

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 considering 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.

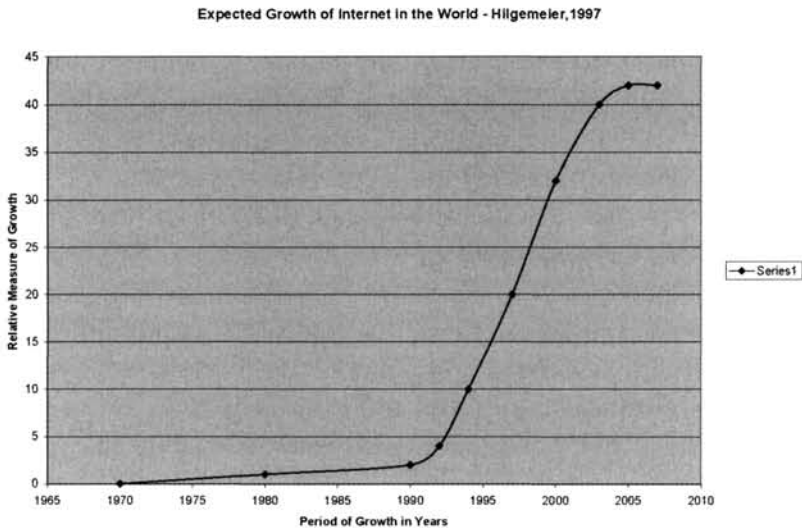


FIGURE 2-1: Real and Expected Internet Growth worldwide - Hilgemeier, 1997.

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%.

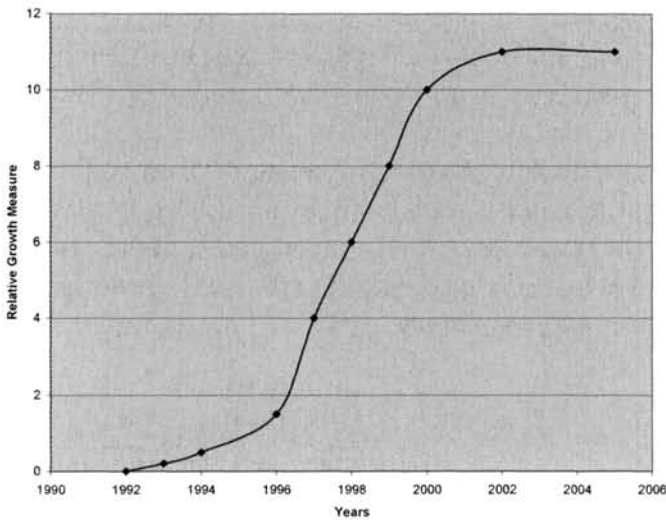


FIGURE 2.2: Expected Growth of Internet in Europe for the period 1992 - 2005 Hilgemeier 1997.

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
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 Rand² in a month. He

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

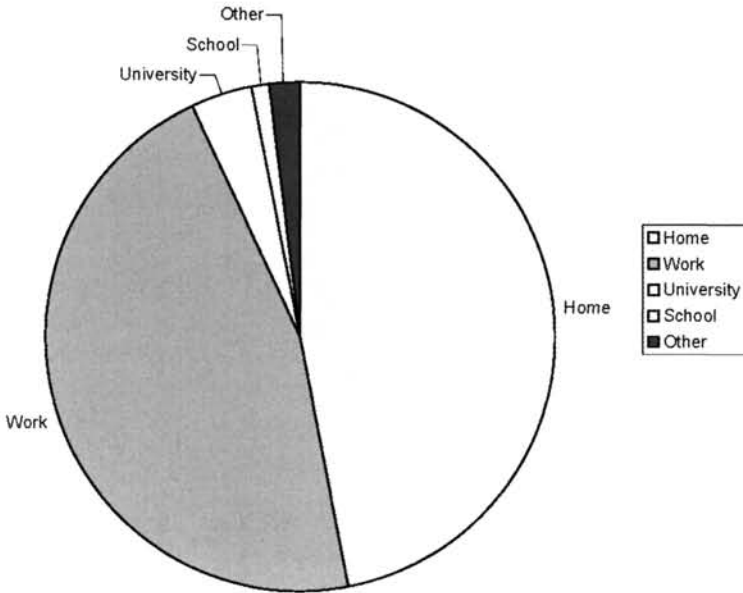


FIGURE 2-3: Main Places from which South African Users have Access to the Net - South Africa On-line, 1997.

