Techniki pomiaru aktywności informatycznej w danych jednostkach terytorialnych są wyjątkowo trudne. Stworzenie serii czasowych wskaźników jest praktycznie niemożliwe ze względu na zmiany techniczne i technologiczne. Istniejące narzędzia pomiarowe spełniają swoje zadanie jedynie na poziomie jednostki, jaką jest kraj, lecz są zupełnie nieadekwatne do pomiarów na poziomie regionalnym. Artykuł jest pierwszą próbą analizy aktywności informatycznej dokonanej, na podstawie dostępnych narzędzi i baz, dla jednostek regionalnych i miejskich. Rezultaty tego typu badań nie są do końca porównywalne. Możliwa jest jednak analiza różnic występujących między nimi, jedynie jednak w oparciu o szczegółowe badania terenowe. Celem autora było wypracowanie takiej metodologii i rozpoczęcie badań nad powyższym problemem. W każdym przypadku przy dokonywaniu analizy regionalnej najważniejszym jest typ bazy danych. Do niedawna węgierski system statystyczny nie dawał możliwości użycia bezpośrednich wskaźników dotyczących społeczeństwa informatycznego. Stąd dane, z których korzystano nie pochodzą jedynie z Narodowego Biura Statystycznego, ale są uzupełnione o informacje zebrane w terenie.

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Measuring the Activity of the Information Society Creating regional, county and town level information indexes (in the case of Hungary)

Introduction

Though Hungary seems to be considerably late entering the information age, compared especially to the US and Scandinavian countries which have taken the lead, it can already clearly be seen that Hungary's various regions and settlements follow different courses of development, and that, despite the shortness of the time elapsed, considerable regional differences have developed between them. The differences experienced in the degree of development are partly the consequences of differing first reactions to the challenges of the information age; however, they are not unrelated to the initial position, state, structure and adaptability of local economies, infrastructure and communities, either.

It is now at the beginning of the third millennium that Hungary is in a position where government-level development policy helps IT gain, ground and content services develop as well as enhance IT education and the use of IT-based knowledge. At this juncture, as the declared objective of the programmes launched is to facilitate catching up with developed nations, we must have precise knowledge of the possible areas of intervention and of target groups so that the utilisation of the rather limited sources of development may be highly efficient, and that such utilisation may, in effect, further the attainment of strategic objectives.

We believe that a good starting point is to be clearly aware of the different types of area development, the reasons why they evolve and change the way they do as well as of the trends discernible in development and changes. We also must be able to recognise the weak points the courses of development run so that we can identify the areas of intervention as well as the tools needed for such intervention. Relying on a national statistical database, often on direct data, the present study aims at describing the country's currently unfolding spatial structure and typifying the most common courses of development.

1. Measuring, but what (and how)?

For any study striving to explore regional differences, the type of database it uses in order to attain the goals the study sets is crucial. Until recently the Hungarian system of statistical data has hardly supported the use

of direct indexes in exploring the events of the information age, thus we must make do with direct ones on numerous occasions. Although we are fully aware that these indexes only provide vicarious information about the phenomenon examined, yet we believe that the use of such information facilitates the process of exploration. Naturally, the use of such indexes is severely restricted, yet, if investigating several dimensions, we arrive at conclusions that corroborate each other, we are perfectly justified in drawing conclusions relying on direct indexes.

In numerous cases the indexes employed are not available for all the regional units examined, e.g. regional, municipal and settlement level analyses are not flawlessly built on each other, yet they complement each other well, providing for the possibility of a multi-dimensional approach. In a few cases, in addition to the database of KSH (National Office for Statistics), we also used indexes based on individual data collection, which, as it was time-consuming, made our job more difficult; however, due to their content, their use was indispensable.

2. Regional level inequalities

Regional level information activity was determined by means of an index made up of income levels, the inner structure of outgoings and the volume of electronic or IT-related consumer durables and the changes in such volume. The data that were needed for the period we examined (1989-1999), and which data considerably changed during this period, were available first at two-year intervals, then, from the mid-nineties, annually (Appendix 1).

Based on income levels, the capital city stands out considerably from the national average, and its lead, compared to rural Hungary, proved rather permanent in the period under review. Within the structure of outgoings, mobility and particularly telecommunications-related expenses are permanently above the average, which clearly underlines Budapest's role as an information hub and indicates the swift spread of the upgraded forms of information exchange. In the star regions of the economic structural change, incomes increased relatively rapidly, however, the proportion of communications-related expenses within such incomes does not exceed the average. In the structure of expenses it is the items linked with the purchase of consumer durables as well as the items related to either housing construction or the purchase of houses that are conspicuous. In the Southern and Eastern regions lower incomes only provide for communications-related expenses of a lesser absolute value, though, in terms of proportion, they could approximate or sometimes even exceed the volumes in Central and West Transdanubia (especially the ones that were typical in Southern Transdanubia in the first half of the decade). In these (i.e. Southern and Eastern) regions families spend more on living, accommodation and clothes, thus it is not surprising that there remain fewer sources available for investing in modern technologies, mainly in IT equipment, which tend to become outdated and depreciate fast. In less successful regions, family incomes are substantially lower compared to Northern Transdanubia, and differences became more marked towards the end of the decade. Having said that,

the households there economise on large-scale capital projects rather than on mobility or communications-related expenses, therefore, based on the value of several years' average, except for the capital city, there are no significant differences within rural spaces. Pest County is in a special position, for there, with a relatively low income level, which nevertheless increases at a rate that exceeds the average, the proportion of mobility (commuting) and telecommunications-related expenses is rather high. The majority of the settlements in the county strive to exploit the advantages stemming from the proximity of the capital city by an intense exchange of information as well as by acquiring knowledge that personal presence provides for (Table 1).

