**CENTRE FOR REGIONAL STUDIES
OF HUNGARIAN ACADEMY OF SCIENCES**

DISCUSSION PAPERS

No. 64

The State of the Info-communication Markets in Dél-Alföld Region – Hungary

**by
Imre KANALAS – Gábor NAGY**

Series editor

Zoltán GÁL

**Pécs
2008**

ISSN 0238–2008
ISBN 978 963 9052 98 7

2008 by Centre for Regional Studies of the Hungarian Academy of Sciences.
Technical editor: Ilona Csapó.
Printed in Hungary by Sümegi Nyomdaipari, Kereskedelmi és Szolgáltató Ltd., Pécs.

Contents

List of figures

List of tables

Preface

The DARFT Kht. as the regional development agency of Dél-Alföld (South Great Plain) Region advertised a planning project, called 'The Strategy of the Information Society in Dél-Alföld'. The 'Strategy' was one of the basic concepts to help form out the Regional Operation Program of the Region for the 2007–2013 period, as a part of the National Development Plan.

The two authors with cooperation Dr. Bálint Csatári, the Director of Alföld (Great Plain) Institute of Centre for Regional Studies (Hungarian Academy of Sciences) and Mr. Tibor Szarvák, the junior research fellow of Szolnok Group of Alföld Institute published a report at Discussion Papers Series (No. 42) 'Regions in Information Society – A Hungarian Case-study' in 2004. The ask from DARFT Kht. to concentrate our investigation deeply into Dél-Alföld Region and renew the analysis made an opportunity for us not just follow the former scenario, but use the very recent trends and processes in our paper.

We began our work in 2005 and it was accepted and used by DARFT Kht. in 2006 in the planning phase of Regional Operative Programme. In 2007 we had an opportunity to re-organize the study and publish it in English. The authors tried to find the very recent data from the different fields of investigation to show a more detailed picture of the Dél-Alföld Region.

1 The Info-Communication Infrastructure and Its Use

1.1 The Fixed-Line Telecommunication in Dél-Alföld

The region is particular regarding the fixed-line telecommunication, because in this area four concessionary service companies work belonging to different proprietory spheres, realizing different strategies. While in the territory of Békés and Csongrád county there are 1-1 (but different) service companies (Hungarotel and Invitel), in Bács-Kiskun the settlements are divided between two service companies (T-Com, Emitel).[1] This type of proprietory diversity aggregate the homogenous development of the region's telecommunication network and its service palette.[2] At the same

[1]The situation of Dunafalva is particular. This small village separated from Baranya county and joined into Bács-Kiskun in the 1990s, since it belongs to T-Com Corp. With the view of ownership, but it belongs to the regional management of Pécs. Territorially it appears as an isle in the ring of the districts of Emitel Corp.

[2]In 2007 the owners of Hungarotel (Hungarian Telephone and Cable Corp., from USA) bought the second largest fix-phone company of Hungary, Invitel Corp. After the merger the new company became the main provider both Békés and Csongrád counties. In the same year T-Com the dominant fix-phone provider in the national market got the majority of Emitel Co., however the two companies are not merged yet, but on the area of strategic development there will be a closer

time the start of the free competition under the influence of the 2003 Single Telecommunication Act forced the regional service companies to introduce the newest service possibilities and the formation of subscriber packages attractive for the subscribers (means: competitive with the other alternatives).[3]

In the region the activation of T-Com can be conspicuous, which remains a determinant trade mark through its Internet and cable network companies. In the first round, the new service companies aimed the entrepreneurial and institutional clientele, but since 2004 the population clients also came to the scope gradually. During that year almost 11,000 companies changed service company (its two-thirds did it in the last quarter, which refers to the quickening of the process), while barely 2000 client changed service company in the private segment (although the half of them did it in the last quarter too). In this respect the regional data are not disposal yet, but estimately not more then some hundreds of companies and not more than a few dozens private subscribers might be concerned by the fixed-line number portability in the region. Temporarily this is not the problem, which mostly occupies the fixed-line service companies.[4]

The optical fibre backbone network of the region is practically complete, on the basis of the fusion of Hungarotel and Pantel a national backbone is also available, which is suitable for the development of the data communication market. The rate of the network's digitalisation is at least 90%, which is qualified good in European comparison, but total coverage would be necessary. The redemption of the microwave technologies (WLC) used in the period of quantitative development is continuous, it is almost ended, which renders possible the use of the prosperous network service system for the involved settlements (primarily in 'Homokhát' – a semi-deserted, sandy area of the region).

All over the country the number of the *conventional telephone lines* exceeded the 3 million with a shade of difference (in June of 2005 it decreased near to 2.9 million), the number of the ISDN channels was stagnating around 600,000 after the beginning of 2003, while the number of the mobile phones approximated over 10 million (and the number of active users are over 9.5 million). While the decrease of

---

cooperation between them. In this case, the structure of owners simplified, Bács-Kiskun county belongs to one owner group, and the other two counties to another, but the region's divided structure prolonged to a longer term.

[3]The number of phone lines offered by the alternative service-providers grown up from 12,000 (March 2005) to 160,000 (December 2006). The rate of increase slowed down in 2006, the number of new clients were 12–13,000 per quaterly, because of the reaction of 'traditional' fix-line service providers (namely, radical decrease of fees). The largest 'alternative' company Tele2 (the early bird of the 6 new actors) – had appr. 60,000 clients – finished its service in 2007, after a four years period and without a chance for making any profit for the owners. The buyer of the company is HTCC.

[4]After a two-and-a-half years term, the number of change rose up to 213,000 in a stagnating-decreasing market (means 6,5% of total number of fix lines), in a significantly higher volume than the experts thought in the beginning.

the conventional telephone lines is undiminished[5] since the end of 1999 (their number exceeded 3,6 million at that time), deviation exists at most in the rate of recession between certain measured quarters, in case of the ISDN basically there is a stagnation, but in case of the mobile phones the increase is slow but continuous since the middle of 2003. Practically the share of both the number of main lines per 100 inhabitants and the number of the telephones per 100 households signs that the fixed phone market arrived to a quantitative growth compass, the aim is the maintenance of the existing subscribers, the quick and radical augmentation of the percentage of the data communication in the income structure, since the number of the initial calls, the total duration of the calls also lessen gradually.

In case of Bács-Kiskun and Csongrád county in Dél-Alföld the number of the fixed lines started to decrease since 1999, according to the national trend (*Table 1*), but while in case of the previous county the diminution of the fixed lines may be estimated barely 7% until the end of 2005, in Csongrád county this rate is well over 15%.

Table 1

Number of fix-phone lines in the region (per 1000 persons)

Year	Bács-Kiskun	Békés	Csongrád	Dél-Alföld	Hungary
1990	67	57	90		96
1993	118	98	149		146
1994	129	101	165		174
1995	156	104	172		211
1996	229	113	249		261
1997	266	254	302		305
1998	297	266	331		335
1999	318	285	350		359
2000	311	295	335		347
2001	304	285	317		368
2002	304	281	306		362
2003	301	274	299		357
2004	299	368	284	285	354
2005	281	241	274	267	343
2006	274	229	263	257	334

Source: KSH, Regional Statistical Yearbooks.

In Békés county the smallest line-density was measured at the end of 2000, but 16% of the subscribers turned away from their service company until the end of

[5]The appearance of technologies, which are more suitable for the access of Internet considerable contributes to this phenomenon. Thus, among the 3 million conventional line subscribers barely 54,000 joined the Internet via modem.

2005. As a result of this, the number of the fixed lines decreased under 360,000 in the region at the end of 2005. It meant 12% decrease in relation to 2000 (nationally the number of the lines definitely did not changed in this period). This diminution is attributable to the development of the mobile communication possibilities and the significant decrease of the mobile tariffs (considerably faster than the fixed line's tariffs). The measure of the decrease of the number of fixed lines may indicate that the region's telecommunication actors, particularly in case of the business and private segment, were slightly able to develop attractive subscription packages to prevent the competition of the mobile segment (*Table 2*). In the region the 10% of the fixed lines is public, 10% belongs to business subscribers.

Table 2

Indicators of telecommunication in the region, 2000, 2003, 2005

Indecees	Bács-Kiskun	Békés	Csongrád	Dél-Alföld	In % of Hungary
Number of main lines, 2000	174,445	116,754	143,377	434,576	11,44
Number of main lines, 2003	162,924	107,570	127,413	397,907	11,03
Number of main lines, 2005	150,981	92,954	115,984	359,919	10,42
of which personal, 2003	125,726	90,886	99,610	316,222	12,00
of which personal, 2005	119,407	76,981	91,168	287,556	11,40
of which business, 2003	16,907	9,763	12,493	39,163	12,09
of which business, 2005	12,552	9,490	10,699	32,741	10,87
In % of 2000 level, 2003	93.4	92.1	88.9	91.6	94.90
In % of 2000 level, 2005	92.7	84.0	84.5	87.6	100.50

Source: KSH, Regional Statistical Yearbooks.

The fixed line market did not become homogeneous after the establishment of the supply market, the penetration is above 300 fixed line per 1000 inhabitants in the micro-regions of county-seats (Kecskemét, Békéscsaba, Szeged) these are the is the most supplied areas in the region, together with the smaller regional centres of higher education, Baja and Szarvas. Mezőkovácsháza, Kistelek and Mórahalom (163!) can be reckon among the laggards according to their fixed lines.[6] The inside territorial inequalities, which were lessening gradually in the 1990s (the scale of development of the most slightly supplied settlements and micro regions were significantly higher exceeded the development rate of the towns and the urbanized areas) started to increase again after 2000 due to the population incomes, partly due to the competition of the mobile telecommunication.

[6]In this respect the penetration rate of fix-line phones of Kiskunmajsa, Szeghalom, Sarkad and Makó areas are similar to the above mentioned ones, under or around 200 subscribers per 1000 inhabitants at the end of 2005.

The changing of the number of *ISDN fixed lines* indicates a certain activity, suspectibility towards the novelties and adaptivity willingness between 1998 and 2003. The process is duplex, because first a subscription package should appear on the side of the service company, which makes attractive the new product for the consumer, on the other hand, the subscriber should decide whether the offered service and its subscription price is managable, and it is worth for him. In case of Csongrád and Békés county it appears that a significant phase delay is manifested during the introduction, since while at the end of 1998 70,000 ISDN line existed nationally, in the mentioned two counties there were 61(!) altogether (*Table 3*).

Table 3

Number of ISDN-channels in the region

Year	Bács-Kiskun	Békés	Csongrád	Dél-Alföld	Hungary
1998	1,286	61	0	1,347	69,145
1999	2,938	224	161	3,323	113,889
2000	8,912	1,820	3,772	14,504	322,176
2001	13,506	3,440	8,498	25,444	487,116
2002	16,438	4,606	11,727	32,771	574,874
2003	17,462	5,288	12,810	35,560	599,868
2004	17,624	5,340	12,500	35,464	593,878
2005	17,630	5,324	12,754	35,708	593,030
2006	17,664	5,552	9,704	32,920	585,330
No./1000 person, 2005	32.78	13.80	30.11	26.50	58.85
2005/2000	197.80	292.50	338.10	246.20	184.10

Source: KSH, Regional Statistical Yearbooks.

The number of the ISDN channels grew to its ninefold between 1998 and 2003, nationally it still grew with 85%[7] in comparison with 2000. From the service companies of the region the Emitel and the Matáv of that time marketed the service relatively quickly, since at the end of 1998 they have drummed up almost 1300 subscribers in Bács-Kiskun county while in the other two counties the sale of the ISDN lines occured the end of 1998 and in the middle of 1999. After 4 years there were 17,500 subscribers in Bács-Kiskun, 12,800 in Csongrád, but only 5,300 in Békés county.[8] Csongrád could show a significant (nationally the most vigorous) dynamic in spite of the late start, and the specific index (number of ISDN lines per

[7]However, only 34,000 of Internet subscribers are kept on file among the 585,000 ISDN-lines owners.

[8]The loosing innovativity of ISDN could be measured by the number of lines provided, which were stagnating not just national, but also on county level, as well. The high rate reduction of ISDN-channels begun in 2006–2007, when ADSL service covered appr. 90% of the whole population and offered faster, cheaper and less difficult connection possibility to Internet.

1000 inhabitants) approximated even Bács-Kiskun county, the leader of the region. Although Bács-Kiskun is the 15th, Csongrád is the 16th, while Békés is the 19th in the order of rank among the counties (including the capital), and they get in the group with Jász-Nagykun-Szolnok, Nógrád and Szabolcs-Szatmár-Bereg in 2005. In case of the top-ranking counties almost double ISDN density emerged at the end of 2003, which indicates the backwardness of Dél-Alföld in this segment of development. This is the explicit indication of the fact, that the subscription packages, which were offered in this region could generate a quite restricted demand. Although the accomplishment of the region is not bad according to the dynamical data, it reached the last rank in the field of specific state of supply, and the specific state of Békés is lower than the before last Nógrád county with 40%.

In Hungary the *xDSL*[9] *service*, which uses the fixed-line telecommunication network, was started in 2000. After the first two years' quasi failure, which based on a defective pricing and defective survey covering a minimal market segment, the growth in the number of subscribers and the technical preparation of the areas suitable for the reception of the service begun with a larger impulse after 2003. Nationally there are reliable data about the tendency of the number of the subscribers only from the January of 2005, but the increase of the number of the subscribers can be followed transmissionably from 2003. At the end of the first year it may be estimated 32,000, at the end of 2003 it is 115,000, at the end of 2004 it is 235,000, in 2005 413,000, in 2006 613,000 and in 2007 750,000. While the service companies offer not only more and more favourable conditions in the field of subscription constructions, but they increase periodically the access bandwidth, which makes the downloading and uploading conditions more favourable. We do not discuss the relations with the Internet in detail, in this part we would like to concentrate on the spatial characteristics of the process.[10]

While in case of the timing, the start of the ISDN-service the companies of the region did not pass the examination well, in connection with the ADSL they did not commit any mistake. Only the putting up for sale of the Hungarotel's first package showed some delay, but it was the result of the unpreparedness of the market and the divergent focus of the company's development strategy. At the end of 2003 Dél-Alföld was the most covered region beside or after Közép-Magyarország (Central Hungary, the region around the capital city Budapest). (*Figure 1*) Region, particularly through the quick connection of the settlements in Bács-Kiskun county. At the end of 2003 the ADSL service was available in Csongrád in the towns with population over 25,000, in Békés in centres where there are more than 10,000 inhabitants, while in Bács-Kiskun, in T-Com district 10

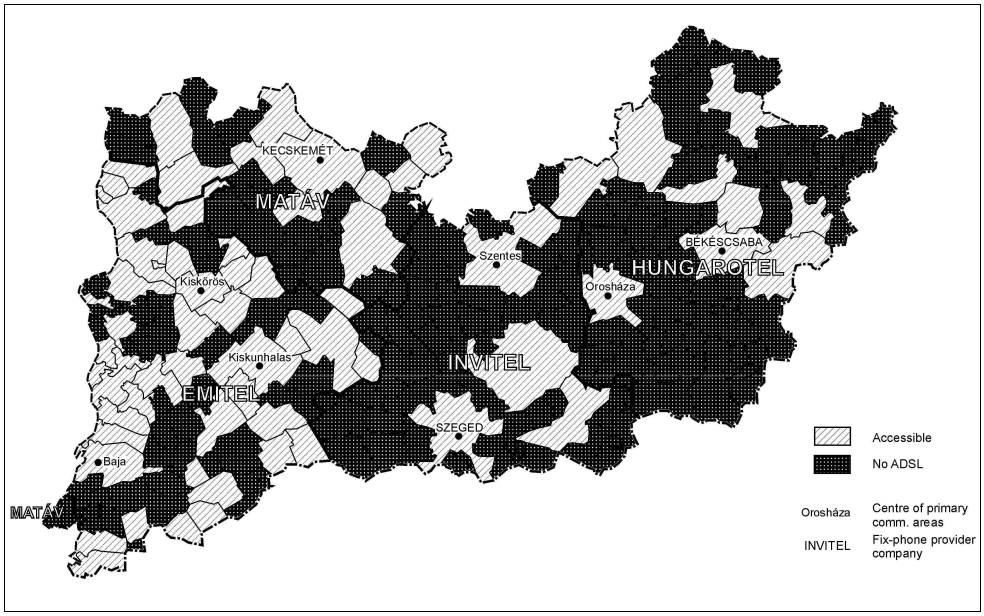
[9]The service is not adapted for conventional phone calls, but it is suitable for access of broadband Internet.

[10]Among the 750,000 connected ADSL lines 739,000 Internet subscribers were registered by the KSH (Central Statistical Office of Hungary) in 2007.

settlements, in Emitel districts already 42 settlements had the possibility to connect the ADSL with a relatively tolerable price level.

Figure 1

ADSL accessibility in Dél-Alföld (Oct. 2003)



Source: Edited by the authors.

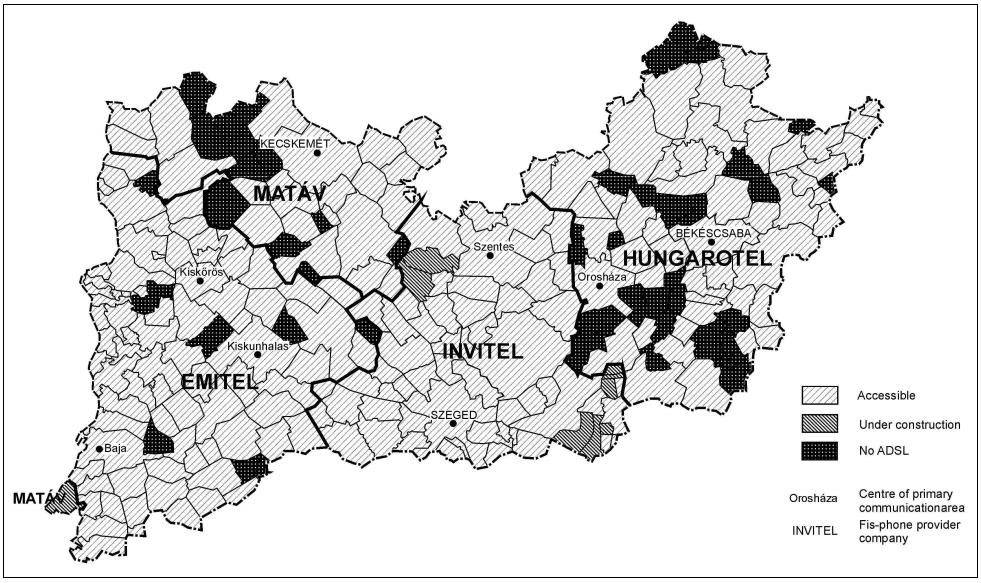
As a result of the quick start, the ADSL service was theoretically available through the fixed-lines for the 90% of the population at the end of 2004. From that time the increase of the market segment is basically not a technical but an economic question. After one year Emitel and Invitel provided nearly total access (the first had 7, the second had 8 not covered settlements), in case of T-Com 12, and in Hungarotel area 27 settlements were waiting for connection.[11] In case of the previous company we could see a contiguous unprovided zone from Izsák to the south boundary of the county, at the latter besides the uncovered settlements in North- and South-Békés, and a low-adaptivity axis runs between Murony and Örménykút in parallel with the main traffic axis of the county (road No. 44). This phenomena was a surprise, because the main transport axis of the county showed a higher level of innovativity in other economic indecees. The 2006 year's situation showed an almost covered region, only 5 small villages (mainly under 500

[11]Respectively in most cases the service companies were technically prepared for the introduction of the new service, but there were not enough subscription intention for the beginning of the work.

inhabitants) existed without ADSL conncetion (*Figure 2*). The number of subscribers were growing fast in the last 3 years, from 25 th.s in 2004 up to 77.5 th.s in 2006. The overall rate of connected people increased over 5.6%, while the national average grew up to 8.2% (without Budapest it was around 6.5%). The rate of growth is the same of national level, but a bit lagging behind the countryside.

