www.zdnet.com/zdnn.

Appendix VIIIb

Index of the Web Sites

ABS	http://www.abs.gov.au.
AC Nielsen	http://acnielsen.com/acn/press/
Activmedia	http://www.activmedia.com
AfricaCom	http://www.africa.com
AfricaOnline	http://www.africaonline.com
AISI	http://www.bellanet.org/patners/aisi
AliNet	http://www.alinet.it
Alta Vista	http://www.altavista.com
Analysys	http://www.analysys.co.uk
APNIC	http://www.apnic.net/home.html
Arabia Middle East	http://www.ameinfo.com
Arabia Online	http://www.arabia.com/business
ArabiaWeb	http://www.arabiaweb.com
Around the Web	http://www.atw.co.za
AsiaTour	http://www.asiatoru.org
AT&T	http://www.att.com
BellaNet	http://www.bellanet.org/patners/aisi
BoardWatch	http://boardwatch.internet.com
BRIE	http://www.brie.berkeley.edu
CERN	http://www.cern.cn
CG	http://www.cg.org.br
CGAIR	http://www.cgair.org
Chasque	http://www.chasque.apc.org/moston
CNR	http://www.cnn.com
CommerceNet	http://www.commerce.net
ComputerWorld	http://www.idg.it/computerworld
Cyberatlas	http://www.cyberatlas.com
Cyberdialogue	http://cyberdialogue.com
Cyberdialogue	http://www.cyberdialogue.com
DataQuest	http://www.gartner.com
DFN	http://www.dfn.org
DidNet	http://www.didnet.co.ae
EFF	http://www.eff.org
Excite	http://www.excite.com
FBI	http://www.fbi.gov
Financial Times	http://www.ft.com
Forrester	http://www.forrester.com
Gandalf	http://www.gandalf.it
Gartner Group	http://www.gartnner.com
GrameenBank	http://www.grameen.com
HealthNet	http://www.healthnet.org

Hermes Comm.	http://www.hermes-datacomms.co.uk
HON	http://www.hon.ch
IAB	http://www.iab.org
IBM	http://www.ibm.com
ICANN	http://www.icann.org
IDC	http://www.idcresearch.com
IDRC	http://www.idrc.ca
IETF	http://www.ietf.org
IHC	http://www.ihc.net
Il Sole 24 Ore	http://www.ilsole24ore.it
IndiaInformer	http://www.indiainformer.com
IndiaLine	http://www.indialine.com
IndiaOnline	http://www.indiaonline.com
I-Net	http://www.inet.it
InfoDev	http://www.infodev.gov
InfoSeek	http://www.infoseek.com
Intelliquest	http://www.intelliquest.com
InternetNews	http://www.internetnews.com
InternetStatistics	http://www.internetstats.com
InternetWorld	http://www.internetworld.com
IOL	http://www.iol.it
ISOC	http://www.isoc.org
ISOC	http://www.isoc.org.il
ISPO	http://ispo.cec.be/infosoc/health
ITU	http://www.itu.int
Jupiter	http://www.jupiter.com
KuwaitNet	http://www.kuwait.net
La Repubblica	http://www.repubblica.it
Lycos	http://www.lycos.com
MarocNet	http://www.marocnet.net.ma/
Media Africa	http://www.mafrica.com
Mediamente	http://www.mediamente.rai.it
Mercosur	http://www.mercosur.com/main.html
Middle East Directory	http://www.MiddleEastDirectory.com
MIDS	http://www.mids.org
Monde Diplomatique	http://www.monde-diplomatique.fr
NAZCO	http://www.nazcosaatchi.com
Netscape	http://www.netascape.com
Network Wizard	http://www.nw.com
New York Times	http://www.nytimes.com
NEWS	http://www.news.com
NSRC	http://www.nsrc.org
NUA	http://www.nua.ie
OCSE/OECD	http://www.oecd.org
ONU	http://www.un.org.at/uncitral

PANOS	http://www.oneworld.org/panos
PCWeek	http://www.zdnet.com/pcweek
Privacy International	http://www.privacy.org/pi
ProMED	http://www.fas.org/promed/index.html
Punto Informatico	http://www.deandreis.it/pin/news
QualiSteam	http://www.qualisteam.com/erg
ReDHUCyT	http://www.redhucyt.oas.org
RIPE	http://www.ripe.net
SatelLife	http://www.satellife.org
South Africa Online	http://www.southafrica.co.za
Sprint	http://www.2sprint.net
TechServer	http://techserver.com/newsroom/ntn
TechWeb	http://www.techweb.com
Telema	http://www.telema.it
The Economist	http://www.enews.com/magazine/economist
The House of Sinergy	http://www.thos.co.za
TIN	http://www.tin.it
TourismWorld	http://www.tourismworld.com.au
TradePage	http://www.tradepage.co.za/seesa
U.S. DoC	http://www.doc.ita.gov
UNDP	http://www.undp.org
UNESCO	http://www.unesco.org
USAID	http://www.info.usaid.gov
USIS	http://www.usia.gov/usis.html
UUNET	http://www.uunet.com
WIRED	http://www.wired.com/news
WitheHouse	http://www.whithouse.gov
WMTools	http://www.wmtools.com
WorldBank	http://www.worldbank.org
WTO	http://www.crocevia.org/videazimut/wto
Yahoo!	http://www.yahoo.com
ZDNet	http://www.zdnet.com

BREAKING THE DIGITAL DIVIDE: IMPLICATIONS FOR DEVELOPING COUNTRIES

by ELENA MURELLI

Edited and with a Foreword by

ROGERS W'O OKOT-UMA

Dynamism and innovation are predominant features in the emergence of the information society and knowledge economy. The rapid deployment and proliferation of the new and emerging information and communications technologies (ICTs) herald new opportunities for growth and development. Governments worldwide are seeking to harness the massive potential offered. In particular, ICT applications promise significant benefits to include improved health care, easier access to public services, increased opportunities for training, work and leisure and, above all, good governance.

Nevertheless, in spite of the obvious benefits of ICT, the field of practice is not without undesirable consequences and impacts. This is particularly relevant when seen within the context of developing countries where relative differences in both speed of adoption and access to ICT are most marked, contributing to uneven economic progress and development. The rapidly widening Digital Divide must be narrowed and its impact lessened to avoid long-term unwanted consequences.

In *Breaking the Digital Divide: Implications for Developing Countries,* Elena Murelli ably and formidably succeeds in a critical analysis of the various dimensions of the Digital Divide for developing countries. The book articulates the issues and problems encountered and outlines steps the Developing Countries can take to facilitate growth and development within and between countries.

Well researched, informative and authoritative this work will specifically advise and inform organisations and governments wanting to make the transition to an information society and knowledge economy. The message is clearly conveyed - no Developing Country can afford to be left behind.

Commonwealth Secretariat

INFORMATION TECHNOLOGY SERIES

SFI PUBLISHING

INFORMATION TECHNOLOGY SERIES

Commonwealth Secretariat and SFI Publishing

ISBN: 0-85092-672-6 (Commonwealth Secretariat)

1-901127-16-8 (SFI Publishing)

ISBN 978-1-84859-747-1

9 781848 597471