In terms of the individual supply indexes under review, the capital city and its broader environs enjoyed a highly prestigious status already before the change of the regime, which was attributable to not only Budapest's high proportion, but also to suburbanisation taking on mass proportions by the nineties. The spread of consumer durables was facilitated by the behavioural patterns experienced in the social environment; in addition, higher incomes as well as better employment prospects unequivocally supported this process. The equalisation measured at year-end can be attributed to conventional data recording methods rather than an actual process of equalisation. Central Transdanubia, which was in an advantageous initial situation, was able to preserve its position, whereas Northern Hungary, which started out in an almost similar situation, brought up the rear. The West Transdanubian region ran a remarkable course, and the almost uninterrupted strengthening of Southern Transdanubia was impressive. By 1999 the level of supply in the three Transdanubian regions had become completely different from that of the rest of the country, offering far better conditions for the development of the information society than either the Great Plain or the counties in Northern Hungary. These three Transdanubian counties had also become the express target areas of the emergence of the information society. Nevertheless, the eastern region of the country is not homogeneous, either. From the two regions in the Great Plain, some activity, though on a supply level that is still below the national average, has only been discernible in the Southern Great Plain in the past four years. This may well indicate activity in large and medium-sized cities, but it also indicates the passivity of small settlements. The situation is the gravest in North Eastern Hungary, where it is not only supply level that is low, but also the rate of development is below the average or only narrowly approximates it. This signals increasing backwardness and a widening technological gap within the entire country and even between rural regions (Table 2).

3. Counties in terms of their present and future strategies

According to the indexes compared, the counties show very different properties in the three examined dimensions. (Appendix 2). Figures measuring the competitiveness of the regions which clearly outline a dynamic zone ranging from Győr-Moson-Sopron County and Csongrád County

to Baranya County, in the southern part of the Transdanubian area are identical. The counties in the southern part of the Transdanubian area show slightly worse figures, but in the eastern part of Hungary, in the depressed regions, such figures fall significantly behind the national average.

The basis of the information society is the strongest in the capital city. In the counties with university centres (Baranya, Hajdú-Bihar and, especially, Csongrád Counties), from the economically dynamic areas, only Győr-Moson-Sopron and Veszprém Counties are approximating the national average. Somogy, Tolna, Bács-Kiskun, Békés, Szabolcs-Szatmár-Bereg and Nógrád Counties have the weakest bases. These low figures can be attributed to the dismal situation of university education as well as the lack of R & D in the case of Tolna and Nógrád Counties; in the case of the Great Plain, low social capacities and the lack of basic infrastructure and the research background account for such low figures. In Somogy County, however, it is the development of social structure and the quality of life, which were the weakest elements.

The level of urbanisation exceeded the national average only in Budapest and Csongrád Country, the main reason for that being the large number of towns in this county. The level of urbanisation is 'evenly' good in the economically dynamic counties. It is only in the counties with regional centres (e.g. Pécs, Debrecen, etc) that we have the same figures. The index of Szabolcs-Szatmár-Bereg County, despite significant development (concerning public infrastructure), was poor. Somogy and Nógrád Counties do not have much better indexes, either. It would be interesting to examine the causes of the low urbanisation indexes of Pest County and the direction of trends in the long run. In these counties neither the level of urbanisation nor the specific indexes of the infrastructure reach the national average.

Baranya, Hajdú-Bihar, Jász-Nagykun-Szolnok, Szabolcs-Szatmár-Bereg and Heves Counties are stable concerning all three indexes. Budapest and Csongrád County show the largest fluctuation in research and Győr-Moson-Sopron, Vas and Veszprém moved towards the economic comparability. The former counties together with Hajdú-Bihar and Baranya Counties could be the regional bases of development, while the latter together with Fejér, Komárom-Esztergom and Pest Counties could be the centres of economy, mainly of manufacturing industry.

The real problem is defining the concept of development for the rest of the counties, where even determining the principles of the strategy can be a problem, since the background is also incomplete. In this group, our first task is to complete the networks and infrastructure. At the same time, increasing social capacity is also an important task. Thorough impact studies must always precede development, revealing endogenous sources and comparing various emerging developmental directions with the developmental plans of the regions.

4. The areas of the information competitiveness of the counties

The development of communications infrastructure east of the River Danube lags behind that of Transdanubia to a considerable extent. As far as the eastern part of the country is concerned, it is the counties along the Romanian border as well as Jász-Nagykun-Szolnok County whose situation is the most dismal. And so is Somogy County's from the western ones. Due to its widespread cable television network, communications infrastructure considered, Zala County has taken the lead in the provinces, leaving behind the counties which exhibit the best economic indexes. The emergence of the information society and economy in Hungary is not necessarily related to areas, which are seemingly successful. It is more likely to appear in the areas and/or settlements that can offer special incentives (Fig. 6).