Figure 2

ADSL accessibility in Dél-Alföld (Aug. 2005)



Source: Edited by the authors.

Csongrád county had the best position in the region. All settlements had the possibility to use broadband channel to connect Internet. The number of subscribers were over 33,000, the penetration rate was 20% higher the countryside average, and just under the national index. The innovative pole of the county was Szeged (the centre of the region) with a wide active suburban zone around it. The towns of the county showed a significant activity rate, even the smaller ones.

In Bács-Kiskun county the number of villages without broadband infrastructure counts 3 (2% of settlements, 0,5% of total population). The number of ADSL subscribers over 27,000, but the penetration rate was under the national, countryside and regional average, too. The forming agglomeration around Kecskemét (county-seat with over 100 th. Inhabitants) involved a more active zone around the city and along the main road No. 44. to eastwards. The secondary pole of the county Baja and 3 surrounding villages formed a smaller active zone in the

South-western part of Bács-Kiskun. The smaller centres showed a moderate level of using new type of ICTs, partly because of their social structure (goes back to historical roots, a special way of development so called 'oppidum', market towns), and the recent situation of local economies. In Bács-Kiskun there were small isles of passivity in using ADSL, mainly in the border zones of the county.

Békés, in general, showed a similar picture comparing Bács-Kiskun. There were two uncovered settlements (2.5% of settlements, 1.4% of total population). The number of ADSL users close to 17,000, the penetration rate just under of the previous county. The closer look suggest, that Békés had more serious problems with adaptivity of new ICTs. The four major centres of the county (Békéscsaba – the county-seat, Gyula, Orosháza, Szarvas) are the only poles of activity, with a potential zone along the main road No. 44. There are wide zones of missing activity in the South zone of the county and covering almost the whole area of North and Northeast subregions. We were hardly point out any suburban way of development, any effect of larger poles to their 'hinterland'. The spatial distribution of ADSL users is highly concentrated in the region. One-fourth of the subscribers settled in Szeged, 42% in the three conty-seats and 57% in the medium- and larger towns (7 of them with Baja, Gyula, Hódmezővásárhely, and Szentes). In all three counties we can paint the similar picture, with an extreme concentration rate in Csongrád, where Szeged covers the 58% of the market alone, and the major 3 poles' share is over 75%.

The spatial structure of ADSL service operators (there are 267 of them altogether in Hungary at the end of 2005) showed an early phase of spread in the Region. The smaller concentrations could be seen in county-towns, particularly in Szeged, where 8 of them situated at that time (no more than 3 ADSL providers settled in other larger towns), where the larger group of users located (*Figure 3*).

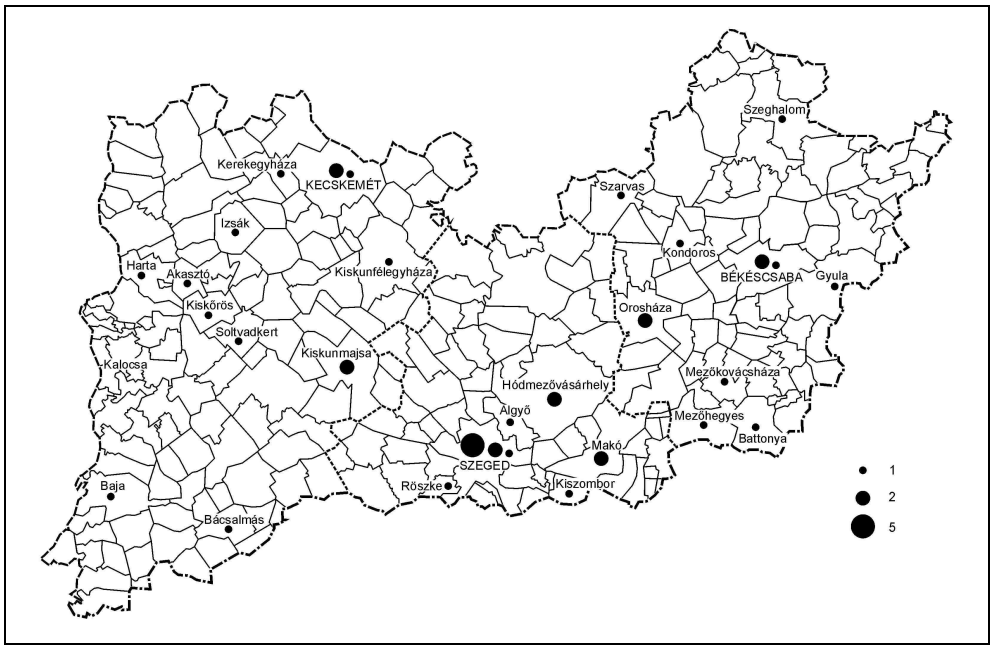
Although the network intelligence increased considerably (until the end of 2002 basically the proportion of the digitalized centres increased to 100%), it could not stop the decrease of main lines. In this situation the fact is important, that the concession areas, which had changed owners during 1994–1996 (and the zone which had remained in the ownership of Matáv – now T-Com) had to overcome some intensive network and extensive subscriber connection tasks. Since the companies covered the expenses of the development phase from loan, the telephone tariffs, which stuck in a high level, were intended for the production of that. By the time they more or less managed to stabilize the financial background (and complete the developments establishing the introduction of ISDN and xDSL) they had to face with external rivals on the earlier sheltered market in consequence of the change of the statutory background (and the end of the originally ensured concession period).

Even regional data were not available, it is well seen that nowadays the significant part of the fixed-line calls is approximately 6–7.5%, but almost the third of the total call time is already concentrated on this. The breakthrough of the VoIP

calls is waited for, temporarily considering the number of the calls and the call time, its share is measurable with fractional percentage in contrast with the trends in West-Europe.

Figure 3

xDSL service providers in Dél-Alföld, 2005



Source: Edited by the authors.

Meanwhile the passed change of ownership (Invitel, Hungarotel), the acquisitions (eg. the purchase of PanTel Corp.) or the transformation of the profile of the company (T-Com) only temporally held back the tune of the changes. Nevertheless the direction of the transformation is unambigous: They have to concentrate on the maintenance of entrepreneurial clients besides the moderate activity on the public market, they have to increase the rate of the profitable data communication in quick tune in the income structure, and prepare for the introduction of the VoIP, and the phone cal possibility through the Internet. Surprisingly the number portability did not take a mass shape, nationally also the business partners moved towards the more favourable constructions (according to the NHH 11000), while only the fragment of the individual clients grasped the opportunity (2100 during 2004). The concession companies are the losing side of the number portability, while the winners are the alternative telecommunication service companies.

1.2 The Mobile-Market in the Region

The beginning of the mobile phone use goes back to 1991–1992, when the first (isolated) zones of the NMT system (Nordic Mobile Telecommunication, using the 450 MHz brandwidth) service appeared in the cities, later along the main roads, these became a spatially more and more contiguous network. Although the nationally covered network of the NMT was completed only at the end of 1996, by this time the carrier of the development were the GSM service companies, which entered to market in 1994. The WESTEL (now T-Mobile) nationally came by leading role considering the number of the subscribers by its quicker network-construction strategy and the introduced trade-name, which position has been kept since that time. During 1999–2000, the networks became being able to give even nationally total coverage, but meanwhile a new competitor entered the market. In relation to the UMTS tender three winners could start the service, thus the two actors servicing in the GSM network was completed with the VRAM Magyarország Ltd., of which the largest mobile telecommunication company in the world, the Vodafone stood behind. The Vodafone announced the completion of the entire network at the end of 2003, so since that time (theoretically) there is total freedom everywhere in the choice of service company for the population of the region.

At present the national introduction of the 3G services means the challenge for the mobile-telephony. In relation to this it is worth to consider that what kind of technological leaps existed, and these leaps offers what sort of teaching for the current developments. After the basic GSM service, which is also called 2G, the WAP was the first attempt to reach breakthrough in the field of mobile data communication. Although the band rate was behind the prevealent modem-connection, even then, by the means of the vigorous marketing masses tried the service and soon got disappointed in it. This fiasco retarded with at least one year the national introduction of the new technologies and the adaptation impulse.

The GPRS possibly considered as 2,5G is able to run at least e-mail and basic-level browser, could obtain 60 Kbit/s- the one side, but it signs the direction of accomplishment of the newer technological leap towards the service companies. This subscriber mass covered the 15% of the total mobile society, according to this the start of the EDGE services was a real step on the side of the two ‘traditional’ service companies.

The bandwidth of the EDGE is roughly amount to the ISDN's, which makes possible the substantial download and upload, although the move of the media-files is hopeless. According to the 2003 year development conceptions, the T-Mobile took charge of the establishmenst of the networks in the medium-sized towns, populated over 25,000, besides the county towns and three touristic towns on the shore of Lake Balaton until the end of the year, from which the networks of the capital and the regional centers (Szeged from the Dél-Alföld) will have operated in

May 2005. The Pannon wants to start the service in towns populated over 100,000 as a first step, which would be followed by the shore of Lake Balaton during the summer, then 40 middle-sized towns until the end of the year. In case of Dél-Alföld, the town structure is quite favourable, since besides the four county-towns[12] there are further six smaller towns (Baja, Kiskunfélegyháza, Kiskunhalas, Szentes, Gyula, Orosháza), which had been the anticipated target area of the second wave of network building. By means of this the service became available for the 40% of Bács-Kiskun, 60% of Csongrád, one-third of Békés county's population. Such a high levelled coverage is expected only in Közép-Magyarország Region until the end of that year. In September 2007 the EDGE network – offering 256 Kbit/s download speed for mobile data communication – is available for 95% of the whole population in Hungary in the Pannon GSM network, covering appr. 85% of the area of Hungary. The provided share of population 80% in the case of T-Mobile and far less in Vodafone network.

The survey of the development steps is also informative because the building of the 3G networks are and will realized through similar steps, using the experiences acquired in relation to the introduction of pervious network building phases.[13] The settlement and the town-structure of Dél-Alföld, as well as the geographic situation (missing hills and mountains) favour the establishment of EDGE and 3G networks because the rate of the number of the towns populated over 20–30,000 and the population exceeded the national rate. The EDGE, GPRS and WAP services are available from almost the entire territory of the region as the possibility of data transmission, although its speed hardly meets the requirements of the subscribers.

The large technical breakthrough in the field of mobile-telephony in 2003 was the MMS, since in the first quarter barely 40,000, while, in the last one million MMS were sent by the subscribers (until the end of 2004 it increased to 3 million). In 2004 the mass quality of the GPRS was outstanding because while at the end of 2004 only 170,000 subscribers used it, after one year there were 1,26 million users, which means sevenfold user scope during a short time. In 2006 about one-third of

[12]The category of county-towns covered the group of larger centres with more than 50,000 inhabitants. Including the capital city there are 23 of them in Hungary and four in the Dél-Alföld region.

[13]The three 3G providers offers a highly developed network for broadband mobile communication in Budapest and the agglomeration zone. Vodafone has a time-gap comparing the other companies, this provider finished its 3G network in regional centres (6 of them excluding Budapest), while the competitors offers their service at least 40–50 more smaller towns in the countryside and widening the covered areas in the larger touristic areas (Lake Balaton, Dunakanyar, Lake Velencei etc.). The speed of data transmission in increasing, in the first phase they offer 386 Kbit/s download and 128 Kbit/sec upload speed. In 2007 the most developed networks offer a 5 Mbit/s download and 1 Mbit/s upload bandwidth, just as fast as the ADSL and CableTV network are.

subscribers used GPRS or EDGE data communication possibilities, but only 200,000 had such kind of equipment were suitable for 3G technology.[14]

The rate of mobile penetration exceeded the rate detected in case of the fixed-line number portability (roughly 30,000 during 2004) but comparing it with the number of the subscribers and the augmentation registrated during the years, it is well seen that this possibility did not rearranged the markets drastically.

The mobile-telephony is a success-sector of the national ICT (info-communication technologies) sector, particularly according to the tendency of the number of the subscribers. They managed to exceed million even in March 1999, thereafter the number of the subscribers increased with one million in every 9th month in average until the reach of the 7 million limit. From this time, the tendency of the number of the mobile subscribers indicates the characteristics of saturation and the penetration takes shape according to the 'S-curve'. They needed one year for the reach of the 8 million limit, 16 months for the 9 million and 19 month for the 10 million. The final level of the saturation now is not determinable unanimously since in the Scandinavian countries, which are leading on the field of development, the proportion of mobile telephones is above 130% per 100 inhabitants. In Hungary the recent penetration rate 103.4% (August, 2007).

The success of mobile-telephony is attributable to the appearance of the supply accomodating to the requirements of subscribers, and the increase of the pretension towards mobile telecommunication and the computer science since we can use our laptop computer by the help of infrared connection without conventional outlet, at most with the joint of a mobile phone. The establishment of *WiFi networks* is spreading in Hungary too, although it is concentrated on significantly roofed places (airports, hypermarkets, coffee bars, confectioneries of pedestrian precincts etc.) in the present phase of development.[15] With this the future developmental way shows the development of the mobile-computer technology.

Relating to the regional distribution of mobile phones, only the survey of the KSH (a national representative questionnaire covering 15,000 households) offers essential proof, because the companies do not give any regional information. After that, we can see that the term between 1996 and 1998 was the time of slow growth, while the period of 1999–2003 was the time of sudden extension, but it was the period of the quick increase, later the similarly quick lessening of regional disparity

[14]The number of wireless Internet subscribers began to increase in 2004. At the end of 2003, there were appr. 24,000 of them, one year later it increased to 74,000, and it was doubled to the end of 2006. In 2007 the total number of this type of Internet users went up to 430,000. To say the truth, a certain minority of this group used the microwave broadband service of AM-Mikro Co. in the Budapest agglomeration area.

[15]The first plan for covering the whole CBD of Budapest with WiFi technology has been established in 2007. The project will probably end in 2010. However, investigation showed a large number of WiFi points along certain routes in the center of the capital city. The very last one pointed out more than 1500 of them along a major road of the city.

at the same time. In general the region was reckond into the backward group, in 2001–2002 it was the worst situation (*Table 4*).

However, in 2003 it approximates the national average thus it got away from the last rank and essentially it was on the same level with Közép-Magyarország, Dél-Dunánúl, Észak-Dunántúl and Észak-Alföld. The number of mobile telephones might be 120 per 100 households. After two years the average number of mobile phones (per 100 households) increased almost 160 in average and the differences among regions diminished (in Dél-Alföld the index was 153).

Table 4

Number of mobile phones per 100 households by region

Region	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Közép-Magyarország	4	6	10	16	29	55	87	124	136	142	159
Budapest	5	6	12	17	34	63	94	124	133		
Közép-Dunántúl	3	5	7	15	35	64	99	142	145	146	171
Nyugat-Dunántúl	3	4	6	11	22	46	85	130	144	148	167
Dél-Dunántúl	2	4	7	12	25	50	78	122	126	137	155
Észak-Magyarország	1	2	3	7	19	49	69	111	120	129	144
Észak-Alföld	2	4	5	11	28	50	88	122	138	146	158
Dél-Alföld	*2*	*4*	*5*	*14*	*25*	*43*	*77*	*120*	*125*	*134*	*153*
Hungary	3	4	7	13	27	52	84	124	134	140	158

Source: KSH, Regional Statistical Yearbooks.

1.3 Alternative Technologies

The *wireless technologies* have a basic characteristic: at least one of the network's segments use electromagnetic waves for data sending and receiving instead of conventional fixed access. The best known types of it are the WLAN – Wireless Local Area Network – and the RLAN – Radio Local Area Network – technologies. They are suitable for the extension of the already existing broadband access on the so-called „last 100 metres" on the level of the actual technological development. Sharing connection can be within a house or office among more computers or the joint technology of rural communities, townships. Among these technologies the spreading of the so-called WiFi was the quickest in Hungary and internationally too, because the 2.4 GHz frequency range they used was gratuitously accessible. (It is illustrative that in the 3,5 GHz band sold by auction in 2002, public broadband service did not appear till now if we disregard an invitation from Veszprém, this freqency range is dominated by business applications.) The great advantage of it is

that it can be operated lucratively with even 20 subscribers because of the moderate infrastructural requirement. The band rate of WiFi is approximately 10 Mbit/sec, but at most 500 metres distance is bridgable by this technology. The basic obstacle of the more intensive spreading and the covering of bigger areas that the available bandwidth decreases in inverse ratio with the increase of the number of users. The occuring of disturbance in the system (eg. Mobile phones, microwave-owens) and the reflections in connection with access and data defending.

Thus in 2003 the Westel and the Pannon GSM, in 2004 the Vodafone started to provide the service, still with limited coverage (eg. Ferihegy Airport), the MATÁV also started a service coverage, a public Internet access named EasyNet Plusz. In Győr experimentative gratuitous public broadband Internet access providing started in 2003. In Hungary the microwave access provides Internet access for 330,000 subscribers (20% of the total number), its significant part is handled on the AM-Micro network in the suburban zone of the capital.

The introduction of the *data communication with optical fibre* means further possibilities. The band rate of the network is essentially limited by terminal equipments. The data communication capacity exceeds 10 Mbit/sec on the present technology level, but it is significantly increasable by the help of a special development (wave multiplexing). The disadvantage of the technology is the high establishment expense, although they mostly seem high among the telecommunication infrastructural elements, comparing with the „basic infrastructure" elements (as road, water, sewage systems, culvert, electricity, gas) the establishment costs amount to its fragments. Nowadays in general the optical fibres are used in backbone networks, excluding the big business partners, the optical rings were established in the cities for contacting them.

The present application of *Ethernet networks* is confined to assuring access within a building or building complex. This application area may look forward to further increase (integrating assurance of talk, Internet and cable TV) as a result of the continuous subdivision building. The establishment of the so-called 'long-range' Ethernet connection now is possible besides ADSL, for 1,5 kilometres round of the telephone exchanges or affiliated stages.

The *PLC technology*, namely broadband power line communication is theoretically realizable on a power network, according to the current experiments, 1–4 Mbit/s bandwidth would be insurable, but no national company has started the introduction of commercial service so far, and successful use of technology is scarcely seen also in the developed world (Reykjavik). The fundamental problem is the bridging of transformers working in the network but the recabling of the affected homes might become necessary, since the high-speed signs can be transmittable within a limited distance on the present networks. The bypass of the disturbing effect of radio, TV, telephone means further problems. According to this, the technology may come into question as a makeshift in the field of the connection of rural areas.

The *satellite data transfer* possibility may play a role primarily in the serving of slightly supplied areas with low density of population. The high rent of the necessary infrastructure (transpoder) and the high expense of duplexity are disadvantegous. The bandwidth may considerably narrow under adverse weather conditions. Its disadvantage that as a result of the detention of sign transmission, the use of the real-time services is not possible. In this segment we cannot count on mass demand under the national conditions, while in the short run it may obtain an important role in the bridging the period until the establishment of the fixed network.

On the way towards the broadband mobile access the 3G telephones and the establishment and start of the networks mean the first breakthrough, its basis is the *UMTS system*. In case of a fixed end the band rate is 2 Mbit/s, on foot it is 386 Kbit/s, by car the access is 114 Kbit/s. By means of the development of UMTS based technology the band rate would be increasable up to 10 Mbit/s, which may be a serious competitor of copper based networks. By this means the aspiration may be realized, that the Internet service separate from the stable terminal equipment.

