HUNGARY AND THE INFORMATION SOCIETY: GETTING A GRIP ON TERRITORIAL IMPACTS

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ABSTRACT

Since transition started in the late eighties, regional differences on various spatial scales have considerably increased within Hungary. Besides traditional ones, new elements have become increasingly noticeable which are assumed to influence and rearrange spatial patterns of the development of Hungarian economy and society. They are in connection with the phenomenon that is generally called "informational" or knowledge-based development.

From the mid-nineties, governments started drawing up a wide national strategy for Hungary aiming at its entering the IS simultaneously with its EU accession. The liberalisation of the telecommunications market has taken a couple of years, and the rise in competition has just very recently had an impact on infrastructure provision and price levels. The diffusion of the relevant technologies, and especially, of Internet service provision and use through narrow- and broadband applications, is spatially uneven, more or less following existing disparities in economic growth and living standards.

International organisations have tried to benchmark the development of information society (IS) on different territorial scales, and most recently on the sub-national scale, and such ventures are being currently undertaken by Hungarian regional scientists and researchers in other fields, as well as by planning institutions. The universal question is: what indicators are available and can be used to measure informational development on the sub-national level? In case of Hungary, it is important to see for instance, whether *the diffusion of different information and communication technologies* can be regarded as a new factor in spatial divergence.

Learning about the spatial variation in these factors would significantly contribute to our understanding of why and to what extent regional inequalities in information society development resemble or deviate from the already existing spatial patterns in economic growth.

The paper, in the context of a broader research process, attempts to give some preliminary empirical answers to the questions above, and some illustration based on the data available of regional inequalities in the emerging information society in Hungary.

Keywords: information society, spatial diffusion of ICT, regional differences in Hungary

1. INTRODUCTION – ICT AND SPATIAL INEQUALITIES

At the advent of the third millennium, a new significant social-economic transformation is under way, which is most frequently referred to as the rise of the "information(al)" or network society (IS). The phenomenon is rather complex and controversial, its origins, and its observed and future outcomes are widely and fervently discussed around the world. Anyhow, in one way or another, *it is expected to change spatial relationships and patterns of development* to at least as great an extent as the former revolutions did (e.g. the industrial revolutions).

For the last thirty years or so, there has been a continuous debate on the economic and social impacts of the evolving technological revolution (Bell 1974/1999, Masuda 1980, Castells 1996/2000). In social sciences, the theoretical approaches of relevant research have undergone a major shift from the initially polarised utopian-dystopian propositions to more balanced, critical theories. The later reject both the total confidence in the power of ICTs to relieve spatial inequalities in the levels of socio-economic development preventing further concentration of economic activities and wealth, and the fears of an extremely divided world under the absolute control and supervision of a powerful elite or dictators through these technologies.

The questions concerning its social-economic impacts have provoked social scientists to build different theories about the IS. So has done the issue of new spatial and organisational configurations of the economy and society emerging along with the IS and other relevant processes such as globalisation (Castells 1996/2000, Storper 1997). The interactions between ICT revolution and globalisation, and the increased level of uncertainty they have given rise to, have several consequences on social and economic development in space. Companies in the New Economy, esp. those producing advanced technology and services, take advantage of ICTs themselves, and can relocate their special functions in a flexible way, clustering in particular, their most knowledge-intensive activities in the most suitable places. The technopoles, metropolises where advanced services and the headquarters of high-technology firms agglomerate are the major nodes in the network, truly material places in the space of flows.

Global changes have led to higher risks of exclusion, or at least increased disadvantages to those who for some reason or other have been "switched off" from the network (Castells, 1996/2000). "Digital gaps" have been widening between the developed and developing parts of the world, as well as between privileged and deprived groups within societies, accumulating on already existing disparities in wealth, political power, innovation capacity, education, etc. Parts of the hinterlands of major network nodes of informational development stay isolated and peripheral despite their geographical proximity to centres of dynamics, due to having no (socio-economically and not just infrastructure-wise) functioning network-links with those centres. The assumption that advantages "trickle down" to the poor and the peripheries can only be justified to a limited extent (Wyatt et al. 2000). It is increasingly true in the new economy that connectivity and inclusion mean adaptability and advantages, while disconnectedness and exclusion result in vulnerability and deprivation.

Furthermore, to mention another, yet a more positive side of the story, i.e. of ICTs' impact on society, the possible welfare functions of their applications are worth some consideration. Flexible work, increased social security, more efficient healthcare, faster and easier access to public services, enhanced democracy, increased opportunity for education, easier contact with civil organisations are just a few of the attractive elements potentially emerging with IS. Despite the disturbing evidence for the further concentration of wealth, knowledge and power, there are some "optimists" who believe that a fairer and more equal society may arise; peripheries and marginal social groups can have their chance to catch up. Some promising examples (e.g. that of the European Nordic countries), give reason for this optimism.

Either way, the importance of ICTs and their impacts are immense, and as such are politically crucial. Driven by the fears and hopes, an "Information Society for All" has become a major political ambition (e.g. e-Europe; Sweden; UN strategy). In its narrow sense, IS is based on conscious and excessive usage of information and communication technologies (ICTs) for the improvement of our lives. To avoid criticism justly aimed at any, even implicit, notion of technological determinism, one should note that ICTs are both the imprints and the drivers of the new "informational" ("networked," see e.g. Castells) organisation of society (i.e. of the economy, state administration, and civil sphere). Still, no-one can deny that IS is to a great extent determined by, or even

founded upon high penetration levels of the new technologies. To put it simply, no country has a chance to become an IS if there is no technological infrastructure available to masses providing them with a *physical* access to the Internet, at least to start with.