One such incentive could be the regional basis of higher education, which has significantly transformed the spatial structure of universities and colleges in the wake of institutional consolidation and mergers. As well as the capital city, the counties where cities operate multi-department universities stand out from the national average, whereas Nógrád, Somogy and Tolna Counties show the least activity in this area (Fig. 7). From the economically most outstanding areas, the higher education basis of both Fejér and Pest Counties is markedly weak (the same is true of Komárom-Esztergom County recently experiencing an upswing). On the other hand, Vas, Veszprém and Győr-Moson-Sopron Counties, left behind as they are from the national average, show a discernible activity. An especially dangerous tendency is the one that can be characterised as follows: either the lack or the structure of higher education in several counties hinders economic development, and both poor economic output and low wages discourage the development of human resources. This downward spiral has to be broken.

R&D activity between 1994 and 1998 showed a similar picture. In the counties with university and research centres it exceeded the national average. From the counties excelling at value production, it is only Győr-Sopron-Moson County whose development has been spectacular, especially in the past 2 years, owing to the inflow of fresh capital into the area through the upsurge in production development (The improvement of the index can mainly be attributed to the activity of foreign companies.). However, the index of Nógrád, Komárom-Esztergom and Tolna Counties, respectively, is rather poor; moreover, it shows a declining tendency. The territorial differences within the country are well illustrated by the fact that two thirds of the counties do not reach half of the national standard considering the computed index (Fig. 8).

Budapest is, however, in a special situation, as it represents a different level of development in nearly every area. The role of the capital city in value production, social structure and areas requiring thorough specialist knowledge is unique. Therefore, its rivals and matches are not in Hungary, but in a wider European space.

Following the large-scale development of the fibre optic feeder network, but prior to meeting mass demand in that respect, the extent to which the counties had been supplied with information infrastructure was rather varied ranging from the capital city, which exceeds the national average by almost 50%, to Szabolcs-Szatmár-Bereg County, which lags behind it by one third. Undergoing the first wave of development, Győr-Moson-Sopron, Baranya, Csongrád, Zala, Vas and Nógrád Counties are relatively better off. Pest County represents the other end of the spectrum.

With the supply market taking shape, the advantage of Budapest has diminished. At the same time, the availability of infrastructure in Szabolcs County, still among the ones bringing up the rear, has improved. The gap between not only the capital city and the provinces but also between the most and the least advantageous counties has conspicuously narrowed, which means that there is no sharp spatial difference in the level of information infrastructure within the country. The availability of information infrastructure is unequivocally above the average in the counties of Northern Transdanubia. Baranya County in Southern Transdanubia and Csongrád County in the Southern Plain come next. The information infrastructure of both Borsod and Tolna Counties has improved considerably. Out of the counties well below the average, the indexes of Szabolcs and Pest counties have improved spectacularly. It, however, strikes us as strange that Somogy County, which was favourably judged 5 years ago, should stagnate, and that Heves and Nógrád Counties should experience an unequivocal step back (Fig.9).

5. The regional distribution of information-oriented workplaces

The weight of the service sector in employment

The service sector employed the largest group of active earners (almost half of them) in as early as 1980, however, even then, the development of the capital city and the "provinces", respectively, was different. In Budapest, close to two thirds of wage-earners were concentrated in the service sector, whereas their rate in the counties was only 43% on average. While on the national level tertiarization was making remarkable progress (in 1996 already two thirds of wage-earners worked in this sector), regional dichotomy hardly diminished. By the end of the period under review, four out of five active earners worked in some service area in Budapest as opposed to the provinces, where only three did. As well as the capital city, Pest County, too, spearheaded the process of transformation, and Somogy County, the stronghold of rural tourism, was also the scene of rapid restructuring. The counties in the Great Plain with a strong agrarian tradition (e.g. Bács-Kiskun, Békés and Jász-Nagykun-Szolnok Counties) seem to be falling behind in this process. Restructuring is apparently decelerating in some Transdanubian counties (e.g. Vas, Fejér and Tolna), too, where (re)industrialisation has commenced (Table 4).

The stage of tertiarization bringing rapid quantitative changes is expected to slowly come to an end. The advance of services is slowing down at the expense of other sectors. In the case of a few counties

or regions, it may even come to a halt or be slightly reversed. The above situation has arisen as a result of two processes, i.e. a slow increase in industrial (processing industry) employment, on the one hand, and the continued downsizing of public services (e.g. education and healthcare) deemed to be oversized, on the other. Regional differences within the country can only diminish very slowly. The tertiarization of the capital city and its metropolitan area (agglomeration) are likely to slow down owing to dwindling reserves. However, the re-layering of the wage-earners in agricultural counties is continuing, which may result in their slowly catching up.[2] The large-scale industrialisation currently taking place mainly in the Transdanubian counties, may even trigger the return of some of those working in the service sector to industries.

