

ACCESS TO THE INTERNET AND REGIONAL STRUCTURES: THE CASE OF ITALY

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ABSTRACT

I study the effects of Internet access on regional structures and provide some insights into the complex question of the role of technology in regional development. The paper analyzes the distribution of access to the Internet in Italy, highlighting the differences among regions and sub-regional areas and with respect to categories of users. This is an aspect of the so-called “digital divide”. I concentrate on the stability and change of regional structures in Italy, pointing at conclusions of general relevance. My analysis confirms the dynamism of the regions of the so-called “Third Italy” and the fundamental distinction between the North-Center with respect to the South, the Italian Mezzogiorno. My preliminary conclusions on the effects of the Internet in promoting economic development suggest lines for further investigation.

Keywords: Regional development, Italy, Internet, digital divide

JEL Classifications: R11, R12, O33

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RESUMEN

El acceso a Internet y las estructuras regionales: El caso de Italia

Este trabajo estudia los efectos del acceso al Internet sobre las estructuras locales y propone algunas reflexiones sobre la compleja cuestión del papel de la tecnología en el desarrollo regional. El estudio analiza la distribución del acceso al Internet en Italia, destacando las diferencias inter e intrarregionales y con respecto a categorías de usuarios. Este es un aspecto de la llamada “brecha digital”. El trabajo se concentra en la estabilidad y el cambio en las estructuras regionales en Italia, desarrollando conclusiones de relevancia general. El análisis confirma el dinamismo de las regiones de la llamada “tercera Italia” y la distinción fundamental entre el Norte-Centro y el Sur, el *Mezzogiorno* italiano. Las conclusiones preliminares acerca de los efectos del Internet sobre el desarrollo económico apuntan a líneas de investigación futura.

Palabras clave: Desarrollo regional, Italia, Internet, brecha digital

Clasificaciones JEL: R11, R12, O33

I. INTRODUCTION

This paper studies the socio-economic effects of new technologies and, more specifically, the effects of information and communication technologies on location and economic development. These effects and, in particular, the spatial effects of the Internet are clearly important for regional development and, consequently, for the evolution of regional structures.

Despite its importance, the question is not much dealt with in the literature on location and regional development, possibly because of its complexity and difficulty. Arguably, the most interesting contributions to this topic are the results of a line of research quite distinct from the more traditional models and theories of regional development. Of particular interest is the work of geographers who, since the 1990's, have addressed the problem (Soja, 1989; Hepworth, 1990; and especially Manuel Castells, 2001). Empirical research on the diffusion of the Internet and its impact on production and location concern Brazil (Paiva da Motta, 2013) and China (Zhen, Wang and Wei, 2015). The effects of new technologies

are analyzed in research on the “digital divide”. This paper focuses on that aspect, elaborating on its consequences for regional structures in Italy.

The paper is organized as follows. After a brief overview of the development of the Internet and of the questions posed by the digital divide, I examine the spatial diffusion of the Internet in Italy. I obtain a fairly accurate map of regional differences that are then elaborated in light of the Italian regional problem. While that is specific, the relationship between technology (access to the network) and regional structures has general implications for the study of regional development.

II. THE DEVELOPMENT OF THE INTERNET

The Internet has forcefully entered everyday life and, in profound ways, economic activity, social life, and individuals’ behavior. Access to the network is truly a mass phenomenon, which now goes far beyond the borders of the small group of users, mostly researchers and academics, who began using them in the 1980’s.¹

Indeed, in a first stage network access was confined mainly to researchers in various fields, academic and otherwise. Only during the 1990’s did it become a mass phenomenon that affects businesses and individuals. Its rapid growth has been possible thanks to the convergence of a number of technological, economic and social factors. In 1991 Tim Berners-Lee, a researcher at European Organization for Nuclear Research (CERN) in Geneva, developed its Hyper Text Transmission Protocol (HTTP), effectively starting the World Wide Web. In fact, the Internet is made of a series of rules and protocols that allow computers to communicate among them. With this software the single machine becomes a point in the network. Communication depends on shared rules and protocols. This is perhaps the reason why the first phase of diffusion was characterized by cooperation and mutual trust, values shared by a restricted community of scientists and scholars.