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% in 1998, 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.

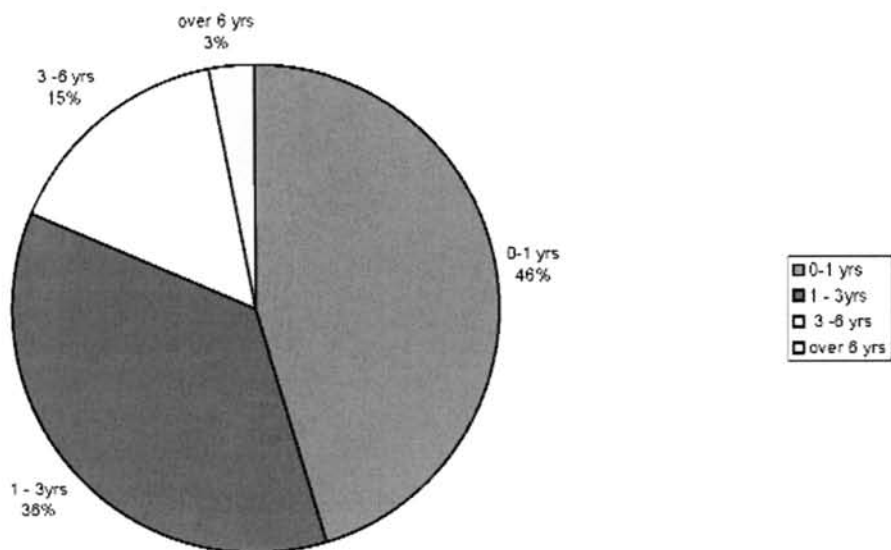


FIGURE 2-4: How long have South African users been Using the Internet? - South Africa On-line, 1997

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.

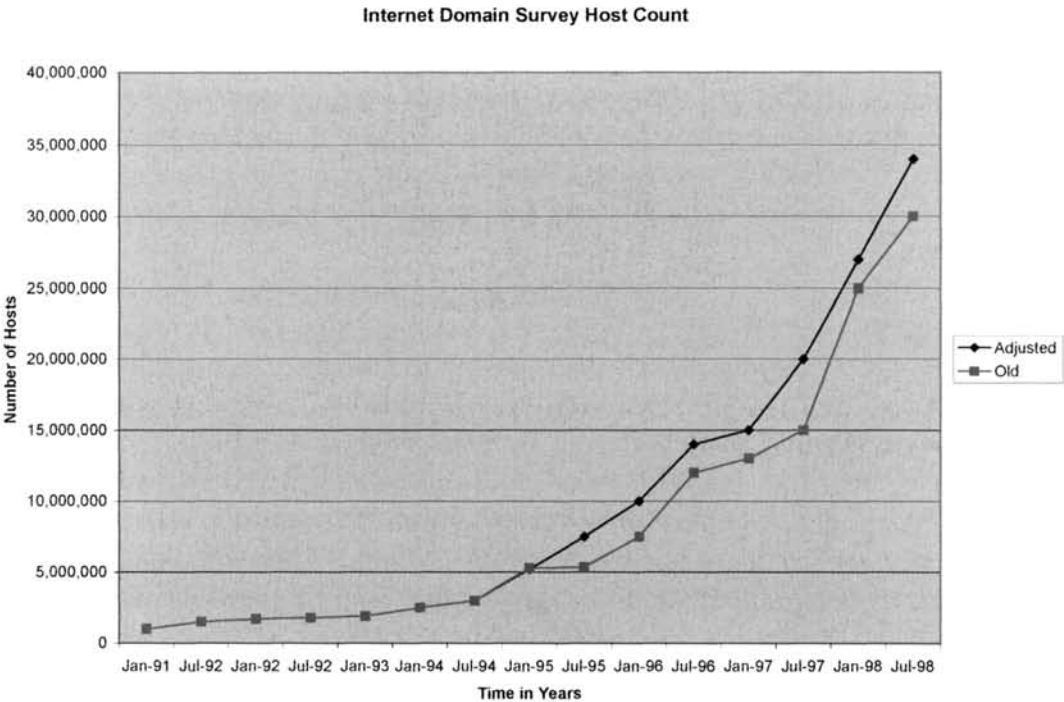


FIGURE 2-5: Internet Domain Survey Hosts Count Worldwide for the Period 1995 - 1998 - Network Wizard, 1999.