The regional distribution of wage-earners in information-oriented sectors

In the information society and economy, the advance of two service areas can be forecast. One is business services providing for the business community and ensuring the undisturbed operation of the economy, which employ an increasing number and rate of people. The other is personal services providing for the increasing and diverse demands of the population, individuals and various smaller social layers, which are becoming increasingly popular (Hepworth, 1992). In what follows, first, both changes in the rate of those working in these two major areas and regional differences within the country are surveyed. The regional distribution of the wage-earners in the primary sector (i.e. agriculture, forestry, fishing and mining), which needs relatively less information, serves as a control.

The capital city represents a category of its own for nearly 18 and 25% of all the wage-earners worked in information-oriented services in 1980 and 1996, respectively. The high initial level was matched with the pace of change, both above the national average, underscoring the fact that the development of Budapest and the "provinces" has taken somewhat different courses. In 1980 the counties in regional centres (e.g. Baranya, Hajdú-Bihar and Csongrád Counties) and the main tourist attractions (e.g. Veszprém and Somogy Counties) led the list of counties. The "stragglers" mostly included the agrarian counties in the Great Plain, but the indexes of the heavily industrialised spaces were not favourable, either. By the end of the period, Pest County had forged ahead conspicuously and taken the second place behind the capital city. The distribution of wage-earners also reflected the spectacular advance of tourism in Somogy County. However, the development of the other, formerly advantageous regions remained sluggish. It is remarkable that the changes measured should have taken place mainly in the nineties, i.e. it was then that the information society started to emerge in domestic economy and employment. The group of stragglers changed to a certain extent: the heavily industrialised counties ranked lower, while the backwardness of the agrarian counties somewhat diminished (Table 4).

Over the past 16 years, the rate of the wage-earners employed in the primary

sectors has fallen back to a mere fraction of what it used to be, affecting, though to a varying degree, the individual counties and regions, each element of the settlement network and each level in settlement hierarchy. In the period under review, as well as the capital city, Pest and Győr-Moson-Sopron Counties continuously stood out with their low rates. By 1996 they had been joined by the majority of industrialised counties owing to the drastic downsizing of mining. A more protracted transformation occurred particularly in the Great Plain counties with a strong agrarian basis. From the Southern Transdanubian counties hit by more massive industrial downsizing, many (e.g. Baranya and Tolna Counties) were also included in this category (Table 4).

The spatial inequalities in qualified jobs

Positions in local economies involving decision-making and the availability in a given settlement or region of highly qualified work force with specialist expertise assume special importance in the information society (Maskell et.al., 1998). The distribution of active earners according to the major occupational groups offers an approach through which regional differences within the country can also be measured. The index of the regional distribution of agrarian and unskilled labour force, like that of primary wage-earners in sectoral studies, was used as a control. In terms of information intensity, these two major groups can be considered the least vibrant areas, therefore they are likely to provide important extra information about the factors impeding the process.

With regard to the aggregate rate of major occupational groups 1-3 with high-level qualification,[3] the counties in the regional centres, along with the capital city, continue to be in the vanguard, the only exception being a Hajdú-Bihar County, which only joined the group in 1990. Initially, Veszprém County also belonged to the above vanguard, however, in 1996 it was replaced by Heves County. At the outset of the period, strugglers included Pest, Tolna and Nógrád Counties along with the counties in the Great Plain (Hajdú-Bihar County excluded). By the end of the period, however, even the counties well ahead in the process of (re)industrialisation (e.g. Vas, Zala, Fejér and Veszprém Counties) had fallen from their "midfield" position (Table 4).

In the 16-year period under review, on the national level, the aggregate rate of the major occupational groups chosen to serve as a control dropped to nearly half of what it used to be. The process is speediest in the capital city, where the rate of agrarian wage-earners is practically negligible and the presence of unskilled workers is also rapidly diminishing. The vanguard in the process of transformation include the better industrialised regions, which dominantly need skilled work force (e.g. Komárom-Esztergom, Borsod-Abaúj-Zemplén and Veszprém Counties). The target areas of new industrial capital projects also show unambiguously strong signs of catching up. In contrast, the indexes of the counties in the Great Plain are unfavourable. Somogy County in Transdanubia, where the weight of the agrarian sector in the local economy and employment is also very considerable,

also belongs to this category. The Great Plain does not show a uniform picture itself, for the counties in the North have lost their agrarian wage-earners at a rate above the national average. Concurrently, the rate of unskilled workers among those in employment has decreased relatively fast. In the counties in the South, however, the processes are considerably slow and the backwardness of those counties increased between 1980 and 1996 (Table 4).[4]

6. The computation of the urban information index

The other aspect of our analysis concentrates on the information activity on the urban level. The computed information index is based on the level of information infrastructure, the density of information technologies in institutions, businesses and homes and the intensity of using these technologies. Of the two dates selected (1994 and 1998), the former represents the early stage of mass development in telecommunications and the "birth" of information activities, whereas the latter shows the emergence of the "supply market" of the communications sector. The measured decline in the above mentioned elements in Budapest and other cities can mainly be attributed to the conservative data registration method of the Hungarian National Office for Statistics. If there are any new data in the registration, the central role of Budapest in the information flow can be seen clearly. At the same time, the "traditional" indexes signal a characteristic equalisation process because of the mature phase of their diffusion.