The second phase of the spread of Internet access began in the early 1990’s. It grew very quickly, so that by 2000 40% of American households were connected. Nearly half of the users had access to broad-band, though only 12% actually used

¹ Samuelson and Varian (2002, p. 364) maintain that the term “Internet” appeared first in 1974 in a research paper describing a “network of networks that would link together computers across the country, and eventually the world”.

it (Samuelson and Varian, 2002, p. 402). In early 2002 there were more than 500 million global connections, although the number of phone lines was still twice that number in the same year.

According to Internet World Stats, the estimated 360 million Internet users at the end of 2000 grew to close to 2 billion at the end of 2010, with a world population of 7 billion people. The largest number of users (about 825 million) are in Asia, but there the penetration rate – the ratio of the total number of domain names registered for each ten thousand inhabitants by geographical area – is the lowest, 21,5%. The highest penetration rates are in North America (77,4%), followed by Australia (61,3%) and Europe (58,4%).

This is a first indication of the world-wide gap between those who have access to the Internet and those who are excluded. The speed of diffusion, however, is such that you can expect a reduction of the gap. In this regard, the case of the Middle East is significant. Although the rate of penetration in the Middle East (29,8%) is still not comparable to that of Western countries, the number of Internet users in the region grew by 1.825,3% between 2000 and the end of 2010.

As for the European Union, the largest number of users is in Germany where, out of a population of some 82 million people, about 65 million use the network. With 51 million users, the United Kingdom (population 61 million) ranked second. France is in third place, with about 45 million Internet users out of 65 million inhabitants. Italy is fourth with about 30 million Internet users out of a population at the end of 2010 of about 60 million. Penetration rates give a better idea of the relative positions: the highest are Sweden (92,5%), the Netherlands (88,6%), Denmark (86,1%), Finland (85%), United Kingdom (82,5%), and Germany (79,1%).

The development of the Internet has been mainly a market phenomenon driven by the interaction between technology and private enterprises, spurred by the free access to a public good, information. The phenomenon has surprised planners and regulators, who clearly did not anticipate such rapid development. The substantial lack of intervention by governments, planners and legislation has become a problem when the absence of regulation comes up against the issue of intellectual property. There is, however, another side to this lack of public intervention: the effects on regional development. The Internet is a technological infrastructure and, as such, it has locational and economic effects. This raises the question of whether, in the absence of any policy, the access to the network deepens or alleviates regional disparities.

III. SOCIO-ECONOMIC AND SPATIAL EFFECTS: THE DIGITAL DIVIDE

The European Union has recognized the Internet a major catalyst for economic development. In the Seventh Framework Program an important role is assigned to a considerable R&D effort for the Internet of the future.² The European strategy is based on three pillars: research, partnerships with industry, and the promotion of dialogue among the member states. One of the main results of this strategy should be a desirable coordination of national R&D, identifying joint research areas to avoid duplication and waste of resources. But development is not only a macro phenomenon; it has an important spatial dimension. Development occurs in some places and locations.

To give an idea of the question posed by the relationship between the Internet and development it is useful to recall briefly how it affects the location of economic activity. Production technology has been notoriously instrumental in redesigning cities and in promoting regional development. Economies of scale have contributed to the forces of agglomeration by influencing the choice of location. Now, however, a technological factor operates in the opposite direction. Access to information and services via the Internet frees production from a particular location and from dependence on economies of agglomeration. In principle, access tends to redefine the question of localization of economic activity. At the same time new tendencies in spatial concentration arise from the centralization of what Castells calls the production functions of the Internet (Castells, 2001). On the other hand, the spatial effects of the Internet overlap with regional structures. The existing disparities may help explain the use of the network, while access to the latter may become a factor to overcome these disparities. In other words, opportunities for development that were previously denied to less developed areas could materialize through the Internet. But access may be difficult, becoming a further cause of the gap between localities and regions. This is very much part of the research on the digital divide.

