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New Forms of Regional Inequalities in Greece: the Diffusion of the Internet Across Greek Regions

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**New forms of regional inequalities in Greece: The
diffusion of the internet across Greek regions**

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1. Introduction

Regional inequalities transcend various aspects of economic, social, welfare and cultural sphere. In order to tackle the complex nature of inequality a substantial number of studies dealing with the identification and measurement of regional disparities in Greece has examined the evolution trends of several indicators. A review of the recent literature indicates that a significant body of research adopts *a partial and selective view unable to grasp novel forms of regional inequality*. The source of this weakness is found in the use of irrelevant and outdated indicators.

For several instances this bias is unavoidable stemming from several shortcomings of the official statistics system. The lack of updated, adequate and reliable statistics is well known in Greece. Among several recurrent shortcomings we should mention the substantial time-lag that intervenes between the collection and dissemination of statistics, the interruption of long-standing time-series due to harmonization with the Eurostat regulations, the inability to break down statistics in more detailed categories due to small sample size of Surveys. This deficiency is noticeably worse at regional level. Only a minority of the available statistics, usually at aggregate level, is delivered at sub-national level.

Hence, research priorities are adapting to the limitations set by the availability of statistics. However the degree of adaptation and flexibility varies considerably among various studies. Several studies quote a series of irrelevant indicators to hide the poverty of data. Indicators once used widely have become irrelevant or misleading today. This is the case for technology-related indicators. Given the speed of technological change technology-related indicators are becoming irrelevant faster than ever before. According to a recent Survey (Observatory of InfoSoc, 2005) a percentage as high as 99% of the total number of households all over the country owns a tv set. The ownership ratio is so high that it is not expected to vary significantly at regional level. Indices such as the number of telephone lines per capita and electricity consumption per capita were suitable to describe regional inequalities during the previous decades however, nowadays, they present insignificant regional variations. Recently launched indicators such as broadband connectivity, or internet accessibility, are of crucial importance today and play a decisive role in transforming the traditional disparities across Greek regions.

Internet accessibility is a useful indication of growth potential and technological capacity of Greek regions. There is no doubt that internet can powerfully influence individuals, places, societies and economies and these effects are likely to grow over the foreseeable future. Its rapid diffusion has stimulated new ways

of organizing economic, social and cultural lives. In contemporary network-based societies it could be argued that “the poverty of connections” is now as important as traditional poverty which comes from the lack of housing, food, water, work and essential services (Graham 2002). Or, in the words of Jeremy Rifkin (Rifkin, 2002):

The reality of people having access to cyberspace and making use of the possibilities it offers is completely different from the reality of the excluded from the global digital networks due to economic and social reasons. Two distinctive civilizations are in the process of shaping. Two civilizations with no communication between them, separating by a dichotomy more intense than the existing one.

Contrary to popular views about “space shrinkage”, “death of distance” and eventually “end of Geography”, that were very widespread among the media and the academia at the first stages of internet expansion, empirical data sketch a completely different picture. The diffusion of internet is starkly uneven at all scales. A profound digital divide¹ is well documented for people, businesses and places.

The aim of this paper is to outline internet diffusion across Greek regions.

Greece is still well behind the EU15 and EU25, in the fields of ICT (Information and Communication Technologies) applications and use. The vast majority of the country’s population has not yet access to internet. The average internet penetration rate is low, at 20,3%. More impressive is the low percentage at specific groups of the populations in terms of educational qualifications, age and income. However our knowledge about regional disparities in internet diffusion is extremely limited.

The next section (2) reviews international literature in the field of internet geographical diffusion at different scales in order to illustrate main research shortcomings, priorities and directions. Section (3) sketches the broad-brush geography of internet diffusion to Greek urban areas and administrative regions. The final section (4) summarizes the main findings and proposes a framework of analysis and future research directions. A separate Technical Annex, found at the

¹ The digital divide marks the gap between individuals, households, businesses and geographic areas at different socio-economic levels with regard both to their opportunities to access ICTs and to their use of the internet for a wide variety of activities (OECD 2001).

end of the paper, outlines statistics about internet penetration in Greece and questions their limitations, comparability and data reliability at regional level.