The tests made with the *4G mobile system* are continuing in the Far-East (Japan ,Taiwan, South-Korea, Singapure, Hongkong) so far but the present results show us a real breakthrough. In case of end in motion the 40 Mbit/s band speed is available too. In spite of this technological bravura the mass spreading of 4G mobile systems is slightly probable in the next 10 years since the return of the 3G networks built, quite heavy costs must be assured.

2004 was the year of the breakthrough of 3G systems for Europe. The owners of the service concessions, sold at the beginning of the decade and went for a price out of sight in certain countries, produced the purchase price on the one hand, on the other hand they built up their systems covering the cities and the main railway and road traffic system. According to our present knowledge the GSM technology will not become redundant for a while, because for some length of time we cannot reckon the building up of the UMTS systems providing complete coverage in any country, and if the users reach the limits of the 3G-covered area, the GSM (EDGE) system takes over the service, as we could see the example in case of the start of the new Spanish system. Since the UMTS system practically will be able to provide an Internet connection quantitatively corresponding to ADSL, the competition of the two technologies is prognosticative.

Technically already tested, but widely not introduced possibilities are missing from the alternative technologies as the *data communication possibility through the electrical network*, which may made available the access to data transmission networks to the 96-97% of the population. We did not discussed in details VoIP possibilities and the AM-Mikro networks which makes possible the regional data communication. Although they signify a real alternative oppose the now dominating communication forms, we does not feel that their potential space

organizing effect has not penetrating force, because of this they fell in to the background in the analysis. By means of the development of the technology other technical solutions, networks may appear. The previously mentioned electricity-energetic networks through which telecommunication signs could be transmissed (PLC technology) may offer new possibilities and they already examined the telecommunicational possibilities of VSAT equipment, orbiting on a smaller height. But we surely cannot reckon on their introduction and mass application in the next 2–3 years.[16]

The positive effect of the competing 'last mile' technologies and the telecommunication's liberalization will be perceptible for the great partners in the first round, but we consider that because of the influence of the technological development, the developments continuing in more directions, and the market competition, favourable changes may occur for the individual consumers within a few years.[17] Larger question that the regional level, which gets more and more tangible role in the articulation of the local interests, the coordination and the distribution of sources, whether how it can accomodate to the changing conditions. Whether, it will find the most advantageous technology or the optimal combination of the competing technologies to more efficiently fulfill its space organizing integrating role? Whether, it become possible, at least on regional level, that as a step towards the direct democracy the arbitrators could work out a solid stand-point in more questions with the knowledge of the population's opinion and execute it on the basis of the authorization of the majority? Whether, it is possible to make the public administration close to people at least on local but on regional level? Is it possible to frame the present structure of power into service provider with the help of the new technologies? Whether, the spread of the new technologies increase the equal opportunity? Whether, it open a social gap – besides the already existing ones – which facilitate the development of a dual society along the dimension of information illiteracy?

The development of the national *VSAT sector* (Very small appertuate terminal) is outstanding in the field of microwave data transmission. In the middle of the 1990s in Hungary already four rivalling companies served more than 1000 terminals and the stage of their activities also extended to a part of Middle-East-Europe. The easy settling, the operation functioning without fixed network and the relatively moderate expenses of the operation determine the quick success of VSAT service. The utility of the system was increased by the fact that one HUB station is able to set up and keep point-multipoint contact with many thousands

[16]The Novacom Telecommnication Ltd. sorked out the technology of which can forward the telecommunication signs to the households through the common electronic network, and the first phase of development being held in Budapest (on ELMŰ's network).

[17]In some cases – as we could see in 2007 – the international policy makers (e.g. the EU Commission) were able to modify the behaviour of service providers and strengthen the competition among them, as it happened in roaming tariffs and planning in SMS tariffs abroad.

terminals. The time sharing, time-division multiplex access (TDMA) technology make possible the profitable operation of the system.

According to the above, it is not accidental that the significant part of the multipremises companies decided that they use the satellite data communication possibility to handle the data transmission within the company. Its advantage is that the centre is able to follow the activities in the premises, it is able to intervene immediately if the course of affairs requires it. The activity area of the five determinant companies of the sector becomes Europe horizontal, since their settled end-points were findable from London to Moscow on the millenium. From the circle of the companies mentioned by the service companies as reference, it was discovered that the target sectors and the target groups widened comparing with the early years. Besides the bank and insurance sphere the retail and wholesale trade, the transmission of stock exchange information, the service of state administration, and the management of energetic systems play more and more important role, but transport companies, national production corporate enterprises also appear in their sphere of interest (Pick, Villeroy&Boch, Medikémia, MOL), they have partners in the domain of building industry, informatics, computer science, office technology and information service sphere too.

The systems are evolved according to the requirements of the customer conforming to three main types:

- unidirectional data casting system: news agency applications, stock exchange information, dissemination of weather forecast, remote maintenance of softwares etc.
- data loggers: report of store of sales locations, compiling of retail return, reception of data remote detectors (power supply, pipelines, railroad and seismic stations, meteorological stations, flood-prevention)
- duplex systems: bank applications, mechanical transactions (payment with debit card, POS-terminals, ATM), on-line stock exchange affairs, insurance affairs, handling of registrations (travel agencies, hotels, transport services, handling of internal data communication of companies, commercial networks, store chains, state administration, public health)

The national VSAT service would also offer a possibility that it become the technical frame of data communication, not only within national compasses but within the range of regional units and among the actors of regional development, since the network security exceed 99.5% and the bandwidth of transmission (2 Mbit/sec is also suit the institutional requirements.

The VSAT service is a special type of microwave services, which is able to cover continent-sized areas due to the used technology. Because of the high price of the service and the relatively narow circle of Hungarian users, this data transmission solution will satisfy primarily special (high-speed electronic data-

exchange, credit card verification, reservation systems, disaster recovery) and not mass requirements in the Hungarian telecommunication.

The *Internet telephony* is emphasizable among the competitors of conventional telecommunication, which gives the 20–35% of the total return, according the report of NHH (National Communication Institution), which decisively develops by the help of the use of fixed-line services. At the same time the rate of VoIP calls exceeded 0.15% only in 2004,[18] which means a significant backwardness compared with West-Europe. Although the UPC already started the VoIP service on the cable-network (that time they obtained 20,000 subscribers). Among the competitors the T-Kábel started the service in June 2005, while the FiberNet realised the start of test operation in August 2005. Given the knowledge that 54% of the national households are connected to a sort of cable-TV network (more than half of them belong to one of the above 3 service companies), the VoIP telecommunication may be a real competitor of the conventional fixed-lines.

1.4 The Development of CableTV Networks

One of the possible technical solution of the access of information society's services is the cable networks' utilization for duplex broadband data transmission. Although in Hungary more than the half of the households connected to one of the service companies'network (*Figure 4*), at the end of 2005 only a minority of them was suitable for duplex data transmission in spite of the fact, that the obligation of the completion of required investments was stated by law.[19] A certain group of service providers was not able to finance it with its low capital value and return, thus the completion of the needed works may be delayed for years. The cable TV market of Hungary is oligopoly-like with three major companies (UPC, which is the service provider of Monor telecommunication zone too, T-Kábel, the affiliated firm specialized to the cable-network services of the largest fix phone provider and FiberNet).

Until the millenium the quantitative increase of the network was the most important aim of the service companies, firstly decisively by means of buildings, later by acquisitions. As a secondary aim, the locking in the headway of the other big service providers was in the forefront of the strategy as a result to fit, the number of providable households was limited, which (and the legal dispute moving in parallel with it) held back the spread of UPC. In 2004 the increase of the limit of the fixed supply highlighted again both the widening of the existing network capacity in the supplied settlements and the spread at the expense of the

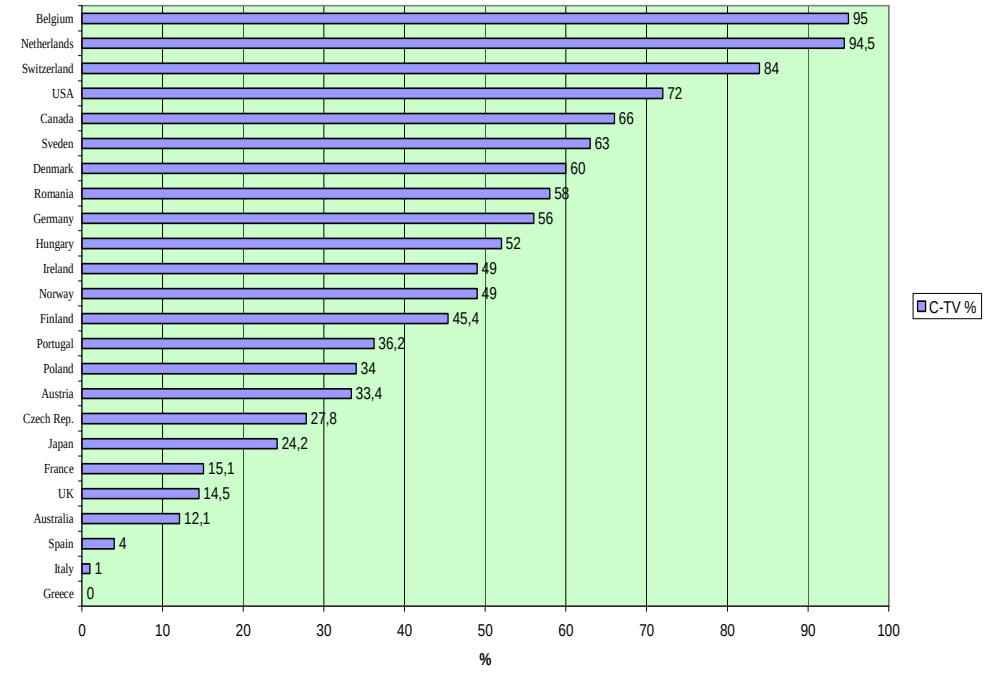
[18]We have no more recent data of this area!

[19]The CableTV network owners had to rearrange the connection configuration of the cables to make them fit for duplex broadband data transmission not later than the end of 2003.

independent small service providers. Legally the big service providers and the actors, which operating medium-sized networks (in small towns), started the modernization of networks (establishment of a 'point-multipoint configuration', opening up the technical possibility of duplex data transmission), in which the UPC Monor district, and its developments were the guiders. At the end of 2003 according to the estimate theoretically the two-thirds of network capacity might become suitable for data communication, which value had increased to 70–75% at the end of 2005. In reality the Internet service started only on its smaller section, where the solvent demand justified it. The number of subscribers showed a sudden increase (18,000) compared with the end of 2001,[20] and it means about a quarter of households supplied with Internet via cable TV.

Figure 4

Share of Cable-TV connected households by countries, 2002



Source: EUROSTAT, 2005.

[20]32,000 in 2002, 77,000 in 2003, 136,000 in 2004, 212,000 in 2005, 375,000 in 2006 and 558,000 in 2007. The share of supplied clients grew up from 5% (2001) to 30% in the whole mass of Internet users, mainly because of the prices of combined (cable TV and Internet) packages.

In this category there are strong reserves in the field of the increase of the number of subscribers. Hungary is in a relatively favourable situation considering the state of supply of cable TV (KTV) compared with the OECD countries and Europe. Slightly more than the half of the housing stock has connection with the network of approximately 400 service companies. As the result of the reduction of the preceding market delimitation[21] three conventionally and one specially situated service companies[22] (UPC, T-Kábel, FiberNet and Antenna Mikro) cover the half of the market.

We have information about the state of supply since 1994, from which the 1997–2005 years seem more or less reliable and at least roughly comparable. It is a result of the fact, that the service circle, which is obligated to supply data for the KSH changes annually (sometimes with significant differences), sometimes they return only partly filled data sheets, which provides free scope for estimate.[23] Entirely it is true that the number of connected households increased to more than the one-and-half-fold since 1997. The increment – namely the quantitative spread of networks – terminated approximately in the millenium. From that time the task of service companies was the increase of network intelligence, the establishment of 'point-multipoint configuration' and the creation of technical background of duplex data transmission.

The characteristic feature of county-sowed information of KSH is that the consecutive years are restrictedly comparable because the circle of service companies obligated to report was changing by one-two-year periods. But the information was suitable for the appraisal of the rate of supply compared one with the other.

In the counties of Dél-Alföld the rate of households connected to network falls behind the national average at the end of 2006 (*Table 5*). Csongrád moved in the level of national index (204 connected households per 1000 inhabitants, while the national average is 201), although here the slack development rate observable between 1997–2003 resulted the loose of former favourable position. In Békés the

[21] While proceedingly the one-sixth of the market could be covered by on provider without the affront of the market competition, according to the 2004 regulation the limit was one-third of the market. The determination of the potential market got affirmation, the whole housing stock have been included to the calculation, not just the covered settlements. In the light of this, while the growth of UPC had to be stopped artifically before 2003, because the number of subscribers nearing 700,000 got unsafely close to the one-sixth limit, now the limitation went up to 1.4 million households. The Hungarian Government, forced by the EU Commission, obliged to cancel any limits of market share of companies in this area before 2010.

[22] Although the Antenna-Mikro does not supply through classical cable-network, the nature of its activity may be connectable with this service.

[23] The uncertainty is signed by the fact that in several counties (Zala, Fejér, Szabolcs-Szatmár-Bereg) the penetration indicators of 1995 are higher than the similar indicator of 2005, in case of Baranya, Borsod-Abaúj-Zemplén and Heves the rate of supply of 2000 is the highest measured value, in case of Győr-Moson-Sopron it is the indicator of 2002.

rate of coverage falls behind with 20% of the national level, but the rate of growth was much quicker, thus the rate of backwardness significantly decreased. The gap between the local and national level similarly shrinked in case of Bács-Kiskun, so the relative rate of supply of the county could increase from 40% to 82% of the national level. The penetration rate of Csongrád county is comparable with the rate of supply of Fejér, Somogy and Tolna, the coverage of Békés and Bács-Kiskun corresponded to the rate of supply of Hajdú-Bihar, Pest and Nógrád, and bit higher than the index of Jász-Nagykun-Szolnok. The rate of increase in the last decade in Csongrád and Bács-Kiskun seemed quite hard, instead of the unfavourable characteristics of settlement network (e.g. the high rate of people living in lonely farmsteads, 'tanya').

Table 5

Number of Cable-TV connected households per 1000 persons in the region

Year	Bács-Kiskun	Békés	Csongrád	Dél-Alföld	Hungary
1995	48	117	150		163
1996	31	107	127		127
1997	47	76	136		110
1998	103	95	143		129
1999	105	98	162		152
2000	105	109	178		161
2001	107	115	160		158
2002	106	128	176		172
2003	109	140	182		188
2004	146	149	184	159	195
2005	166	159	204	176	201
2006	162	178	208	181	210

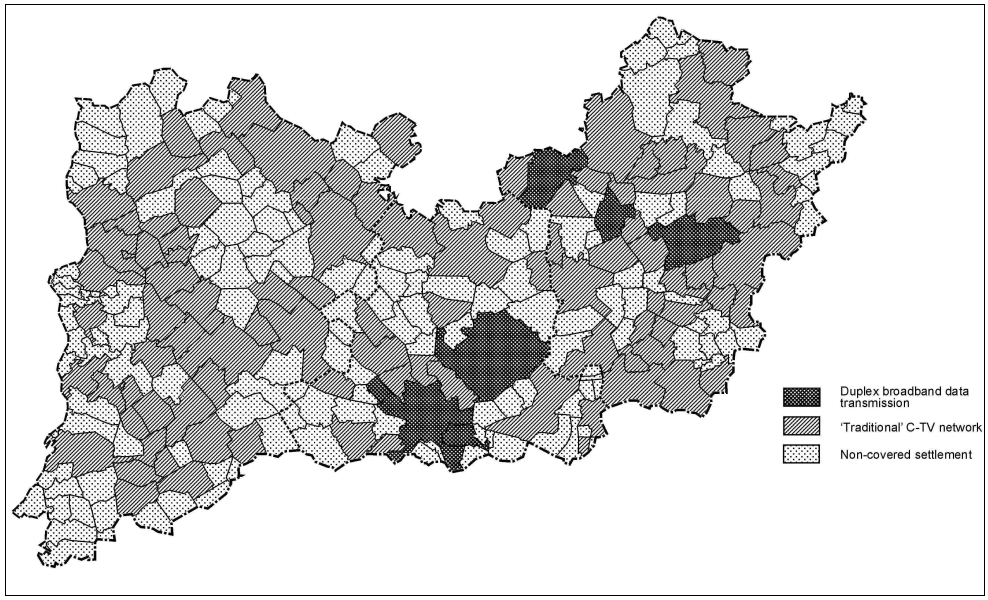
Source: KSH, Regional Statistical Yearbooks.

At the end of 2003 the CTV system operates in 1050 settlements in Hungary, and 102 in Dél-Alföld, which means that while nationally more than two-thirds of settlements were waiting for the network establishment, in Dél-Alföld it was less than 60% (*Figure 5*). This is an expressive information in the light of the fact that in 2001 they still registered 70% (nationally) and 68% (regionally) rates. By the end of 2005 10 newly connected settlements got CTV network in the region, so the share of non-supplied settlements decreased 54%. Thus in the region the number of supplied settlements increased spectacularly, in Bács-Kiskun with the biggest scale (17 new), while in Békés and Csongrád the increase of coverage was more moderate (5 and 8 new). Among the counties the coverage of Békés is the strongest, since there almost 55% of whole settlement stock is already in

possession of established system, the rate just the same in Bács-Kiskun and in Csongrád (42–43%). While in 2000 in Csongrád 5 (Szeged, Hódmezővásárhely, Zsombó, Deszk, Sándorfalva), in Békés 3 (Békéscsaba, Kondoros, Szarvas) systems were already in possession of CTV network[24] which were suitable for Internet transmission, in Bács-Kiskun this type of network did not existed at that time, even after two years.

Figure 5

Cable-TV local networks in Dél-Alföld (2003)



Source: Edited by the authors.

The micro-regional[25] rate of supply showed much larger scattering: in Kunszentmiklós micro-region there are 8, in Békéscsaba micro-region (shaped by Békéscsaba and four small nearby villages) 371 connected households per 1000 inhabitants, besides this only one index-number was registrated above 250 in case of Szeged (288), while under 50 in Kiskunhalas (15), Orosháza (25) and Mórahalom (46) micro-regions at the end of 2003. There are unbroken unprovided blocks in Kiskőrös region, the east-part of Bácska, on the eastern boarder of Homokhát, ont he border of Békés and Csongrád counties, int he two micro-districts of South-Békés and ont he north-east border of the county. By the end of 2005 significant

[24]In Csongrád county 53% of total population lived in that settlements, in Békés appr. 22%.
[25]Hungarian micro-regions means the LAU1 (former NUTS4) level of public administration and basic actors of regional policy.

changes had been gone in the spatial structure. The rate of connected households increased, and the group of highly active micro-regions widened. Békéscsaba, Szeged, Gyula and Kiskunhalas were far above the national average, Szarvas and Hódmezővásárhely were over the countryside average. Kunszentmiklós and Mórahalom were in the most unfavourable position, but the large uncovered areas, we could see two years before were broken with newly connected 'isles'. There were 10 of 25 micro-regions where at least two-third of settlements had been 'cabled' and only 3 remains under one-forth CTV network by the end of 2005.