Transdanubia considered, the favourable conditions characterising the swathe along Lake Balaton were conspicuous as early as 1994. The active zone widening westward stretched as far as the Austrian border and ended at Budapest in the east. The strip along the western frontier and the Vienna-Budapest axis were rather active. Several small active zones are evolving around county seats and along the River Danube. Cities with unfavourable potential can be found in inner peripheries, and in the South West border zone. By 1998 the situation was different inasmuch as regions with unfavourable potential had shrunk and contiguous zones had been split up. However, problem areas had not disappeared. A certain group of old and new cities showed a consistently low activity. The spaces with favourable potential, especially the ones in the North of Transdanubia had expanded and the zones formerly separated from each other had gradually merged, enclosing, like enclaves, the spaces with unfavourable potential.

The cities in the agglomeration of the capital city are among the winners of the development. They had relatively favourable potential as early as 1994, which had become even stronger by 1998. A few smaller towns in the periphery of the agglomeration zone were, however, characterised by moderate activity during that period.

Favourable information infrastructure was an unequivocally big city phenomenon in the Plain in 1994, available exclusively in county seats. Forming a sickle-like zone stretching along the main

motorways and exhibiting major activity, the spatial emergence of a group of medium-sized towns (with 20 to 50 thousand inhabitants) still retaining favourable potential was also concentrated. A few centres also belonged to the active zone along the River Danube. However, other cities with higher indexes were islands in unfavourable surroundings. By 1998 the situation had modified inasmuch as some active zones had coalesced, too, and the number of single islands had slightly increased.

However, the majority of small and medium-sized cities in the Plain were unable to change their unfavourable situation both in 1994 and 4 years later. In a number of cases, even deterioration could be seen, a fact signalling that, despite relative considerable development, this group of towns were not only unable to catch up with the developed regions of the country, but, due to an uncommonly drawn-out growth, they also lagged behind the cities and regions taking the lead in development. The vicinity of both the national frontier and county boundaries and the lack of populous and multifunctional organising centres in some parts of the Great Plain are immediately reflected in the information indexes of cities. Now it seems, however, that neither the social and economic structure of this group of towns nor their value system can induce rapid changes.

In the North of Hungary the axis exhibiting the most conspicuous activity can be found in a wider region along the M3 motorway. Compared to 1994, the situation was different 4 years later inasmuch as the county seats concerned had further increased their advantage at the expense of small and medium-sized towns. The present situation of industrial cities reflects a slump in local economies.

As a result, spaces with unfavourable potential were concentrated in the fringe zones of the region. The small towns of Heves and Borsod Counties resembling those of the Great Plain form a congruous space with poor potential. Similarly, most small towns with impaired functions also seems to form an area falling back. The position of the clustered settlements with unfavourable indexes is stable and no dramatic shifts are to be expected in the near future.

Closing remarks

The techniques for measuring information activity of spatial units are largely uncertain. Creating time series of indicees are rather hard because of the very rapid technical and technological changes. The existing measuring tools and databases are useful in country level, but demonstrating the real regional inequalities are almost impossible.

In this paper we made a very first attempt for interpretting and measuring information activity in different regional and urban scales, using the existing and accessable databases. The results of different types of this research are not compatible each other completely. Exploring the differencies among these results is possible, but only with a very accurate and detailed field-work in the certain target areas. In this time, we have no tools how to

implement it, but we started a research to create the methodology of tihs type of field-work.

The main object of this paper is to make a starting point and a tool for other researchers to perform such kind of examinations in the field of information activity. I hope in one or two years we have more results and we can compare and estimate each other. The most important goal of the study would be the starting of an international research to investigate information activity in regional level.

Tables

Table 1. Some characteristics of expenditures of households by region (1992-1999)

A./ In the share of total personal expnditures

Buying vehicles	1992	1994	1996	1997	1998	1999
Budapest	3,3	2,5	1,1	1,4	1,3	1,1
Pest County	1,9	1,1	1,1	1,7	1,0	1,4
West-Transdanubia	2,9	3,7	2,0	1,0	1,8	1,5
Mid-Transdanubia	1,8	3,6	1,6	1,4	2,5	2,8
South-Transdanibia	3,6	2,9	1,6	3,5	2,4	3,0
North-Hungary	1,4	2,3	0,9	1,7	1,8	2,2
North-Great-Plain	1,7	3,2	2,1	1,3	1,0	3,1
South-Great-Plain	2,7	2,0	2,1	0,9	2,0	1,3
Hungary altogether	2,5	2,7	1,5	1,6	1,7	2,0

B./ In the share of country average

Buying vehicles	1992	1994	1996	1997	1998	1999
Budapest	151,4	108,1	83,9	105,9	94,4	64,4
Pest County	77,5	42,3	66,3	113,2	59,3	75,8
West-Transdanubia	108,0	139,9	127,5	60,9	104,6	73,8
Mid-Transdanubia	68,8	133,1	103,8	88,7	153,9	147,6
South-Transdanibia	144,9	107,6	103,2	229,6	143,8	146,6
North-Hungary	57,2	85,5	53,4	101,0	99,0	102,5
North-Great-Plain	64,5	109,5	127,0	74,0	55,3	141,5
South-Great-Plain	103,3	71,6	134,7	54,1	116,6	62,0
Hungary altogether	100,0	100,0	100,0	100,0	100,0	100,0