2. Literature review

International Organizations, among others, the UN (United Nations), OECD (Organization for Economic Co-operation and Development), World Bank, European Commission, have undertaken the difficult task to develop statistical systems in order to measure and monitor different aspects of the ICTs. In parallel, a small number of private firms, such as MIDS (Matrix Information and Demography Services) in the US and NUA in Ireland, are very active in this field too. Their main aim is to establish definitions and methodologies and produce internationally comparable indicators highlighting the key developments of ICTs penetration and growth. The above statistics cover every aspect of the Information Society. Data related to internet infrastructure and users are in the core of their inquiry since there is a strong policy interest in issues such as equality of access and the potential for the internet to change significantly society – in both positive and negative ways (OECD 2005).

Tracking the diffusion of the internet is a daunting task. Internet is growing and changing rapidly at global scale without central control. Its dynamic nature and the need for harmonized statistics among different countries prevent these organizations from illustrating accurate data. Furthermore the nature of the internet poses certain technical problems and intricacies that may lead to false indications. Issues such as the mask of corporate servers by firewalls or the possibility of a host registered under a national domain to be located in another country must be treated with special care (Press 1997). Furthermore, because much of this infrastructure is actually an array of intangible data and logical constructs (domains, virtual backbones) or easily reconfigured electronic equipment (host computers and fiber optic networks), means it can be reallocated almost instantly in response to market shifts, natural disasters, etc. By definition, the internet is highly volatile and in constant flux (Moses and Townsed, 2000). Hence it is widely accepted that the available international statistics, even the more reliable of them, trace trends and relationships and conclude to rough estimates than precise measurements.

A growing number of studies, using data sets disseminating by international organizations, is conducting **cross-country comparisons** in internet diffusion. The majority of them has a clear geographical focus to certain devel-

oped countries mainly in North America, the EU and Australia. This focus is due to the great share of internet use originating from developed countries, as well as, to scarcity of data at developing countries. Due to data limitations the analysis is restricted to geographical variations of a small number of indicators tracing the size of the population using the internet (penetration rate). Social characteristics of users and more detailed analysis are almost non-existent. At global level, there is a very intense positive correlation between the level of development and ICT diffusion. With a few exceptions, notably S. Korea and Malaysia, a small number of highly developed countries, the USA, Scandinavian countries, certain EU members, Australia, N. Zealand and Canada, predominate in internet access and use world-wide (Wenhong et al. 2002, Perrons 2004, OECD 2005). On the other side of the spectrum extended populated areas of Africa, Asia and Latin America are still not connected (Beilock & Dimitrova 2003).

Relative research in the field of internet diffusion at **sub-national level** is not so well developed. Due to severe data gaps only a small part of existing research examines the diffusion of the internet at sub-national level. As it is expected it is mostly originated from certain developed countries with well organized Statistical Services and intense internet activity. We may distinguish three research directions:

- The Geography of telecommunications infrastructure. Telecommunications infrastructure was, not so long ago, nearly ubiquitous in developed countries thanks to standardized nature of telephone service. This has not been the case since the last two decades. Rapid technological advances provide a complex menu of transmission and communication services from the base level dial-up access to constant high-speed (or broadband) connections. As a result telecommunications absent from every list of plant location factors that has been published in the last 20 years is today in top five – if not even higher-criteria for locating a facility. A number of studies examine geographical variations in digital telecommunications technology at sub-national level (Press 1997, Moss & Townsed 2000). Evidence from several developed countries concludes that high-speed bandwidth access is disproportionately available to large urban areas. In the US, New York, Boston - Washington corridor, and then Chicago to Los Angeles and San Francisco (via Texas and Colorado), are the consistent priority of telecommunications providers in order to benefit from large business markets (Malecki & Boush 2002). Rural areas are generally disadvantaged. With the exception of college towns and a small

number of other rural places, rural areas are not receiving investment in more advanced telecommunications infrastructure (Grimes 2003).

