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Complex regional assessment possibilities of competitiveness of the information economy and society in Hungary: from regional statistics to regional policy

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Complex regional assessment possibilities of competitiveness of the information economy and society in Hungary: from regional statistics to regional policy¹

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ABSTRACT:

Since ICT factors got growing importance in shaping social and economic differences, the determination of competitiveness in the information economy and society became needful in understanding modern regional disparities of Hungary. To evaluate recent inequalities caused by the factors of information and communication technologies (ICT) complex indices of competitiveness were created, which can reveal the reasons of major inequalities in the level of information society development. By the application of the widely known Bennett methodology estimations on the level of Hungarian small regions (NUTS4 or LAU1) were carried out based on regional statistical data.

Additionally calculations were made on the three major segments of ICT competitiveness reflecting also the advantages and disadvantages of structural circumstances. The structural factors of competitiveness in the examinations were the level of information infrastructure, the level of social adaptivity of ICT innovations and the level of the information economy, each of them measured by a complex index created from each structural factor's multivariable dataset. According to the results the majority of small regions have no kind of advantage in competitiveness, while only 10% percent of the small regions in Hungary have all components of advantage: good infrastructure, high level of social adaptivity and developed information economy.

By the recognition of ICT-based inequalities the strategic policy also tried to formulate suitable answers on how to develop regional information society. ICT-based regional strategies were created, which formulated several development directions and suggestions, however, they did not fully reach their aims. The efficiency of the strategies is below expected. Due to lack of allocated financial sources the strategic plans seem to be only bookshelf documents with no influences on regional inequalities. On the other hand there are also examples on successful development tools, but those have only indirect connections with regional information strategies. All in all the aim of this research paper is to describe what inequalities are present in Hungary and how they are introduced in regional plans, as well as to reveal the real possibilities of the application of this development tool by the evaluation of changes observable in statistical reports.

Keywords: information and communication technologies, information society, information economy, Hungary, regional disparities, regional information strategies

JEL classification: L86, L96, O18, R00, R58

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1 INTRODUCTION

Recently a growing group of factors can be forcefully emphasised among social and economic processes, which can not be omitted in researches of inequalities. At the beginning of the 21st century alongside of traditional factors of competitiveness some new ones seem to emerge, which have radical effects on inequalities. Since social processes in the background of the nowadays very popular phrase of information society are discovered in fact recently, there are more and more practical experiences confirming that processes affecting regional differences are showing also new characteristics. By the appearance of the new innovations of information and communication technologies a transformation process has got started, which has changed our opinion on regional differences and also on the everyday usage of space on the individual level and also on the level of the society. Since recognising the growing importance of the notion of information society, modern social sciences have certainly the task to discover and evaluate the main characteristics of changes induced by the information age.

The research of ICT-based inequalities despite the novelty of this term is already not unknown in circles of national and international researchers. Basic works of Castells (Castells 1996, 1997, 1998), Norris (Norris 2001) or van Dijk (van Dijk 2005) formulated many concepts on inequalities of the information society. Also regional aspects of this topic became widely analysed (see Odendaal 2003, Townsend 2001, Goddard et al. 1985), however it has still a lot of questions to be answered, especially in relation with recent policy making and ICT management. Just to mention some, it is important to know how regions differ from each other and what solutions are proper to manage and to develop information society of the regions.

The influence of recent years' international flows made it necessary in Hungarian strategies of regional competitiveness to include the topics of information society development as well. After the creation of the national information strategy regional development also recognised the importance of this topic, or at least its possibilities. Since 2004 and 2005, when Regional Information Strategies were created, it was entitled to expect wider range of results of information society development in the Hungarian regions. Real experiences of development policy are, however, not reassuring enough. Aims and thoughts formulated in regional strategies has been achieved and accomplished slightly or just indirectly. Interviews made with fellows of regional development agencies focusing on the afterlife and consequences of Regional Information Society Strategies tried to reveal real opportunities of this development tool. It made possible also to emphasise problems of information society development, and to collect the steps done since the publication of the strategies. According to the opinion of the professionals of regional development agencies the effectiveness of strategies are questionable,

however, there were some good examples (e.g. the network of telecottages) on regional (local) information society development, which had on the other hand not much connection with the previously mentioned strategies. In the following the regional pattern of ICT-based inequalities in Hungary will be presented, as well as the response of ICT-policy and regional policy on the challenges of information society development.