Maintenece costs of vehicles	1992	1994	1996	1997	1998	1999
Budapest	5,8	7,6	6,6	6,2	4,9	6,3
Pest County	7,0	7,4	7,5	6,8	6,4	6,9
West-Transdanubia	6,2	7,2	6,9	6,5	5,7	6,8
Mid-Transdanubia	6,8	6,5	6,9	6,6	5,6	6,7

Maintenece costs of vehicles	1992	1994	1996	1997	1998	1999
Budapest	107,5	122,2	122,5	123,0	109,9	113,0
Pest County	113,6	108,8	111,4	112,1	106,6	98,7
West-Transdanubia	92,9	107,9	103,5	102,6	102,2	102,0
Mid-Transdanubia	104,5	94,8	106,0	106,7	105,1	106,8

South-Transdanibia	7,5	7,9	6,8	6,8	6,4	7,2
North-Hungary	5,6	5,6	6,0	5,4	5,1	5,1
North-Great-Plain	5,1	5,0	4,9	4,4	4,7	6,1
South-Great-Plain	6,5	7,2	6,5	6,3	5,4	7,3
Hungary altogether	6,2	6,7	6,6	6,1	5,4	6,5

South-Transdanibia	121,0	118,7	103,9	114,2	116,4	107,7
North-Hungary	88,2	81,9	86,1	83,3	86,2	71,7
North-Great-Plain	78,5	67,9	68,1	62,8	77,4	86,3
South-Great-Plain	100,3	100,6	97,7	101,4	95,5	109,9
Hungary altogether	100,0	100,0	100,0	100,0	100,0	100,0

Telephone charges	1992	1994	1996	1997	1998	1999
Budapest	n.a.	2,0	3,5	4,2	4,9	5,6
Pest County	n.a.	1,2	2,6	3,6	4,3	4,7
West-Transdanubia	n.a.	1,1	2,5	3,2	3,5	4,1
Mid-Transdanubia	n.a.	0,8	1,9	3,4	3,9	4,3
South-Transdanibia	n.a.	1,3	2,4	2,8	3,1	4,0
North-Hungary	n.a.	1,4	2,3	3,0	3,2	3,9
North-Great-Plain	n.a.	0,9	2,3	2,6	3,1	3,9
South-Great-Plain	n.a.	1,0	1,8	2,4	3,2	4,1
Hungary altogether	n.a.	1,3	2,5	3,2	3,8	4,4

Telephone charges	1992	1994	1996	1997	1998	1999
Budapest	n.a.	176,9	167,6	155,4	155,6	148,4
Pest County	n.a.	89,2	124,6	111,8	122,2	95,9
West-Transdanubia	n.a.	87,7	98,2	94,0	91,1	90,9
Mid-Transdanubia	n.a.	62,8	76,6	102,7	106,2	100,8
South-Transdanibia	n.a.	101,7	95,6	89,3	82,2	87,2
North-Hungary	n.a.	106,9	85,3	88,8	76,7	80,6
North-Great-Plain	n.a.	61,7	81,5	70,4	73,3	79,4
South-Great-Plain	n.a.	74,0	69,1	73,7	82,2	90,1
Hungary altogether	n.a.	100,0	100,0	100,0	100,0	100,0

Source: Regional Statistical Yearbook 1993., 1995-1999.

Note: Before 1992 the structure of database was completely different.

Table 2. Stock of durable goods in households indicated information activity by region (in percent of national average)

Region	1989	1991	1992	1994	1996	1997	1998	1999
Central-Hungary	136,0	142,5	128,5	128,8	126,5	122,5	120,5	112,1
West-Transdanubia	82,5	85,3	98,5	94,5	104,5	111,8	110,8	107,0
Mid-Transdanubia	103,5	106,5	89,8	105,5	96,8	101,3	107,5	105,2
South-Transdanibia	77,8	87,5	93,0	113,8	97,8	97,0	96,5	105,2
North-Hungary	92,3	99,0	83,0	83,0	80,0	78,5	82,3	79,6
North-Great-Plain	75,5	78,0	77,8	76,5	85,5	83,0	81,3	84,7
South-Great-Plain	88,3	90,5	73,5	73,8	81,5	82,0	86,0	98,5
Hungary altogether	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0

Source: Regional Statistical Yearbook 1989., 1991., 1993., 1995-1999

I*ndecees of information activity: Color television set, CD-player, tape recorder with radio, HI-FI set, video recorder, video camera, satellite, mobile phone, personal computer and till 1992 in the positive, but since 1997 in the negative side the number of record player per 100 households in percent of the national average.*

Table 3. Regional competitiveness, information activity and level of urbanisation by counties (in percent of national average)