- Geographical diffusion of internet users. Internet diffusion is considered as one of the main drivers to regional transformations. The scarce research at sub-national level has shown that types of regions tend to differ significantly with regard to internet up-take and usage. Whole sections of the population, mostly among the low income residents of remote areas, are excluded from the internet. Within the same country clusters and enclaves of “superconnected” people, firms and institutions often coexist with large numbers of people with non-existent or rudimentary access to communication technologies (Graham 2002, Careis & Osimo 2004, Milicevic & Careis 2005).
- Geography of internet content production. This body of research focuses on the supply-side of internet. A region’s ability to produce and disseminate internet content is examined. Regions with a strong internet content production are in better position than the regions where internet consumption prevails. Adopting rather sophisticated methodology, these studies map the spatial distribution of country code domains. Research conducted in Germany has indicated that despite the decentralized structure of the country a few city-counties equipped with external economies, high tech activity and qualified labor were the early adopters of internet content creation and dissemination. These agglomerations, like Munich, Berlin, Hamburg and Cologne, have enhanced their position in the pre-existed uneven economic landscape (Sternberg & Krymalowsky 2002). Relevant research in the US has indicated even more intense polarization trends (Moss & Townsed 2000, Zook 2002).

3. Diffusion of the internet across Greek Regions

The lack of high quality internet-related data is obvious in several countries all over the world. Greece is certainly among them. Since the end of 1990s a multitude of official and non-official sources have launched own initiatives in gathering and disseminated internet-related data in Greece. Among others, National Statistical Service of Greece, General Secretariat of Ministry of Economics, Local Development Agencies, Entrepreneurs Associations, Consulting firms, have gathered and published a considerable volume of data related to internet activity. As it was expected these non coordinated initiatives, have led to a waste of resources and conflicted results.

In a separate Technical Annex, sited at the end of the paper, issues of comparability and validity of data sets provided by the three more referenced data sources are outlined. The evaluation procedure has concluded to rather disappointed results. Different data sources adopting different methodologies have provided data sets with limited comparability whereas the availability of reliable internet-related data at regional level is extremely limited. The great majority of data are delivered at national level only. Several Surveys have published data at regional level but their validity is questionable due to small sample size and false representation. The first Survey carried out by the Observatory of Information Society at the end of 2005 seems to be the more reliable source. We have restricted our analysis to data deriving from the more reliable source only. Hence, our analysis is static, restricting to 2005 data only.

It should be stressed from the very beginning that the data used are a **gross overestimation** of reality. The only available data at sub-national level refer to “loose users”, individuals having accessed the internet at least once during the last trimester. Obviously this is a loose and elastic definition including accidental and non systematic users as well. At national level, the rate of these “loose users” is 20,8% well above the relative rate for “heavier users” (17,9%) the ones accessing the internet at least once per week.

At sub-national level, Observatory Survey delivers data at two alternative geographical scales: at four distinct areas with differentiated urbanity level and at the administrative regions the country.

Disparities in areas with differentiated urbanity level

Observatory of InfoSoc Survey has broken down several indicators to four distinct geographical areas in order to test variations in internet access and use according to urbanity level. Specifically, data refer to: Athens, Thessaloniki, remaining urban areas, remaining areas of the country. The regionalization to these four geographical areas seems meaningful and consistent with the characteristics of the national urban system. Urban areas² of the country are far from homogenous. Athens and Thessaloniki are the two predominant urban centers presenting differentiated performance in several socio-economic indicators. Hence, urban