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].

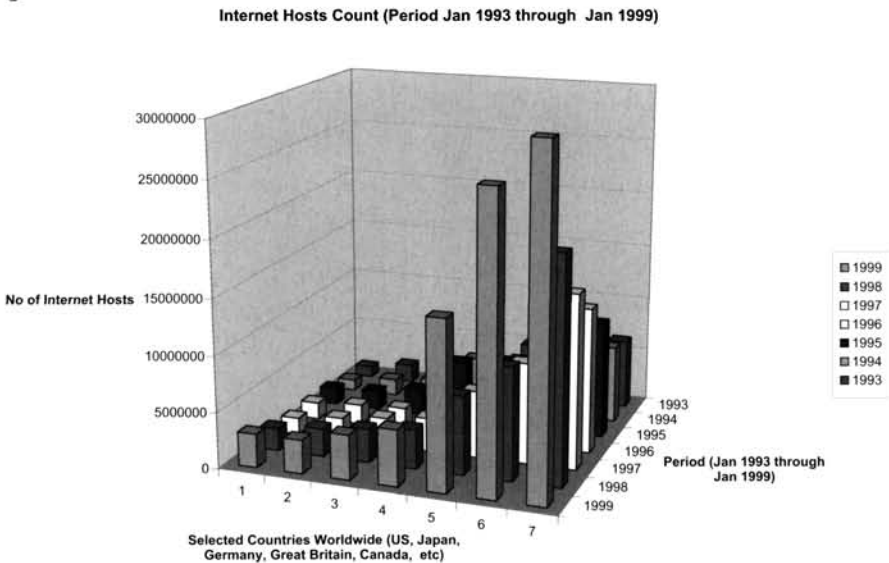


FIGURE 2-6: Host Count from January 1993 to January 1999 - Network Wizard, 1999.

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*.

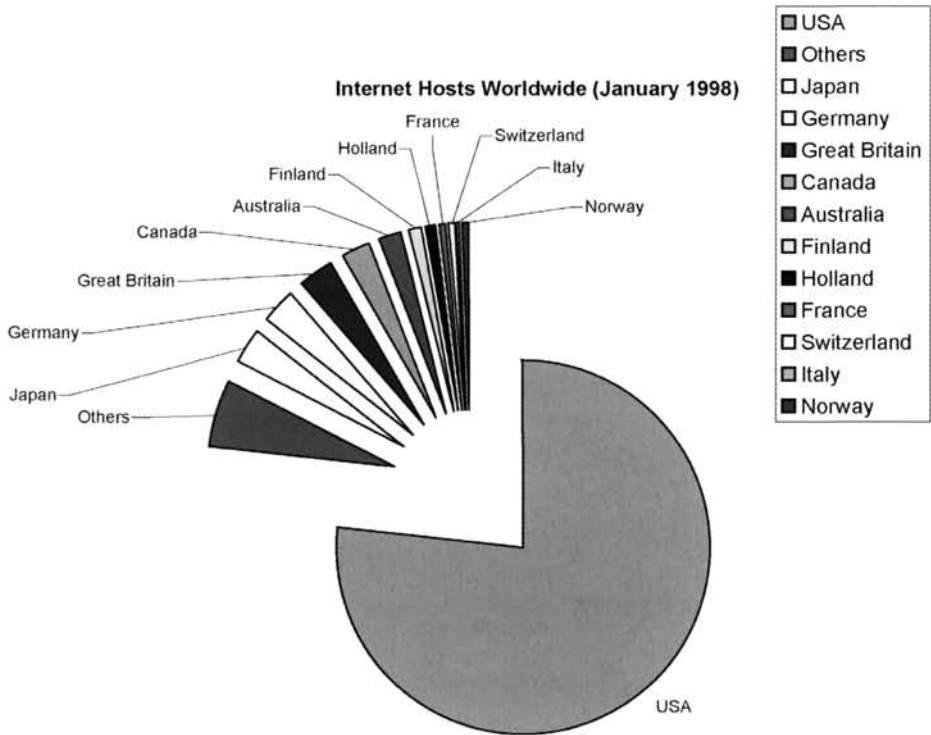


FIGURE 2-7: Hosts Internet in the Worldwide By Proportion January 1998– Network Wizard,1998.