Yet, the penetration of ICTs depends on the inseparable aspects of both provision (supply) of, and social demand for them. Accordingly, several governments and organisations in the developed and developing world have recognised the dual importance of investments into the "hard infrastructure" of informatics and telecommunications, and the "soft", human infrastructure (education, digital literacy, human capital, and content, etc.), which represent the two chief objectives set in short and longer termed IS strategies.

The first step everywhere has been a pronounced concern with the provision of the basic infrastructure and services, and has been approached mainly by a thorough liberalisation of the telecommunications market (see e.g. EU directives on this). Nevertheless, market actors when rolling out advanced ICTs and services tend to ignore marginal segments of society and peripheral areas that lack solvent demand for them. (A survey carried out in ESPON 1.2.2 among telecommunications companies in Europe, clearly justify this). Consequently, existing socio-economic divisions and their spatial patterns tend to be reproduced and strengthened by a new, digital divide already at this basic infrastructural level. The need for intervention has risen once again, as several times before in the history of earlier cycles and revolutions in socio-economic development.

2. PROBLEMS OF MEASURING REGIONAL TRENDS IN ICT SUPPLY AND UPTAKE

Logically, in order to intervene, one should have reliable knowledge of the processes at work, the current state of affairs, its origins, and the possible ways and tools to improve the situation. First of all, policy-makers have to monitor, constantly measure ICT- and social developments. International organisations have been trying to benchmark the development of information society (IS) on different territorial scales, and most recently on the sub-national scale (EU - ESPON, BISER). Such ventures are being currently undertaken by Hungarian regional scientists and researchers in other fields, as well as

by planning institutions (e.g. Centre for Regional Studies of the Hungarian Academy of Sciences). There are several limitations they face in this attempt, below is a mention of but a few.

The problems are that 1) technologies like the Internet or mobile telecommunications (not to mention their advanced forms such as broadband and 3G) are developing extremely rapidly and often in converging, unpredictable ways, and 2) at the same time they have already altered socio-economic practices and relations to an unprecedented extent. Therefore, authorities responsible for tracking supply and demand, social impacts and changed attitudes are under great pressure, yet, in most of the cases they are unprepared, or even ignorant, staying a long step behind the crucial phenomena. *Developing indicators,* methods, and defining the *suitable geographical scales* for measurement that are appropriate for the technology in question, take a lot of research and time, so does the *collection of data* based on them. Thus it frequently happens that by the time some methodology has been worked out for the understanding of the penetration and impacts of a certain type of ICT, it becomes irrelevant.

The strategic importance of the information and telecom sector makes it especially "secretive": competition is globally extended and rather sharp, information costs a lot, and when acquired, means new markets; new markets mean survival to companies. For this reason, spatially relevant data in particular, of both supply and demand are strictly confidential, companies are reluctant to let more information out than what they are forced to provide by the national regulating authorities. (The ESPON 1.2.2 survey carried out among telecommunications companies and regulators proves this supposition.) Information collected via investigation by private research institutions are pricy and have several limitations (regarding e.g. comparability, and the spatial representativeness of the sample).

For the reasons mentioned, national statistics are rather light on regional data about advanced telecommunications even in the countries considered well on the way towards IS. However, most recently there has been a surge of interest on the parts of policy, business and the academia, in finer spatial patterns and certain regularities in ICT penetration and their impact on socio-economic development. Several research programmes have been launched almost simultaneously by different organisations of

the EU, national governments, international research networks, private agencies, and different sets of benchmarking indicators are being drawn up to measure the levels of development of regional IS, within and across national borders (e.g. ESPON 1.2.2, BISER, UN reports).

Finally, it is important to note in relation to *the meaning* of different ICT indicators that there are several levels of information that can be drawn from various indicators. Firstly, there are data on the spatial patterns of infrastructure supply: the roll out, infrastructure provision by telecommunications companies that entail larger investments (esp. in case of broadband, optical cable infrastructures). These are the least relevant to real penetration, yet they are linked to spatial patterns of demand assumed or even observed (e.g. through direct market surveys, or simply using available socio-economic indicators) by the supplier. It is however doubtful whether supply and demand are well-matched in every case, and there also remain the questions if supply should and can proactively trigger demand in certain regions, and where thresholds lie between immediate and delayed profitability, and unprofitableness. For to understand spatial patterns of roll-out, it is not enough to have knowledge about general regional socio-economic development but it is important to have a look at telecoms regulations, special rights granted to, obligations imposed on service providers (i.e. concerning universal service obligations, concession rights).

Secondly, territorial inequalities of subscriptions to ICT services take us a step closer to real diffusion processes; examples can be the number of fixed main lines, ISDN lines, broadband Internet and mobile service subscriptions per population or households. Yet they do not give a deeper insight into the utilisation, "added value" of these means of access to data flow and communication to living standards, economic development, and welfare in a region or locality.

Information on the later can only be traced through deeper investigations into sociological aspects of ICT usage and by considering such complex qualitative features of penetration as e.g. the purpose of usage, the content reached, and the extra income earned by the given applications. This last, third level of understanding regional socio-economic impacts requires carrying out standardised and thoroughly representative surveys in every region, which is a rather time- and resource-consuming venture.

