

## **Emerging patterns in telematic flows among European countries and peculiarities of the Italian case**

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*Abstract.— The development of the Internet in Europe has witnessed extraordinary and rapid growth over the last few years. If, in general terms, this phenomenon is common among many countries it is also true that the rhythm of Internet penetration has nonetheless been quite different. This difference is even more pronounced when the analysis is extended beyond the EU Member States to Europe in its larger context, i.e. the composite regional macroeconomic system that, for cultural and commercial reasons, joins countries in an intense and significant relationship (including, in particular, the EFTA countries, Turkey and some East European countries). The paper seeks to verify whether - and to what degree - the relationships that currently exist on the Internet among these countries are such that they show the prerequisites of a network in which it is possible to identify a series of ties that define a clear hierarchical structure to this space. In conclusion the Italian case, which due to the disparities in the regional (north and central vs. south) diffusion of the phenomenon presents important peculiarities, will be dealt with in depth. The aim is to identify the causes and evaluate whether the liberalisation processes that are presently occurring in the telecommunications sector will, in future, result in a reduction or in a worsening of this national anomaly.*

*Keywords.— Telecommunications, Flows, Europe, Italy*

*Mots-clés.— Europe, Italie, Flux, Télécommunications*

### **INTRODUCTION**

In the modern information society, communication, always considered a fundamental requirement of organised society, acquires the function of an actual connective system, a basic channel of the economic and social life.

On the geographical level, this phenomenon is of extreme interest since the capacities of communications to intervene in human relations, overcoming the barriers created by physical distances, are amplified; from this derive repercussions on the spatial behaviour of individuals and, in short, on the very organisation of the territory.

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With reference to the study of a specific area, such as the European area which will be dealt with here, the progressive success of a new communication technology capable of modifying the behaviours of the economic and political agents renders debatable the pre-existing system of relations among the area's populations, bringing about related processes of adjustment to the overall territorial set up.

In fact, the alteration of the traditional space-time co-ordinates caused by these phenomena suggests new models of territorial organisation and tends to redefine the remote relations according to the "connected/not connected" criterion, in which the higher the degree of connection to a place, the greater its capacity for carrying on relations with other places will be. Thus new spatial hierarchisations come to exist, casting doubt on the previous models and reopening, at least partially, the classifications of centrality and marginalisation on the basis of the "technological illiteracy" factor.

In the initial phase of the spreading of a new communication technology, the relational processes it serves and the very dislocation of its infrastructure tend to revisit the directrices already traced by the pre-existing vectors (Arnum and Conti, 1998); however, in the long term it is probable that the advent of a new technology produces profound effects of an economic, political and social nature due to the capacity to both modernise the pre-existing forms of communication, consequently changing the behaviours of the individuals, and, most of all, promote new relations among the area's individuals. The result will be a totally new communications system, renewed in its expressions by the new instruments available and reflected in the evolution of the relational processes among the populations of the various countries.

These brief considerations stress the usefulness of reflecting on the evolution of the relations among countries within a complex regional system such as the European one, on the basis of the data on the telecommunications traffic. However, it is necessary to point out that in this field, while the traditional phenomena boast a consolidated experience of studies (for example, commonly used indicators are the hours of transmission of television and radio programmes broadcast by a country and followed by the subscribers of another country, or the minutes of phone conversation between the users of two countries), the knowledge of more recent phenomena, such as the Internet, which today is the most representative and striking expression in the telecommunications world, is not so thorough. In fact, little is known about the geography of the web, its spatial structure, the nature of its contents, the physical location of its protagonists. There are dramatically topical questions such as: what paths do the millions of connections among web users follow? What intensity do the connections among the nodes reach? How do they change with time?

These gaps and shortcomings are particularly serious because, due to the pervasiveness and the assortment of the contents, the communications that take place today on the Internet are able to grasp simultaneously both economic and socio-cultural aspects. Indeed, through the telematic networks, there is not only a

promotion and sale of products and exchange of professional knowledge and know-how, but also an exporting of values and lifestyles by the most advanced countries.

**COMMUNICATIONS ON THE INTERNET IN EUROPE :  
ATTEMPT TO IDENTIFY INTERPRETATIONAL PARADIGMS FOR A READING OF  
THE TRANSFORMATIONS IN COURSE**

Faced with the growing requirements for information on the spread and impact of the new technologies in society, it should be pointed out that the measurement of all economic phenomena of an immaterial nature raises a series of technical problems that make it necessary to use caution in using the data in circulation. One kind of problems concerns the access to the information, since the progressive liberalisation of the sector has made service-supplying companies much more jealous of their stores of information. As Bonora effectively points out, this “is one of the paradoxes of the digital society, which overwhelms us with information, but conceals the instruments for decoding it” (1997, p. 408). Furthermore, the speed of the spread to new users and the rapidity of the technical progress, which can be seen in the marketing of increasingly sophisticated tools for remote communication, soon make the data at the researcher’s disposal obsolete.

Needing to guarantee that the data will have the indispensable comparability, the analysis conducted in this paper on the flows on the Internet in Europe was carried out using data of a single, authoritative source: the OECD. The recourse to this source avoided the inclusion in the study of countries outside the organisation, such as many countries of the Mediterranean, which would have made it possible to extend and enrich the conclusions. Nevertheless, it was decided to privilege the criterion of reliability of the source, which also guarantees the total comparability of the data.

With reference to the Internet, many scholars (Goodman, 1994; Hargittai, 1998; Press *et al.*, 1998) and important organisations (ITU, 1999, 1998; UN, 1999) have already pointed out the huge difference in its spread among advanced countries and the others. On the other hand, little has been said on the differences, although significant, which can be found within the same category of the advanced countries. Among the exceptions to this orientation, Hargittai (1999) and OECD (2000) studied the matter for the OECD countries, for which there is much up-to-date information collected by the same organisation, which is surely one of the most active and authoritative ones in the study of the spread of the communication networks.

These same data, which are a primary source for every researcher working on this theme, are at the basis of this work. In particular, the information concerning the links<sup>2</sup> present in the Internet sites was used. In spite of several limitations

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2. A link is a reference to information present on another web page. It is generally indicated with the symbol G together with the underlining of the web address (URL) if it is expressly shown (e.g. [www.geog.ac.kr](http://www.geog.ac.kr)).

implicit in the current survey procedures<sup>3</sup>, the data on the links offer valid starting points for an analysis of the communications among countries. In fact, they reflect, even if indirectly, the degree of attraction exerted by the Internet sites of one country on the users of other countries<sup>4</sup>. This way, it is possible to express an approximate measurement of the intensity of the “bond” between two countries on the web, or reflect on the comparison between the hypertexts that two countries direct reciprocally to one another.