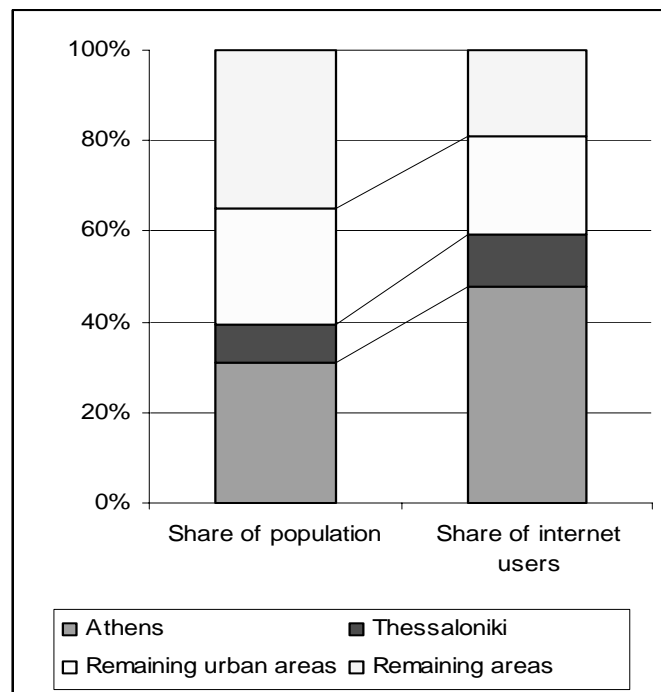
² NNSG defines as urban areas those with population more than 10.000, semi-urban areas those with communities with a population range between 2.000 and 10.000 and rural the ones where the population is dispersed in communities with a population less than 2.000 (Labrianidis et al. 2004b).

areas are broken down into three distinct sub-categories. On the contrary semi-urban and rural areas are treated as a single unified geographical area since their traditional demarcation is not so obvious and apparent nowadays (Labrianidis et al. 2004b).

Personal computers and internet provide the equipment and connectivity that allow individuals to benefit from ICTs.

The population with access to computers is the pool of potential internet users. The national average measuring people’s access of computers is considerably low, at 35%. It varies significantly geographically. The higher rates are found in Athens (36%) and Thessaloniki (44%) while the respective figures are considerably lower in remaining urban areas (32%) and remaining areas of the country (23%). It should be noted that the issue of access is considerably different from the issue of ownership which indicates a more systematic and heavy use. People can have access to a computer from more steady locations (office) indicating constant and repetitive use, to more volatile ones (internet cafe, a friend’s home) indicative of occasional and rare use.

Figure 1: Share of population and internet users per level of urbanity, 2005



Source: Observatory of Info Soc 2005, LFS 1998

Population access of the internet is measured by “Internet users per 1000 inhabitants”. Athens (31%) and Thessaloniki (27%) are the predominant centers of internet use. Overall, of approximately 1,85 million users spread all over the country, estimations based on 1998 Labour Force Statistics projections, almost 1,1 mil., that is a percentage as high as 60% of the total users, are located within the two largest urban conurbations of the country. The remaining 40% (that is 0,75 mil. users) are residents of the extended remaining areas of the country that concentrate 60% of the national population over 15 years old. The level of polarization in the two major urban centers is so intense that even the percentage of users located in the remaining urban centers is well behind (17,0%) the national average (20,8%). This is an indication of the early adoption stage of internet penetration in Greece.

Internet penetration rate is widely used due to its clarity and simplicity. There is no doubt that it’s a useful indication of the speed and intensity that local population makes use of the internet. However its usefulness is limited as it gives no further information about function or purpose. For developed countries the question of “access” is gradually diminishing as an issue while questions such as “what type of access” or “what kind of uses” are becoming ever more important. Unfortunately the small size and representation of the sample does not allow the publication of additional explanatory data at sub-national level.

The only available indicators refer to the frequency and location of use. Frequency of use is considerably higher in higher rank urban centers. In Athens and Thessaloniki 96% and 90% of the total number of users have access to internet at least once per week, while the relative figures for remaining urban areas and remaining areas of the country are considerably lower at 86% and 80% respectively. Also there is a notable higher percentage of users from Athens (79%) and Thessaloniki (74%) accessing the internet from home (t00) compare to 71% and 65% for the remaining urban areas and remaining areas of the country respectively. Those accessing internet from home, willing to pay the subscribers fees, are considered as the “core” of users.

The significantly differentiated performance of both indicators to different geographical areas, reveals that a more detailed analysis indicates that regional variations are even deeper than the coarse indicator of internet penetration rate has shown.