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.

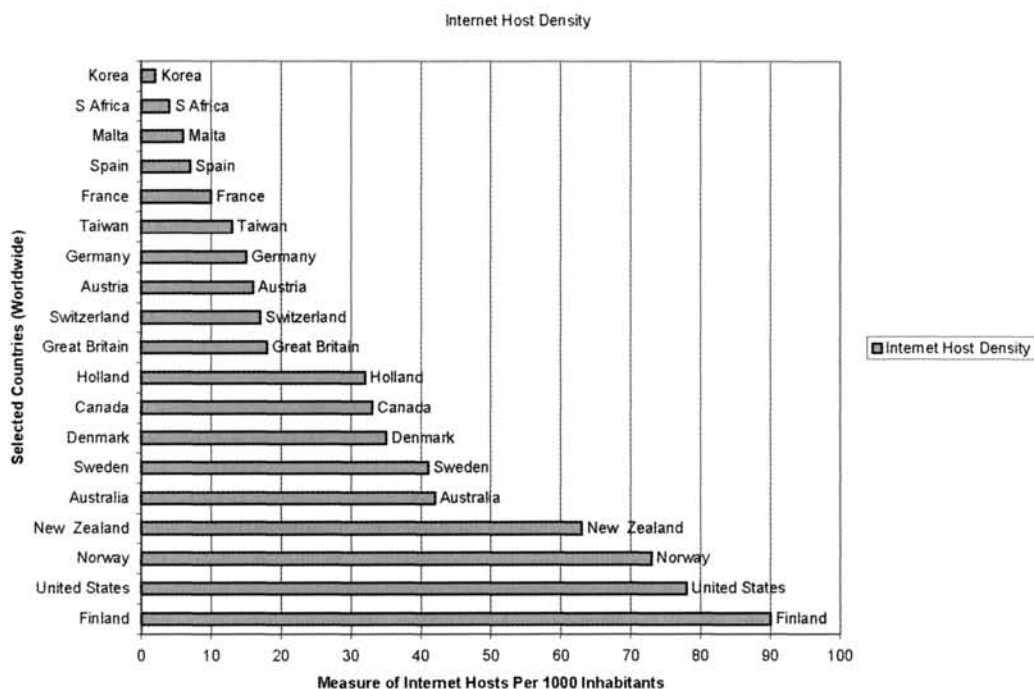


FIGURE 2-8: Internet Hosts Worldwide per 1,000 Inhabitants - Network Wizard, 1998.

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.

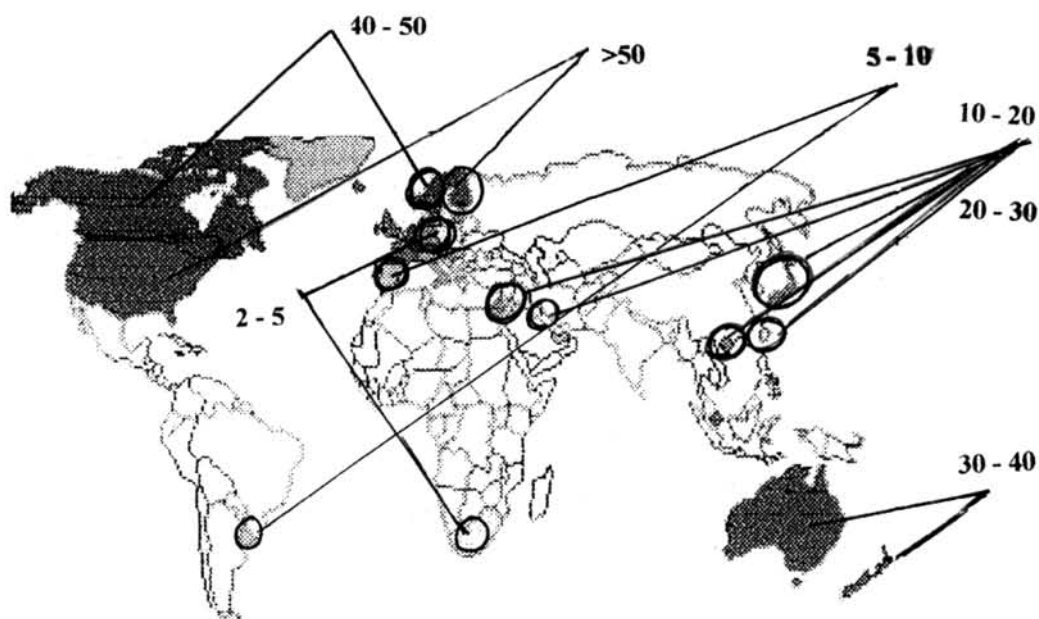


FIGURE 2-9: Internet Host Density in the Worldwide - Network Wizard, 1998.