Moreover, on the basis of these data, it is possible to study in depth themes concerning traffic on the web, starting with the correspondence between the paths physically followed by the information in its circulation and the traffic volumes among countries. Indeed, it is well known that the flows of data among the web servers currently take place in a manner that is not very efficient. Dodge (1998) and Cukier (1999) give several emblematic examples of the fact that the substantial deregulation of the flows on the Internet, their extremely rapid increase, and the unequal distribution of the infrastructure generate bottlenecks and profound inefficiencies that penalise the web’s performance. A more precise knowledge of the sizes and directions of the flows could facilitate a more logical and consistent distribution of the telecommunications infrastructure.

The data considered in this analysis concern that composite macroregional system that places alongside the European Union several countries that carry on intense and significant relations with it (we are referring, specifically, to Norway, Iceland, Switzerland, Turkey and several countries of Eastern Europe). With the number of links coming out of each of these countries towards the others equal to 100, the link percentages from and to each country are as follows:

A system which hinges as a whole on two countries can be seen: Great Britain and Germany, which alone attract more than 30% of all links. This datum, which reflects the infrastructural superiority in the telecommunications sector of these two countries over the rest of Europe<sup>5</sup>, suggests their clear predominance in the Internet geography in Europe. In particular, the high number of links addressed

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3. At the basis of the studies on the phenomenon is the concept of “domain”, which is the main reference for analyses on the web. However, it is necessary to point out the limit posed by the impossibility of attributing to a specific country the domains with generic suffixes (“.com”; “.net”, “.org”; “.edu”; “.gov”; “.int” “.mil”). This disadvantage is, however, felt especially for the United States, while in Europe the use of country code domains is more frequent. Anyway, a country code domain name doesn’t mean that the placement of infrastructure will necessary be in the country concerned, although it generally reveals a firmer link to a national economy.

4. As mentioned above, even if not all infrastructure and content under a certain country code domain are necessarily located in that country, for the scope of this paper the physical location of the web server may be of little importance because the company, the users and even the network provider usually refer to that country. As a matter of fact, the Internet enables content providers to physically locate their product where they find the best available prices, services and network performance.

5. Consideration drawn from the OECD data given in the publications “Internet Infrastructure Indicators” and “Communications Outlook”

to them from the sites of the other countries suggests that Great Britain and Germany are two primary points of reference for all of Europe as far as the content proposed on their Internet sites is concerned.

It is, however, possible to note a profound difference between the “British space” and the “German space”. While the former exerts a strong attraction (more or less accentuated but always strong) for all the other European countries, the latter is more selective, exerting a greater attraction for some countries, in particular neighbouring ones, of little demographic importance and of similar language, such as Austria and Switzerland.

This datum allegedly emphasises the language factor as a discriminating element in the evolution of communications on the web: in fact, while the German sites are an important point of reference for Austrian and Swiss users, the “British space” may take advantage of the widespread knowledge of the English language, which has by now become the actual “web Esperanto”<sup>6</sup>.

Another consideration that can be obtained from the analysis of the data is that the prevalence of hypertexts directed towards British and German sites tends to crush the traditional communication spaces, that is those consolidated schemes that used to push a country to privilege in its relations the countries that were most similar in historic experiences and common cultural matrixes. In fact, the historic-cultural similarities between countries do not prove to be a significant factor of structuring the communications on the Internet. For example, the users of the three Benelux countries do not show a particular attraction for their own sites, and the same goes for other traditional national groupings (the Iberian countries, those of Eastern Europe, etc.). An exception is the Scandinavian area, whose behaviours with regard to the phenomenon differ distinctly from those of all the other countries and bear witness to the existence of a significant uniformity of social attitudes and technological development; in these countries, among the first in the world in Internet diffusion, there is a significantly high number of hypertexts within the area. Furthermore, another common characteristic concerns the strong attraction for the British sites, which is much higher than that for the German sites.

The datum of the countries of Eastern Europe present in the survey (Poland, Czech Republic and Hungary) is exactly the opposite: they exchange very few hypertexts amongst themselves and show a substantially equally divided attraction for British and German sites.

To the data of Table 1 can be applied the kinds of relations conceptualised by Reynaud (1981) for the study of the socio-spatial classes: absence of relations, symmetrical relations, asymmetrical relations. The first type occurs when a class (in our case a State) does not have significant relations with the outside and appears

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6. The world distribution of the Internet sites according to the language factor is proof of the overwhelming superiority of English on the web: it is calculated (OECD, 1999) that  $\frac{1}{3}$  of the web sites are written in English; following are those in Japanese, German, French and Spanish, with enormously lower percentages.