It is very likely that these levels of information in spatial analysis of the socio-economic impact of ICTs are related to the three stages of roll-out of a new technology, from its introduction to its becoming universally and more-or-less evenly accessible everywhere. In the innovation phase, also in order to testing them, companies provide the new ICTs in the most profitable regions where there is thought to be always a demand for the newest applications, i.e. usually densely populated, high-income, metropolitan areas concentrating dynamic business activities, the most attractive consumers of ICTs (e.g. ADSL in most European countries, 3G mobile service). In a later phase of the life-cycle of the ICT in question, regional variations in subscriptions sufficiently illustrate spatial dissemination patterns, but indicators of this type become irrelevant as soon as the technology has diffused evenly in society (e.g. fixed telephone lines, 2G mobile telephony).

3. THE HUNGARIAN CASE

3.1 ICT developments and policy measures along the long and winding road to information society

Above the general significance of ICTs and the linked social-economic reorganisation was stressed, and a few of the limitations and implications to the spatial analysis of developments were mentioned. Both are much relevant to the case of Hungary. It is a country which is entering not only capitalism, but global capitalism, and is about to give up part of her currently regained national independence and identity by joining the European integration at the same time. Last but not least, it is a society which aspires (of course, greatly pushed by the political, business and intellectual elite) to be the leading information society in its region, while at the beginning of the nineties, only about 9 percent of the population had a fixed telephone line at home (TEP 2000), which (by far not alone) indicates what infrastructural conditions Hungary had inherited from the Socialist Era.

Formerly, to express the country's state of telecommunications development, indices such as the number of fixed telephone lines per 100 inhabitants (1980: 5.8; 2000: 38 in Hungary) and the length of waiting lists were taken into account. The failure to meet quantitative demand, and shortcomings concerning the very basic qualitative features

were the major sources of problems (TEP). Considering the current level of technological development, these indicators seem to be rather out-dated: the variety of telecom services and available technologies has significantly increased, and digitalisation has been almost completed. At present, the inexcusably high telephone charges, and the difficult entrance to the market cause inconveniences (TEP).

Initially, besides the early recognition by the first democratically elected government of the urgent need to upgrade basic infrastructure, as well as to privatise and start liberalising telecommunications, it was basically the market forces that imposed the need for certain regulations and measures. Yet this did not happen in an entirely conscious and comprehensive way, esp. in the first half of the 1990s. Nevertheless, there have been several positive developments: as mentioned above, ***fixed line telephony*** diffused remarkably fast in the nineties, waiting lists virtually disappeared by the middle of the decade, and the proportion of ***digital connections*** in the network reached up to over 91% by the end of 2000. Meanwhile the speed of diffusion of ***mobile phone subscriptions*** has surpassed all expectations: for instance, the total number of subscribers has more than quadrupled since 1999, to reach 70.4% (7.131 M) of the population in April 2003.

However, ***market liberalisation*** has been progressing slowly, and consequently ***prices*** continued to stay high (esp. as compared to income levels in Hungary) till very recently, when the concession rights of the major market player have come to end. This has led to difficulties in the spread of ***Internet*** into households, which is still dominated by ***modem (dial-up)*** and ***ISDN*** technologies. Therefore, while mobile communication could diffuse at a much higher rate than it had been forecasted, and over a remarkably short period of time, Internet users still have to rely on the – yet, thanks to civil movements and national programmes, fast improving -- facilities at their workplaces and at public access points. Internet-penetration in households has not yet come up to earlier expectations, and ***broadband technology***, though being strongly promoted, is still not affordable, and consequently, not accessible for greater masses.

Since the mid-nineties, consecutive governments have been working on a wide national strategy for Hungary aiming at its entering the IS simultaneously with its EU accession. Concerning *institutionalisation* of this field of policy *on the national level*, the

Hungarian Government created a Commissioner for ICT (2000) within the office of the Prime Minister, which was later replaced by the Ministry of Informatics and Communications (2002), both responsible for drawing up an Information Society National Action Plan. This year (2003), the ***National Information Society Strategy*** formed and readjusted by the last two governments has been launched, which represents a more comprehensive approach to the problem and among various strategic goals, aims at state-subsidised infrastructure development. At present (mid-2003), a new telecom law is being drafted to result in a drop in telephone call charges, as well as in the requirement imposed on companies to contribute to a national "universal access fund"; it will come into effect in 2004, the year of Hungary's accession to the EU.

Besides, some fairly well elaborated and successful ***initiatives by the government and NGOs*** are worth mentioning, which already have important implications to welfare provision, i.e. equal opportunities and the issue of more balanced regional development. Sulinet ("Schoolnet") since 1996 has proved to be successful in establishing Internet connections in all secondary schools and many primary schools; and an online reference source and database (Medinfo) was launched in 1999. Hungary was the first in Central Europe to develop a large number of telecentres (446 by 07.2003) with a range of ICT equipment and services. A national programme is currently under way which is providing PCs and home Internet for teachers, public and civil servants. The purchase of PCs is also encouraged by means of granting a €245 (HUF 60,000) tax credit, and internet connection fees were by government decree lowered by a quarter in March 2003.