Nationally more than half of the CTV-internet market was covered by UPC, the 10% by Fibernet, 15% by T-Kábel. At the end of 2006 UPC had appr. 200,000 subscribers, 65,000 of them joined via T-Kábel networks and 40,000 via Fibernet. The other two larger companies (EMKTV and PR-Telekom) covered 15–18,000 clients. These five major companies covered about 90% of total CTV-internet market at that moment. The business plans of companies forcast a high rate of increase in the number of subscribers for 2007. Although exact data are not available about the development of the number of CTV-internet subscribers within the region, some surveys suggest, that in the larger centres there is an increasing popularity of this kind of service.

1.5 The State of the Informatics Market

We can draw an overall picture suitable for national comparison about the public market segment according to the surveys of KSH. Relying upon these findings there was PC in 41.6% of the households in Dél-Alföld, while the national average was 47.1% at the end of 2006 (*Table 6*).[26] The difference among regions decreased significantly between 2003–2006, in the best equipped region the penetration was 54%, and in the worst 40%. The Northwest regions had a moderate advantage comparing to the Eastern regions, but the difference quite lower than the inequalities in economic indicators, or incomes. The laptops, notebooks, palmtops covered 11% of households in Hungary and 6.2% in Dél-Alföld. This types of ICTs are rather expensive and the advantage comes from the mobility did not count enough in the region. The major problem was, that PCs with Internet connection covered only one-tenth of households, while the national average was 50% higher in 2005 (*Table 7*).

The rate of Internet connected households in Dél-Alföld was over 27% in 2006, thanks to the national program Sulinet and Sulinet Plus not far from the national average, and the favourable Northwestern regions (*Table 7*). The broadband

[26]Although the Sulinet programme (a government organised project for stimulating home PC and home Internet use) generated substantial change in case of rate of supply of PC, given the knowledge of partial data, it can be affirmed that the backwardness of the region barely lessened.

network was suitable only for 15.5% of the households, while the national index counts 22%, just like the leading countryside regions in Hungary (*Table 8*).[27]

Table 6

Number of PCs per 100 households by regions

Region	1993	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Közép-Magyarország*	4	5	12	11	12	13	17	21	29	37	46	46	54.4
Budapest	13	11	14	13	15	16	20	26	33	37	49	51	
Közép-Dunántúl	5	7	7	9	10	15	22	23	25	34	33	39	49.4
Nyugat-Dunántúl	8	5	9	11	11	14	15	14	19	31	33	35	49.2
Dél-Dunántúl	6	7	6	8	7	9	10	16	18	26	27	33	46.2
Észak-Magyarország	5	5	5	6	7	10	12	18	17	25	29	29	39.8
Észak-Alföld	4	4	7	7	7	10	12	15	19	27	32	34	41.1
Dél-Alföld	3	3	5	6	6	8	10	10	13	20	22	26	41.6
Hungary	7	6	8	9	9	11	14	17	21	30	35	36	47.1

*In 1993 and 1995 Pest county only.
Source: KSH, Regional Statistical Yearbooks.

Table 7

Number of PCs with Internet connection per 100 households by regions

Region	2001	2002	2003	2004	2005	2006
Közép-Magyarország*	8			22	24	42.3
Budapest	11			23	27	
Közép-Dunántúl	5			12	16	32.1
Nyugat-Dunántúl	3			10	13	32.2
Dél-Dunántúl	5			11	12	28.9
Észak-Magyarország	4			8	9	24.9
Észak-Alföld	5			10	11	25.4
Dél-Alföld	2			7	9	27.1
Hungary	5	6	11	14	15	32.3

*The data includes the capital city, Budapest.
Source: KSH, Regional Statistical Yearbooks.

[27]Budapest and Pest county (forming the Central Hungary Region) had much higher penetration rates in every examined dimension (e.g. the share of laptops count 17%, the Internet-connected households share over 42%, and broadband networks covered one-third of flats).

Table 8

USE of ICTs in Hungarian households, 2006 (%)

Region	Mobile phone user	Notebook, Palmtop user	Broadband internet user	PC-users	Internet-user	Buying via Internet
Közép-Magyarország*	86.8	17.0	31.8	69.4	59.6	12.0
Közép-Dunántúl	87.0	9.3	22.5	59.5	47.4	6.8
Nyugat-Dunántúl	78.7	10.0	22.2	59.0	49.4	7.6
Dél-Dunántúl	86.0	10.0	18.3	56.1	47.3	9.1
Észak-Magyarország	81.9	7.0	15.6	52.0	39.7	5.8
Észak-Alföld	81.2	9.1	15.6	54.2	41.0	5.7
Dél-Alföld	85.3	6.2	15.5	53.7	42.4	6.2
Hungary	84.4	9.2	22.0	59.5	48.5	8.2

*The data includes the capital city, Budapest.
Source: A magyarországi háztartások…, 2006. KSH.

In spite of this, the *expenses of informatical and communicational purpose* of the households of Dél-Alföld did not fall behind the regional average, while prior to that (before 1998) the gulf prove much deeper.[28] Although the annual spent amount falls behind (with 13%) the Közép-Dunántúl region's similar data, in the examined period it occurred in more years (1998–2000, 2003) that Dél-Alföld got in the center of the field according to its placing. It is to be remarked that the differences among the five other regions are minimal, a kind of process of levelling off is typical of them (*Table 9*).

In case of the *central public administration*, significant disparities appear in more dimensions between the equipment and the use of means of the self-governing and administrative spheres.[29] Between 1998 and 2005 the computer stock increased to its three-folds in the sphere, but barely the 35% of 224,000 computers are concentrated in the self-governments. The renewal of computer stock is continuous, under the present rate of exchange the computers of the self-government would go through a complete change within 6–7 years. But it is reflecting that there are scarcely 3000 servers for 3168 self-governments (2000 in the year of 2003), the number of workstations not used for server purposes is barely 200. It strongly restrains the process of the optimal establishment of internal networks (*Table 10*).

[28]Between 1998–2005 appr. 80-90% of the national average were spent on similar purposes by the households of Dél-Alföld. The data of the capital city consecutively exceeded the national average, thus the situation of Dél-Alföld was relatively good in the regional comparison.
[29]Because the structure of the database, in some cases we have no information after 2003.

Table 9

Annual communication expenditures by regions (in HUF)

Region	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Közép-Magyarország	1,879	8,042	11,727	16,222	20,612	25,784	30,917	36,134	44,774	52,894	56,100	62,021
Budapest	3,727	9,477	13,198	18,033	23,222	29,485	34,276	41,036	50,893	59,619	65,400	
Közép-Dunántúl	1,323	4,329	8,722	12,305	15,771	18,575	22,890	26,077	33,217	38,570	42,000	47,973
Nyugat-Dunántúl	1,847	5,553	7,988	10,560	14,222	18,240	20,668	25,280	32,864	34,836	37,200	44,858
Dél-Dunántúl	2,142	5,405	7,584	9,524	13,646	16,026	20,612	21,536	30,441	31,517	36,100	42,340
Észak-Magyarország	2,252	4,823	7,543	8,883	12,620	14,992	20,434	22,483	26,904	29,945	33,400	39,423
Észak-Alföld	1,301	4,606	5,983	8,498	12,428	14,930	19,839	22,851	28,966	29,844	34,100	39,818
Dél-Alföld	1,560	3,904	6,261	9,528	14,097	16,204	19,228	21,315	31,003	31,661	36,400	42,310
Hungary (average)	2,107	5,654	8,495	11,587	15,649	19,007	23,425	26,776	34,383	38,166	41,900	48,049

Source: KSH, Regional Statistical Yearbooks.

Table 10

Computer stock of administration (1998–2005)

Year	PC	Med. capac.	Large capacity	Together	Newly bought	Server PC	Non-server Workstation	Server WS + Large capac.	Palmtop
1998	72,639	2,287	149	75,075	15,522				
1999	90,705	2,314	287	93,306	20,681				
2000	101,461			111,150	23,674	3,595	5,471	623	
2001	116,318			125,573	23,379	4,114	4,361	780	
2002	136,882			148,539	29,504	3,484	6,159	2,014	
2003	170,304			183,106	28,611	8,782	2,026	1,994	
Central admin.	119,856			130,355	19,120	7,098	1,716	1,685	
Local authority	50,448			52,751	9,491	1,684	310	309	
2005	211,512			223,514	31,038	5,604	1,277	3,677	1,444
Central admin.	137,319			145,931	19,443	3,427	1,079	2,857	1,249
Local author.	74,193			77,583	11,595	2,177	198	820	195

Source: A közigazgatás informatikai eszközei és információs tevékenysége, 2003 and 2005, KSH.

The rates of PC-use are a bit more favourable, at the end of 2005 there was no computer only in the 1.6% of governments (it was 6% in 2003). The Internet access was not yet general, there was not this type of connection in case of over 200 self-governments (600 in 2003). Intranet or Extranet appear sporadically, but the 91.5% of them enjoyed the benefits of e-mail (75% in 2003). Scarcely the two-third of self-governments the employees were in possession of an own computer (50% in 2003) (*Table 11*). In case of the administrative sphere among the developments requiring large investment, the establishment of Intranets was almost finished at the end of 2003, what is more, Extranet network operated in every ninth institution. Here the 70% of employees could work on his/her own computer.

Table 11

Use of ICTs and services in administration (2003, 2005)

		Year	PC	Intranet	Extranet	Internet	e-mail	Open code software
Central admin.	Institution	2003	100.0	85.8	11.5	100.0	99.5	
		2005	100.0	86.1	15.8	100.0	100.0	46.6
	employee	2003	70.2	59.5		33.8		
		2005	82.8	69.7		44.9		
Local author.	Institution	2003	94.0	6.8	0.7	81.2	76.8	
		2005	98.4	8.6	1.8	93.1	91.5	16.7
	employee	2003	51.8	18.4		34.7		
		2005	65.0	29.0		49.1		

Source: A közigazgatás informatikai eszközei és információs tevékenysége, 2003 and 2005, KSH.

The use of security tools became more common between 2003 and 2005. The most popular forms were, firewalls and anti-virus programs. The higher levels of e-security (security servers, data backup process in certain terms, encryption and use of e-signature) became more common in national level institutions, but in local level administration they are rarely used (*Table 12*).

Sharp disparities developed among the types of Internet connections, too (*Table 13*). While at the end of 2003 the most of the self-governments preferred the modem and ISDN connection providing low bandwidth, and the joint rate of broadband connections scarcely reached the one-eigth of all the self-governments, in the public administration the joint share of them exceeded 28%, moreover, the share of the outstandingly reliable leased line connections alone was present in the two-thirds of the institutional circle.[30] By the end of 2005 the broadband

[30]Some institutions connected the Internet in more than one ways, that's why the overall values exceeded 100%.

connection types (xDSL, CTV, leased line) gave the majority of Internet connections in self-governments (51.5%) and the share of modem-users decreased under 20%. A relatively new phenomena was the increasing use of wireless and GPRS connections (22.1% together) and the moderating role of ISDN-channels (27.3%). A smaller group of self governments had at least two types of Internet connections, the larger towns used 3–4 rival technologies in parallel.

Table 12

Use of security tools in administration (2003, 2005)

		Year	Sec. server	Firewall	Encryp-tion	Data backup	e-signa-ture	Anti-virus program
Central admin.	Institution	2003	74.0	76.8	26.3	91.8	13.5	97.0
		2005	83.9	88.6	36.2	95.4	27.8	98.6
Local author.	Institution	2003	19.3	28.4	5.0	29.0	4.4	75.5
		2005	25.5	62.6	7.5	30.8	4.8	89.9

Source: A közigazgatás informatikai eszközei és információs tevékenysége, 2003 and 2005, KSH.

Table 13

Types of Internet connections (2003, 2005)

		Year	Modem	ISDN	xDSL	Cable	Leased line	Wireless	LAN	GPRS	Other
Central admin.	Institution	2003	18.5	22.8	21.3	6.8	65.8				25.5
		2005	14.7	17.4	27.0	7.9	55.9	11.2	31.3	7.9	6.8
Local author.	Institution	2003	37.4	61.1	8.7	4.1	4.2				5.2
		2005	19.8	27.3	38.2	9.5	3.8	15.2	6.1	6.9	1.5

Source: A közigazgatás informatikai eszközei és információs tevékenysége, 2003 and 2005, KSH.

While the annual gross amount of the investments of informatics was almost the same in the two spheres in 2003, two years later the rate of self-governments grew up to 70% in total ICT investments (*Table 14*). In case of the amount converted to the operation of the instrumental-stock and the networks 1:3.5 rate evolved to the sphere of self-government's disadvantage. Partly it can be attributed to the fact that at the end of 2005 gulf-like disparity developed between the two spheres in the field of the use of safety devices. Inside the Dél-Alföld region, the ICT investments show a harmonic structure, very close to the county's share in population, or active workers (*Table 15*).

While the *rate of the employees* working with computer in self-governments nationally increased from 61 to 70% between 1998 and 2003, in Dél-Alföld it

increased from 51.4% to 62.7%, namely at a significantly quicker pace than the national average (*Table 16*). The lowest rate was signed in Békés county (56.3%), although the pace of increase was the quickest there (almost 17%). Because of the slower changing rate of Bács-Kiskun (almost 8%) it reached only 57.4% in 2003, while in case of Csongrád more then the four-fifths of employees were regular PC user during daily work. Only a fragment of the annual investment amount of informatics get to the provinces, thus it is practical to give the share of the region comparing to this, in addition that its rate of the regional population is approximately 16%. Regarding the whole period we can see that the region got a share from the development sources parallel with the rate of population, with smaller fluctations. Within the region, suited to the population Bács-Kiskun appropriated a bit more, while Csongrád a bit less means to informatical development.

Table 14

ICT Investments and Expenditures (2003, 2005)

		Year	Invest.	Expend.	Computer services	Commu-nication services	Internet services
Central admin.	Institution	2003	104,258	24,242	4,636	17,979	1,627
		2005	68,422	26,261	15,760	9,041	1,460
Local author.	Institution	2003	108,901	7,344	1,116	5,374	854
		2005	171,539	10,816	2,903	6,746	1,167

Source: A közigazgatás informatikai eszközei és információs tevékenysége, 2003 and 2005, KSH.

Table 15

Regional data of informatics in administration (1998–2002)
ICT investment (M HUF)

Year	Hungary	Countryside	Dél-Alföld	Bács-Kiskun	Békés	Csongrád
1998	15,929	3,617.3	625.5	346	137	169.4
1999	26,499	3,802.7	769.4	262.1	251.8	255.5
2000	31,322	3,739	502	197	161	144
2001	49,158	4,881	723	266	266	191
2002	66,072	4,552	729	294	211	224

Source: A közigazgatás informatikai eszközei és információs tevékenysége, 2003 and 2005, KSH.

Table 16

Share of employees working with PC (%)

Year	Hungary	Dél-Alföld	Bács-Kiskun	Békés	Csongrád
1998	61.13	51.33	49.64	39.59	68.83
1999	65.16	56.46	53.65	48.50	71.09
2000	61.01	58.77	59.77	46.19	73.43
2001	64.01	60.66	54.71	54.47	78.76
2002	70.17	62.67	57.38	56.34	80.03

Source: A közigazgatás informatikai eszközei és információs tevékenysége, 2003 and 2005, KSH.

The characteristics of the *ICTs use of the entrepreneurial sphere* can be examined in three profiles (*Table 17*). Between 2001 and 2005 the rate of *use of computers* increased from 73 to 90% nationally, without a large-scale difference among counties. Budapest's preferable position which was clear at the beginning of the period, was eliminated. Neither of the counties could reach the national average, the highest rate evolved in Jász-Nagykun-Szolnok county. Around 89% of companies of Bács-Kiskun, Csongrád and Békés were using computers at the end of 2005. The difference between the strongest and the weakest counties is less than 3%, which shows the spatial equalization and the entering to a mature period of enterprise spread of computers. The fact, that while the penetration increased with 10% in the national average between 2001 and 2002, the growth was less than 7% between 2002 and 2005, denote this phenomenon.

The rate of *Internet connection* was in the period of quick, steady increase in the course of the above term. As a result of the yearly 9% increase level between 2001–2004, the 78% of the companies of the country were in possesion of a sort of network access at the end of the period. The national average was drawn up by the capital till 2004, when the growth of penetration rate of Budapest was slowed down, however the counties growing potential became much higher in 2005. That of the average and the capital city rate of supply in the case of the preceding one the differences were much larger (12% in 2003 and 8% in 2004), than in 2005 (1.5%) which means that in case of the Internet access 2005 was the year of moderating spatial inequalities.. The rate of the county in the most favourable situation (Komárom-Esztergom) was over the national average by only 2%, while the rearguard Békés falls behind the most developed county by circa 5%. Here the backwardness of the region has already been manifest, since besides the unfavourable situation of Békés, Csongrád was in the 10–12th position, Bács-Kiskun was the 16th in the gradiation although their backwardness behind Komárom-Esztergom was only 2.6 and 3.3%, when the annual penetration growth rate was almost 5%. It also indicates that the differences among the counties are

Table 17

Main characteristics of ICT use in enterprises 2001–2005 (%)

County	PC use					Internet use					Own webpage				
	2001	2002	2003	2004	2005	2001	2002	2003	2004	2005	2001	2002	2003	2004	2005
Budapest	82.40	85.9	90.1	91.3	90.1	63.61	70.8	78.8	84.1	79.5	20.29	35.8	42.4	54.3	50.9
Pest	65.81	80.4	84.0	86.9	89.0	45.03	54.7	63.4	73.3	78.2	9.15	18.2	23.6	34.5	37.6
Fejér	69.35	82.3	83.2	87.3	89.4	44.99	55.3	62.4	73.4	78.0	9.24	17.8	23.7	32.3	36.5
Komárom-Esztergom	71.23	85.6	84.8	90.1	90.7	45.69	58.0	64.3	76.6	80.2	8.26	18.6	24.9	34.5	37.9
Veszprém	71.03	80.0	83.3	87.8	89.0	39.28	52.9	62.4	74.5	77.6	7.20	17.2	24.6	34.7	36.3
Győr-Moson-Sopron	70.38	81.2	83.8	87.4	88.9	44.45	54.4	63.3	73.8	77.6	9.40	17.9	24.7	33.3	36.3
Vas	70.27	81.3	83.4	87.3	89.3	41.54	53.4	62.9	72.9	77.5	6.09	15.2	21.8	27.8	33.7
Zala	67.98	83.4	84.3	86.7	89.8	42.55	53.9	63.0	72.4	78.0	7.21	16.5	22.3	31.8	35.2
Baranya	69.58	82.3	84.1	86.8	89.2	43.46	53.1	63.1	72.4	77.5	7.55	16.3	23.2	31.8	36.0
Somogy	69.04	78.9	83.2	87.4	90.1	35.93	47.4	59.3	71.5	76.8	6.37	14.9	21.9	28.1	34.7
Tolna	69.34	83.0	83.8	87.9	88.7	37.87	49.3	61.6	73.3	77.5	5.77	10.2	20.0	26.0	32.1
Borsod-Abaúj-Zemplén	68.67	81.8	82.9	88.5	89.6	45.47	53.4	61.1	73.9	77.8	7.46	16.2	22.0	30.8	35.9
Heves	55.80	80.5	82.2	87.8	88.8	34.08	51.3	59.8	73.5	77.1	4.91	13.3	20.2	30.7	35.0
Nógrád	68.50	83.6	83.1	87.1	90.1	44.68	54.7	63.1	73.8	79.3	5.62	13.3	21.3	31.8	38.3
Hajdú-Bihar	68.71	82.3	84.4	87.7	88.7	43.35	51.2	61.0	72.5	76.5	6.99	15.3	21.2	30.9	33.4
Jász-Nagykun-Szolnok	71.16	81.1	85.1	88.1	89.2	45.06	51.2	63.0	72.1	77.2	6.51	14.1	19.9	29.6	32.6
Szabolcs-Szatmár-Bereg	69.72	80.6	83.4	88.3	88.4	42.87	49.3	59.1	71.6	76.6	5.90	13.1	19.4	27.5	32.9
Bács-Kiskun	68.23	82.5	84.5	86.7	89.3	44.32	52.6	61.9	72.3	76.9	6.52	16.6	22.2	31.0	33.8
Békés	66.24	80.5	82.4	85.3	89.2	39.06	50.4	58.6	68.5	74.9	5.60	11.5	18.1	25.1	29.8
Csongrád	70.15	80.8	83.6	87.7	88.8	43.61	53.7	62.6	72.8	77.6	7.87	17.4	24.1	32.4	35.5
HUNGARY	72.53	82.8	85.6	88.6	89.5	48.72	58.0	67.0	76.2	78.1	11.09	21.6	28.3	38.1	39.8

Source: Az információs és kommunikációs eszközök állománya és felhasználása a gazdálkodó szervezeteknél, 2001., 2003., 2005., KSH.

minimal, they might be reversible within one or two years by the application of aimed development politics.