From/to	Austria	Belgium	Czech Rep.	Denmark	Finland	France	Germany	Greece	Hungary	Iceland	Ireland	
	(.at)	(.be)	(.cz)	(.dk)	(.fi)	(.fr)	(.de)	(.gr)	(.hu)	(.is)	(.is)	
Austria (.at)		2.3	0.9	1.8	10.3	4.9	30.5	0.7	1.0	0.3	1.0	
Belgium (.be)	2.9		0.7	2.4	3.5	11.4	11.2	1.0	0.7	0.5	1.9	
Czech Rep. (.cz)	4.7	2.2		2.4	4.8	5.5	18.1	0.8	1.7	0.4	1.3	
Denmark (.dk)	1.5	1.4	0.5		18.8	3.4	6.8	0.4	0.4	0.6	0.8	
Finland (.fi)	2.5	2.2	0.7	3.1		3.9	32.7	0.6	0.7	0.7	1.4	
France (.fr)	2.7	8.2	0.7	3.5	3.3		14.2	0.8	0.6	0.3	1.4	
Germany (.de)	11.0	2.4	0.9	5.1	3.9	6.9		0.7	0.8	0.3	1.5	
Greece (.gr)	2.6	2.8	0.7	2.1	3.2	7.1	16.0		0.9	0.4	1.2	
Hungary (.hu)	4.9	2.0	2.1	1.8	5.1	6.7	15.2	1.0		0.3	1.3	
Iceland (.is)	3.8	1.8	0.8	6.1	4.3	2.7	5.9	0.7	0.6		1.5	
Ireland (.ie)	1.5	1.8	0.3	1.1	5.3	5.4	7.0	0.9	0.2	0.2		
Italy (.it)	3.2	2.9	0.8	2.3	3.8	9.4	13.5	1.0	1.1	0.5	1.6	
Luxembourg (.lu)	3.4	13.3	0.6	2.5	2.6	9.3	19.3	1.3	0.4	0.7	1.7	
Netherlands (.nl)	3.3	7.3	1.0	2.7	5.2	6.3	14.8	0.9	0.9	0.6	1.7	
Norway (.no)	2.3	1.9	0.7	9.3	5.4	5.5	10.8	0.7	0.6	1.0	1.6	
Poland (.pl)	3.0	2.2	2.1	2.8	4.2	5.6	16.5	0.9	1.4	0.4	1.4	
Portugal (.pt)	1.7	2.2	0.6	1.5	3.1	4.4	16.7	1.7	0.5	0.3	1.0	
Spain (.es)	3.0	3.8	1.0	2.7	4.2	8.3	12.3	1.3	0.9	0.5	1.7	
Sweden (.se)	2.3	2.0	0.7	6.1	6.4	3.8	9.6	0.6	0.5	0.7	1.4	
Switzerland (.ch)	5.5	3.0	0.8	1.9	2.9	13.3	28.0	0.6	0.8	0.2	1.2	
Turkey (.tr)	3.7	2.9	1.3	2.5	4.6	7.4	13.0	1.2	1.5	0.4	2.3	
Utd. Kingdom (.uk)	3.2	3.7	0.8	3.6	4.7	7.4	20.2	1.3	0.8	0.6	4.5	
Total	4.5	3.1	0.8	3.6	5.0	6.3	13.4	0.8	0.8	0.5	1.8	
From/to	Italy	Lux	Nether	Norway	Poland	Portugal	Spain	Sweden	Switzer	Turkey	United	Total
	(.it)	(.lu)	lands (.nl)	(.no)	(.pl)	(.pt)	(.es)	(.se)	land (.ch)	(.tr)	Kingdom (.uk)	
Austria (.at)	6.6	1.3	6.1	2.8	0.8	0.8	1.8	4.6	8.8	0.2	12.6	100.0
Belgium (.be)	5.0	2.9	20.1	3.5	0.9	1.0	2.3	5.2	6.6	0.2	16.1	100.0
Czech Rep. (.cz)	5.4	1.0	9.0	4.3	2.0	1.2	1.8	5.7	7.8	0.2	19.7	100.0
Denmark (.dk)	2.5	0.8	4.6	30.5	0.5	0.5	1.0	10.8	2.8	0.1	11.2	100.0
Finland (.fi)	3.7	1.3	6.8	5.3	0.6	0.7	1.4	11.5	4.4	0.2	15.6	100.0
France (.fr)	6.3	2.3	8.8	4.9	0.9	1.1	2.8	5.8	12.8	0.2	18.4	100.0
Germany (.de)	5.3	1.9	11.1	3.9	1.1	0.8	2.0	6.4	12.2	0.2	21.6	100.0
Greece (.gr)	5.2	3.8	9.7	3.1	1.1	2.3	1.5	6.3	4.7	0.3	25.0	100.0
Hungary (.hu)	5.5	0.7	9.1	4.5	2.0	0.8	1.8	5.3	10.0	0.4	19.4	100.0
Iceland (.is)	2.7	0.9	6.8	6.6	0.7	0.6	1.1	7.5	3.5	0.2	41.3	100.0
Ireland (.ie)	4.3	0.5	5.4	4.9	4.1	5.0	3.9	15.4	2.4	0.0	30.4	100.0
Italy (.it)		1.7	11.9	3.6	1.0	1.0	3.2	7.6	7.8	0.2	21.7	100.0
Luxembourg (.lu)	5.4		7.5	1.5	1.0	2.2	3.9	3.9	6.1	0.1	13.4	100.0
Netherlands (.nl)	6.1	1.5		4.8	1.3	1.0	2.3	8.3	6.0	0.2	23.8	100.0
Norway (.no)	3.2	0.9	7.5		0.8	0.6	1.2	14.9	5.0	0.2	25.9	100.0
Poland (.pl)	10.2	3.2	7.0	5.3		0.9	1.6	7.1	7.4	0.3	16.5	100.0
Portugal (.pt)	4.0	0.9	4.1	2.3	2.0		2.7	11.0	7.4	0.4	31.4	100.0
Spain (.es)	7.1	3.0	7.9	4.1	1.1	2.3		6.1	8.1	0.3	20.4	100.0
Sweden (.se)	24.5	0.8	7.3	8.2	0.9	0.7	1.4		4.9	0.1	17.0	100.0
Switzerland (.ch)	5.9	0.9	7.7	3.0	0.7	0.9	1.7	5.0		0.2	15.9	100.0
Turkey (.tr)	4.9	1.3	8.5	4.3	2.1	0.9	1.7	5.8	8.2		21.5	100.0
Utd. Kingdom (.uk)	6.3	1.7	11.4	4.8	1.1	1.1	3.0	8.1	11.5	0.3		100.0
Total	6.9	1.6	8.6	5.5	1.1	1.0	2.0	7.1	8.0	0.2	17.4	100.0

Source: OECD, Communications Outlook, 1999

Table 1.— Links among domains of 22 countries (data in percentages, situation at July 1998).