3.2 Regional inequalities in infrastructure provision

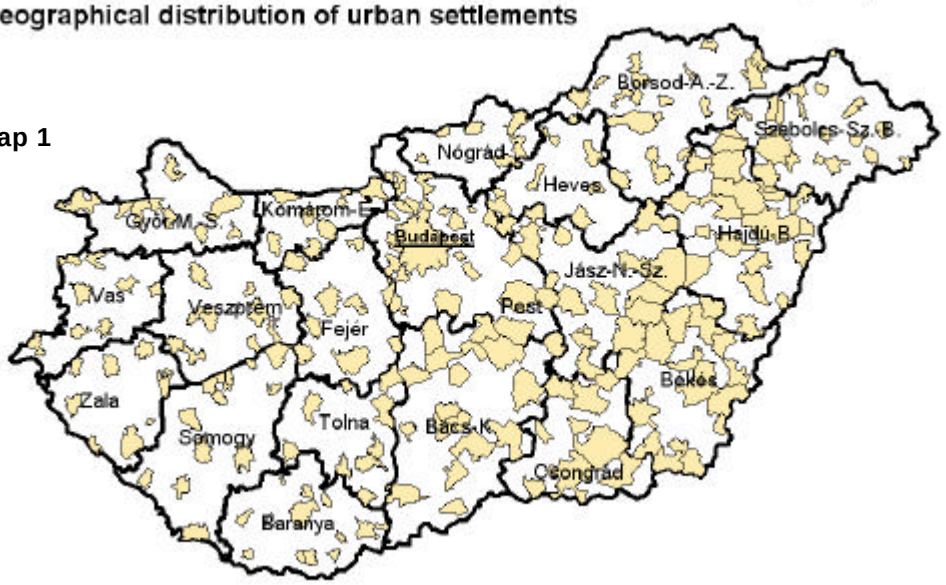
From the above it seems that something has been and is going on since the mid-nineties in Hungary what one might consider in a way revolutionary, at least regarding political intentions and aspirations. In the following I give some account and illustration of spatial patterns of real IS development in Hungary. Because of the scarcity of data, only four variables are included in the present study, and they are rather different in nature.

Fixed main line penetration and the **proportion of ISDN lines to 1000 main lines** are indicative of more than just potential access (show the spatial diffusion of usage,

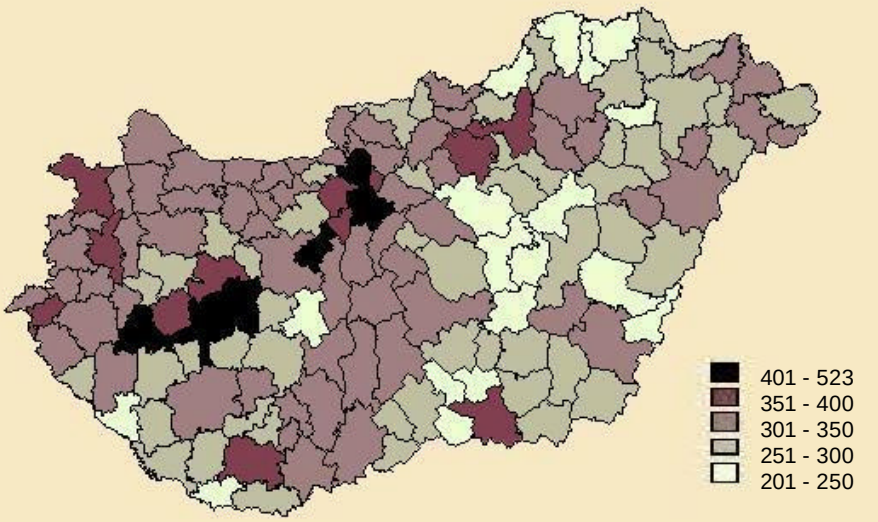
subscription), while the **population covered by potential access to ADSL** illustrate the roll-out of a more advanced technology. **The distribution of, and served population by, telecottages** show the involvement of local actors in adjusting and complementing market forces to improve the situation in their relevant territories.

HU: The names and location of NUTS 3 regions (counties and the capital) and the geographical distribution of urban settlements

Map 1



Map 2
HU: Number of fixed main lines per 1000 inhabitants in NUTS 4 regions.