2 INEQUALITIES IN INFORMATION SOCIETY COMPETITIVENESS

When speaking about regional inequalities in an information society environment, new and somewhat complex definitions appear in scientific and policy documentation. Digital divide or sharply saying the digital gap is the expression of the researchers of information society on describing how specific the inequalities are in this environment. Digital divide is a multidimensional phenomenon with global divide, which reflects to the divergence of internet access between industrialised and developing societies, social divide, which concerns the gap between information rich and poor, and democratic divide, which signifies the difference between those who do, and who do not use the toolset of digital resources to engage, mobilise and participate in public life (Norris 2001). In the background of ICT-based differences there are (also) general social distinctions, namely income, education, gender or age differences of the population (Servon 2002). We should note that digital divide cumulatively foster existing social inequalities, therefore in many senses this phenomenon arises not just in information society. According to definitions of the OECD the main feature of digital divide is the difference of accessibility, which exists among individuals, households, economic and geographical regions, and which is determined by different variables of economy and society (OECD 2001).

Concerning regional differences, the several times mentioned accessibility dimension of digital divide in many senses was shaped as a consequence of inequalities based on geography. Regional level of built up infrastructure as well as distance from access points of networks is usually more unfavourable in geographically peripheral places. Accessibility is though a central category of the geography of information society. It worsens the chance of peripheries since the deployment of technical systems as the “soul” of network society is defined by regularities of economy (it’s worth or not), hence infrastructure differentiates society and space also on its own. Centre-periphery relations live further in urban-rural differences, additionally inequalities are defined along city-hierarchy as a result of that nodes of information and communication networks are to be found basically in urban spaces, and the density of connecting services and activities is also the highest at these places.

Theoretical researchers explain the altering role of the influencing effects of factors related to regional inequalities of information society mostly by the assistance of diffusion models (e.g.

Kiiski & Pohjola 2002, Hüsing & Selhofer 2004), primarily starting from that inequalities are basically determined by the adaptation level of ICT. Social and spatial diffusion in time is characterised by an “S” curve, which shows a time-lagged shape depending on the development level of the analysed social group (Fig. 1.). As a result of later adaptation certain social groups (peripheral regions) are becoming relatively lagged behind, which can be realised in social and spatial inequalities. In phases of the adaptation process different types of inequalities can be discovered. In early adaptation phase, when only few applies ICT, differences can be seen in accessibility, in the phase of diffusion differences are between users and non-users, while in the phase of saturation differences in quality can be emphasised (Molnár 2002). As a result, ICT-based inequalities can be more or less measured by the society’s adaptation level; this however does not or just indirectly take into consideration components like information economy.

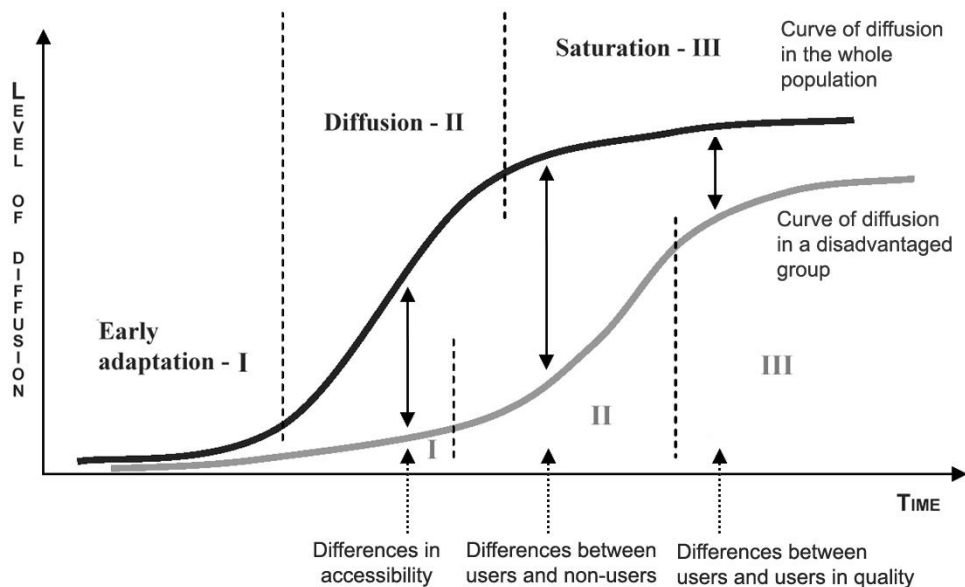


Fig. 1. Diffusion model of ICT innovations in the whole population and in a disadvantaged group of people (own construction after Galácz & Molnár 2003)

Inequalities of the application of information and communication technologies in function of the general development level of the economy and society can be described also in a complex way. Since the level of development has a significant multivariable character, numbers of social and economic factors should be taken into account. The resulted picture reflects both regional structure of information society development and a new dimension of socio-economic inequalities. The position in information economy and society has a sensible importance in regional competitiveness, therefore it can be interpreted also as a new factor of regional inequalities.