From/to	Austria (.at)	Belgium (.be)	Czech Rep. (.cz)	Denmark (.dk)	Finland (.fi)	France (.fr)	Germany (.de)	Greece (.gr)	Hungary (.hu)	Iceland (.is)	Ireland (.ie)
Austria (.at)		=	.at	=	.fi	.fr	.de	.at	.at	.at	.at
Belgium (.be)			.be	.dk	.fi	.fr	.de	.be	.be	.be	=
Czech Rep. (.cz)				.dk	.fi	.fr	.de	#	=	#	.ie
Denmark (.dk)					.fi	=	.de	.dk	.dk	.dk	=
Finland (.fi)						=	.de	.fi	.fi	.fi	.fi
France (.fr)							.de	.fr	.fr	.fr	.fr
Germany (.de)								.de	.de	.de	.de
Greece (.gr)									=	#	=
Hungary (.hu)										#	.ie
Iceland (.is)											.ie
Ireland (.ie)											
From/to	Italy (.it)	Lux (.lu)	Nether lands (.nl)	Norway (.no)	Poland (.pl)	Portugal (.pt)	Spain (.es)	Sweden (.se)	Switzer land (.ch)	Turkey (.tr)	United Kingdom (.uk)
Austria (.at)	.it	.at	.nl	=	.at	.at	.at	.se	.ch	.at	.uk
Belgium (.be)	.it	.be	.nl	.no	.be	.be	.be	.se	.ch	.be	.uk
Czech Rep. (.cz)	.it	.lu	.nl	.no	=	.pt	.es	.se	.ch	.cz	.uk
Denmark (.dk)	=	.dk	.nl	.no	.dk	.dk	.dk	.se	.ch	.dk	.uk
Finland (.fi)	=	.fi	=	=	.fi	.fi	.fi	.se	.ch	.fi	.uk
France (.fr)	.fr	.fr	.nl	=	.fr	.fr	.fr	.se	=	.fr	.uk
Germany (.de)	.de	.de	.de	.de	.de	.de	.de	.de	.de	.de	=
Greece (.gr)	.it	.lu	.nl	.no	=	=	=	.se	.ch	.gr	.uk
Hungary (.hu)	.it	#	.nl	.no	.pl	#	.es	.se	.ch	.hu	.uk
Iceland (.is)	.it	#	.nl	.no	#	#	.es	.se	.ch	#	.uk
Ireland (.ie)	.it	.ie	.nl	.no	.pl	.pt	.es	.se	.ch	.ie	.uk
Italy (.it)		.it	.nl	=	.it	.it	.it	.it	.ch	.it	.uk
Luxembourg (.lu)			.nl	.no	.lu	.pt	.es	.se	.ch	.lu	.uk
Netherlands (.nl)				.nl	.nl	.nl	.nl	=	=	.nl	.uk
Norway (.no)					.no	.no	.no	.se	.ch	.no	.uk
Poland (.pl)						.pl	.es	.se	.ch	.pl	.uk
Portugal (.pt)							=	.se	.ch	#	.uk
Spain (.es)								.se	.ch	.es	.uk
Sweden (.se)									=	.se	.uk
Switzerland (.ch)										.ch	.uk
Turkey (.tr)											.uk
United Kingdom (.uk)											

Source: Author's elaboration of the data of Table 1

Table 2.— Relations among domains of 22 countries by type of relation. Detailed table.

- a) The symbol # indicates an absence of relations: both countries direct less than 1% of their links to the sites of the other country.
- b) The symbol = indicates symmetrical relations: the two countries direct reciprocally similar percentages of links (differences limited to within 30% of the lowest value)
- c) The suffix of the country indicates asymmetrical relations in favour of that country: the two countries direct reciprocally unequal percentages of links (differences higher than 30% of the lowest value).

	Asymmetrical relations in favour	Symmetrical relations	Absence of relations
United Kingdom (.uk)	20	1	0
Germany (.de)	20	1	0
Netherlands (.nl)	16	3	0
Switzerland (.ch)	16	3	0
Sweden (.se)	16	2	0
Finland (.fi)	13	4	0
France (.fr)	13	4	0
Italy (.it)	13	3	0
Norway (.no)	12	4	0
Denmark (.dk)	10	4	0
Austria (.at)	10	3	0
Belgium (.be)	9	2	0
Spain (.es)	7	2	0
Ireland (.ie)	5	3	0
Luxembourg (.lu)	4	0	2
Poland (.pl)	4	2	1
Portugal (.pt)	3	2	3
Greece (.gr)	1	5	2
Czech Rep. (.cz)	1	2	2
Hungary (.hu)	1	2	3
Turkey (.tr)	0	0	2
Iceland (.is)	0	0	7

*Source: Author's elaboration of the data of Table 1*

*Table 3 – Relations among domains of 22 countries by type of relation. Summarising table*

substantially isolated. The second type identifies flows of relations between two classes which are equivalent in intensity but not insignificant. Lastly, the asymmetrical relation concerns unequal flows between two classes.

In detail, the comparison among all the countries with regard to their communications on the web made on the basis of the data of Table 1 is as follows:

The table 3 shows the summary of the relations among all the countries, broken down into asymmetrical, symmetrical and absent. The analysis shows that the prevailing type of relation is the asymmetrical relation. Great Britain and Germany are the countries which present the majority of asymmetrical relations in their favour, where, that is, the links directed to their sites coming from another country are always higher than those that they direct to the sites of that country (for example, France directs 14.2% of all its links to German sites, while Germany directs only 6.9% of its links to French sites; similarly, 18.4% of the French links are directed to British sites, while only 7.4% of the British links are directed to French sites).

Unlike what might be expected, behind Great Britain and Germany there are not countries such as France or Italy which occupy a very significant position in the European panorama as far as political, economic and demographic weight is

concerned; instead, there are the Netherlands, Switzerland and Sweden, which evidently show more vitality and maturity with regard to the Internet phenomenon than Italy and France.

Ranking last in the classification are those countries which always show asymmetrical relations to their disadvantage and frequent cases of absence of relations. These are Turkey and Iceland, which appear to be extremely isolated in the European Internet panorama. It appears significant that their geographic positions on the European “outskirts” correspond to being on the “web outskirts”, with little penetration of the Internet and a marked attraction towards foreign sites (see the data published by the OECD, 1999).

### **Observations about connectivity within the Internet**

As much as the analyses of the Internet phenomenon perceive the need to supplement the quantitative data with precise comparisons on qualitative aspects (more actually cultural), this limit does not prevent drawing from the preceding data several general considerations concerning the possible repercussions on the communications systems among the countries considered.

The research has brought out profound differences and precise hierarchies among countries which all belong to the same category of the world’s richest countries. The new schemes taking hold tend to highlight a marked polarisation of the flows around the technologically more advanced countries. The spread of communication technologies which are increasingly more powerful and accessible to citizens thus develops within a framework that sets up the centrality of the countries with a strong technological penetration against the simultaneous marginalisation of the less equipped ones.

On the basis of this assumption it is possible to see for the future, at least with reference to the technologically most advanced realities, a diversification and intensification of the communication flows. On the other hand, the communications among countries in conditions of very differentiated technological development or up to now based on factors connected with geographic closeness could suffer a considerable regression. This is surely a risk for the progress of communications within a regional system such as the European one, whose countries show very differentiated technological advancement levels.