Disparities among regions

The relatively small size of the sample does not allow the break down of data at the scale of urban settlement, municipality, or even prefecture. The

smaller available geographical reference unit corresponds to the level of the administrative region³. Administrative regions lack any homogeneity and cohesion. They are extended geographical areas with diversified economic and social structure, having several urban centers of varied size and significance along with remote rural areas. It is expected that in such extended and diversified terrains an average is no more than an umbrella figure, a compensation of several contradictory trends. Internet-related research has shown that the social and economic cores and peripheries of the global information “age”, rather than being continents apart, often lie geographically adjacent to each other within individual regions or even individual cities (Graham 2002).

Personal computers and internet connectivity are the only two indicators available at regional level.

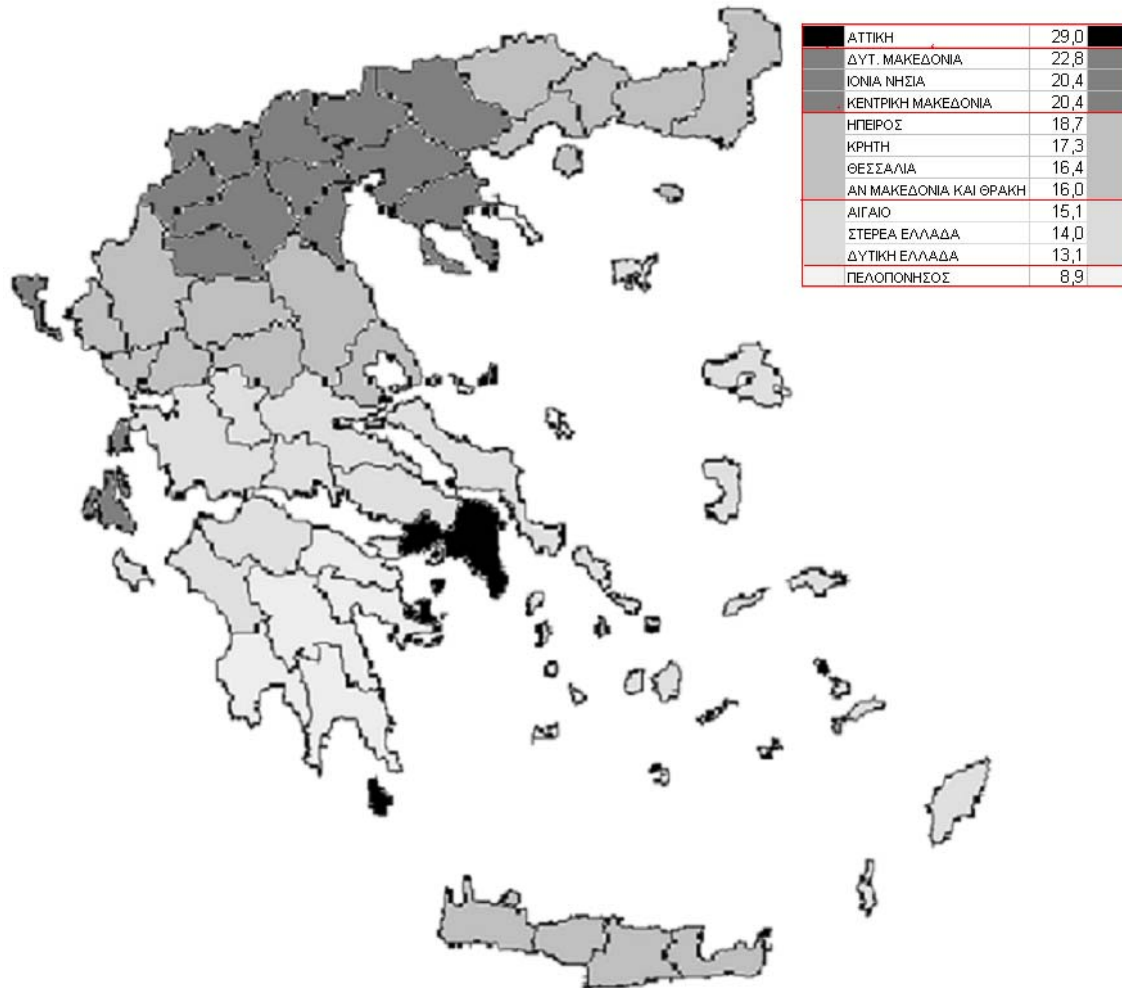
The rate of population with access to computers varies considerably among the regions. The higher rate is found in Attica (44%) while the lower in Peloponnese (23%).