The rate of *companies possessing private website* scarcely exceeded 11% in 2001, at the end of 2005 we could registrate already a value almost 40%. This segment has just entered a quick spreading period, which was moved by mostly the quick website building of the companies of Budapest between 2002–2005 (rate increased from 20.4 to 50.9%!), while during the 2003–2005 period the counties also closed up this rate of development (the total increase of rate of supply was nationally 18.2%, in the capital 15.1% in the later term). After this the difference between the development of the country and the capital is significant, in Budapest more than half of the companies had own website, while in the provinces even in the most advanced counties 37–38% had it. In this segment, among the counties of Dél-Alföld Csongrád is the 10th, Bács-Kiskun is the 16th, their backwardness behind the leader was 2.4 and 4.1%, which seems to be caught up regarding the annual tune of development. Regrettably, Békés county is rearguard in this field too, here scarcely 30% of the companies possess own website.

Although regarding the fact that the measure of backwardness comparing with the most advanced regions is less than two years, it is stateable that the situation of the companies of the county, what is more, the region is not bad. The rate of backwardness is less by orders of size than any other conventional economical indicator, and a regional economic development policy favourable for the information technologies could be created with far less instruments regarding the source-requirement.

2 Internet-use in the counties of Dél-Alföld

2.1 Internet subscribers

The Internet subscription market exceeded the 100,000 volume in the course of the second quarter of 2001, the 250,000 volume approximately in May 2001, in June 2003 the half million, at the end of 2004 the 750,000 volume, at the end of 2005 the one million and in June 2007 the 1,5 million barrier (*Table 18*). Two recoilings are demonstrable in the evolution of the number of subscriptions, one lasted from the end of 2000 to the autumn of 2001, the other from the autumn of 2003 to the autumn of 2004. In both case the influence of the government-level politics is demonstrable in the evolution of the number of the subscribtions. In the early period the modem connection form was determinant, now its rate decreased under 3%. The maximum number of modem connections was in September 2003 (363,000), now it is under 50,000. The ISDN connections, which volume increased with smaller fluctuations until the beginning of 2004, and it seemed a real

Table 18
Types and number of Internet subscriptions and annual revenue of the sector (in M HUF)

Year	Month	Type of internet connection								Revenue (M HUF)
		Modem	ISDN	xDSL	Cable-TV	Leased line	Wireless	Other	Together	
1999	March	94,805	974		344	632	33	48	96,836	
	June	102,296	888		399	661	33	7	104,284	
	Sept.	114,642	1,333		381	987	11	0	117,354	
	Dec.	133,672	1,693		486	1,151	12	0	137,014	n.d.
2000	March	156,450	2,668		1,546	1,473	11	39	162,187	
	June	172,316	8,686		1,674	1,696	11	37	184,420	
	Sept.	184,243	13,250		1,760	1,803	21	118	201,195	
	Dec.	201,713	20,838		5,414	1,994	22	128	230,109	5,933.7
2001	March	211,604	23,754		7,228	2,048	28	362	245,024	
	June	221,152	26,147		10,121	2,058	32	1,462	260,972	
	Sept.	225,522	25,484		12,745	2,271	35	2,319	268,376	
	Dec.	247,948	27,947		17,419	2,460	34	6,020	301,828	
	D	265,190	28,192		17,571	3,108		7,613	321,674	12,549.3
2002	March	283,837	30,462	12,999	20,512	3,258	38	5,391	356,459	
	June	290,947	36,783	16,912	25,276	3,562	38	10,738	384,218	
	Sept.	308,313	34,788	24,254	30,387	4,421	36	16,243	418,406	
	Dec.	327,480	34,549	32,054	31,190	4,487	36	16,103	445,863	21,028

Count. Table 18

Year	Month	Type of internet connection								Revenue (M HUF)
		Modem	ISDN	xDSL	Cable-TV	Leased line	Wireless	Other	Together	
2003	March	337,628	31,781	46,794	41,525	4,278	18,993	18,160	499,159	
	June	346,802	32,376	62,156	48,852	4,468	21,272	18,779	534,705	
	Sept.	*362,924*	37,670	84,124	67,207	4,791	21,032	18,084	595,832	
	Dec.	355,874	35,524	114,813	77,189	4,631	24,055	18,023	630,109	31,189.9
2004	March	320,732	*40,249*	143,923	89,580	5,602	29,577	10,312	639,975	
	June	303,866	36,569	166,003	99,587	5,641	30,272	10,290	652,228	
	Sept.	295,604	36,005	186,952	113,502	5,830	32,665	9,709	680,267	
	Dec.	284,376	36,118	235,969	135,803	4,384	73,960	10,105	780,716	45,346
2005	March	273,184	31,841	266,339	138,834	4,273	94,862	10,038	819,371	
	June	239,690	33,644	293,610	156,908	4,460	104,550	10,443	843,306	
	Sept.	222,990	30,266	327,748	179,633	3,968	116,660	12,442	893,707	
	Dec.	210,662	30,949	372,523	212,145	4,507	155,988	13,963	1,000,737	64,753
2006	March	197,501	29,235	436,132	256,800	4,705	166,553	14,911	1,105,837	
	June	160,751	15,602	450,395	308,431	4,594	199,505	15,365	1,154,643	
	Sept.	69,164	18,913	523,264	347,873	4,470	218,065	13,295	1,195,044	
	Dec.	70,969	14,909	597,331	374,647	4,749	251,774	15,246	1,329,625	85,468
2007	March	53,796	13,494	650,306	443,742	6,285	296,973	14,067	1,494,104	
	June	49,147	13,332	682,396	473,350	5,348	325,781	17,328	1,576,011	
	Sept.	65,683		709,945	511,384	7,827	376,259	19,308	1,690,403	
	Dec.	62,985		739,028	557,904	7,718	434,361	24,338	1,826,334	111,517

Source: Statistical quaterly review on Internet-sector, KSH.

alternative besides the modem connection for a short period (the maximum number of subscribers were over 40,000), they possessed a marginal share under 1% at June 2007 (just over 13.300 persons and companies). At present the xDSL and the cable connection possibilities mean the two real competing technologies, both of them are suitable for broadband data transmission. Basically the share of leased line is minimal (0.3%) because of the price calculation problems, the number of connections stagnating after 2004. The role of microwave connections is slowly improving, but it may become a real alternative only by the considerable growth of Wi-Fi access points. The wireless Internet use got an increasing role in Hungary, after the WAP, GPRS and EDGE technologies, but the real breakthrough will come after the establishment of 3G mobile-networks.

2.2 The spread of internet and broadband subscribers in Dél-Alföld region[31]

The rate of broadband subscribers was just over 10% of all internet subscribers in March 2002. This percent went up to 25% in the Autumn of 2003, 50% in the Summer 2005 and 75% in the Autumn of 2007. The penetration of subscription per 1000 inhabitants grew up from 3,5 to 131,8 between 2002 and 2007 in Hungary.

The regional (NUTS 2) data is available from the Summer of 2004. In that moment about 10% of all broadband subscribers were concentrated in the Dél-Alföld Region. This 25.000 clients involve a three-fourth penetration rate comparing the national average. In 2005-2006 period the region concentrate only 9.3% of all broadband subscribers, so the penetration rate fall down to 70%. The 2007 year was a period of convergence and rapid growth for the Dél-Alföld Region, so the number of subscribers almost doubled in one year (from 77,500 to 139,000) and the penetration rate comparing the national average grew up to 86%.

The county-level (NUTS 3), micro-regional (LAU 1) and settlement (LAU 2) data is available only in the last two years, so we have limited information to point out the major development trends in lower administrative levels.

However, among the counties in Dél-Alföld, Csongrád is in the most favourable position (*Table 19*). In 2006 the penetration rate was just under the national average (93%) and one year later this index grew up to 107% thanks to a very rapid growth in the number of subscribers (from 33,000 to 55,000). Csongrád is one of the most active counties in Hungary (4-5th in the rank of counties) in adopting this kind of new technologies. Bács-Kiskun had a time-lag in this adoption process. In 2006 the penetration rate was only 60% comparing the national average, but one year later the gay became thicker (84%). This rapid growth in the number of clients

[31]The basis of this data came from the National Communication Authority (NHH) and Central Statistical Office (KSH) of Hungary.

(from 27,000 to 53,000) resulted that the position of Bács-Kiskun in the rank of

Table 19

Types of internet subscriptions by counties, 2004–2006

County	2004				2005				2006				Subscr./100 inhab.		
	All	xDSL	C-TV	wireless	All	xDSL	C-TV	wireless	All	xDSL	C-TV	wireless	2004	2005	2006
Budapest	493,626	134,782	73,590	70,172	532,612	192,738	95,737	78,846	457,031	187,228	168,979	54,431	28.95	31.38	26.91
Pest	43,424	20,236	6,273	2,017	70,678	36,474	17,212	3,587	166,046	96,749	31,459	28,835	3.80	6.11	**14.11**
Fejér	15,794	7,504	2,042	526	29,724	12,453	2,851	9,679	43,746	26,869	4,964	9,202	3.68	6.94	10.20
Komárom-Eszt.	10,463	4,701	1,633	345	16,524	8,040	3,065	2,137	35,989	20,481	5,932	7,520	3.32	5.25	11.42
Veszprém	14,218	1,518	1,882	1,338	13,059	2,564	4,414	2,151	28,632	16,995	3,466	5,058	3.88	3.58	7.87
Győr-Moson-S.	23,486	9,351	4,807	70	35,965	15,340	8,085	4,831	53,301	29,820	12,508	6,751	**5.34**	**8.14**	12.04
Vas	9,298	2,958	2,044	3	14,111	4,981	3,730	2,013	20,912	10,565	5,762	2,705	3.51	5.34	7.94
Zala	14,242	4,495	3,508	943	22,929	8,096	6,610	4,023	35,785	14,966	10,131	7,,880	4.82	**7.79**	12.19
Baranya	22,048	6,453	6,077	2,422	24,676	13,598	1,772	4,535	44,954	21,800	3,958	16,718	**5.51**	6.19	11.29
Somogy	12,081	3,931	1,762	58	13,937	6,629	2,343	839	33,278	13,943	6,723	10,637	3.64	4.23	10.13
Tolna	8,675	4,400	387	3	12,067	7,443	790	805	16,354	11,396	408	3,130	3.54	4.97	6.79
Borsod-Abaúj-Z.	26,284	5,205	11,896	1,544	44,477	9,534	20,455	8,499	74,245	21,515	34,130	15,909	3.59	6.13	10.33
Heves	11,948	3,988	2,322	20	16,143	7,428	3,697	,425	30,065	15,447	6,389	6,439	3.70	5.03	9.41
Nógrád	6,494	935	216	1,808	12,725	2,529	328	6,787	17,789	5,798	1,989	8,511	3.00	5.92	8.35
Hajdú-Bihar	19,228	7,415	294	191	24,245	13,233	1,525	2,514	40,114	22,756	4,602	7,584	3.50	4.43	7.35
Jász-Nk.-Szolnok	12,725	4,028	3,118	832	20,729	7,959	6,399	2,638	38,725	19,278	11,057	6,107	3.10	5.09	9.59
Szabolcs-Sz.-B.	13,253	3,747	4,650	3	24,351	7,612	9,017	3,342	43,707	15,368	12,225	13,810	2.28	4.21	7.59
Bács-Kiskun	*15,359*	*8,486*	*936*	*23*	*31,412*	*12,328*	*9,737*	*3,902*	*53,542*	*24,202*	*15,236*	*11,836*	*2.84*	*5.84*	*9.98*
Békés	*10,978*	*914*	*3020*	*2,075*	*15,315*	*2,300*	*5,925*	*4,045*	*34,158*	*5,774*	*14,890*	*11,930*	*2.82*	*3.97*	*8.94*
Csongrád	*11,253*	*920*	*4,846*	*3,732*	*25,058*	*1,242*	*8,454*	*10,391*	*61,252*	*16,380*	*19,840*	*19,781*	*2.65*	*5.92*	***14.46***
HUNGARY	794,877	235,967	135,303	88,125	1,000,737	3,72,521	212,146	155,989	1,329,625	597,330	374,648	254,774	7.86	9.91	13.20
Broadband+mobile	57.80	29.69	17.02	11.09	74.01	37.22	21.20	15.59	92.26	44.92	28.18	19.16			

Source: Az internet előfizetések területi megoszlása, KSH, 2008.

counties improved. While the leading sector of development was higher and tertiary education, R&D sector, business services, regional and county-level institutions and manufacturing in Csongrád, the stimulations of growth came from the economy and institutions in Bács-Kiskun. Békés was almost in the worst position among Hungarian counties (2nd weakest activity rate) and the penetration rate in 2006 was only the half of the national average. The catching up period has begun in 2007 but the results were less impressive comparing Bács-Kiskun. The level of broadband subscribers grew up two-third of the national average, but the gap between the most active regions and Békés is wide.

The close up process we could describe in county level is more characteristic in micro-regional level, as well. In 2006 only the Szeged agglomeration zone's ac-

tivity level was over the national average (*Table 19*). There were four more micro-regions (around the other most important centres of the region) over 75% of the national average. In 2007 the picture changed dramatically, the majority of micro-regions (13 of 25) jump over the 75% level and there were four of them over the national average, with two more very close to it. On the other tip of the scale the indecees suggest the similar process. In 2006 almost the half of micro-regions were under the half of the national average in the level of broadband subscribers, and there were two of them under 25%. One year later only four of the remaining under the 50% level and the activity rate of the worst was 35% of the national average. The problem is, that in Békés county three small regions in the Southern and Northeastern parts forming larger zones of less active areas (*Table 20*). This under-development trend in this field merging a lot of 'traditional' economic, social and infrastructural index and deepen the peripherality of these regions.

The lowest level of data in broadband subscribers connected to settlements (LAU2 units). In this scale we will concentrate not the individual trends of certain villages, or towns, but the processes forming the spatial structure of the region in this field of activity. In 2006 there were only two active poles in the Dél-Alföld Region, one around the centre of the region Szeged and a smaller spatial concentration around Baja, along the river Danube, close to the Serbian border zone. There are lots of central settlements in the region with 15–110,000 inhabitants, but most of them were relatively passive in that moment, comparing to the rival towns of Hungary (*Figure 6*).

The data from 2007 showed a quite different picture thanks to the rapidly growing demand of the broadband internet access. The strengthening and spreading active zones around the larger centres, along the main roads and other axis of flows describe the major regional characteristic of Dél-Alföld Region (*Figure 7*). It seems, that this new phenomena does not create new spatial structure, instead of it fixing the 'traditional' inequalities. These active zones parcelled majority of the former passive zones. The level of activity of important centres of the region grew rapidly, the gap between them and the rivals inside Hungary almost eliminated.

Table 20

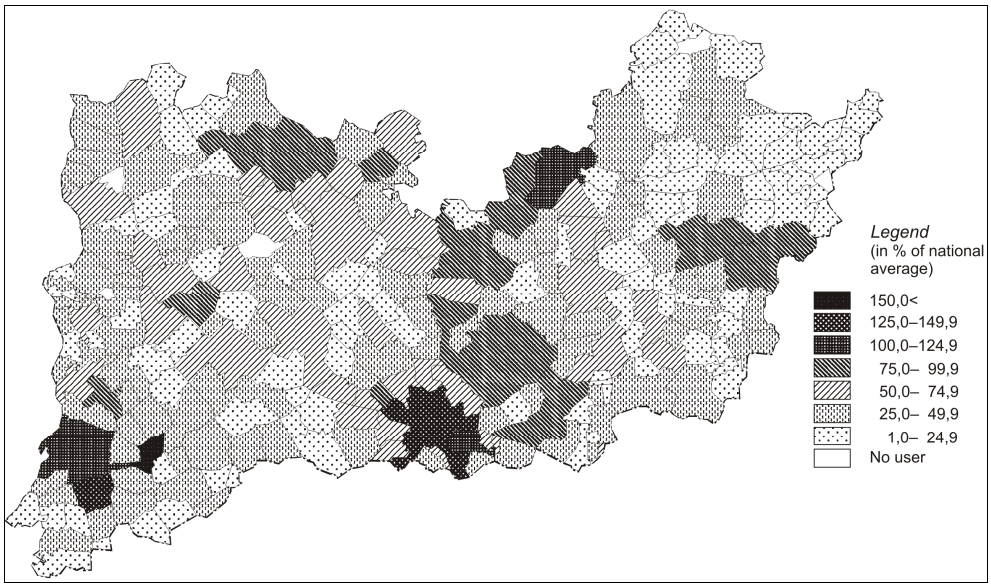
The number of broadband internet users in Dél-Alföld region, 2006, 2007

Name of LAU1 units	Subscr.	Popul.	Penetr. level	Subscr.	Popul.	Penetr. level	In % of national average	In % of national average
	2006			2007			2006	2007
Baja	5,270	76,906	69	9469	76,906	123	84.15	93.18
Bácsalmás	447	18,578	24	1064	18,578	57	29.27	43.18
Kalocsa	2,269	57,595	39	5060	57,656	88	47.56	66.67
Kecskemét	11,168	167,150	67	20240	167,150	121	81.71	91.67
Kiskőrös	2,379	58,956	40	4847	58,956	82	48.78	62.12
Kiskunfélegyháza	1,820	52,016	35	3671	52,042	71	42.68	53.79
Kiskunhalas	1,909	47,488	40	4451	47,488	94	48.78	71.21
Kiskunmajsa	659	17,261	38	1223	17,261	71	46.34	53.79
Kunszentmiklós	1,040	32,261	32	2211	32,289	68	39.02	51.52
Jánoshalma	406	17,885	23	1202	17,885	67	28.05	50.76
Bács-Kiskun county	*27,367*	*546,096*	*50*	*53438*	*546,211*	*98*	60.98	74.24
Békéscsaba	5,129	76,112	67	9241	76,112	121	81.71	91.67
Mezőkovácsháza	1,271	45,963	28	1818	45,946	40	34.15	30.30
Orosháza	2,660	63,874	42	4351	63,874	68	51.22	51.52
Sarkad	323	25,399	13	1132	25,393	45	15.85	34.09
Szarvas	2,296	31,921	72	3122	31,921	98	87.80	74.24
Szeghalom	709	43,310	16	1867	43,304	43	19.51	32.58
Békés	1,455	57,447	25	4304	57,447	75	30.49	56.82
Gyula	2,894	53,573	54	5163	53,573	96	65.85	72.73
Békés county	*16,737*	*397,599*	*42*	*30998*	*397,570*	*78*	51.22	59.09
Csongrád	1,293	25,225	51	2086	25,225	83	62.20	62.88
Hódmezővásárhely	3,941	60,669	65	6248	60,669	103	79.27	78.03
Kistelek	619	19,467	32	887	19,467	46	39.02	34.85
Makó	2,404	50,209	48	4310	50,209	86	58.54	65.15
Mórahalom	824	26,199	31	1674	26,199	64	37.80	48.48
Szeged	21,288	208,225	102	34464	208,225	166	124.39	125.76
Szentes	2,990	45,850	65	4917	45,850	107	79.27	81.06
Csongrád county	*33,359*	*435,844*	*77*	*54586*	*435,844*	*125*	93.90	94.70
DÉL-ALFÖLD	77,463	1,379,539	56	139022	1,37,9625	101	68.29	76.52

Source: NHH, 2007., 2008.