It thus becomes necessary to promote actions from above aiming to limit the territorial imbalances in the access to telecommunications networks. Today the central European bodies show full awareness of the need to launch a policy of fair development of the networks that can assist the outlying regions of the Union in making up for the “digital disadvantage”<sup>7</sup>. This awareness derives from the observation that, while the cabling of the metropolises and rich areas coincides with the

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7. A recent important sign in this direction was given by the European Commission at the Lisbon summit of 23-24 March 2000; the official documents can be consulted on the Commission’s homepage (<http://europa.eu.int/comm>).

interest of private operators, the creation of infrastructure in the disadvantaged areas instead necessarily requires public intervention, increasingly undelayable in the presence of such a pressing technological progress.

In fact, the logic of a commercial nature that guides the spread of the Internet sees a gain in advantage of the more populous areas that guarantee higher earnings for telematic and multimedia service companies, to the detriment of the more isolated rural areas. Therefore, in the current phase of their development, not only do the telematic networks not cancel the contrast between urban and non-urban, but they even strengthen it, discriminating both the costs and the quality of the services in favour of the former.

In addition to the exclusively demographic factor, it is necessary to add that the technological equipment also depends on the availability of capital necessary for the investments. In this sense, the current growth of the sector characterised by the accentuation of the liberalisation process appears even more dangerous for the purposes of a balanced distribution of the equipment over the territory. An emblematic example is the cabling work being carried out in several of the most populous Italian cities, which in the future will allow only these to have access to cable television.

Furthermore, of particular importance is the “technological illiteracy” factor, which tends to penalise the countries and areas that cannot count on modern training systems that are adequate for society’s new needs. In this sense, for an extremely innovative sector such as that of telecommunications, the specificities of the national and local economic system may provide strong stimuli for professional updating; suffice it to think, for example, of the beneficial effect produced in north-eastern Italy, where an economic fabric heavily based on entrepreneurial creativity prevails.

It is therefore true that technological innovations in the telecommunications field today make available exceptional opportunities for access to information but, as Bonora maintains, “the routes of acquisition are anything but linear and automatic” (1997, p. 401). The references to the territorial differences present today in Italy, mentioned above, suggest that it is advisable to study further this case, which appears emblematic of the contradictory nature of the current telecommunications development.

#### **THE PENETRATION OF THE INTERNET IN ITALY: A CASE OF EXTREMELY UNBALANCED GEOGRAPHIC DIFFUSION**

The observation that the telematic market today is far from guaranteeing for all citizens and all enterprises equal possibilities of access to the web brings to the attention a series of problems of both an ethical and an economic nature: those of the first kind refer to the circumstance that the web deepens the distances in the social body, accentuating the gap in opportunities available to individuals; those of an economic nature concern aspects such as the competitive advantage of the

regions which benefit from higher levels of telematic infrastructuring or the distortions in the global competition generated by the different connection costs from one country to another. The Human Development Report of the United Nations (1999) also recently dealt with these themes, observing the concentration of Internet users in the industrialised countries and pointing out the danger of a new geographic barrier raised by the development of the web: "Geographic barriers may have fallen for communications, but a new barrier has emerged, an invisible barrier that, true to its name, is like a world wide web, embracing the connected and silently – almost imperceptibly – excluding the rest" (p. 63).

Precisely the theme of "fair access" takes on worrisome aspects because of the unequal distribution of the infrastructure over the territory. Since the telematic communication phenomena require the availability of infrastructure, in the absence of which the basis condition for their spread is lacking, there is no doubt that the different infrastructural capacity produces territorial differences in the development of these phenomena. Thus the technological level of this infrastructure and its degree of coverage of the territory is a valid indicator for evaluating not only the current dimension of the phenomenon, but its potentials also. In fact, where the telecommunications infrastructure is most widespread, there is also a potential superiority in both access to the web and possibility of acquiring visibility on the web.

For analysing the regional differences in the spread of the Internet phenomenon in Italy, in this research it was preferred not to resort to data on the number of users of the web due to the well-known problems concerning this kind of observation (ambiguity of the definition of "user", technical problems, etc.).

The reality of territorial telematics seems, on the other hand, to be more significantly represented by concepts such as that of the "digital city", developed during the international co-operation projects aiming at the development of urban areas through common policies in the telematic sector<sup>8</sup>: this expression is used to indicate all the Internet sites, whether public or private, referring to certain geographic realities, such as cities, provinces, regions, islands, districts, etc. It is a concept that goes beyond the simple datum of connections to the web. Offering a significant representation of the profound connections between local economic development and telematic instruments, the "digital city" concept indicates the perception by the local community of the new communication instruments as key elements for the promotion of the territory.

According to these data, the digital cities are concentrated mainly in the north, with peaks in Liguria and Emilia-Romagna. The centre, and even more markedly the south and the islands, appear very much behind. Nevertheless, the four geographic divisions are not very homogeneous within themselves, alternating regions with a strong technological penetration with others that are behind.

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8. See the network of users which has developed around the "European Digital Cities" project financed by the European Commission (<http://www.edc.eu.int/telecities>). The fame of the concept of "digital city" in Italy is due to the Assinform-RUR-Censis research.

	Number of digital cities	Digital cities per 1,000,000 inhabitants	1998-1999 increase (%)	1997-1998 increase (%)
Piedmont	66	15.4	4.0	65.8
Valle d'Aosta	2	16.7	0.0	0.0
Lombardy	207	22.9	15.0	462.5
Liguria	155	95.3	1.3	86.6
North-West	430	28.5	8.0	158.4
Trentino-Alto Adige	30	32.2	7.1	180.0
Veneto	92	20.5	0.0	130.0
Friuli-Venezia Giulia	8	6.8	14.3	0.0
Emilia Romagna	239	60.2	91.2	177.8
North-East	369	34.9	46.4	144.7
Tuscany	109	30.9	29.8	12.0
Umbria	12	14.4	300.0	0.0
Marches	50	34.3	2.0	188.2
Latium	36	6.8	33.3	35.0
Centre	207	18.7	27.0	33.6
Abruzzo	12	9.4	100.0	0.0
Molise	9	27.4	200.0	50.0
Campania	55	9.5	17.0	38.2
Apulia	45	11.0	32.4	30.8
Basilicata	13	21.4	0.0	18.2
Calabria	115	56.0	0.9	200.0
Sicily	81	15.9	11.0	192.0
Sardinia	19	11.5	5.6	50.0
South and Islands	349	16.7	13.3	96.2
Italy	1355	23.5	20.9	109.1