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'*.

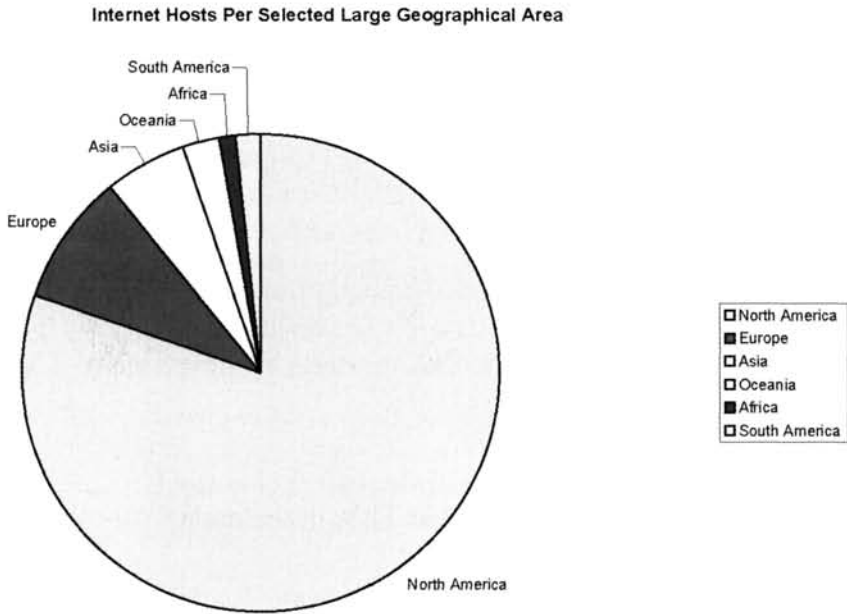


FIGURE 2-10: Internet Hosts Per Selected Large Geographical Areas - Network Wizard, 1998.

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 is on 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.

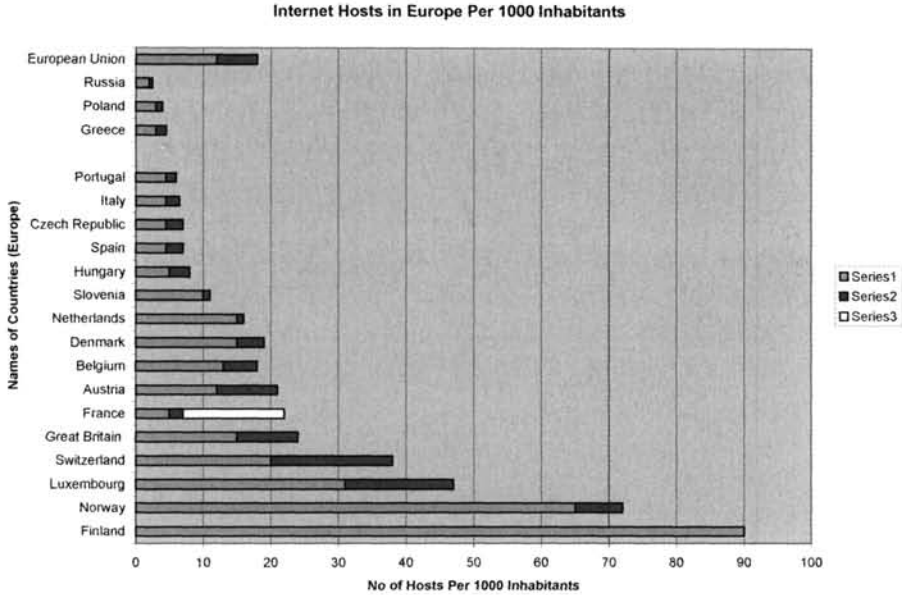


FIGURE 2-11: Internet Hosts in Europe per 1000 Inhabitants - RIPE, 1998.

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 oscillations 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).