The term “digital divide” refers to the gap between those who have access to the Internet, and therefore to the information and the databases available in the network, and those who are excluded. Since 1974, Ted Nelson, considered the father of hypertext, showed an acute awareness of the dangers that this situation

² <http://www.future-internet.eu/home/future-internet-assembly.html>

may entail (Castellucci, 2009). He argued this point by using the very word “divide”. His 1974 book *Computer Lib/Dream Machine* is regarded as a contribution to computer science literacy. Indeed the divide between those who know and those who do not know about computers is a form of illiteracy. The gap is important in times of rapid development of the Internet, when access to the network becomes the problem where the availability of information and services is rapidly increasing.

The digital divide poses two problems. On the one hand there is the question of access to the network and, therefore, the penetration of the new technology along a spatially differentiated path. On the other hand, there are the economic and social effects. This requires an analysis of the relationship between access to the network, economic development and territorial organization, all of which determine the evolution of regional structures. Access conceivably has relevant economic and social effects at the local and regional levels. In turn, knowledge of these effects would allow a discussion of the digital divide in a more comprehensive manner.

IV. MEASURING THE DIGITAL DIVIDE

A. Methodology and Data

While the question of its effects on regional structures calls for the study of causes and effects of the Internet, measuring access to the Internet allows for a first map of the digital divide. We need, however, an appropriate measure. The literature divides the metrics used in two categories: exogenous and endogenous metrics. Exogenous metrics evaluate the number of Internet users through “external” methodologies, that is, methodologies that are not linked to the network, such as questionnaires. Endogenous metrics rely instead on automatic data collection; tools and data extraction are intrinsic to the technology itself. The main advantage of endogenous metrics is accuracy, since the information is obtained from the Internet itself. The same accuracy concerns the collection of information on the location and characteristics of users.

The most common endogenous metric is the number of Internet hosts (number of computers connected to an IP, Internet Protocol). The retrieval of information is easy on the network, but the main problem is the possibility of overestima-

tion or underestimation of the number of users.³ Despite this problem, almost all studies on the adoption and diffusion of the Internet are based, internationally, on host count. Only a few studies use domain names registered by Top Level Domains (TLD), which is the most valid alternative.⁴ An example is the study by Zook (2000a), who analyzed the spread of the Internet in the United States using as a metric the number of domain names under the TLD “.com”. Zook argues that the domain name is “a conscious decision of using the Internet through more sophisticated manner” and therefore provides an estimate of the “advanced” users of the network.⁵

B. Using Domain Names Registration

The analysis of the spread of the Internet and the digital divide in Italy is based on domain names registered by the Institute for Informatics and Telematics (IIT) of National Research Council (CNR). The IIT is the Italian authority that manages the registration of domain names under the country code Top Level Domain (ccTLD) “.it”. It collects and elaborates a very large mass of data. Using the metric of the domain names registered in the ccTLD “.it”, it is possible to analyze the diffusion of the Internet at the regional and provincial levels and by categories of users. The analysis based on these data has several advantages: it benefits from the characteristics of endogenous metrics, it allows for a spatial analysis of the distribution of the Internet, and it provides information on different users (businesses, individuals, non-profit organizations, professionals, government agencies).

V. THE SPATIAL DIFFUSION OF THE INTERNET IN ITALY

A. The Map of Internet Distribution

The analysis that follows is based on the penetration rates calculated by IIT, elaborating the data collected through the registration of domain names under

³ Firewalls, dynamic IP addresses and the use of mobile phones cause underreporting, while the combination of multiple IP addresses on the same machine lead to overestimation of access.

⁴ It has the same reliability of other endogenous metrics and it minimizes, even though it does not fully overcome, the problem of over/under estimation.

⁵ Other examples of TLD are “.biz” and “.org”.

the cCTLD “.it” in 2010. The geographical areas of Italy considered are: 1) three macro areas (North, Center, South), which are aggregations of the administrative regions;⁶ 2) the 20 administrative regions; 3) the provinces, which are administrative sub-regional areas (Map 1).

MAP 1
Italy: Macro areas and regions



⁶ The aggregation is that of the National Institute for Statistics. The North includes eight regions: Piemonte, Val D'Aosta, Liguria, Lombardia, Trentino-Alto Adige, Veneto, Friuli-Venezia Giulia, and Emilia-Romagna; the Center includes four regions: Toscana, Umbria, Marche, and Lazio; the South includes eight regions: Abruzzo, Molise, Campania, Puglia, Calabria, Basilicata, Sicilia and Sardegna.