*Source: Author's elaboration of Assinform-RUR-Censis data (1999)*

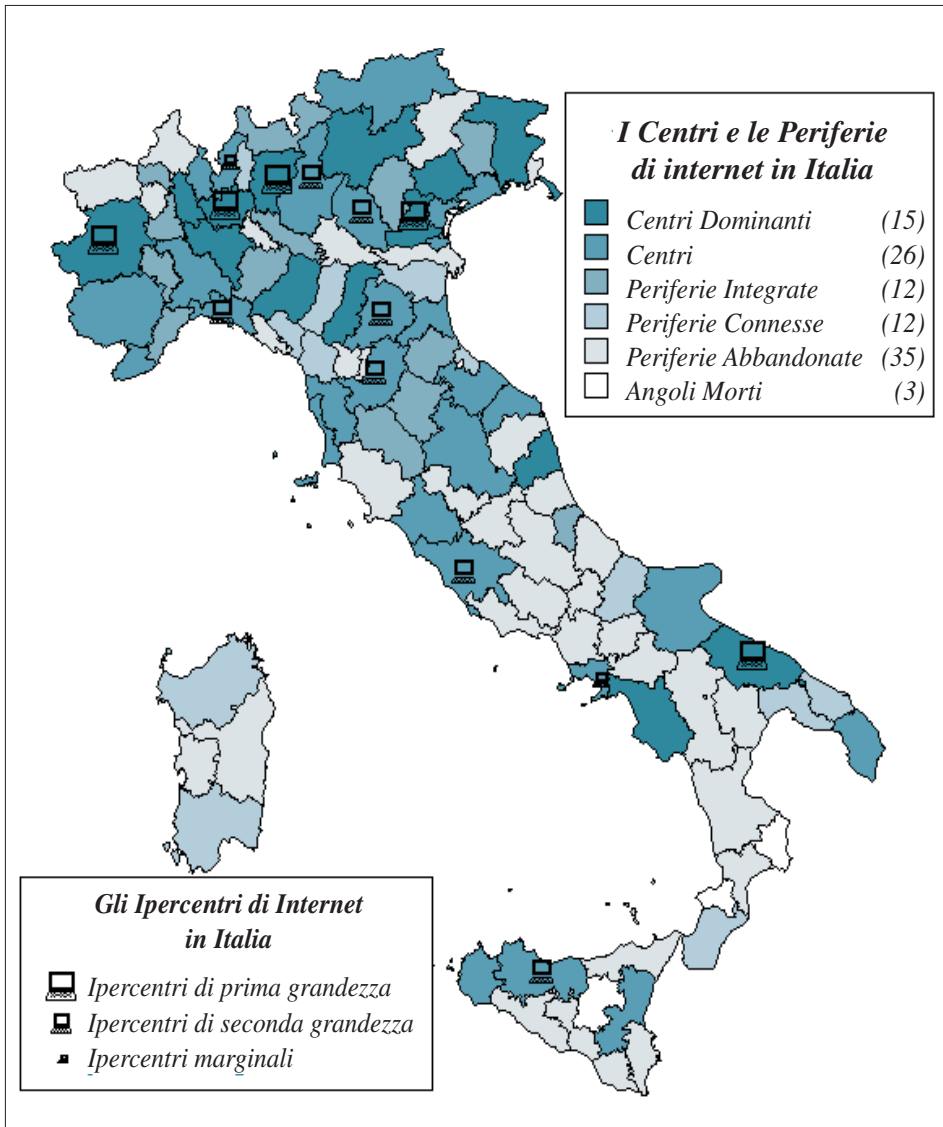
Table 4.— The “digital cities” in the Italian regions (data referring to the month of October 1999).

This consideration on the heterogeneity of the phenomenon within divisions of limited area suggests studying the matter further, preannouncing a distribution of the phenomenon which is geographically rather involved and complex.

A picture on a smaller scale concerning the datum of the infrastructure equipment is offered by Rodighiero's study (1999, see map 1), which makes a double classification: of the provinces and the main nodes, the first classified into “dominant centres”, “centres”, “integrated outskirts”, “connected outskirts”, “abandoned outskirts” and “dead ground”, and the second broken down into “hypercentres of first magnitude”, “hypercentres of second magnitude” and “marginal hypercentres”<sup>9</sup>.

The picture that emerges is made up of a small number of cities and metropolitan areas in a dominant position, i.e. located along the system's main backbone,

9. For details on the methodology and parameters used, see the site <http://users.iol.it/daniele.rodighiero>.



Map 1 – Telematic infrastructure equipment in Italy by provinces

(up right box): The Internet Centres and Outskirts in Italy: - Dominant Centres - Centres- Integrated Outskirts- Connected Outskirts- Abandoned Outskirts- Dead Ground

(bottom left box): The Internet Hypercentres in Italy: - Hypercentres of first magnitude - Hypercentres of second magnitude - Marginal hypercentres

Source: Rodighiero (1999).

a multitude of minor centres (in the demographic sense), strongly dynamic as far as the number of accesses to the web is concerned but positioned along secondary axes, and several outlying areas (not necessarily from the geographic standpoint) which are completely left out of the new geography of the country's telecommunications. Therefore, particular attention is devoted to the urban/non-urban dichotomy, which allegedly favours those more advanced urban realities which are strongly interconnected by high-speed transmission networks.

The fragmentation of the provincial picture, in a national context that tends to confirm the north/south disparity, seems to indicate that the Internet geography in Italy is simultaneously marked by two kinds of factors: of the structural type, tending to perpetuate the traditional lines of a division of the country into two parts, with a rich and modern north and a poor and backward south; of the local type, suitable for making the best use of the strong entrepreneurship of several specific areas of the south which are particularly sensitive to the new technologies.

As hard as it may be to identify the crucial factors that orient the Internet geography in Italy, the consideration that today the telematic phenomena are urged on more by enterprises than by private users (consider the extremely rapid development of e-commerce, in which the "business-to-business" form prevails over the "business-to-consumer" form) suggests as a possible interpretational path the particular structural composition of the national economy, the peculiarities of which distinguish the Italian reality from all the other European realities.