Figure 6

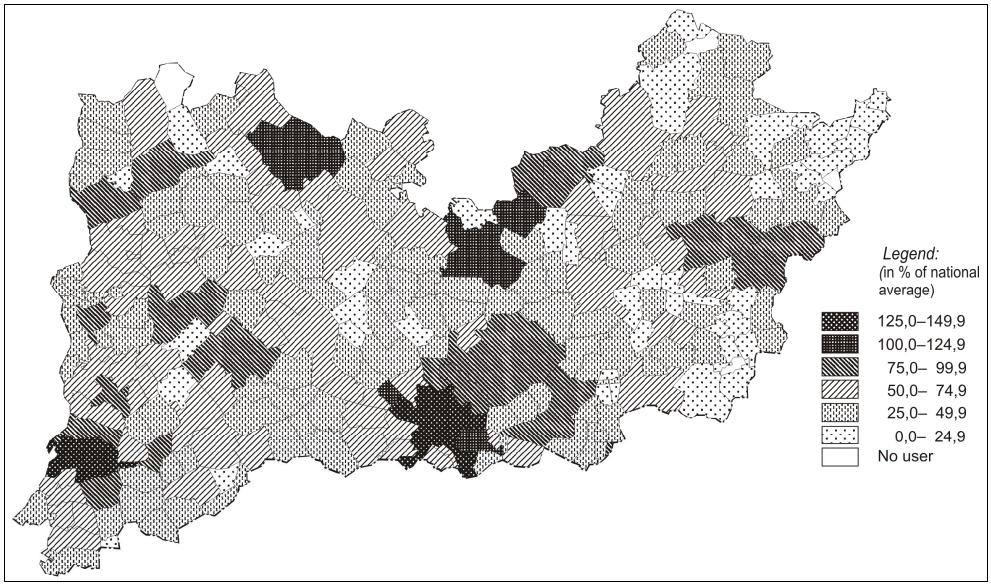
Broadband internet use by LAU2 units in Dél-Alföld (30/06/2006)



Source: Based on the data of NHH, 2007.

Figure 7

Broadband internet use by LAU2 units in Dél-Alföld (30/06/2007)



Source: Based on the data of NHH, 2008.

The special developmental characteristic of the region, the high importance of small 'market-towns' and large villages seems an advantage in this special innovation area, differing from other economic processes (e.g. attracting FDI, level of entrepreneurship, concentration of decision-making centres, global competitiveness). The other side of the same process is the emerging activity of smaller settlements. The growing number of broadband internet clients differ the formerly homogeneously passive villages not only in the vicinity of larger centres, but in the majority of the region. The number of subscribers emerged rapidly in the majority of villages, however that was not enough to jump up into a higher category in one year. Larger passive zones are remaining particularly in Békés county, which can be describe the periphery of the Dél-Alföld region.

The new, dynamically increasing segment of the market of computer technology is the wireless access, and the increase of bandwidth provided by them drive it forward. This service is available by the help of laptop, notebook, palmtop or 3G mobile phone equipped with the appropriate outlet. The big cities of the western world (New York, Paris, Amsterdam, Rome) got to the point in the development, that they establish the real outdoor linkage possibilities eg. in parks, picnic areas by the help of small aerials, within a radius of 300 m of them the data transmission becomes possible. Most of the towns handle the WiFi establishment as a strategic question, since the police, the fire brigade or perhaps the traffic department require the more effective connection to the network.

The spread of WiFi network has started in Hungary too, primarily concentrating on the capital city (hotels, coffee bars, shopping centres, Ferihegy Airport), basically providing indoor linkage possibility. In the larger countryside towns the initiation of Győr is known among the development conceptions, where the coverage of the town's walking street and the joint caterer places is at issue with the help of the establishment of outdoor aerials. In Dél-Alföld there are just a few similar initiations, but the coverage of frequented pedestrian zones in the cities, the establishment of networks of hotels, coffee bars and shopping centres probably will not keep us waiting for long time.

2.3 Tele-houses and public Internet connection possibilities in Dél-Alföld

The results of realising the Information Society, the practical applications (e-administration, telework, e-commerce) and the access of different information sources at this time does not belong to a narrow geographical area or a special social class, group. However, we can say that social accessibility towards ICTs, IT-related services in term of material, technological background, physically are differ. The reasons are depend on the differing technical level of society, the level of education (particularly the e-illiteracy), the cultural background, the financial possibilities.

In the certain development level of Hungary, as a whole, and Dél-Alföld region we could say, that technical, and technological barriers (e.g. missing info-communication networks, level of digitalisation, data-transmission possibilities) and the quality of informatics services does not mean a strong barrier to influent the possibility of Internet connections and to utilise the synergetic effect of Internet use.

The rate of connected actor emerging slowly in the region, because of the cultural background (particularly for elderly people), the level of education, the missing social programmes helping the adaptation of new technologies and applications, and with the larger influence, the financial conditions of local society. The limited demand comparing the well-developed regions, in parallel with the relative high prices of internet useage handicap the diffusion of home PCs. That's why the public internet connection possibilities (tele-houses, Internet-cafes, eHungary points) play a decisive role in accessing the global information sources. The role of these places does not confined to this activity area, they help to widen the digital literacy in the local society, they offer new types of e-content, improving the local activity and playing a quite important role in begin a lot of common initiatives and starting local movements (e.g. 'green' activities).

As an important factor of building information society, moderating the digital gap and forming the common life of local society the major part connects to tele-house movement in the last decade.[32] It seems true, however, the experts of this theme arguing the real social trends, the importance, the useability and effectivity of tele-houses.

The network of tele-houses began in 1994 and the diffusion was very fast, however the number of tele-houses under the forecast of the 'Tele-house Association'. Their prognostic: 800 tele-houses and 1200 tele-cottages[33] for the year 2003, while the real trend was just over 500 units. The reasons of the lower diffusion rate can be found in the governmental policy (very limited amount of money for supporting the existing elements), the dispute among experts about the social significance of the local units, the passivity of local society against the offered e-services. After a consolidation in 2007 the network counts 440 tele-houses existed, 274 of them offered high level e-services and 166 served on basic level.

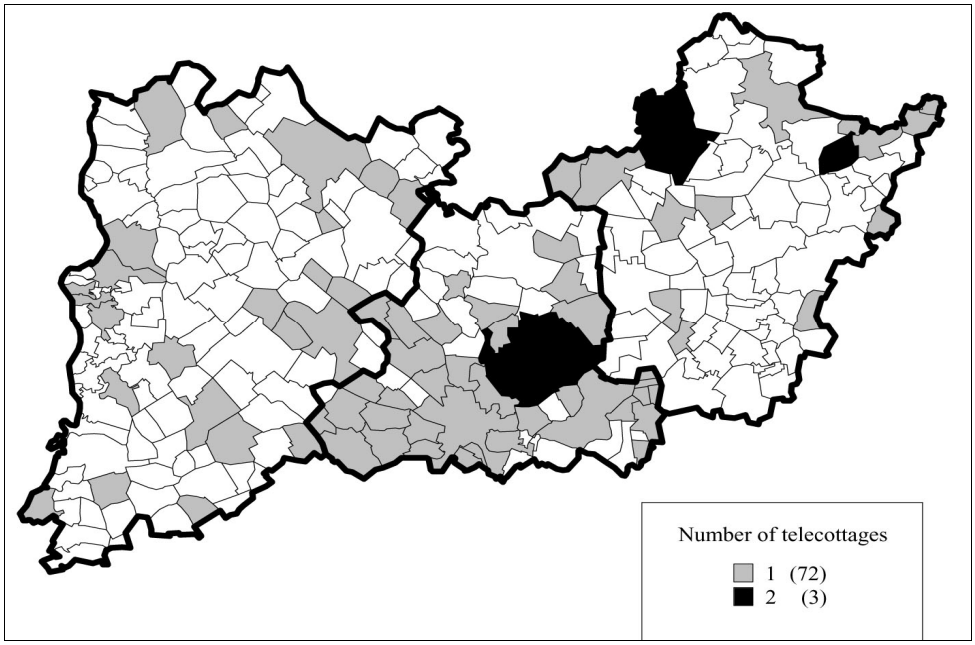
The Dél-Alföld region's self-governments, entrepreneurs and social organisations played an important role in strengthening the Hungarian tele-house network. At the end of 1990s there were only 4 existing tele-houses in the region, the number of units emerged to 15 in 2000, and 78 in 2005 (settled in 75 villages and towns) and offered different office and computer services for the local people

[32]The Sulinet program had a rather important role, as well, in the 2004–2006 years.
[33]A smaller unit working in one, or two rooms, with a few computers connected to a local institution (primary school, library, community centre, self-government etc.)

and entrepreneurs (*Figure 8*). In 2007 in the region 48 more developed units worked (15 in Bács-Kiskun, 10 in Békés and 23 in Csongrád) with the assistance of 17 smaller tele-cottages (5-5 in Bács-Kiskun and Békés, 7 in Csongrád).

Figure 8

The location of tele-houses in Dél-Alföld region



Source: The author's own compilation based on http://www.telehaz.hu (2005)

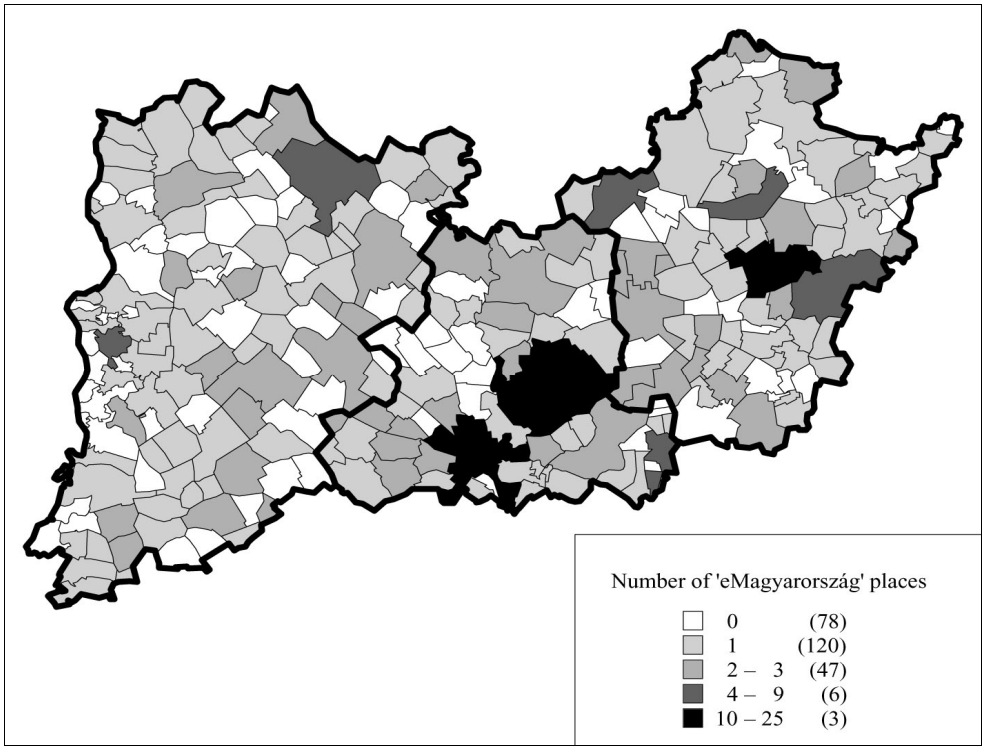
The importance of diffusion of tele-houses and eHungary points (there were 301 of them in 176 settlements in the region in 2005)[34] was rather high, but it was more essential that these units made possible to use modern IT-equipment, new e-contents and public services, which were the disadvantage areas of building up Information Society, with a serious digital gap lagging behind the more urbanised, well-developed regions and settlements. The major role of public Internet-access points are to moderate spatial and social inequalities, eliminate social inclusion in using the possibilities of Internet even in peripheral areas, and for the socially disadvantage people (social groups). These networks help to overcome the material

[34]In 2007 the network of eHungary points count 1364 units altogether and 248 in Dél-Alföld. This amount of such kind of public Internet access points is the highest among the regions, however the penetration rate 1,83 per 10,000 person is significantly lower comparing with Nyugat- and Dél-Dunántúl regions (2,11 and 2,24). In Bács-Kiskun there are 87 eHungary points, in Békés 79 and in Csongrád 82. However the index is 50% over the national average.

and cultural barriers, moderating the hazards of the challenges of newly forming 'Information Age'. The two parallel networks and their units (313 altogether) covered almost all settlements in the region (254 of them), particularly in Békés (94 units for 75 settlements) and Csongrád (112 units for 60 settlements), offering sometimes rival public access opportunities inside a village or a town (Figure 9).

Figure 9

The spatial spread of eHungary points



Source: The author's own compilation based on http://www.emagyarorszag.hu (2005)

Tele-houses and eHungary points play an active role in adapting new technologies adjusting new forms of services and benefit from the possibilities of Internet. We try to show some challenges and potential community answers:

- Fasting time, increasing uncertainty, emerging new technologies (The World became more difficult, more variable and more colourful in the last decades through a huge amount of new innovation in economy, technology, society. Understanding and adapting changes, finding the new ways in the 'jungle of information' make a major challenge for the small local communities.

- Information 'Big-Bang' (The amount of information growing exponentialy, the rate of relevant information decreasing, and the technique of 'information mining' become more difficult).
- Importance of digital literacy, diffusion of informatics in different fields of life (The emerging share of existing information is accessible only through digital form, via ICTs).

The crucial role of tele-houses and eHungary points in the process of adjustment to the challenges of emerging Information Society could be the orientation, publicity, preparation, stimulation and motivation, and particularly in the area of education. On the other side, these service centres could help the local communities with their technical-technological background, the personnel and institutional connections. In a later phase they can offer telework places stimulating the local employment. This tools are important in the management of the challenges under:

- Accessibility of digital equipment (possibility of employment, data and information collection, equal opportunity)
- Emerging connections between local and global economies (The small communities are prefer the development of local economy, but the globalisation and the challenge of competitiveness limited their possibilities in forming a local development policy. They are obliged to find a certain way of development: including special knowledge, technique, information base, relations, new forms of employment in some cases which are suitable for local pretensions).

Forming and stimulating local communities, mediating local values, culture could be highly important inside the role of tele-houses to eliminate the hazards of 'Information Age' influenced the local societies:

- Individualisation and alienation in parallel the emerging importance of neo-liberal ideology (the number of 'traditional' family and friendship-type connections decreasing, their importance diminishing).
- Weakening attach to locality (The number of 'traditional' social connections decreasing, the number of local workplaces diminishing, the social and spatial mobility level increasing).
- Value and identity crisis (The meeting of different cultures become more frequent and intensive, with positive and negative consequences in parallel (diversity vs. conflicts), conflict of civilisations after Huntington).

The major problems of tele-houses in Dél-Alföld region seems:

- Human resources – The majority of tele-houses employed only one expert, without a long-term contract. The subsidies from the central government help

them to create a new job, but hardly to maintain it. In a large group there are only part-time workers in the tele-house, which means a limited time for Internet-users. The employees' majority has no special education background, in some cases they were unable to provide the offered services in a high quality and the further training possibilities were limited.

- Financial background – Half of the tele-houses in the region produce deficit year by year, because of the limited budget. The applications could help them to survive, but means a large uncertainty for the units. The crucial question is how to emerge the revenues. To introduce new services seemed risky, because of the limited local demand.
- Equipment, technical development – The tele-houses of Dél-Alföld generally well-equipped, the broadband connection with Internet is common. The average number of PCs is around 8. The major problem how to care about the agening computers, how to change the old ones.
- Services – The opening time must harmonise with the claim of users, it makes some complication in some villages. The majority of worked tele-houses without own homepage. The services connected strongly with computers and other equipment. The quality of offered services showed a wide range difference among the tele-houses. The number of trainings, cultural and receation programmes were very limited.
- Partnership – The connections among tele-houses were rare, instead of the 'umbrella' organisation called Public Association of Tele-houses in Dél-Alföld is existing with an own portal. In some cases (where business companies operate the units) the links with local self-government were missing. The local NGOs could be the main partners of tele-houses, but in 2005 the connections with them were unique.
- Local inhabitants, potential users – The offered service palette was not attractive enough for the wider user-groups. The average number of guests were 80–100 person per week, mainly children (using Internet-base games), and a significant part of clients recruited from the local NGOs, when the business partners are hardly could be seen in tele-houses.
- Marketing, quality assurance – The future work and further development of tele-houses base on the clear legal background of foundation, the competencies and responsibilities, the tasks and functions of founders, the precise roles of financing. We see and important element of the methods and tools of monitoring particularly the quality management of offered services. It seems a crucial factor to make a demand-analysis before the start of the operation concentrating on local enterprises and society needs in parallel the advertisement of possible services in local level.

The activity of tele-houses and the results of a numerous research in the field of social sciences suggest, that this network is an effective tool for decreasing 'digital gap' even spatially and socially. The existing and widening network with a well defined governmental policy can create the new form of rural development suitable for the challenges of 'Information Age' through infrastructural, institutional and human resource development. The major pillar of this policy is partnership among central and local governments, founders and owners of tele-houses, local business actors and NGOs and of course the main user groups.

3. The content provider's activity in the region

3.1 Registration of Domain-name servers

The first domain name server of Dél-Alföld was set working in 1993, to years after the first Hungarian domain name registration. Because of the low pretensions of informatics experienced in the region, the weak establishment of the IT-network, the incomplete services, and the high price of servers only a moderate increase is observable in case of the number of registrations until 1997.

The second period of augmentation started in the second third of the 1990s and lasted until the beginning of 2000. The slow economic recovery, the establishment of IT-networks, the widening of the scope of applications and the spectacular growth of requirements were in the background of the development of informatics and the growth of equipment stock. The next period, lasting up to the present, started in the first quarter of 2000. A characteristic of the impulse of increase is that the number of servers multiplied tenfold just in the last six years, which caused not only quantitative increase but the modernization of the computer stock, and the sudden improvement of the equality of IT-services.

The first petition for domain name registration, which is indispensable for Internet mailing and content providing arrived to the record keeper 'The Council of Internet Providers' in 1993.

In the first half of the 1990s it was typical that the registrations came primarily from Szeged and the county-seats on a very concentrated way: on the one hand examining the activity-side from the field of economy and education, on the other hand analysing the affection of settlement. Until the second half of the 1990s, we cannot mention the regional spread on a larger scale in the field of domain name registrations. Real change was observable from 1998, when the 270 domain registration came from 35 settlements. It is a characteristic of the county distribution that owing to the dominant ICT importance, the share of Csongrád county significantly exceeded the share of the other two counties. The past ten years also brought significant transformation in the examined terrain. The most

outstanding change is the sudden increase of the number of domain name registrations, which was influenced not only by the increase of the economical solvency and the governmental IT-programmes, but the liberalisation of domain name registrations, which essentially facilitate obtaining domain names for individuals.