There are wide variations among internet connectivity rates across the regions, ranging from 29% for Attica until 8,9% for Peloponnese. As shown on table incorporated into figure 2, there is a profound ranking of regions into 5 categories in terms of internet connectivity rate. It is worth noting that the level of inequality is so high that only the two top regions have an internet penetration rate above the national average.

The picture is rather confusing. The geographical diffusion of internet accession rates deviates significantly from the geography of development of Greek regions. Several research studies have shown a strong positive correlation between GDP and internet accession rates. It is the most developed regions that have the resources and the expertise to harness the internet benefits. This thesis is not asserted by the available data. It is difficult to justify the low ranking of regions of Kriti and the Aegean or the classification of the region of central Macedonia in the 4th position behind the regions of Western Macedonia and Ionian islands! Probably the scale and level of analysis, in such an aggregate level, distort the results. Issues such as the impact of the academic communities in remote and sparsely populated areas like the Ionian and Aegean islands, the impact of major urban centers, like Thessaloniki and Patras, or the economic base of regions, need to be measured.

³ The country is divided into 13 administrative regions (NUTS II). The rather sparsely populated insular regions of the Southern and the Northern Aegean have been unified to form a single region in order to provide statistically significant results.

Figure 2: Internet penetration rate at the (12) administrative regions of the country, 2005



Source: Observatory of InfoSoc 2005

4. Discussion: Geography and the internet

The above results indicate several important trends. First and foremost, Greece is still well behind at internet access. While for many OECD and EU countries the digital divide is becoming a use divide (OECD, 2004), at least for middle income groups, this is definitely not the case in Greece. This digital lag is even sharper for extended geographical areas of the country.

There is an obvious urban dominance of internet penetration and use in Greece. These results are directly consistent with the findings of several studies

conducted in both the US and Europe, however urban polarization in Greece is remarkably more intense. Also, there are notable regional variations among the administrative regions of the country. Several regions have a surprisingly low performance in internet connectivity for European standards.

However, we have only a very broad and rather fuzzy idea about the geography of internet penetration in Greece. Because of data limitations and paucity of earlier research the approach is broad-brush and should be viewed as exploratory. We are unable to explore the key factors that determine internet's diffusion to Greek regions, to give convincing answers to open questions such as "*why the region of Western Macedonia is the top second region in terms of internet penetration in Greece?*", or "*why the 63% of users in Thessaloniki are making everyday use of the internet while the relevant percentage in Athens is 56%?*". Definitely these results do not provide a solid base to formulate relevant policies.

It is obvious that two major shortcomings inhibit any attempt for high quality research related to internet penetration across Greek regions: lack of reliable data series and lack of field work research at micro level.

Improvement of statistics is of paramount importance for the ability of in-depth research in internet penetration to Greek regions. A substantial number of market researchers are collecting national user statistics in a rather spontaneous way with serious overlaps. Private firms are very active in this field. Hence there is always the danger that data may remain restricted to clients or be prohibitively expensive for the research community. Growing involvement of national statistical agencies in compiling internet user data will help to make such data more reliable and more accessible to the public. The Australian Bureau of Statistics compiles estimates on the number of Internet users for that country based on household surveys. The U.S. Census Bureau has also started to compile Internet usage statistics derived from its Current Population Surveys (Minges 2003). NSSG must undertake more active role in gathering and disseminating internet-related statistics.