In fact, in Italy the productive fabric, especially in the north, is extremely fragmented and numerically full of economic parties, characterised by a strong presence of small and medium-sized enterprises which represent the most typical and dynamic reality of the national economy, a key sector for the innovation of the processes and employment. Now, since authoritative studies (OECD, 1998; G8/European Commission, 1998) point out that it is precisely with the small and medium-sized enterprises that the new remote communication instruments are having trouble spreading and taking hold, precisely the unequal territorial distribution of these enterprises could condition a national panorama of a geographically much more intricate use of the technologies than the traditional, and evidently insufficient, north/south interpretational scheme<sup>10</sup>. Table 5 clearly

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10. In order to explain the reluctance of small and medium-sized enterprises in convincingly undertaking the route of the new communication technologies, many factors are commonly called into play, having to do with both reasons of economic convenience (initial investments in the company infrastructure and personnel training) and organisational reasons (the need to revise the traditional flows and procedures). There is also allegedly an erroneous perception of the potential of telematic communication: in fact, the enterprises tend to see the Internet more as an instrument to support the traditional organisation (the Internet as a channel of communication and promotion) than as a new opportunity for extending their commercial boundaries. In any case it appears evident that the minor enterprises, already more inclined to limit investments in innovation because of their reduced financial resources, find it hard to evaluate the benefits adequately because they are typically lacking in specialists with the technical knowledge and know-how necessary for permitting the technology to be put to the best use and fully exploited.

Geographic distribution	Enterprises with online computer equipment (in%)	Enterprises without online computer equipment (in%)	
North-West	24.1	75.9	100.0
North-East	25.5	74.5	100.0
Centre	22.0	78.0	100.0
South	18.1	81.9	100.0
Italy	22.3	77.7	100.0
Employee class			
1-19	21.1	78.9	100.0
20-49	79.2	20.8	100.0
50-249	91.4	8.6	100.0
250 or more	96.3	3.7	100.0

*Source: Italian National Statistical Institute, Intermediate Census on Enterprises of Industry and Services (provisional data)*

*Table 5.– Enterprises by possession of online computer equipment, employee class, and geographic distribution (data referring to the year 1997).*

shows that the use of online equipment rises with the increase in the number of employees in the company.

## LESSONS FROM THE ITALIAN CASE

### **1. The profound infrastructural differences that cross both the country's geography and its economic fabric render necessary a more incisive high level planning.**

The situation described requires a re-balancing intervention by the institutions since it is evident that precisely the small and medium-sized enterprises, structurally afflicted with problems in the distribution activity, could reap sure benefits, being able to progress from an asphyxiated, circumscribed distribution to one of potentially unlimited dimensions.

Without going into the differences between the European and the U.S. models, because this would stray from the purposes of this paper, we mention the subject here since the evolution of telematics in Italy significantly reflects several basic tendencies that are present throughout all of Europe. While in the United States the process of change, widely shared by the Government and the economic operators, is based on the principle of minimum interference by the State and on a proactive role of the private sector, in Europe the situation is profoundly different. With the small and medium-sized enterprises' lack of adequate technological and financial capacity and with private individuals being little inclined to change, the market does not seem able to stimulate an autonomous development. It is thus indispensable to have a strong action by the Governments and State administrations

aiming to promote the process of technological upgrading and to eliminate the restrictions and obligations caused by the overlapping of national regulations and behaviours. The Italian reality is fully framed within this European panorama, reflecting – even to an accentuated degree – both the hesitancy of its enterprises in adopting the new information and communication technology solutions, and the cultural resistance of its private users.

Apropos of this, however, it must be admitted that Italy is a classic example of a shortage of high level planning. The difficulty of the central administration's intervention in successfully affecting strategic fields for the development of the information society, such as professional training, the computerisation of the public administration and incentives for research, has up to now been compensated by the dynamism of several local governments, promoters of projects on a smaller scale. Even if this is notable as far as intentions are concerned, the initiative of several local actors, countered with the political inertia of others, has generated an extremely heterogeneous situation with evident fractures that cross both the country's geography (with some areas more up-to-date than others with respect to information technology) and its economic fabric (some sectors and categories have had experiences which are unknown to others).

An example of the limits of the central organisation in effectively guiding the country onto the route of the information society can be seen in the disorderly development that the Italian telecommunications market has undergone in recent years: it is not able to guarantee the same service cost and quality conditions offered in other advanced realities. The Italian market, which has gone through (and in part is still going through) a phase of turbulence and rapid changes, seemed to discharge some of its internal inefficiencies onto the user, through an artificial increase in rates.

This situation began to become fluid and susceptible of change as a consequence of the profound effects generated by the sector liberalisation process launched with Law 249/1997. In fact, several fundamental turning points occurred already in 1998, such as the establishment of the Authority for Telecommunications, the granting of licences to fixed network operators, the application of the interconnection list and the granting of licences to new mobile operators.

There remain, however, several objective obstacles to the development of communication infrastructure for the Italian enterprises which are attributable to several structural elements of the country's industrial system. We are referring, in particular, to the numerous presence of small enterprises, which multiplies the production structures present throughout the territory, and to the organisation of the production, which is heavily based on great processes of division of work among several firms. This industrial development model, of a polycentric and reticular nature, the most advanced implementation of which is found in north-eastern Italy, makes it necessary for the connections throughout the territory to be extremely widespread and far-reaching.

## **2) The technological development in the communication field measures the capacities for adjustment of the industrial district model: decline or new “virtual district”?**

The “industrial district” model is commonly known for having made the system of Italian small and medium-sized enterprises competitive all over the world, thanks to an effective intertwining of connections of little formality and few procedures among enterprises of a single economic sector and located in the same area. In the district, the communication channels among enterprises, both for the management of commercial transactions and for the spread of know-how, are based on the belonging to the same socioeconomic community, on the trust that derives from the continuation of the relations with the passing of time. Nevertheless, today these indispensable forms of communication tend to become insufficient if they are not adequately supported by the use of telematic instruments (Franch and Zaninotto, 1997).

Interesting prospects have, however, opened in relation to the recent evolution of the Internet, tending to assert the community dimension (group of users moved by a common interest who interact on the web) as the ideal Internet dimension, that is, that in which its communication potentials are expressed best. This evolution, centred on “user categories”, may entail profound effects on the development of the phenomenon, orienting it towards the strengthening of the online presence not of single users, but rather of collective parties representing them.

In light of these considerations, the Italian peculiarity of the great fragmentation of the enterprises throughout the territory could turn into an advantage once the small and medium-sized enterprises finally overcome the cultural obstacles with regard to the new communication instruments and the personal computer is thought of not only as a mere work instrument but as an actual competitive opportunity. At that point it will be possible to hypothesise the persistence of the traditional (and winning) models of communication and know-how transfer among enterprises of the same industrial district, repeated in an innovative manner with the possibilities offered today by the new information and communication technologies.