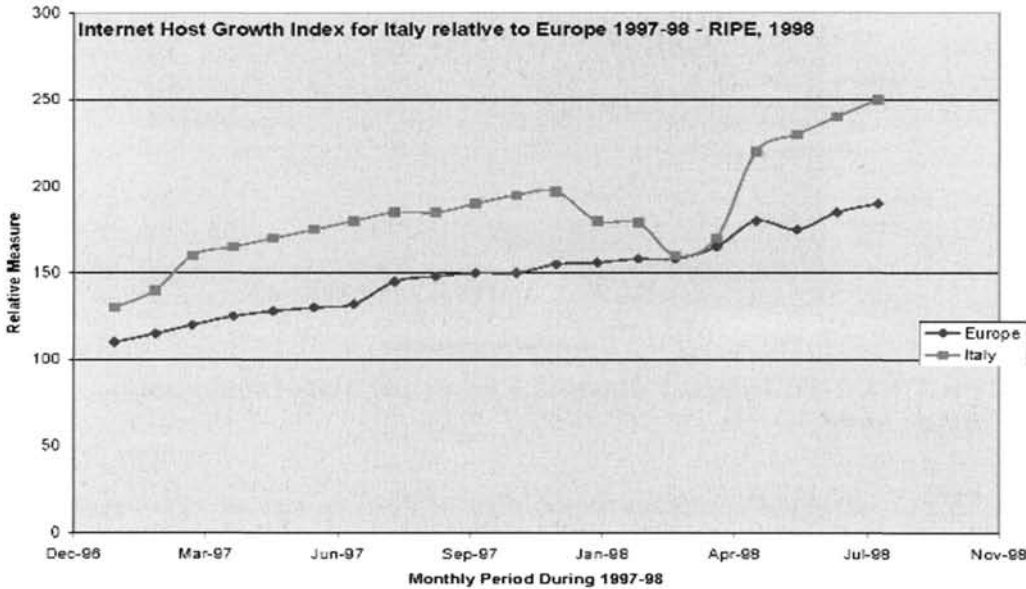


FIGURE 2-12: Internet Hosts Growth Index: Italy-Europe 1997-98 - RIPE,1998.

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.

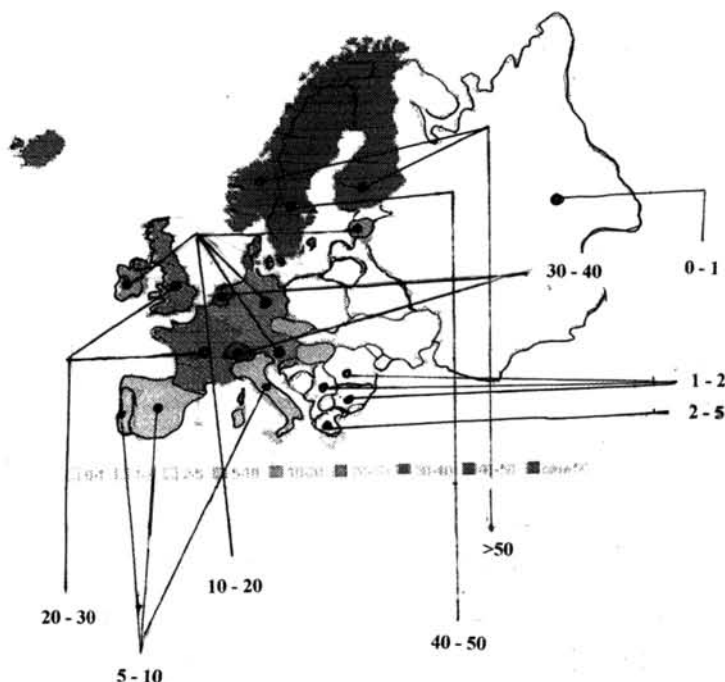


FIGURE 2-13: Internet Density in Europe - RIPE, 1998.