Extensive Surveys will provide more reliable and detailed data at proper scale and level of analysis. The need for research in smaller geographical reference units has been already elaborated. There is need for more focused research as well. Statistics used are averages across the whole spectrum of the population, all economic sectors and size classes. At such a broad level indicators are of limited value for benchmarking. They only reflect underlying structural factors rather than giving any insight into differences in internet take-up and usage. The differentiated access and use of population segments in terms of age, education level, income, location, much be explored.

Finally, we need to develop more sophisticated and suitable indicators to describe regional variations indicators. It will be useful to construct composite indexes combining internet diffusion with social factors⁴ as well as factors of the wider regional environment

Significant outcomes about the internet penetration and use can be observed at the micro level only. In order to gain in-depth understanding of the processes at work there is a need for extensive field work at restricted geographical reference units.

Extensive field work research examining internet penetration and usage by SMEs and population in two remote rural areas of the country (Labrianidis et al. 2004a, Skordili 2003, Skordili 2005) has set to light interesting findings regarding the actual uses and the impediments of internet diffusion. Only a minority of the registered users make a productive use of internet. The great majority of them make only occasional use. The main impediments to internet diffusion are found in specific organizational and structural features of local firms and specificities of the local milieu. Local firms are micro firms with strong local orientation employing labor with low educational qualifications. The unwillingness of business owners to undertake risks, their scepticism and resistance to the adoption of ICTs does not stem solely from technophobia and lack of capital. It is deep-rooted and directly associated with the traditional agricultural character of the surveyed areas. Most transactions are based on social interactions, through personal and family networks. It is well known that, all over the Mediterranean, there are close relational ties and support links among the members of the same family. However the auspiciousness among members of different families, or even more notably, from people originated from different villages is obvious too. This attitude explains why the propensity of local entrepreneurs to cooperation and networking is extremely limited.

The above mentioned local specificities consist “hidden” factors with immense influence in definition and interpretation of patterns of accession and usage. The ignorance or underestimation of specificities of the local context can lead to speculations like the following expressed at official document (E-business forum 2002).

However, if the same rate of growth is maintained, then it is estimated that by the end of 2004 Internet penetration in Greece will reach between 50% and 68%, against the European Union mean of 66% achieving con-

⁴ The World Times / IDC is a composite Information Society Index (ISI) widely used from cross-country comparisons. It is the sum of three sub-indices dealing with social, information and computer infrastructure deriving from 19 indicators (Press 1997).

vergence in this area. These estimates have been based on two different scenarios relative to the mode of Internet growth. The first scenario assumes that a **constant growth rate** will be maintained, where the second is based on exponential rates, **equivalent to those experienced by the mobile market in Greece** during its launch years.

Without a clear understanding of exactly how the Internet is diffusing across cities and regions we probably would have accepted unreliable results beyond their actual significance. A combination of quantitative techniques, based on reliable and adequate data with qualitative information about the specific social, economic and spatial characteristics associated with internet use by individuals and businesses, consist a solid base to formulate tailor made policies adapted to region's

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Technical Annex

Evaluation of official and semi-official sources collecting internet-related data in Greece

Among several initiatives investigating internet penetration in Greece, the more referenced sources are the following four:

The **Eurobarometer ICT penetration Survey** is a part of a greater set of public opinion Surveys conducted on behalf of the European Commission, twice a year since 1973. Eurobarometer Surveys cover the population of the respective nationalities of the EU member countries. The Survey of ICT penetration in Greece is based on a sample of about 2.000 individuals representative of the population of continental Greece only (islands are excluded) aged 15 and over. The reliability of Survey results is questionable, mostly due to small and biased sample size.

e-business forum. Secretariat of Information Society (attached to Ministry of Economics) has published the results of the *National Survey on new Technologies and Information Society*, annually, since 2002. The Survey is conducted by a private consulting firm (VPRC) and examines the diffusion of mobile telephony, pcs (personal computers) and internet to three groups: the population, the SMEs (Small and Medium Size Enterprises) and the top 500 enterprises activating in the country.

With significant delay, as late as in 2002, **National Statistical Service of Greece** (NSSG) started to publish ICT related data in Greece. Since then three annual Surveys on *ICTs use* have been published. The penetration of computers and internet to various segments of the population are examined. Data at national level are rather reliable.