In the period between 1998 and 2004 in Dél-Alföld the number of registrations increased twenty-seven-fold owing to the favourable economical and social processes. The spatial spread of the domain name registrations is well represented by the fact that as opposed to the 35 settlements, in 2004 domain applications arrived from 194 settlements (of the total 254) (*Table 21*). But the considerable part of the growth applied from the cities and medium-sized towns henceforward, thus their rate is very high within the settlement structure (91%). The most domain name applications in the region arrived from Szeged (2.569), but the data of Kecskemét (1.242), Békéscsaba (531), Baja (366) and Hódmezővásárhely (337) reflect significant IT-activity, too (*Figure 10–11*).

From the spatial localization of domain name registrations being in close connection with the informatical activity, we reason that the use of servers and the joint services need special pretensions (good infrastructural provision, skilled manpower, relatively big consumer market, high entrepreneur density, generous service offer etc.).Contrast with other economical activities the domain name registering partners can find these conditions almost solely in the towns, to be more exact in the regional centres well-supplied with economical, educational, cultural and administrative functions, possessing larger competence in the field of decisions.

Examining the regional proportion of domain registrations we can state that regarding the rate of supply Dél-Alföld – with Közép- and Dél-Dunántúl – are in possession of average indicators. Regarding the data, it can be stated that the share of Dél-Alföld increased in the past years, considering the domain registrations, which proves that the receptivity to admit of ICT-devices, use the new opportunities, while the moderate rate of increase draws attention to the fact that on the one hand the incomes, on the other hand the lack of consistent government politics may strongly restrain the progress.

Table 21

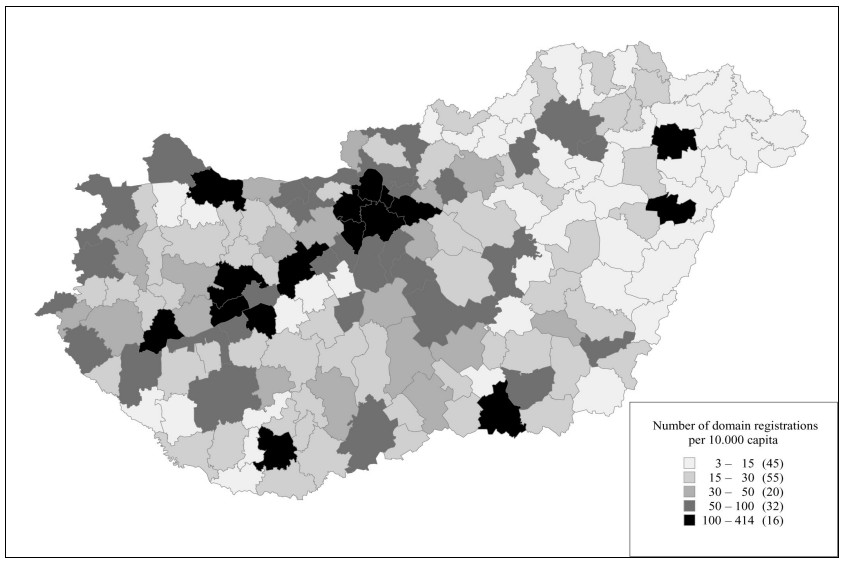
Number of domain name registrations by counties (1998, 2004)

Counties	Domain name registration (No.)		Regional distribution of registrations (%)		Number of domain name server registrations per 1000 inhabitants (03/2004)
	1998	03/2004	1998	03/2004	
Bács-Kiskun	78	2,793	1.59	2.39	5.13
Békés	47	1,179	0.96	1.00	2.98
Csongrád	145	3,344	2.95	2.86	7.83
Dél-Alföld	270	7,316	5.50	6.25	5.35
Baranya	92	2,791	1.88	2.39	6.90
Somogy	53	1,551	1.09	1.33	4.62
Tolna	28	793	0.57	0.68	3.18
Dél-Dunántúl	173	5,135	3.54	4.40	5.14
Hajdú-Bihar	103	2,547	2.10	2.17	4.62
Jász-Nagykun-Szolnok	50	1,280	1.02	1.09	3.08
Szabolcs-Szatmár-Bereg	41	1,908	0.84	1.63	3.25
Észak-Alföld	194	5,735	3.96	4.89	3.69
Fejér	106	2,561	2.16	2.19	5.98
Komárom-Esztergom	55	1,574	1.12	1.34	4.99
Veszprém	73	2,297	1.49	1.96	6.21
Közép-Dunántúl	234	6,432	4.77	5.49	5.78
Borsod-Abaúj-Zemplén	70	2,516	1.43	2.15	3.38
Heves	46	1,457	0.94	1.24	4.48
Nógrád	26	639	0.53	0.55	2.91
Észak-Magyarország	142	4,612	2.90	3.94	3.58
Budapest	3,435	70,261	70.06	60.00	40.87
Pest	245	11,023	4.99	9.42	9.97
Közép-Magyarország	3,680	81,284	75.05	69.42	28.78
Győr-Moson-Sopron	116	3,418	2.36	2.92	7.79
Vas	45	1,510	0.92	1.29	5.65
Zala	49	1,634	1.00	1.40	5.49
Nyugat-Dunántúl	210	6,562	4.28	5.61	6.53
Hungary altogether	4,903	117,076	100.00	100.00	11.54

Source: Internet Szolgáltatók Tanácsa [Council of Internet service providers] 2004.

Figure 10

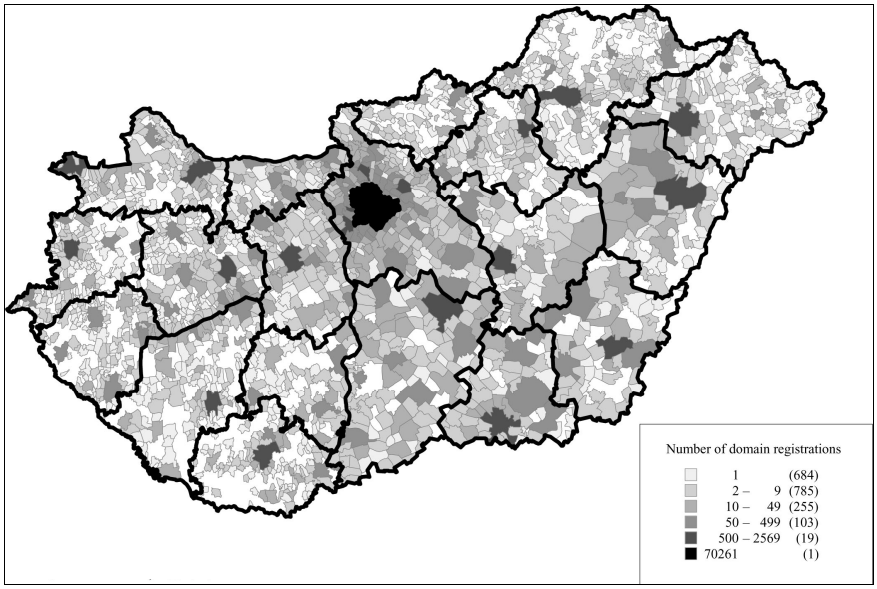
Domain-name registration by LAU 1 units, 2004



Source: The author's own compilation based on Council of Hungarian Internet Providers.

Figure 11

Domain-name registrations by settlements (LAU 2), 2004



Source: The author's own compilation based on Council of Hungarian Internet Providers.

3.2 Domain-name registrations by main activity fields

If we examine the activity area of domain name applicants of Dél-Alföld we experience that in 2004 the 68% of registrations happened in six spheres (administration, economy, R&D, civil institutions, public education, education) considered the most important regarding the establishment of information society (*Table 22*).

Table 22

The number and share of domain name registrations by main terrains (1998, 2004)

Year		Admini-stration	NGOs	Economy	Culture	R&D	Education	Others
1998	Registration	17	12	192	3	8	18	20
1998	Share	6	5	71	1	3	7	7
2004	Registration	194	184	4387	54	48	103	2346
2004	Share	3	3	59	1	1	1	32

Source: Based on the data from Internet Szolgáltatók Tanácsa (Council of Internet service providers) 2004.

Almost the 60% of the applicants came out of the companies, enterprises of the economic sphere. The high rate is absolutely not surprising, since in this sphere the most concrete is the expected profit of the IT-investment and the refund of the invested amount (eg. IT-services, e-trade, advertising activity, high-speed communication). It is not accidental that between 1998 and 2004 the number of registrations increased twenty-two-fold. It might be generally told that although in different tune, but the number of organizations possessing domain name increased in every activity area.

The ‘other’ category must be separately emphasized, where the 32% of all the registrations. The high rate is mostly explained by the fact that the individuals also got to this category, who presented their applications in great quantities after the liberalization of domain name registrations. This considerable interest is attributable to on the one hand the appearance of the individual content providers, on the other hand the fact that the individual entrepreneurs entered in great number the computer technology and the informatics spheres, where the companies (eg. preparation of home page, information and data store service, data bank activity, network operation) might be started with the help of relatively low capital investment, which required the domain name registration and the use of server.

The IT-activity of civic institutions and foundations (NGOs) is also significant. The number of domain names and home pages of the institutions considerably

increased since 1998. The appearance of the NGOs on the Internet was significantly urged by the CXXVI law of 1996,[35] which provided the use of the 1+1% of the income tax.

It can be proved that in the past ten years several administrative, official and self-governing institutions registrated own domain name, which number recently exceeded 190. Even independent home pages belong to the most of them, through which several official affairs (invitations of tenders, applications, recordings, administration of documents, information) may be handled in electronic form in the future, starting and helping the spread of e-administration and the evolution of electronic public administration.

The IT efforts of educational institutions are well seen too. The institutions of higher and general education registrated 103 domains altogether, in the past period. Because of the growing necessity of further study and the animation of the demand towards certain specialities several colleges and universities could start the fee-paying educational activity. In favour of the introduction of these opportunities the prestige of schools and the service of numerous computers equipped with Internet the number of ancillary servers significantly increased. Similarly, we can owe the setting of more dozens of servers to the 'Sulinet-programme', with the help of it several secondary and primary school could begin the content providing through Internet in the region.

The appearance of the general education and the R&D-spheres on the Internet is regrettably weak nowadays. The general culture institutions (museums, community centres, theatres etc.) registrated cca. 54, the R&D institutions only 48 domain names. This low number indicates – also from this point of view – the embarrassed financial circumstances of the culture and R&D institutions of the region (because in most cases there is no money for the maintenance of domain servers, the electronic processing representation of collections, scientific achievements and cover its expenses), and the deficit of the appearance of the culture and the science of Dél-Alföld on the Internet.

Entirely it is stateable that the rate of supply of domain servers of Dél-Alföld region significantly improved. In the past five years the dynamic, but very concentrated informatical development was typical. But it must be emphasized that the decisive part of the IT investments, especially the domain name registrations settled in towns. These processes draw attention to an important occurrence determining the spatial structure and the regional development. Besides the present tendencies and the already existing problems in rural areas, which basically under development (eg. defects of infrastructural rate of supply, economical

[35]Under the 'Law CXXXVI (1996) on the utilization of the determined part of the income tax according to the tax-payer' the non-profit companies, foundations satisfying the conditions of 'Law CLVI (1997) on the non-profit organisations', could reckon on the 1% of the income tax of taxpayers, thus after the introduction of the law several associations, clubs and foundations became financially concerned to present their activity as widely as possible.

backwardness, unemployment) we should reckon on a new challenge determining the future. The different opportunities of access of the IT-networks and devices (both physically and financially) may continue to aggravate the developmental differences between the town and rural areas. The low social adaptation of the use of informatics continues to widen the 'digital gap' between villages and towns on the level of social success and the opportunities of individuals, which carries several unfavourable consequences (eg. social deviations, depopulation of certain areas, mass migration of population into the towns).

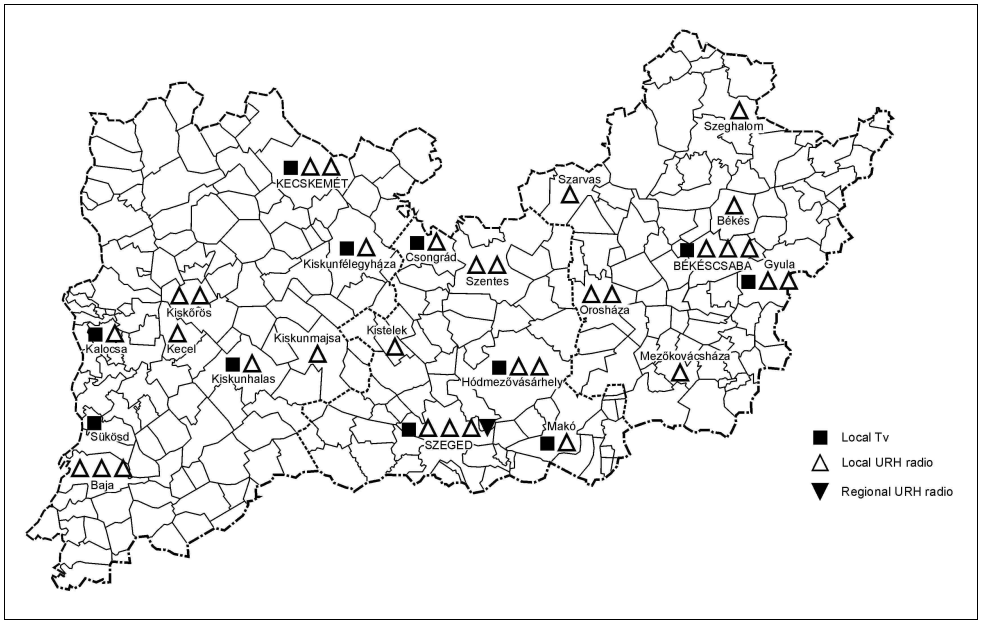
4 Electronic media market in the Region

The local and regional media may play an important role in the information flow of the region. While in case of the press the picture is relatively clear, since besides the nationally distributed information sources county and local papers, and thematic publications appear in the region, and these generally approach a well confinable target public. But the units of the electronic media are slightly thematic within their fradcasting area, they try to shape a programme structure, attractive for the most wide range of social classes, and also undertake certain public-utility tasks at least on a basic level. In this regard the importance of local television systems and the regional television and radio broadcast is outstanding, but we should not forget the opportunities implied in the commercial radios possessing stable and wide audience. Although the conceptions about the start of regional television, which came to light in the recent years, were not realized, the neccessary steps already clearly appear according to the plan (*Bubryják*, 2001), the re-announcement of realization would not be expedient.

The network of the local television service companies of the region is incomplete, even if we know that a municipal studio broadcast for a larger area. The basic possibility of broadcasting is provided by the cable networks, it excludes a significant part of the population of the region from the reception of programmes of local interest, partly because cable network does not work in the settlement, partly because the development has not yet arrived to the given residental area. This information opportunity is not replaceable with private satellite dishes, of which penetration is more favourable in Dél-Alföld than the national average. The preceding phenomenon shows all the same, that the population of the region is open to the current of events in the world, they readily receive new information and not only look for, but apply th possible access paths to satisfy the requirements (*Figure 12*).

Figure 12

Localelektronic mediums in Dél-Aflöld, 2005



References

Antalóczy, K.–Sass, M. 2005: A külföldi működőtőke-befektetések regionális elhelyezkedése és gazdasági hatásai Magyarországon [The regional spread and effects of FDI in Hungary]. – *Közgazdasági Szemle.* 5. 494–520. pp.

Barsi, B. – Csizmadia, Z. 2001: Egy nagyváros helyzete az információs társadalomban [The state of a large city in Information Society]. – *Tér és Társadalom.* 2. 147–172. pp.

Barsi, B. 2002: A területfejlesztés kihívásai az információs társadalomban [The challenges for regional development in Information Society]. – *Comitatus.* 10. 22–31. pp.

Barsi, B. 2003: Az információs és kommunikációs technológiák hatása a versenyképességre [The effect of ICTs on competitiveness]. – *Tér és Társadalom.* 3. 183–195. pp.

Barta, Gy. – Bernek, Á. – Nagy, G. 2003: A külföldi működőtőke területi elmozdulásának esélyei Magyarországon [The possibility of the spatial movement of FDI in Hungary]. – *Tér és Társadalom.* 4. 173–190. pp.

Cairncross, F. 1997: *The Death of Distance; How the communications revolution will change our lives.* Harvard Business School Press, Cambridge, Mass.

Castells, M. 1996: *End of Millenium. The Information Age: economy, society and culture.* Oxford, Blackwell Publishers.

Castells, M. 1996: *The rise of network society. The Information Age: economy, society and culture.* Oxford, Blackwell Publishers.

Castells, M. 1997: *The power of identity. The Information Age: economy, society and culture.* Oxford, Blackwell Publishers.

Castells, M. 2001: *The Internet-galaxy. Reflections on the Internet, business and society.* Oxford, Oxford University Press.

Cooper, R .– Madden, G. 2005: Regional development and business prospects for ICT and broadband networks. – *Telecommunication Policy.* 2–3. 97–100. pp.

Criscuolo, P.–Narula, R. 2002: *A novel approach to national technological accumulation and absorptive capacity: Aggregating Cohen and Levinthal.* MERIT Research Memoranda, No. 16.

Csatári, B. 2004: Az e-kistérségi információs rendszer kialakítása. In: Csefkó, F. (ed.): *Kézikönyv az e-önkormányzás bevezetéséhez.* Mecseknádasd, Községi Önkormányzatok Szövetsége. 87–115. p. [The development of e-information basis for LAU1 level administrative units]

Csatári, B. – Kanalas, I .– Nagy, G. – Szarvák, T. 2004: *Regions in Information Society – a Hungarian Case-Study.* Pécs, Centre for Regional Studies. (Discussion papers, 42).

Demetrovics J. – Keviczky L. (eds..) 2000: Az információs társadalom. Magyarország az ezredfordulón. Stratégiai Kutatások VI. Közlekedés, hírközlés, informatika. MTA, Budapest. [The Information Society. Hungary at the dawn of the new Millenium]

Dőry, T. – Ponácz, Gy. M. 2003: Az infokommunikációs ágazatok szerepe és súlya a magyar városhálózatban [The role and weight of info-communication sectors in Hungarian town-network]. – *Tér és Társadalom.* 3. pp. 165–181.

Erdősi F. 2005: A vezetékes távközlés/infokommunikáció regionális jellemzői Európában I–II. [Regional characteristics of fixed communication / info-communication sectors]. – *Területi Statisztika.* 4. pp. 252–266; 5. pp. 440–453.

Farkas, J. 2001: Az ipartól az információs társadalomig [From industrial to Information Society]. – *Magyar Tudomány*. 3. pp. 271–282.

Fransman, M. – King, K. (eds.) 1984: *Technological Capability in the Third World*. London, Macmillan.

Jakobi, Á. 2002: A területi egyenlőtlenségek új elemei az információs társadalomban. Regionális Tudományi Tanulmányok 7. 55–84. pp. [New elements of regional inequalities in Information Society]

Kanalas, I. – Nagy, G. (eds.) 2003: Régiók az információs társadalomban [Regions in Information Society – a Hungarian case-study]. Kecskemét, MTA RKK Alföldi Tudományos Intézete.

Kanalas, I. – Nagy, G. 2004: Tömegkommunikáció – a médiumok területi megjelenése [Mass-media – The spatial diffusion of mediums]. In: Erdősi, F.: *Magyarország közlekedési és távközlési földrajza.* Budapest–Pécs, Dialóg Campus Kiadó. pp. 481–484.