The spatial distribution of Internet access based on domain names registered in 2010 shows that:

- 1) The North has more than half of the national total of domain names. However, the penetration rate in the macro area Center is slightly higher than that of the North. The South has a much lower penetration rate, in fact little above half of that of the Center (Table 1).
- 2) The region with the highest penetration rates is in the North-East (Trentino-Alto Adige). The second highest penetration rate is that of Lombardy. High penetration rates are also shown by the four regions of the macro area Center (Toscana, Marche, Umbria and Lazio) and by four regions of the macro area North (Table 2). Much lower are the penetration rates in the South, where the best placed regions are Abruzzo, Puglia and Campania (Map 2).
- 3) As to provinces, the highest penetration rates are in some of the major Italian cities (Milano, Firenze, Roma, Bologna) and some smaller cities in the North and the Center (Ascoli Piceno, Bolzano, Rimini, Trento, Siena, Padova). The twenty provinces with the lowest penetration rates are all (but two) in the South.

There is, then, a clear split between the North-Center and the South that emerges from the regional and provincial data.

This spatial distribution is confirmed by the penetration rates relative to businesses, whereas the penetration rates relative to individuals modify to some extent the picture. For instance, one region of the South (Campania, where Naples is located) has a penetration rate in line with that of the North; the highest penetration rate is that of Lazio (where the capital Rome, is located).⁷

⁷ The penetration rate for business is the number of domain names registered by companies over the total number of companies. The penetration rate for individuals is the number of domain names registered by individuals over total population.

TABLE 1
*Italy: Macro-area Distribution of Domain Names
 and Penetration Rates*

Macro-area	Number of domain names	% of domain names (Italy = 100)	Penetration rates
Center	384.113	24,20%	385,30
North	859.588	54,16%	371,77
South	343.550	21,64%	201,83
Italy	1.587.251		316,7363

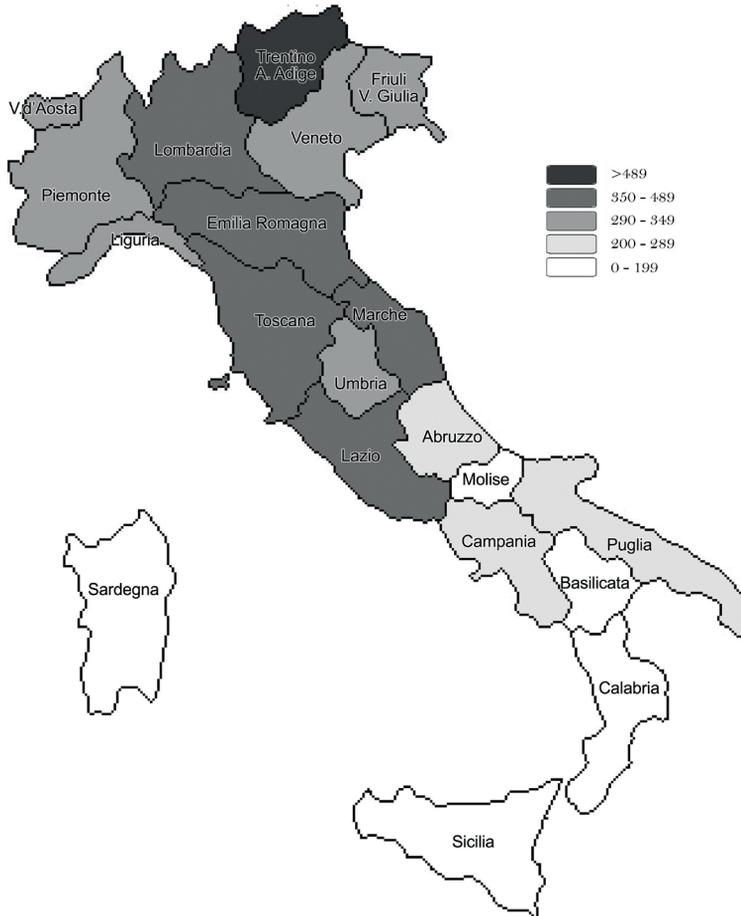
Source: Institute for Informatics and Telematics of the CNR (National Research Council)