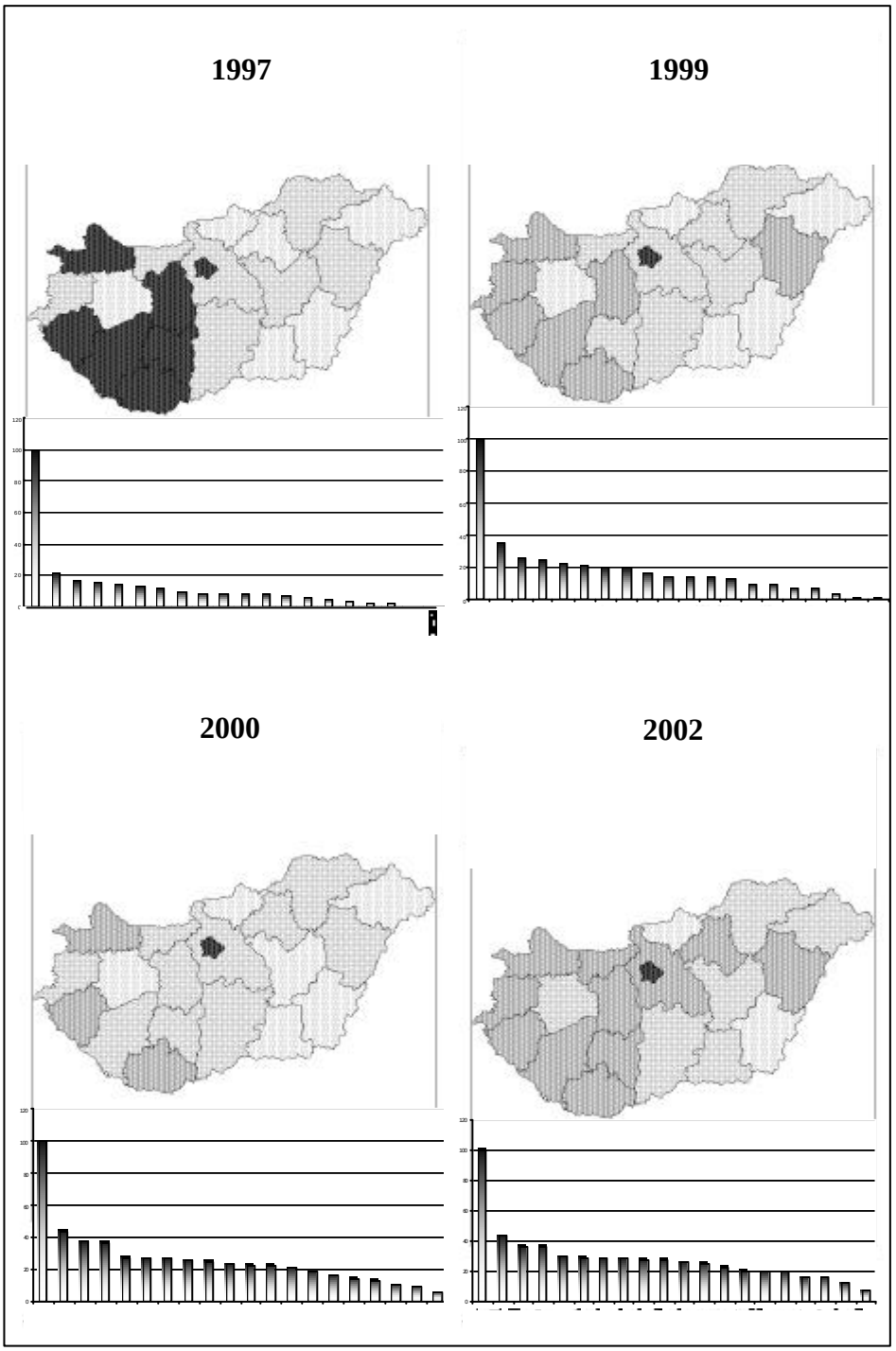
Source: HCSO / http://w3.ksh.hu/orszagjaras/angol_3.htm

Maps 3A-D

ISDN lines per 1000 inhabitants, relative to Budapest
(Budapest = 100)