The inequality analyses of the predominantly social terms of development and the rather economic phrases of competitiveness are searching the answer whether new technologies are reproducing former regional structure of the economy, and fostering differences of

competitiveness between regions, or rather shaping up new patterns of spatial structure. It was already clear at the beginning of the 1990s that differences in development are partially consequences of diverse reactions on the challenges of the information age, but not independent from the starting position of the local economy, infrastructure, or social structure and adaptivity (Ruttkay, 1992). On the other hand at the beginning of the decade it was believed that Internet and the communication revolution may liberate economy from bounds of geography, since ICT can easily bridge physical distances and can defeat geographical barriers. In spite of disappearance of inequalities, however, the concentration of ICT and high-tech industries and the emergence of technological clusters showed the opposite processes. In these cases namely ICT contributes to the increase of competitiveness of cities, metropolitan areas and advanced regions, which stabilised former inequalities.

In differences of economic competitiveness beside inherited inequalities new mechanisms appeared significantly as well. ICTs in global economic processes reevaluated the factors of labour market by different solutions of distant working, or by placing administrative jobs (back offices) to other countries, or simply by the solutions of lease-work based upon the usage of information technologies. In the new information economy these regions and employees are sometimes called as “peripheral workers” in contrast with the central regions’ developed “core labour force”. Lease-workers of peripheral regions are working only in routine distant jobs, and while they often use modern technologies, these people are not in the position to significantly alter their network jobs. Therefore certain regions become centres of development, while others are left out of this opportunity. Making distinctions between central and peripheral regions can be explained by many other economic and social reasons as well, therefore a better way of selecting prosperous or lagging behind areas is the multivariable approach.

3 ESTIMATIONS OF ICT-BASED REGIONAL INEQUALITIES

In order to better understand the unequal spatial structure of Hungary, in the following estimations on the level of small regions (NUTS4 or LAU1) are presented. To discover regional inequalities of the information society a complex index was created, by the application of the well known simple Bennett methodology (Bennett 1954). Based on the dataset of 174 small regions a complex index of competitiveness could have been created using 8 indicators. Data were represented as percent of the maximum value and averaged by small regions with the following simple formula (1):

$$ISC_j = \frac{\sum_{i=1}^N \left(\frac{x_{ij}}{x_{i \max}} \cdot 100 \right)}{N} \quad (1)$$

where ISC_j is the index of information society competitiveness in region j , X_{ij} is the value of indicator i in region j , $X_{i\max}$ is the maximum value of indicator i in the dataset, and N is the number of indicators.

The following indicators were used in the estimation:

- *Indicators of the information infrastructure*: Internet subscribers per 1000 people, mobile phone subscribers per 1000 people, cable-TV subscribers per 1000 people, PCs per 1000 people;
- *Indicators of social adaptivity*: Internet users per 1000 people, level of e-Government in municipalities;
- *Indicators of information economy*: ICT firms per 10.000 people, share of on-line enterprises.

Values of the estimation range from 0 (the worst) to 100 (the best).