Kanalas, I. – Nagy, G. 2005: Számítástechnika-infokommunikáció [Informatics, infocommunication]. In: Erdősi F.: *Magyarország közlekedési és távközlési földrajza.* Budapest–Pécs, Dialóg Campus Kiadó. pp. 453–479.

Kanalas, I. – Nagy, G. 2005: Távközlés-infokommunikáció-tömegkommunikáció [Communication, mass-communication]. In: Erdősi F.: *Magyarország közlekedési és távközlési földrajza.* Budapest–Pécs, Dialóg Campus Kiadó. pp. 428–452.

Kanalas, I. 2004: Jász-Nagykun-Szolnok megye információs-kommunikációs helyzete és információs aktivitásának néhány területi jellemzője [The state of info-communication sector and informational activity level of Jász-Nagykun-Szolnok County]. – *Területi Statisztika.* 1. pp. 56–71.

Kondor, Zs. – Fábri, Gy. (eds.) 2003: *Az információs társadalom és a kommunikációtechnológia elméletei és kulcsfogalmai* [The theories and basic ideas of Information Society and communication technology]. Budapest, Századvég Kiadó. (A Budapesti Kommunikációs Főiskola Tankönyvei).

Krémer, A. 2002: Az információs társadalom kialakulása és mérési problémái. Térinformatika 8. [The rise of Information Society and the problems of quantification]

Mansell, R. 1999: Information and communication technologies for development: assessing the potential and the risk. Telecommunications Policy 23. 35–50. pp.

Mattelart, A. 2004: Az információs társadalom története. Gondolat-Infonia, Budapest. [The history of Information Society]

Nagy, E**.** – Nagy, G. – Kiss, J. P. 2003: Szeged: kihasználatlan tartalékok és részsikerek. In: Timár J. – Velkey G. (eds.): Várossiker alföldi nézőpontból. Békéscsaba–Budapest, MTA RKK Alföldi Tudományos Intézet – MTA Társadalomkutató Központ. pp. 120–162.

Nagy, E. – Nagy, G. 1994: A vállalkozások területi terjedése [The spatial spread of enterprises inside the city]. In: Mészáros, R. (ed.): *A település térbelisége.* Szeged, JATEPress. pp. 136–156.

Nagy, E. – Nagy, G. 2001: Békés megye gazdasági fejlődése. [The economic development of Békés County]. – *Bárka.* 4. pp. 71–79.

Nagy, G. 1994: Számítástechnikai és telekommunikációs eszközök szegedi vállalkozásoknál [Elements of ICTs in new enterprises and companies in Szeged]. In: Timár J.

(ed.): *Az „alföldi út" kérdőjelei.* Békéscsaba, MTA RKK Békéscsabai Osztály. pp. 202–207.

Nagy, G. 1995: A külföldi működő tőke térbeli terjedése és hatásai Magyarországon [The spatial spread and its effects in Hungary]. *Tér és Társadalom.* 1–2 . pp. 55–82.

Nagy, G. 1997: Kommunikációs szektor az Északnyugat-Dunántúl térségben [Communication sector in Northwestern-Transdanubia Region]. – *Tér és Társadalom.* 1. pp. 125–146.

Nagy, G. 1998: A helyi média szerepe az Északnyugat-Dunántúl megyéiben [The role of local media in the couties of Northwestern-Transdanubia Region]. In: Tóth, J. (ed.): *Földrajzi Kaleidoszkóp. Tanulmányok Dr. Krajkó Gyulának.* Pécs–Szeged, JPTE TTK Általános Társadalomföldrajzi és Urbanisztikai Tanszék, JATE TTK Gazdaságföldrajzi Tanszék. pp. 118–133.

Nagy, G. 2000: Az információs ágazatok területisége [The spatial characteristics of ICT sector]. In: Horváth Gy. – Rechnitzer J. (eds.): *Magyarország területi szerkezete és folyamatai az ezredfordulón.* Pécs, MTA RKK Pécs, 2000. pp. 314–334.

Nagy, G. 2000: Regional differences in telecommunication penetration. Does the levelling effect of the market work? – *Przestrzen-Spoleczenstwo-Gospodarska: Studia i Materialy.* 5. pp. 30–40.

Nagy, G. 2001: Az információs társadalom és az Alföld **–** adaptációs esélyek The Information Society and the Alföld – Potentials for adoptation]. – *Alföldi Tanulmányok* (2000–2001) 18. pp. 90–108.

Nagy, G. 2001: Knowledge-based development: opportunities for medium-sized cities in Hungary. – *European Urban and Regional Studies.* 4. pp. 329–339.

Nagy, G. 2002: Az Alföld gazdasági fejlődésének néhány új vonása. Területfejlesztés, rendszerváltás és az Alföld. (Alföld II. Program zárókötet) [Some new characteristics of the economic development of Alföld] [Regional development, Transition and the Alföld] (szerk.: Csatári B. – Timár J.) pp. 78–105.

Nagy, G. 2002: Békés megye a határmentiség és az európai uniós csatlakozás kettős erőterében [Békés county between two forces – EU-accession and border-zone location]. – *Bárka.* 3. pp. 51–61.

Nagy, G. 2002: Oldódtak-e az öröklött területi különbségek a rendszerváltás évtizedében? (Néhány gazdasági alapmutató vizsgálata) Tanulmány Mészáros Rezső akadémikus 60. születésnapjára összeállított kötetbe [Was the spatial moderating effect of market worked in the decade of transition?] [Ideas in Hungarian Human Geography] – In Becsei, J. (ed.): *A magyar társadalomföldrajzi kutatás gondolatvilága.* Szeged, SZTE Gazdaság- és Társadalomföldrajz Tanszék. pp. 211–226.

Nagy, G. 2002: Területi különbségek az információs korszak küszöbén (Mit mérünk, és hogyan?) [Regional differences in the dawn of Information Society? Measuring, but what and how?]. – *Területi Statisztika.* 1. pp. 3–25.

Nagy, G. 2003: A gazdasági fejlettség minőségi elemeinek szerepe és mérési lehetőségei [The possible ways of measuring the qualitative elements of economic development]. In: Nemes Nagy, J. (ed.): *Kistérségi mozaik. (Tanulmányok).* Budapest, ELTE Regionális Földrajzi Tanszék, MTA ELTE Regionális Tudományi Kutatócsoport. pp. 87–106.

Nagy, G. 2005: Alföldi városok a formálódó információs társadalomban [Towns of Alföld in the forming Information Society]. In: Nagy, E. – Nagy, G. (eds): *Az Európai Unió*

bővítésének kihívásai – Régiók a keleti periférián. III. Alföld-kongresszus 2003. november 28–29. Békéscsaba. Békéscsaba, Nagyalföld Alapítvány. pp. 348–353.

Nagy, G. 2004: Az Információs Társadalom Magyarországon – Területi különbségek [The Information Society in Hungary – Regional differences]. – *eVilág.* 2. pp. 10–15.

Nagy, G. 2004: Measuring the Activity of the Information Society – Creating reginoal, county and town level information indexes (in the case of Hungary). In: Wojciech Retkiewicz (ed.): *Formation of Information Society in the Regions of Uniting Europe.* Łódź: University of Łódź Department of Space Economy and Spatial Planning, pp. 124–149. p. (Space – Society – Economy, 6.).

Nagy, G. 2005: Mobiltelefonálási jellemzők a békéscsabai középiskolások körében [The main characteristics of mobile-phone use in secondary school pupils in Békéscsaba]. – *Földrajzi Értesítő.* 3–4. pp. 377–392. pp.

Negroponte, Ch. 1995: Being Digital. New York, Knopf.

Rechnitzer, J. – Grosz, A. – Csizmadia, Z. 2003: A magyar városhálózat tagozódása az infokommunikációs infrastruktúra alapján az ezredfordulón . [The hierarchical structure of Hungarian town-network around 2000 based on the level of info-communication infrastructure]. – *Tér és Társadalom.* 3. pp. 145–197.

Ricz, J. 2007: Az agglomerálódás klasszikus és új logikája [The traditional and new logics of agglomeration process]. – *Külgazdaság.* 7–8. pp. 83–102. pp.

Szabó, K. 2002: Az információs technikák szétterjedésének következményei a hagyományos szektorokban [The consequences of the spread of informatical techniques in traditional economic sectors]. – *Közgazdasági Szemle.* 3. pp. 193–211.

Szabó, K. 2006: Az infokommunikációs technológiák hatása a hagyományos gazdasági határvonalakra [The effect of info-communication technologies on traditional 'borders' of economic activities]. – *Külgazdaság.* 9–10. pp. 4–28.

Szalavetz, A. 2002: „Új gazdaság és gazdasági növekedés Magyarországon. Külgazdaság, XLVI. szeptember 31–45. pp. ['New' economy and economic growth in Hungary]

Szalavetz, A. 2002: „Új gazdaság" jelenségek – A feldolgozóipar tercierizálódása [New trends in economy – the tertiarisation of manufacturing]. – *Külgazdaság.* 12. pp. 4–17.

Szalavetz, A. 2002: Az informatikai szektor és a felzárkózó gazdaságok [The informatics sector and the converging countries]. – *Közgazdasági Szemle.* 9. pp. 794–804.

Szalavetz, A. 2003: Az információs technológiai forradalom és a világgazdaság centrumán kívüli országok technológiai felzárkózása [The ICT revolution and the technological convergence of peripheral countries]. – *Közgazdasági Szemle.* 1. pp. 22–34.

Szarvák, T. 2004: A digitális szakadék, mint új periféria-képző jelenség [The digital gap as a new indicator of peripherisation]. – *Tér és Társadalom.* 3. pp. 57–75.

Teller, T. 2000: Infrastruktúra és területiség összefüggése az információs társadalomban [The context of infrastructure and regionality in Information Society]. – *Comitatus.* 7–8. 7–16. pp.

Tiner, T. 2004:A hazai mobiltelefónia területi terjedésének néhány sajátossága [Some aspects of spatial spread of mobile phones in Hungary]. – *Földrajzi Értesítő.* 3–4. 237–246. pp.

Török, Á. 2004: Buborék és kristálygömb: az új gazdaság fogalmáról és gazdaságfejlődési szerepéről [Bubble and crystal globe: the definition and role of new economy in development]. – *Magyar Tudomány.* 2. pp. 140–150.

Turnock, D. – Nagy, G. 1998: The potential of the small towns in Eastern Europe – a Hungarian Case Study. – *RSAI Newsletter.* 213. pp. 18–22., 214. pp. 16–22.
Z. Karvalics, L. 2003: *Információ, társadalom, történelem. Válogatott írások.* [Information, Society, History. Selected papers]. Budapest, Typotex Kiadó.

Primary databasis and analysis

Digitális Mobil Gyorsjelentések, 2001–2007. NHH. [Digital mobile quarterly reports].
Időszaki Statisztikai Közlemények, 1990–2003. KSH, Budapest. [Statistical annual reports].
Az információs és kommunikációs eszközök állománya és felhasználása a gazdálkodó szervezeteknél 2001, 2003, 2005 [The stock of ICTs and its use in economic organisations]. Budapest, KSH, 2003. 2005, 2007.
Az internet előfizetések területi megoszlása és típusai, 2004–2006 [The spatial distribution and types of internet subscriptions] KSH, Budapest, 2008.
Kábeltelevízió-szolgáltatások Magyarországon, 2002. KSH, Budapest, 2004. [Cable-TV services in Hungary]
A közigazgatás informatikai eszközei és információs tevékenysége, 2003, 2005 [The informatical background and information services of administration]. Budapest, KSH 2004, 2006.
A magyarországi háztartások infokommunikációs (IKT) eszközellátottsága és az egyéni használat jellemzői, 2006. KSH, Budapest, 2007. [The level of ICT technologies and its use in Hungarian households].
Negyedéves Távközlési Jelentések, 1999–2005. NHH [Communication quarterly reports]
NHH Szélessávú felmérés, 2006. Powerpoint prezentáció, 2007. www.nhh.hu [The state of broadband Internet communication].
Számítástechnikai szolgáltatók és szolgáltatások, 2003. KSH, Budapest, 2004. [Service providers and services in informatics].
Szélessávú internet-előfizetések számának alakulása településenként, 2006. június 30-i adatok alapján. NHH, 2007. (www.nhh.hu) [The number of broadband internet subscribers by settlements in 30/06/2006 in Hungary].
Távközlés, Internet, 2003, 2005 [Communication, Internet annual report]. Budapest, KSH 2004, 2006.
Vezetékes Havi Gyorsjelentések, 2001–2005. NHH. [Fixed communication monthly report].

The *Discussion Papers* series of the Centre for Regional Studies of the Hungarian Academy of Sciences was launched in 1986 to publish summaries of research findings on regional and urban development.

The series has 5 or 6 issues a year. It will be of interest to geographers, economists, sociologists, experts of law and political sciences, historians and everybody else who is, in one way or another, engaged in the research of spatial aspects of socio-economic development and planning.

The series is published by the Centre for Regional Studies.

Individual copies are available on request at the Centre.

Postal address

Centre for Regional Studies of the Hungarian Academy of Sciences
P.O. Box 199, 7601 PÉCS, HUNGARY
Phone: (36–72) 523 800
Fax: (36–72) 523 803
www.rkk.hu
http://www.dti.rkk.hu/kiadv/discussion.html

Director general

Gyula HORVÁTH

Editor

Zoltán GÁL
galz@rkk.hu

Papers published in the Discussion Papers series

Discussion Papers / Specials

BENKŐNÉ LODNER, Dorottya (ed.) (1988): Environmental Control and Policy: Proceedings of the Hungarian–Polish Seminar in the Theoretical Problems of Environmental Control and Policy

OROSZ, Éva (ed.) (1988): Spatial Organisation and Regional Development Papers of the 6th Polish–Hungarian geographical Seminar

DURÓ, Annamária (ed.) (1993): Spatial Research and the Social–Political Changes: Papers of the 7th Polish–Hungarian Seminar

DURÓ, Annamária (ed.) (1999): Spatial Research in Support of the European Integration. Proceedings of the 11th Polish–Hungarian Geographical Seminar (Mátraháza, Hungary 17–22 September, 1998)

GÁL, Zoltán (ed.) (2001): Role of the Regions in the Enlarging European Union

HORVÁTH, Gyula (ed.) (2002): Regional Challenges of the Transition in Bulgaria and Hungary

KOVÁCS, András Donát (ed.) (2004): New Aspects of Regional Transformation and the Urban-Rural Relationship

BARANYI, Béla (ed.) (2005): Hungarian–Romanian and Hungarian–Ukrainian border regions as areas of co-operation along the external borders of Europe

ENYEDI, György – KOVÁCS, Zoltán (eds.) (2006): Social Changes and Social Sustainability in Historical Urban Centres. The Case of Central Europe

KOVÁCS, András Donát (ed.) (2007): Regionality and/or Locality

SZIRMAI, Viktória (ed.) (2007): Social Inequalities in Urban Areas and Globalization. The Case of Central Europe

Discussion Papers

No. 1 OROSZ, Éva (1986): Critical Issues in the Development of Hungarian Public Health with Special Regard to Spatial Differences

No. 2 ENYEDI, György – ZENTAI, Viola (1986): Environmental Policy in Hungary

No. 3 HAJDÚ, Zoltán (1987): Administrative Division and Administrative Geography in Hungary

No. 4 SIKOS T., Tamás (1987): Investigations of Social Infrastructure in Rural Settlements of Borsod County

No. 5 HORVÁTH, Gyula (1987): Development of the Regional Management of the Economy in East-Central Europe

No. 6 PÁLNÉ KOVÁCS, Ilona (1988): Chance of Local Independence in Hungary

No. 7 FARAGÓ, László – HRUBI, László (1988): Development Possibilities of Backward Areas in Hungary

No. 8 SZÖRÉNYINÉ KUKORELLI, Irén (1990): Role of the Accessibility in Development and Functioning of Settlements

No. 9 ENYEDI, György (1990): New Basis for Regional and Urban Policies in East-Central Europe

No. 10 RECHNITZER, János (1990): Regional Spread of Computer Technology in Hungary

No. 11 SIKOS T., Tamás (1992): Types of Social Infrastructure in Hungary (to be not published)
No. 12 HORVÁTH, Gyula – HRUBI, László (1992): Restructuring and Regional Policy in Hungary
No. 13 ERDŐSI, Ferenc (1992): Transportation Effects on Spatial Structure of Hungary
No. 14 PÁLNÉ KOVÁCS, Ilona (1992): The Basic Political and Structural Problems in the Workings of Local Governments in Hungary
No. 15 PFEIL, Edit (1992): Local Governments and System Change. The Case of a Regional Centre
No. 16 HORVÁTH, Gyula (1992): Culture and Urban Development (The Case of Pécs)
No. 17 HAJDÚ, Zoltán (1993): Settlement Network Development Policy in Hungary in the Period of State Socialism (1949–1985)
No. 18 KOVÁCS, Teréz (1993): Borderland Situation as It Is Seen by a Sociologist
No. 19 HRUBI, L. – KRAFTNÉ SOMOGYI, Gabriella (eds.) (1994): Small and medium-sized firms and the role of private industry in Hungary
No. 20 BENKŐNÉ Lodner, Dorottya (1995): The Legal-Administrative Questions of Environmental Protection in the Republic of Hungary
No. 21 ENYEDI, György (1998): Transformation in Central European Postsocialist Cities
No. 22 HAJDÚ, Zoltán (1998): Changes in the Politico-Geographical Position of Hungary in the 20th Century
No. 23 HORVÁTH, Gyula (1998): Regional and Cohesion Policy in Hungary
No. 24 BUDAY-SÁNTHA, Attila (1998): Sustainable Agricultural Development in the Region of the Lake Balaton
No. 25 LADOS, Mihály (1998): Future Perspective for Local Government Finance in Hungary
No. 26 NAGY, Erika (1999): Fall and Revival of City Centre Retailing: Planning an Urban Function in Leicester, Britain
No. 27 BELUSZKY, Pál (1999): The Hungarian Urban Network at the End of the Second Millennium
No. 28 RÁCZ, Lajos (1999): Climate History of Hungary Since the 16th Century: Past, Present and Future
No. 29 RAVE, Simone (1999): Regional Development in Hungary and Its Preparation for the Structural Funds
No. 30 BARTA, Györgyi (1999): Industrial Restructuring in the Budapest Agglomeration
No. 31 BARANYI, Béla–BALCSÓK, István–DANCS, László–MEZŐ, Barna (1999): Borderland Situation and Peripherality in the North-Eastern Part of the Great Hungarian Plain
No. 32 RECHNITZER, János (2000): The Features of the Transition of Hungary's Regional System
No. 33 MURÁNYI, István–PÉTER, Judit–SZARVÁK, Tibor–SZOBOSZLAI, Zsolt (2000): Civil Organisations and Regional Identity in the South Hungarian Great Plain
No. 34 KOVÁCS, Teréz (2001): Rural Development in Hungary
No. 35 PÁLNÉ, Kovács Ilona (2001): Regional Development and Governance in Hungary
No. 36 NAGY, Imre (2001): Cross-Border Co-operation in the Border Region of the Southern Great Plain of Hungary
No. 37 BELUSZKY, Pál (2002): The Spatial Differences of Modernisation in Hungary at the Beginning of the 20th Century
No. 38 BARANYI, Béla (2002): Before Schengen – Ready for Schengen. Euroregional Organisations and New Interregional Formations at the Eastern Borders of Hungary
No. 39 KERESZTÉLY, Krisztina (2002): The Role of the State in the Urban Development of Budapest