County	Competitiveness		Information activity		Urbanisation index	
Budapest	147		477		160	
Baranya	107		108		94	
Fejér	109		79		99	
Győr-Moson-Sopron	143		90		95	
Komárom-Esztergom	97		76		93	
Somogy	91		68		80	
Tolna	90		66		75	
Vas	117		75		92	
Veszprém	116		88		91	
Zala	93		76		98	
Bács-Kiskun	103		63		85	
Békés	87		60		89	
Csongrád	119		145		106	
Hajdú-Bihar	93		103		93	
Jász-Nagykun-Szolnok	83		83		87	
Pest	100		70		75	
Szabolcs-Szatmár-Bereg	71		62		73	
Borsod-Abaúj-Zemplén	80		73		87	
Heves	86		75		85	
Nógrád	67		56		79	

Edited by Gábor Nagy in 1999;

Table 4. Change of some characteristics of employment sturcture by counties (1980-1996)

	Rate of service sector			Share of information-intensive services			Share of primary sector			Proportion of highly qualified workforce			Proportion of under-qualified workforce		
Counties	**1980**	**1990**	**1996**	**1980**	**1990**	**1996**	**1980**	**1990**	**1996**	**1980**	**1990**	**1996**	**1980**	**1990**	**1996**
Bács-Kiskun	38,4	42,5	57,3	6,7	6,5	10,8	36,5	32,1	16,0	17,6	21,1	25,2	30,3	23,3	17,5
Baranya	46,9	51,4	61,3	9,9	9,2	12,3	29,2	24,3	13,9	21,0	25,6	32,2	21,3	17,6	12,1
Békés	38,3	42,9	54,8	7,0	6,8	10,4	32,5	28,2	16,5	18,3	22,5	26,8	26,2	21,0	18,1
Borsod-Abaúj-Zemplén	43,3	47,1	61,0	8,5	7,9	10,2	20,7	17,9	9,1	20,8	25,1	30,1	19,3	14,7	11,2
Budapest	62,3	70,5	81,6	17,9	20,5	24,5	4,3	3,4	0,8	39,0	40,1	46,6	9,5	8,1	5,9
Csongrád	46,1	51,2	61,5	9,3	9,6	12,5	25,7	21,0	16,7	21,8	26,2	28,7	25,3	19,9	17,9
Fejér	42,2	46,3	55,6	8,3	7,5	9,9	22,3	17,4	10,8	20,1	23,7	26,6	19,8	14,6	11,9
Győr-Moson-Sopron	44,9	52,0	61,0	8,7	9,4	12,9	18,6	15,0	7,8	22,2	25,7	29,6	19,7	14,8	11,9
Hajdú-Bihar	45,8	50,4	61,0	9,2	10,1	10,9	28,0	22,1	12,5	20,5	24,6	30,9	25,7	19,5	13,9
Heves	46,8	51,9	60,6	8,0	8,3	10,5	25,2	19,5	7,4	19,9	24,3	29,3	21,6	15,5	12,6
Jász-Nagykun-Szolnok	42,6	46,8	57,7	7,5	8,3	10,2	27,5	22,8	13,3	19,0	23,3	27,6	25,7	18,4	14,0
Komárom-Esztergom	39,6	45,8	59,5	8,2	9,0	10,8	32,0	26,2	12,1	20,6	24,1	27,4	17,6	13,9	9,7
Nógrád	44,6	48,1	63,8	8,4	7,5	12,1	21,2	17,2	5,8	19,4	22,4	28,4	19,5	14,9	12,5
Pest	46,9	54,1	70,0	8,8	9,8	15,1	18,8	14,9	6,2	18,2	21,7	27,7	19,7	15,9	12,7
Somogy	48,4	55,2	68,1	9,3	9,5	14,7	28,4	23,1	12,5	20,2	24,0	27,0	25,9	19,9	16,4
Szabolcs-Szatmár-Bereg	45,4	50,4	60,4	5,9	5,9	8,6	29,6	22,3	10,0	17,7	22,6	26,5	30,0	19,5	14,9
Tolna	44,7	46,5	55,3	7,8	6,7	10,7	28,3	23,4	14,2	19,4	23,4	28,5	24,6	19,2	12,9
Vas	46,5	50,4	54,9	7,9	8,2	9,4	20,5	18,8	8,2	20,6	24,2	25,4	22,3	16,1	11,6
Veszprém	43,4	48,4	60,3	9,6	10,3	13,1	25,6	21,9	10,0	21,1	24,0	26,6	18,2	14,3	11,3
Zala	46,5	51,0	60,2	8,9	9,0	12,3	27,0	19,5	8,8	20,0	23,7	26,7	24,9	17,0	11,4
Hungary altogether	47,9	53,6	65,2	9,2	10,8	14,3	21,4	17,5	8,8	23,8	27,0	31,8	20,3	15,5	11,9

Source: Based on the data of Central Statistical Bureau – Microcensus, 1996., own calculation

Appendix

Appendix 1.
Indicees for information activity of regions

Structure of expenditures (1992-1999)

Personal expenditures of average net incomes, from this:	
Rate of non-perishable consumer goods	
Rate of transportation and communication, from this:	buying automobiles maintenance costs of cars telephone charges (since 1994)
Culture, entertainment and recreation, from this:	much valued cultural articles recreation
Dwelling construction and purchases of real estate,	excluding repayment of loans for constuction