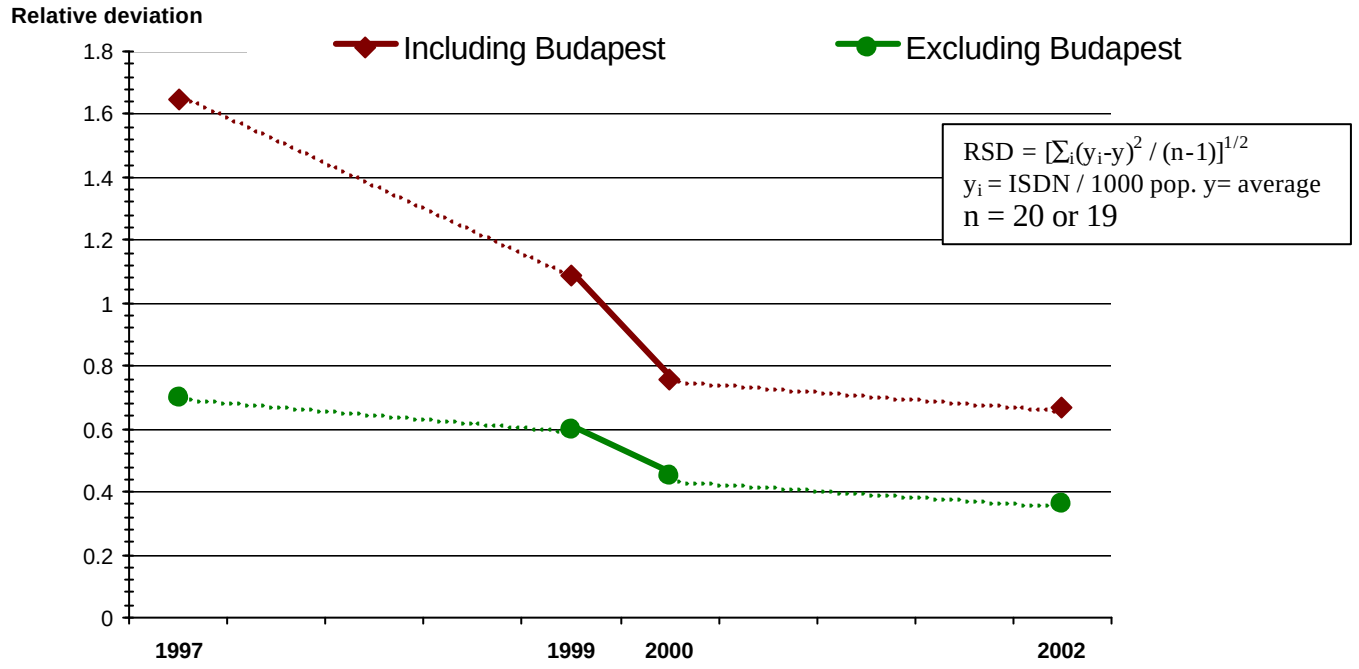
0 – 5
6 --20
21–50
100

} from light to darker colours



Source of data: HCSO

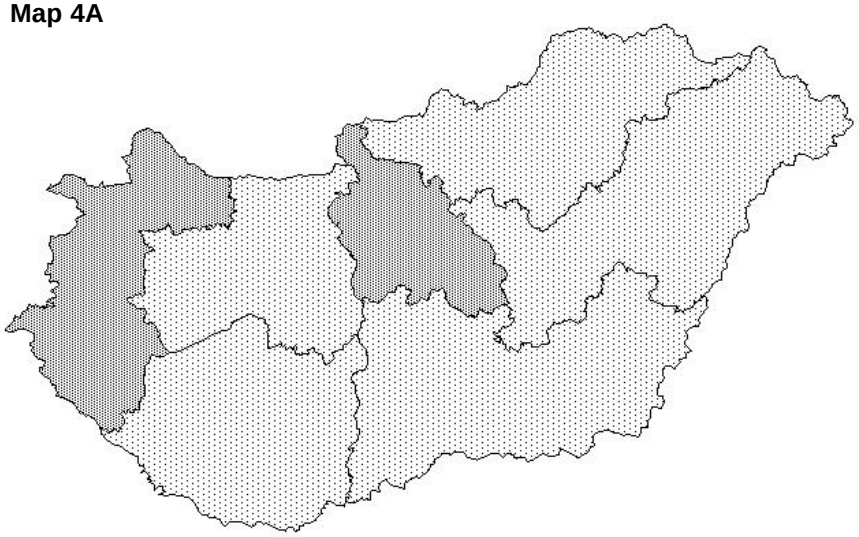
Figure 3E **The extent of regional differences in ISDN lines per 1000 inhabitants on the county level, 1997-2002 (unweighted relative deviation)**



HU: Regional inequalities in ADSL provision (by Q3.2003, NUTS 2)
(% of regional population with potential access to ADSL)

over 66%	(0)
51 - 66%	(2)
50% or less	(5)
0 (ADSL is not available yet)	(0)

Map 4A



Some notes on method (Maps 4A-C):

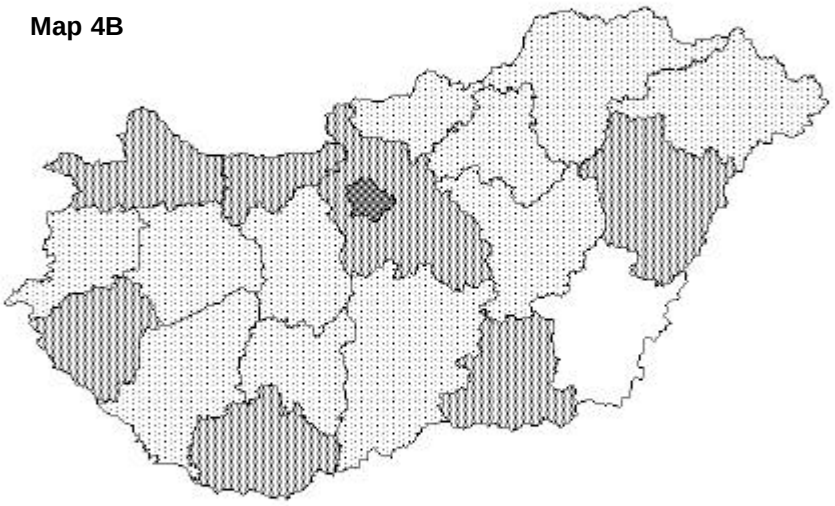
1) A constantly updated list of localities and coverage maps of every settlement where ADSL can be subscribed to at Axelero, the main Internet service provider (member of the incumbent Matáv Group),
2) and population data for NUTS 3 (counties), 4 (subregions) and 5 (localities) were used.
3) A close approximate of the proportion of residents who can have access to this broadband service was calculated in each region (relative to their total populations). These maps show coverage by the third quarter of 2003.

HU: Regional inequalities in ADSL provision (byQ3.2003; NUTS 3)

(% of regional population with potential access to ADSL)

over 66%	[1]
51 - 66%	[7]
50% or less	[11]
0 (ADSL is not vailable yet)	[1]