TABLE 2
*Italy: Regional Internet Penetration Rates and Rankings,
 and Distribution of Domain Names*

Ranking of Penetration Rates	Region	Number of domain names	Penetration rates	% of domain names (Italy = 100)
1	Trentino AA	40.731	489,6442	2,57%
2	Lombardia	350.525	428,5510	22,08%
3	Lazio	188.434	398,5735	11,87%
4	Toscana	124.245	392,0693	7,83%
5	Emilia-Romagna	136.519	367,8732	8,60%
6	Marche	46.425	354,3022	2,92%
7	Veneto	143.141	350,6388	9,02%
8	Valle d'Aosta	3.511	328,3702	0,22%
9	Umbria	25.009	328,0768	1,58%
10	Friuli-VG	32.783	312,0829	2,07%
Italy		1.587.251	316,7363	

Source: Institute for Informatics and Telematics of the CNR (National Research Council).

MAP 2
Italy: Regional Internet Penetration



Source: Table 2.

The most interesting information about domain name registration by categories of users is that well above half of the total number of domain names are registered by businesses (57%); individuals register almost thirty percent of the total. A small percentage is represented by professionals and by non-profit organizations (5,56% and 5%, respectively).

B. A Comparison with 2004

Some interesting information can be drawn from the comparison with the penetration rates calculated for 2004. Overall, there is no major change. For instance, in 2004 the twenty provinces with the lowest penetration rates were, as in 2010, almost all in the South. The meaning of the changes could perhaps be assessed by a more focused investigation of local factors and/or regional trends.⁸

The most interesting information concerns the rates of change of penetration rates. Considering first businesses, the highest rate of growth is that of a region of the South (Abruzzo, 63%). With this exception, the highest rates of growth are those of the regions of the North and the Center.⁹ This picture changes when we look at the growth of penetration rates of individuals. They range from 292% to 161% but, interestingly, the highest growth rates are those of the regions of the South – Molise, Puglia, Basilicata, Calabria, Sicilia and Campania, in descending order.

To sum up, changes between 2004 and 2010 have not fundamentally modified the spatial distribution of the Internet and, in particular, the technological (and economic) gap between the Center-North and the South. However, we must note the increasing rates of registration of domain names by individuals in the South, which suggest a reduction of the gap.

VI. MAPS AND EXPLANATIONS

A. The Causes of the Digital Divide

Domain name registration gives a reasonably accurate picture of the spatial distribution of access to the Internet, therefore a first map of the digital divide in Italy. Interpreting it is, of course, a much more complicated matter. To address

⁸ For instance, in 2004, Piedmont had among the ten highest penetration rates for business. At the provincial level, among the twenty highest penetration rates, we find Udine, Verona and Reggio Emilia, which were replaced in 2010 by Ascoli Piceno, Trieste and Rimini.

⁹ Abruzzo, although part of the macro-area South, is a “border” region between the Center and the South. Also, Puglia has a relatively high rate (41%), higher for instance than that of Piedmont (35%), a region in the North.

the question, it seems worth asking, first, what are the reasons underlying the differences in the distribution of users of domain names by geographical areas and categories.

An exploratory regression analysis shows that penetration rates can be explained by several economic and social factors, in particular, those related to education.¹⁰ The analysis also shows that regional and provincial penetration rates are influenced by the presence of “registrars”, private companies that operate as intermediaries, granting domains names and services packages.

For business, important variables are legal form, sector (with particular reference to service companies and those in the ICT sector), size, the number of employees in R&D, and investment in IT. The registration of domain names by individuals is influenced by another set of variables: gender, age, income, employment condition, the level of education, and residence in urban or rural areas. The registration of domain names for business is more concentrated than the distribution of income, suggesting that inequality in the registration of domain names accentuates the differences between richer and less affluent areas.