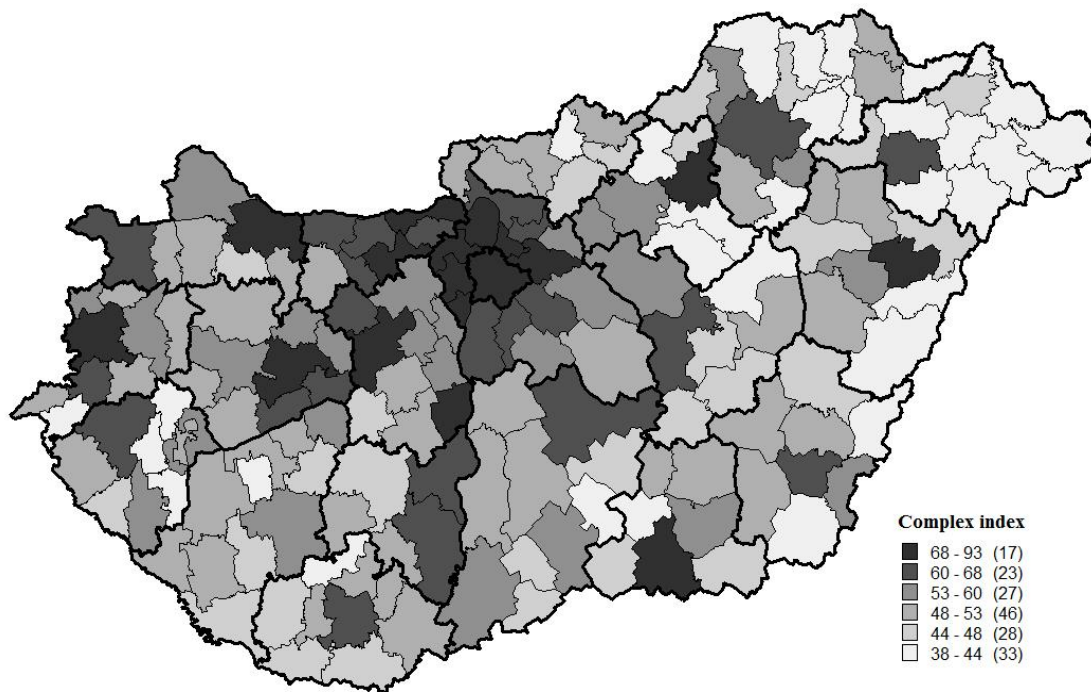


Fig. 2. Complex ICT index of small regions in Hungary, 2010

The figure below represents results of this detailed examination on Hungary's regional structure of development concerning the information economy and society (Fig. 2.). The map shows results of an important feature of the spatial structure of information society development, namely the definite difference observed by city-hierarchy, which is reflected by the above average attendance of urban areas. Meanwhile another significant feature is the lagging of the eastern part of the country. Regional differences between eastern and western parts of the country, particularly the lagging of the Great-Plains regions is remarkable. At the same time maximum values of the index are located mostly in the agglomeration of Budapest, in

metropolitan regions (Győr, Debrecen), as well as in the neighbourhood of Lake Balaton, whilst the minimum values of the index can be connected mostly to small regions of East-Hungary. The results reflect the location of the competitive and the lagging behind small regions within the country, and therefore serve as a good foundation of selecting intervention regions of ICT-policy.

Numerous other calculations confirmed that inequalities between regions are constant, or in other words the patterns of digital divide in Hungary are rather stable (Németh 2003, Csatóri et al. 2004). At the same time calculations made on the three major segments of competitiveness reflect also advantages and disadvantages in structural questions. These structural factors of competitiveness were: the level of information infrastructure, the level of social adaptivity of ICT innovations and the level of the information economy. Each factor was measured by a simple complex index created from each structural factor's multivariable dataset, and analysed as a comparison to the national average. In this calculation the previously already mentioned indicators were applied, which are based on statistical data collections of the Hungarian Central Statistical Office, and on surveys of the GKIeNET Institute, Budapest. The results were grouped as follows (Tab. 1.):

Tab. 1: Competitiveness types of regions

Group ¹	Information infrastructure	Social adaptivity	Information economy
Complex advantage in ICT competitiveness			
Favourable in all factors	1	1	1
Multifactoral advantage in ICT competitiveness			
Unfavourable only in level of information economy	1	1	0
Unfavourable only in level of social adaptivity	1	0	1
Unfavourable only in level of information infrastructure	0	1	1
One-factor advantage in ICT competitiveness			
Favourable only in level of information infrastructure	1	0	0
Favourable only in level of social adaptivity	0	1	0
Favourable only in level of information economy	0	0	1
Complex disadvantage in ICT competitiveness			
Unfavourable in all factors	0	0	0

¹ 0=below national average, 1=above national average

According to the results for 2010 (Fig. 3.) the majority (54%) of the small regions in Hungary had no advantage in any of the competitiveness factors. These small regions are dispersed everywhere in the country, but with higher numbers in South-Transdanubia, East and North-Hungary. The most successful regions with complex advantage in ICT competitiveness – having advantage both in infrastructure, social adaptation and information economy – are showing a more concentrated picture. In 2010 there were 19 regions (out of 174) in this category mostly in the Northwestern part of Hungary and around the capital of the country. Multifactoral but not overall complex advantage was experienced in 19 small regions, of them 15 were competitive in infrastructure and social adaptation, 1 (Nagykanizsa) in infrastructure and information economy, and 3 (Kiskunhalas, Dabas, Gyál) in social adaptation and information economy. In these

regions it is suggested to focus the strategic ICT-policy on the factor, which is the least developed, namely on the improvement of the information economy by 15 cases, the development of the information infrastructure in 3 small regions, and the development of the social adaptivity in the small region of Nagykanizsa. Other small regions of the country are represented with only one advantageous factor (there are 42 small regions in this category), therefore it is needed to concentrate on at least two directions of development by these cases. What more obvious on the picture is that the majority of the small regions have no advantage in any of the main factors of competitiveness. There are 94 small regions in Hungary, which have unfavourable position in all factors of ICT competition. These regions – located in Southern, Eastern and North-Eastern parts of Hungary – are the ones that are affected the most by problems of digital divide.