Map 4B

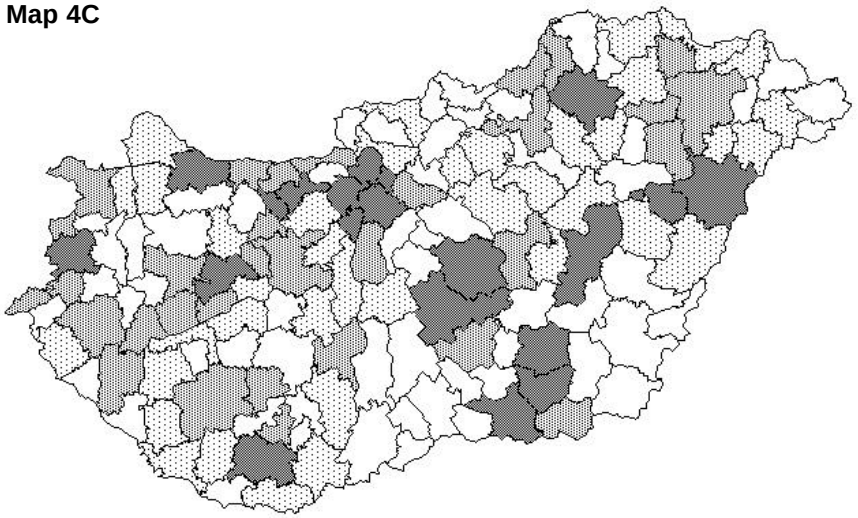


HU: Regional inequalities in ADSL provision (by Q3.2003; NUTS 4)

(% of population with potential access to ADSL)

over 66%	(20)
51 - 66%	(32)
50% or less	(39)
0 (ADSL is not available yet)	(59)

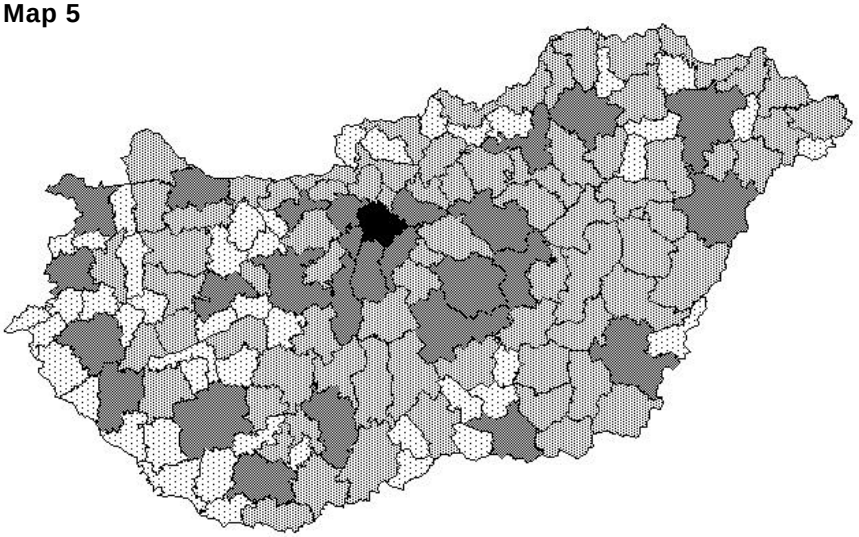
Map 4C



HU: Population distribution into subregions (2001, NUTS 4)

1 770 000 to 1 780 000	(1)
80 000 to 300 000	(27)
30 000 to 80 000	(75)
0 to 30 000	(47)

Map 5



Sources of data (Maps 4A-C and 5):

ADSL supplier Axelero Internet (member of the Matáv Group), www.axelero.hu;

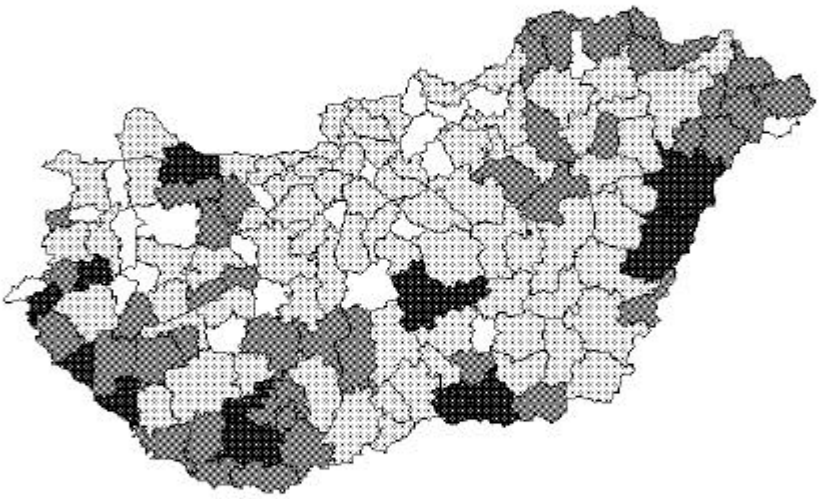
Census 2001 population statistics, HCSO – Hungarian Central Statistical Office (http://www.nepszamlalas.hu/tablak/load1.html, www.ksh.hu)

HU: Telecentres per 1000 inhabs. in subregions (NUTS 4), 7.2003

(Major cities (>100,000) other than Budapest, are excluded)

- 0,257 - 0,751
- 0,08 - 0,256
- 0,001 - 0,079
- 0

Map 6



Source:

Website of the Hungarian Telecottage Association (HTA)

4. OBSERVATIONS AND CONCLUSIONS

I consider the following points to be the most important observations concerning the figures above:

1. Fixed main lines and ISDN

Map 2 and Maps 3 A-D all indicate the traditional east--west and Budapest vs. rest of the country division in Hungary, that was generally present in the 1990s according to several socio-economic indicators (such as GDP per capita, taxable income levels, FDI). On my opinion, the diffusion of ISDN technology, although the scale of the relevant maps above does not allow differentiation within counties (on the level of settlements), shows a somewhat typical course: starting in the capital and its region, spreading to some major countryside towns, diffusion of the new technology still retains the well-known pattern of the major capital vs. rest of the country and east—west distinctions. Most probably however, ISDN penetration shows a much more diverse and finely grained pattern, with higher concentrations of ISDN lines in major urban localities.