In general, the economic literature agrees that gender, age, education, income, employment status and the geographical area of residence tend to explain the spread of the Internet among individuals (IIT-CNR, 2011). In particular, low levels of education and income tend to be associated with lower Internet use. Furthermore, for the same availability of technical infrastructure, teenagers connect to the network more than adults and the differences in access between men and women are primarily affected by the level of income.

The analysis for Italy confirms that there is a “generational” and a “gender” digital divide. Men register more domain names than women, a fact that did not significantly change between 2004 and 2010. Younger people (age 18-41) register domain names much more than older people.

B. Effects on Economic Development: The Geography of the Internet

This preliminary analysis of the causes of the technological gap suggests a first important conclusion: penetration rates are significantly correlated with the

¹⁰ The regression analysis carried out by the IIT is summarized in an internal report (IIT-CNR, 2011). Data on the registrations of domains are combined with statistics from several official sources.

typical characteristics of economic development and the spread of the Internet reflects the level of regional development. The technological gap largely overlaps with existing regional differences. However, it is often assumed that technology and access to the Internet can positively affect development and, therefore, act as forces that can close the existing gaps. The problem is indeed that of the effects of the Internet on economic development and the location of economic activities.

To understand the problem it is useful to refer to the work of Castells (2001) and the aforementioned research by Zook (2000a and 2000b) for the United States. Castells and Zook refer to an Internet geography and examine the driving forces following three levels of analysis. A first level concerns the spread of the Internet connection, that is, the growth of the number of users that log on through a network connection. This can be called the geography of users.

A second level of investigation concerns what Castells refers to as the geography of technology (Castells, 2001, p. 196). This includes the telecommunication infrastructure, the connections between routers (organizing Internet traffic) and the broad band, that is the telecommunication lines for moving data packets on the Internet. Here location tendencies run in the opposite direction than those one would expect from the existence of the network. The network as such suggests the possibility of obliterating space (and time), therefore modifying location patterns. However routers and, in general, the nodes of the network are no just nodes; they are located in “places”, they are location-sensitive.

That applies even more to the third level of analysis, what Castells calls the geography of the production of the Internet (Castells, 2001, p. 200). This geography reflects the places where most of the know-how for the Internet is produced. This concerns hardware production, which follows the lines already identified in the 1990's (Castells and Hall, 1994) with the creation of Technopoles, the XXI century industrial complexes. Internet software companies, media services and Internet service providers have a similar location pattern, rooted in metropolitan areas of origin. This is confirmed by the location tendencies of the dotcom companies, the content providers that are a large part of the commercial internet. Zook's world-wide domains map highlights that Internet content providers are highly concentrated in a few metropolitan areas of the developed world (Castells, 2001, p. 246) Using domain names, Paiva da Motta (2013) finds that this is also true in emerging economies, such as Brazil. Firms operating online tend to agglomerate in large cities. Zhen, Wang and Wei (2015) find that in China, another emerging economy, clustering is even more concentrated than in Western countries, so that they speak of the rise Internet cities.

The forces that shape the Internet geography may, therefore, redefine location tendencies, but do not erase space, even less agglomeration forces. The point is that the digital divide is not measured by access only. Even supposing that the connection to the network is spreading and, therefore, there is a tendency to greater uniformity of technological conditions, what matters are the consequences of being connected. That is so because the Internet is not simply a technology, but rather a technological tool distributing informational power, the generation of knowledge and the capacity to be connected to all fields of activity (Castells, 2001, p. 251). The fundamental divide, therefore, indeed concerns the effects on economic development.

That is why the registration of domain names is important. It gives a first clue to the possible impact of being connected.

Zook's analysis of the contents' providers is based on a statistical sample of Internet domains and an examination of websites (listed in Alexa.com) concerning the number of users and webpages retrieved. But the commercial use of Internet concerns not only web companies, the dotcom companies, but also companies in the Web, companies that have a web site and then have a position in digital space. The registration of domains is important information because it focuses its attention not only on access but on the use of the domains and digital space.

Indeed, domain registration suggests that users want more than pure access. The registration of domain names is a form of use of the network that involves users who are, in principle, more "sophisticated", who are interested in using digital space and have greater access to services enabled by the Internet. That involves basically having a website. This opens the way to a digitization of economic relations. It allows for a presence in virtual space according to the different needs of users. That has a well-known commercial and communication potential. Registration of domain names concerns, therefore, high-end users and represents a sort of second level of diffusion of the Internet. The most interesting question concerns the use of domains and the implications for economic development and local economies.