In this way, the relational mechanisms typical of the industrial district could undergo a metamorphosis in form, but not in substance, improving in what could be called, with a derived expression, a “virtual district”, in continuity with the original local identity but at the same time an “active node” in the world communications network.

## **CONCLUSIONS**

The analysis of the communications on the Internet in Europe and the study of the Italian case show clearly that even in the modern information society, based essentially on technology’s capacities to make every place on the globe potentially able to communicate, spatial indifference is still a dream. At every appearance of a new communication technology (as was the case in the past with the telegraph and

the telephone, and today with the Internet), apprehension for the loss of meaning of the physical distances in the name of an improbable “spatial indifference” crops up: this belief is based on the idea that a technology that is potentially able to connect all corners of the globe may introduce a new universal system of communications that democratically allows equal access to the web; even the initial diffusion of the Internet was accompanied by enthusiastic outbursts, summed up in slogans such as “virtual democracy” or “electronic equality”.

Very soon, however, the dream of spatial indifference lost steam and the attempts at identifying the new interpretational paradigms more suitable for reading the transformations taking place gained courage. In favour of the heterogeneity of the communication space was the fact that telecommunications development acts on territorial realities which are already differentiated in their spatial structures from the start. “Avant de modifier l’organisation de l’espace, les nouvelles technologies de communication s’inscrivent dans une organisation spatiale préexistante et dans un espace différencié” (Bakis, 1990, p. 25). In other words, the social organisations which have succeeded one another in time have already marked the communication space, leaving direct legacies to the subsequent ones, which adapt to an already unbalanced territorial situation. Technical neutrality thus does not seem sufficient for attenuating the social logic of the hierarchisation of the spaces, leaving just one conclusion: “L’égalité spatiale est impossible” (Bakis, 1994, p. 377).

The geographic space is thus confirmed to be inhomogeneous compared to its supposed functional equivalence, i.e. equality to all the points as far as the possibility to carry out the same functions with the same capacity is concerned. This conclusion may appear even too intuitive, but it is worthwhile to stress that the “democratic illusion” of the Internet is actually still a dream, the evanescence of which must be confirmed. The persistence of this deception resides in the fact that telematic networks, like the telephone ones, are organised as a hierarchy of centres and nodes which make it possible at every access point to reach another access point. Obviously, the position (hierarchical and relative) of these points in the network is not indifferent, influencing the performance and the utilisation costs. Nevertheless, because of the widespread connectivity and the high performance of the network, the user does not have full awareness of this hierarchical organisation. The “telematic illusion” is based precisely on the user’s impression of being connected “directly” with each of the other users. In other words, the widespread coverage of the territory by the web conceals an unequal access.

The analysis of the data made in this study on the use of the information technologies and on the spread of their infrastructure unequivocally shows enormous disproportions among countries and regions, as is the case among economic sectors and social groups: the metaphor of the “electronic highways” does not hold up against the evidence of the reality, at least as long as the transit permits are exclusive for some or the tolls are too high for others to pay.

## REFERENCES

- ARNUM, E., CONTI, S., 1998, "Internet deployment worldwide: the new superhighway follows the old wires, rails and roads", in *Proceedings of the Internet's Society Internet Summit Meetings*, Geneva, July.
- ASSINFORM-RUR-CENSIS, 1999, *Le città digitali in Italia*, Roma, November.
- BAKIS, H., "La banalisation des territoires en réseaux", in BAKIS, H. (comp.), *Communications et territoires*, Paris. La Documentation Française, 1990, pp.15-31.
- BAKIS, H., 1994, "Territoire et télécommunications – Déplacement de l'axe problématique: De l'effet structurant aux potentialités d'interactions", *Netcom*, vol. VIII, n° 2, p. 367-400.
- BONORA, P., 1997, "Trame e luoghi della comunicazione", in COPPOLA, P. (comp.), *Geografia politica delle regioni italiane*, Turin, Einaudi, p. 401-428.
- CUKIER K.N., 1999, "Bandwidth Colonialism? The Implications of the Internet Infrastructure on International E-Commerce", in *Proceedings of the Inet 99 Conference, Internet Global Summit*, San Jose, June 22-25.
- DODGE, M., 1998, "The geographies of Cyberspace", *Netcom*, vol. 12, n° 4, p. 383-396
- FRANCH, M., ZANINOTTO E., 1997, "La diffusione degli IOS nei distretti industriali", *Sinergie, Rapporti di ricerca*, 3.
- GOODMAN, S.E., PRESS, L.E., RUTH, S.R., RUTKOWSKI, A.M., 1994, "The global diffusion of the Internet: Patterns and problems", in *Communications of the ACM*, vol. 37, n° 8.
- G8/EUROPEAN COMMISSION POLITICAL GROUP, 1998, "A global market for the SMEs" pilot project.
- HARGITAI, E., 1998, "Holes in the Net: The Internet and International Stratification", in *Proceedings of the Internet's Society Internet Summit Meetings*, Geneva, July.
- HARGITAI, E., 1999, "Weaving the Western Web, Explaining Differences in Internet Connectivity Among OECD Countries", *Telecommunication Policy*, 23, 10/11.
- INTERNATIONAL TELECOMMUNICATION UNION, 1999, *Challenges to the Network: Internet for Development*, Geneva, ITU.
- INTERNATIONAL TELECOMMUNICATION UNION, 1998, *World telecommunication development report*.
- OECD, 1998, *Survey on SMEs and electronic commerce*.
- OECD – Directorate for Science, 1998, *Technology and Industry, Internet Infrastructure Indicators*.
- OECD, 1998, *Measuring electronic commerce: international trade in software*.
- OECD, 1999, *Communications Outlook*.
- OECD – Directorate for Science, 2000, *Technology and Industry, Local Access Pricing and E-Commerce*.
- PRESS, L., BURKHART, G., FOSTER, W., GOODMAN, S., WOLCOTT, P., WOODARD, J., 1998, "An Internet Diffusion Framework", *Communications of the ACM*, October, p. 21-26.
- REYNAUD, A., 1981, *Société, espace et justice: inégalités régionales et justice socio-spatiales*.
- RODIGHERO D., 1999, "La geografia di internet in Italia: centri e periferie", June, <http://users.iol.it/daniele.rodighiero>
- UNITED NATIONS, 1999, *Human Development Report*.