After a certain length of time, regions other than Budapest start to catch up to each other (and thus differences decrease in the countryside, see the change in relative deviation in Figure 4E), while the level of ISDN penetration in them will never reach that of the capital region. I assume a reason for this can also be the emergence of alternative, and actually more advanced technology, namely broadband applications (especially ADSL).

2. ADSL infrastructure provision

Maps 4A-C illustrate the territorial differences of ADSL-accessibility to potential subscribers on different spatial scales, i.e. the proportion of those inhabitants (from the total regional populations) that can subscribe to ADSL services in their region of residence if they wish to do so. As mentioned earlier, when interpreting spatial patterns based on this type of indicator (basically, of infrastructure availability), it should be noted that they do not indicate real penetration (unlike subscription data would be, if they were available). Still, they are linked to spatial patterns of demand *assumed* or

even *observed* (e.g. through direct market surveys, or by consideration of available socio-economic indicators) by the service provider. Nevertheless, whether supply and demand are always well matched is questionable.

In the case of ADSL, it shows in the maps that patterns are finer grained in reality than what NUTS 2 and 3 level maps are able to indicate, and that scale of measurement *is* important. There are significant differences to note *within* most of the NUTS 2 regions and counties. Consider for example: Komárom-E. in Central Transdanubia, and its subregions. (See Map 5).

Map 5 shows the spatial distribution of population in Hungary on the level of subregions. Comparing Maps 3 and 4, it becomes obvious that the key guideline for the Internet provider is population density, i.e. the size of the market. Besides, densely populated regions are more urbanised, and have a more diverse economic base with a higher share of services and business activities that are major consumers of ICTs. The only exception is Békés (in the south-easternmost part of Hungary, in S. Great Plain region), where the absence of ADSL cannot be accounted for by economically unattractively low population density and insufficient demand. The truth is that this is the only county in Hungary that altogether belongs to other service provider than members of the Matáv Group. In Békés, Hungarotel owns the concession rights: it is a minor fixed line competitor of the incumbent Matáv. It was only in April 2003 when in some parts of the two biggest towns (Békéscsaba, Orosháza) ADSL was made available by Hungarotel in Békés. Hungarotel chose the areas which they considered the most surely profitable, to test the new ICT.

On the basis of Maps 4 and 5 it is easy to forecast in which regions Axelero will invest and provide ADSL in the future, following concentrations of population that are assumed to secure profit. The only reason for developments to happen otherwise (i.e. sparsely populated, poorer regions having access first) could be Universal Service Obligation extended to broadband Internet services, which is rather unlikely in Hungary in the foreseeable future, considering the fact that it is not the case in more advanced, EU member states either.

3. Diffusion of telecottages

Thanks to a fruitful co-operation between the civil, private sectors and the Hungarian State, as well as to a rather significant sum of foreign donation, telecentres (or "telecottages") have been mushrooming throughout Hungary since the mid-nineties. Their mission is to support rural, disadvantaged localities with the provision of ICTs, linked services and training, as well as a popular public space. The majority of telecentres have sprung up in small villages truly in need of such institutions, there are only a few exceptions situated in bigger towns or cities such as the capital or some county capitals. It is noticeable that especially in the western, south-western part of the country (Southern Transdanubia), there is a dense network of telecottages, which is attributable to the region's rurality, its unattractiveness to costly infrastructural investments (see map 4C about ADSL), and its unique settlement pattern of "micro-sized" villages (see Map 1). To some extent, the telecottage movement seems to have been successful in compensating for the lack of interest in the region on the part of major ICT suppliers, yet the lack of advanced technologies in their locations is not an advantage from the telecentres' point of view either.

Starting from the penetration of an "old" ICT, wired telephony (Map 2), then showing the regionally imbalanced spread of ISDN technology in Hungary from 1997 (Maps 3A-D), and the spatial patterns of the provision of the new ADSL infrastructure on several geographical scales (4A-C) I attempted at getting a grip on spatial inequalities emerging in the technological side of IS development. Rather similar patterns can be seen in the diffusion of old and more advanced ICTs in Hungary, and these follow, to a great extent the spatial inequalities in general socio-economic development. The reason for this is that both the supply of (roll-out) and adoption of (subscription to) these technologies are bound to be determined by financial factors, economic considerations (profit, solvent demand, on the one-hand, and income levels, household budgets). If this we accept as a rule, we can be certain that there will always be regions which are lagging behind in ICTs relative to others, even if certain technologies have time to diffuse almost universally before a better alternative application emerges in the market.

The question is whether technologies themselves matter the most. Suspecting that they are not sufficient to explain the IS phenomenon in its total complexity, I included a map illustrating the regional distribution of telecentres in Hungary. Telecottages cannot be

regarded merely as tools or infrastructure, they rather network than compete, and they are formed according to real needs, from local ideas, civil movements, and not particularly driven by profit-making. Yet no final conclusions can be drawn, more indicators are needed, further research and different approaches and methods to get a grip on territorial differences and impacts of the IS.

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