VII. THE DIGITAL DIVIDE AND REGIONAL PROBLEMS

The other side of the issue is that the registration of domain names overlaps with the existing regional structures and regional inequalities. This requires that

we look at the problem of the technology gap in the framework of a country's regional problems.

A. Territorial Dualism and the “Third Italy”

Until the end of the 1960's the approach to the regional problem in Italy contrasted an industrialized North, dominated by large companies and spatial concentration, with a backward and mainly agricultural South, the Mezzogiorno. Overimposed on this was the contrast between modern manufacturing in the North and traditional industries in the South, that is, the contrast between development and underdevelopment. At the end of the 1960's, a new spatial dynamics began to emerge. It was sustained not only by a marked process of productive decentralization but, more importantly by a new model of industrialization, intermediate with respect to that of the developed North (the so-called industrial triangle (Turin, Milan, Genova) and the underdeveloped regions of the Mezzogiorno.

The 1970's were a period of economic transformation in Italy. Main trends of transformations are: the increasing importance of small-size firms; a more evenly distributed population growth; the relocalization of economic activity towards less industrialized areas; the restructuring of large enterprises and industrial agglomerations, and a vast process of disperse industrialization. These changes promoted the development of the regions of the Northeast and the Center, which had remained partially in the margins of postwar industrialization. Bagnasco (1977), using an apt, though partially misleading term, labeled these regions the Third Italy (Map 3). It is characterized by an original model of regional development, dominated by small firms, which has its roots in a spatially disperse structure and a social formation with specific characteristics, for example a less polarized social structure, with respect to those of the northern industrial triangle and of the South.

Although such a model went through crises and restructuring, it consolidated in the 1980's and 1990's. It has become so popular that it has been adopted as a reference for industrial development in both advanced and developing economies. It even became a model for regional policies in Southern Italy and, more generally, in lagging regions. It is perhaps the greatest transformation of the territorial articulation of Italian economic development after the rapid growth of the 1960's and it stimulated a rethinking of regional analysis. Indeed, the territorial

MAP 3
The Third Italy



and economic structures that characterize the regions of the North-East and the Center have substantially modified the way we approach regional development, revamping the interest for the mechanisms of local development and the issue of endogenous or self-centered development.

B. The Local Systems of Small Enterprises

An essential aspect of this model of regional development is an industrial system composed of small firms. They often have roots in manufacturing expertise

going many years back and diffuse skills associated with a specific craftsmanship, combined with an entrepreneurship that sometimes has origins in agriculture itself. These systems have followed distinct evolutionary paths. Some have almost completely disappeared. For others, development has involved a transformation that is reflected in the degree of internal structuring.

Garofoli (1991) classified local industrial systems on the basis of an increasing degree of internal interdependence and cohesion. The element shared by these areas is the capacity to hold together economies of scale and productive flexibility. A fundamental element is the creation of localized external economies, to ensure a competitive advantage by being internal to the area.

It is now common to refer to these localized systems as “industrial districts”, a notion that has its roots in Alfred Marshall’s concept of external economies and was brought to new life by the numerous works of Becattini. According to Marshall, the district is an industry that, because of its location, can achieve economies of scale thanks to the specialization of a great number of small producers. It further benefits from the labor skills developed locally and from the fast circulation of ideas. These characteristics tell a story that seems tailored to what empirical studies of areas of small-scale manufacturing in Italy during the 1970’s were discovering.

It is very much an open question whether the type of localized industry theorized by Becattini is still in existence, considering the evolution of the Italian industrial system in the last twenty years (Becattini and Magnaghi, 2016). Nevertheless it marked an important evolution in the study of local development in Italy and elsewhere.¹¹

C. The Distribution of the Internet and the Evolution of Regional Structures

The findings of this research on domain registration attain a new perspective precisely in the framework of the regional problem.