At the end of 2005 the recently established **Observatory of Information Society** published the results of a novel Survey conducted during the summer of 2005. It is based on the largest sample ever collected for this purpose in the country. The applied methodology is consistent with the methodology of the EU initiative eEurope. In particular, it covers people's access and use of basic ICT equipment and the internet, uses of the internet in the context of e-business, health, education and training, interaction with authorities and government.

The above sources have been used widely during the last years. However they rely on different methodologies and have produced data with notable variations in definitions, quality and scope. A closer look at key points of the method

of sampling applied by each survey (table 1) reveals their differences and hence limited comparability.

Table 1⁵: Key points of sampling methods applied by the main Surveys collecting internet-related data in Greece, 2001-2005

SURVEY	Sampling frame	Sample Size	Age of Interviewees	Period of Interviews	Mode of interview
National Statistical Service of Greece					
2003	Pop. Census 01	4.341	16-74	1 st trimester	Telephone
2004	"	4.970	"	"	Face-to-Face
2005	"	4.485	"	"	Telephone
e-business forum					
2001	Pop. Census 91		15 +	30/7-27/9	Face- to-face
2002	"	2.461	"	"	"
2003	"	2.802	"	"	"
2004	"	2.804	"	"	"
2005	"	2.741	"	"	"
Observatory of InfoSoc					
2005	Pop. Census 01	8.330	15-74	1/6-9/7	Telephone

Source: NSSG ,2003, 2004, 2005, E-business Forum, 2002, 2004, 2005, Observatory of InfoSoc 12/2005

As shown in the above table, there are profound differences in sampling frames, size of sample and representation. NSSG surveys used the 2001 NSSG Population Census as sampling frame from the very beginning while the rest initiatives were making use of the previous census (1991) since they did not had access to detailed data sets of the more recent survey. There are slight differences to reference population age. All the three Surveys leave out children and teenagers until the age of 15 or 16. E-business forum Survey does not have an upper age limit while the others ignore the elderly above 74. Hence e-business forum statistics are expected to be at lower level compare to the rest Surveys. In most cases interviews were conducting using telephone interviewing techniques while e-business forum surveys were making use of face-to-face interviews. It is expected that rejection rates certain population categories, namely the elderly and less educated, are higher in telephone interviewing than in face-to-face conduct.

⁵ Eurostat Survey does not publish data at regional level. Its sample is representative of the continental population (the insular population is excluded) only.

Hence, although a great volume of internet-related data in Greece has been published the above mentioned differences in applied methodologies restrain the comparability of results. In fact the above surveys have concluded to conflicted results, as shown in the following table.

Table 2: Different estimates of Internet use at national level, 2001-05

	Eurobarometer	NSSG	e-business forum	Observatory of InfoSoc
2001	21%		10,15 %	
2002	18%	14,7 %	19,3 %	
2003		16,3 %	19,9 %	
2004			19,7 %	
2005				

Source: NSSG ,2003, 2004, 2005, E-business Forum, 2002, 2004, 2005, Observatory of InfoSoc 12/2005

The availability of data according to urbanity level is highly problematic. NSSG has never published internet penetration data according to urbanity level. The more close proxy is the internet accession rate in Attica.

The only available diachronic data set has been published by the E-business forum annual Surveys from 2001 to 2004. Survey presents internet penetration rates in three distinct geographical areas: urban, semi-urban and rural areas. Survey results reveal mixed trends. From 2001-03 there is a significant increase in the share of urban areas while there is a reverse trend during the second sub-period 2003-05. Empirical data is difficult to justify such an optimistic view.

Table 3: Internet accession rates by the level of urbanity

E-business forum	Urban	Semi-urban	Rural	National average
2001	14,6	6,5	4,5	10,6
2002	21,1	14,0	8,4	17,2
2003	25,3	17,5	9,7	19,9
2004	25,7	13,2	10,9	19,7
2005	24,9	12,4	12,2	19,5

Source: E-business forum, 2002, 2004, 2005