Stock of durable goods per 100 households

1989	1999
• Passenger car	• Passenger car
• Color television sets	• Color television sets
• Record players	• PC-s
• Video recorders	• Video recorders
• HI-FI sets	• HI-FI sets
• PC-s	• CD-players
	• Tape recorders with or without radio
	• Video cameras
	• Satellites
	• Mobile phones

Appendix 2.
Counties in the segments of information society –indicees

Economy and labour-market
- Rate of active earners
- Rate of unemployed people
- GDP per capita
- Industrial production per capita
- Active enterprises
- Rate of enterprises with FDI
- Subscribed capital of enterprises with FDI
- Enterprises with ISO and QS classification (Hungarian Quality Database)

Society
- Population change between 1990-99 (calculated)
- Agening index (Rate of 60-X population per rate of 0-18 population)
- Net migration
- Average monthly net earnings of employed people
- Personal income tax per capita
- Persons per one physician
- Hospital beds in operation

Communication
- Number of main phone lines
- Intra-firm computer networks (unique database)
- Length of fibre-optic bones (unique database)
- Number of data-transmission units (unique database)
- Length of motorways
- Length of main roads
- Number of airports (national and regional)

Universities and colleges
- Number of full-time students
- Change in number of students between 1990/91 and 1999/2000.
- Number of faculties
- Change in the number of faculties between 1990/91 and 1999/2000.
- Full-time students of third level educational institutions by residence of parents
- Rate of students in universities of sciences, technical universities and economic universities

Institutions of research and development (R&D)
- Number of R&D institutions
- Number of R&D units
- Actual staff number, of which scientists and engineers
- Number of staff with scientific degree
- Current R&D expenditures, of which rate of capital expenditures

R&D activity
- Number of R&D projects
- Number of book, of which in foreign language
- Articles published in foreign scientific reviews and in Acta Academica
- Number of licences and inventions (unique database)
- The rate of economic actors in R&D expenditures
- Use of Central Technological Development Fund by counties (unique database)

Level of urbanisation

- Rate of urban population
- Energy consumption in households
- Gas consumption in households
- Rate of dwellings connected to public sewerage network
- Length of public sewerage network per 1 kilometer of public water network
- Number of exhibitions (completed official database)
- Number of libraries
- Number of cinema performances (completed official database)
- Number of theatre performances

Economic competitiveness

See the calculations of J. Rechnitzer in the book of "Területi Stratégiák" Dialóg Campus Kiadó, Budapest-Pécs, 1998. pp. 270-271.)

Appendix 3.
Indicees used for calculation of urban information index

1994:

- Number of shops for industrial articles
- Number of shops for cultural articles
- Number of restaurants
- Number of confectioneries
- Number of international tourist arrivals in public accomodation facilities
- Average tourist nights of foreigners spent in public accomodation facilities
- Number of secondary school students (full time)
- Number of third level education students (full time)
- Faculties and departments in universities and colleges
- Number of readers registered in public libraries
- Number of enterprises in R&D and communication activities (CÍM-KE database)
- Rate of unemployment
- Number of persons receiving income substitution
- Number of persons receiving social benefit
- Investments per capita in the sector of transportation, logistics and telecommunication
- Total area of urban parks managed intensively
- Total area of urban parks
- Rate of dwellings and holiday houses covered by regular waste removal service
- Area of paved urban roads and squares
- Number of main phone lines
- Number of persons waiting for main phone line
- Number of visitors in local museums
- Number of visitors in theatre performances

1999:

- Number of shops for electrical household equipment
- Number of shops for books, newspapers and stationery
- Number of restaurants and confectioneries
- Number of foreign tourists accomodated in public accomodation establishments
- Average number of tourist nights spend by foreigners in public accomodation establishments
- Number of secondary school students (full time)
- Number of third level education students (full time)
- Faculties and departments in universities and colleges
- Number of readers registered in public libraries
- Number of active enterprises in the sectors of telecommunication, computer technology, R&D and media (CÉGKÓD-TÁR database)
- Rate of unemployment
- Number of persons receiving income substitution
- Number of persons receiving social benefit
- Area of urban parks managed intensively
- Total area of urban parks
- Rate of dwellings and holiday houses covered by regular waste removal service
- Area of paved urban roads and squares
- Number of main phone lines
- Number of persons waiting for main phone line
- Rate of dwellings connected to Cable-TV
- Number of domain-name servers (unique database)
- Number of intra-firm computer networks (unique database)
- Number of visitors in local museums
- Number of visitors in theatre performances

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(Footnotes)

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[2] Though this sector lost two thirds of its active earners between 1990 and 1997, further shrinking is expected to occur, mainly in the Great Plain counties, owing to the ongoing process of concentration.

[3] Major group 1: legislators, top-level managers in public administration, interest representation and economy; major group 2: persons in jobs requiring a university or college degree; major group 3: persons in jobs requiring any other certificate of secondary or higher education.

[4] High unemployment rate and the inner structure of the group of those out of employment in the Northern Great Plain can, however, partly explain the changes that have occurred, since it is agrarian wage-earners and unskilled workers who have lost their jobs on a massive scale.