We have seen above that the differences in penetration rates between Macro Areas in Italy indicate a clear gap between the regions of the North-Center and the regions of the South. It is now possible to refine the analysis by focusing on

¹¹ For a summary and a discussion of the concept of industrial district see Paniccia (2002) and Markusen (1996).

the regions of the Third Italy, which includes the four regions of the North-East (Veneto, Trentino, Friuli-Venezia Giulia, Emilia-Romagna) and three regions of the Center (Toscana, Marche, Umbria).¹² It does not include Lazio whose dynamics are strongly influenced by the presence of Rome, the nation's capital and largest city.

We can then observe that:

- a) Of the ten regions with the highest rates of penetration, two are in the North-West (Lombardia and Val d'Aosta); the others are all in the North-East and in the Center. The presence of the Lazio region is likely to be related to the presence of Rome.
- b) Of the twenty provinces with the highest rates of penetration, two are in the North-West (Milano and Biella); all others are in the North-East and the Center, with the addition of Rome. More specifically, ten are in the North-East, six in Tuscany and one in Marche (Ancona).

It is apparent that, more than the North-West, the regions of the North-East and the Center are at the forefront of domain registration. We can conclude that, to the extent that this is an indicator of "digitization" and of a potential for economic development, the regions of the Third Italy are the most advanced.

These results suggest an evolution of regional structures along three directions. First, they confirm the dynamism of the regions of the Third Italy; second, their technological dynamism suggests that there is now little difference with the regions of early industrialization of the North-West; and third, the sharp contrast concerns now a fairly homogenous North-Center and a South that, despite various internal differences, lags-behind.

As pointed out above, in the 1970's Bagnasco contrasted the dualistic model of regional development with a more articulated regional structure. Based on the above analysis we can say that at the end of the 2000's the notion of the Third Italy is still useful to the extent that it identifies many of the most dynamic regions of the country. This very dynamism redefines the regional problem that concerns now a developed North-Center and a South that is not catching up.

¹² The North-West then includes four regions: Piemonte, Lombardia, Val d'Aosta, Liguria.

VIII. CONCLUSIONS AND LINES OF RESEARCH

Domain name registration measures access to the Internet at the regional and sub-regional levels. The comparison of penetration rates allows for a first map of the digital divide in Italy. We have a fairly accurate picture of the phenomenon in the context of an industrialized economy like Italy with important regional differences. This can be of general relevance for the study of the impact of technologies on regional patterns of development.

Interestingly, the registration of domains reflects the levels of development of regions. This contrasts with the emphasis often placed on the network as the key to development and new opportunities in the least developed regions. It is then open to question whether access could give a boost to economic development and close existing gaps. We know that relatively new trends of development are in place in some of the regions of the Italian Mezzogiorno. We have also noticed the fast-growing domain registration by individuals in the South. This suggests that the situation may be changing and that the digital divide is getting smaller. This trend may be accelerated by improvements in the technological infrastructure (broad-band).

In general, the fact that the digital divide overlaps with regional disparities suggests that local factors linked to the socio-economic characteristics of the territory and territorial organization may have a role in determining both the distribution and the effects of information and communications technology. Regional structures should then be explicitly considered to evaluate both.

The second main conclusion is that the key point is not access to the Internet, but the use of the Internet connection. Indeed, a possible reduction of regional disparities depends on the development effects of access. In this respect, the mapping suggests a number of interesting questions for further investigation, which should explicitly address the effects on economic development. Some of them can be derived from the study of the forces shaping the technological infrastructure and the production of the Internet. At a fundamental level they depend on the use of digital space and, more generally, on the relationship between access, digital technology, and the transformation of the processes of production and consumption.

An innovation introduced by the Internet is electronic commerce. The spread of e-commerce allows companies to sell without using traditional channels and allows consumers to expand their choices. The benefits for business are related

to the possibility of expanding the market and thereby increasing sales, but also decreasing costs, consolidating image, and promoting customer loyalty. An interesting line of research on the economic development effects of the Internet is, therefore, deepening and sharpening the analysis of the use of virtual space, focusing on the motivations and the profile of users that are registering domain names. That is most appropriate precisely with respect to business activities. At the same time focusing on certain regions or sub-regional areas would make possible to control for the weight of local factors and the influence of the territorial organization.

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