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.*

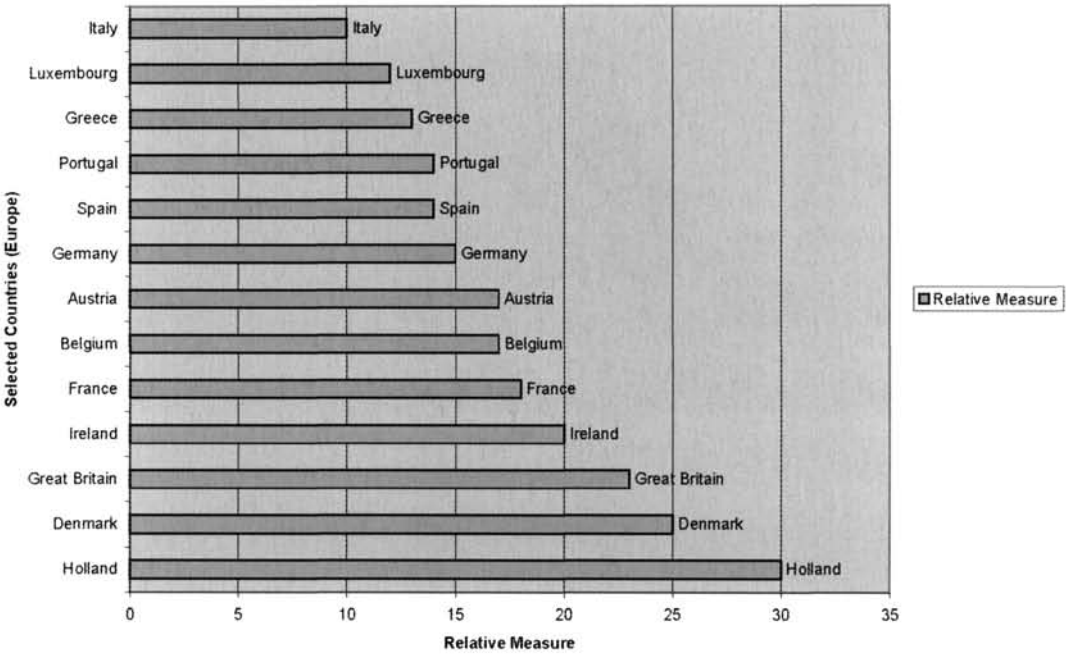


FIGURE 2-14: Internet Growth with regard to GNP in the European Union - RIPE, 1998.

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.

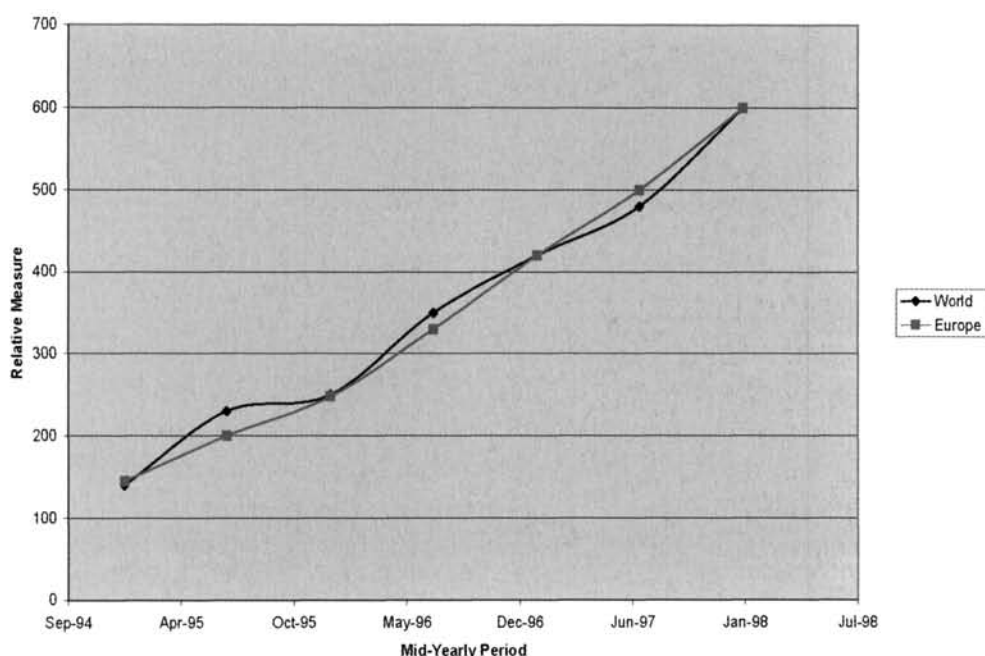


FIGURE 2-15: Analysis of the Data by Network Wizard and RIPE, 1995-1998 For Europe Relative to the World.

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 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.