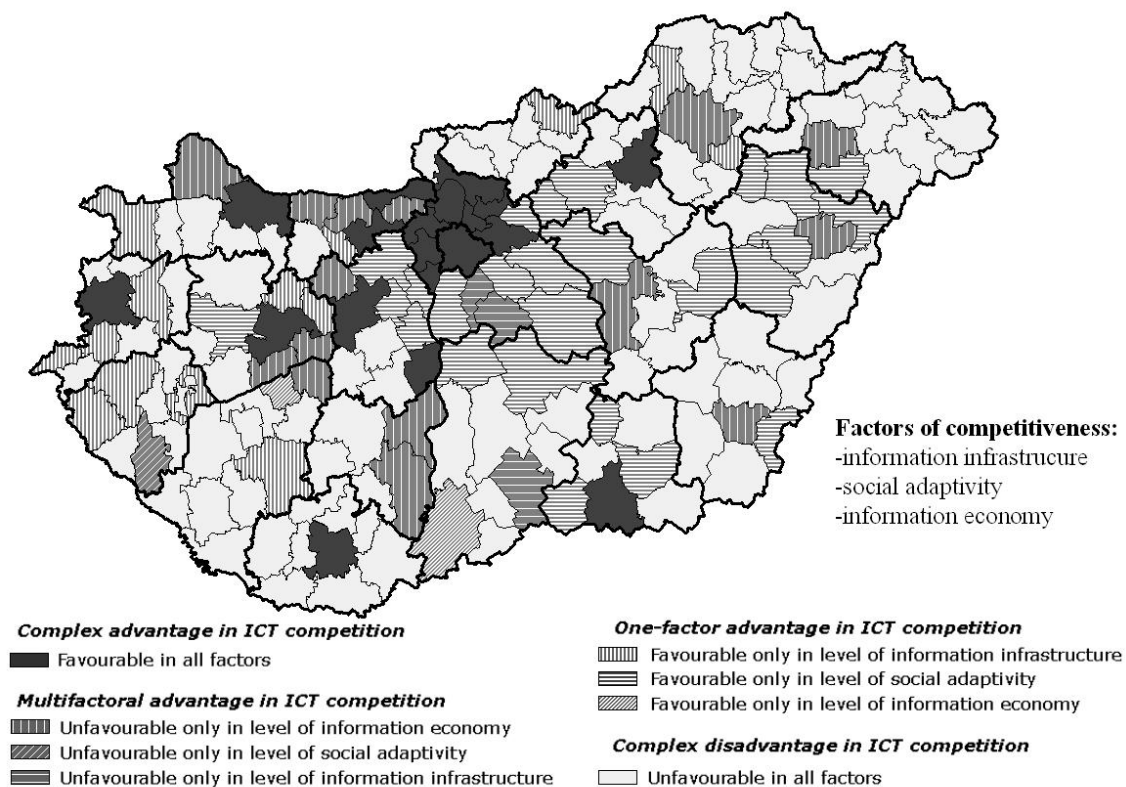


Fig. 3. Regional types of ICT competitiveness of small-regions in Hungary (2010)

The results of this competitiveness analysis may help policy makers to formulate the most suitable solution of information society development in each region. It could also contribute to the pioneer task to let policymakers understand that ICT should be taken into consideration when speaking about spatial inequalities in the 21st century. Regional inequality calculations therefore reflect the need of dealing with the topic of regional information society development, however, recent experiences of the application of Regional Information Society Strategies in Hungary do not always mirror these expectancies.

4 REGIONAL RESPONSES ON ICT-BASED INEQUALITIES IN HUNGARY

In parallel with the emergence of the thought of information society and the recognition of the existence of ICT-based inequalities, also the necessity of managing ICT-based development policy came to the light. As most development policy instruments the tool of information society development can be defined among wide conceptual borders. Problems appear already at the definition of information society or information economy (Karvalics 2007), to which the diversity of development tools – including regional development instruments – is added (see e.g. Mansell 1999). Comprehensively it still can be asserted that information society development and regional information society development has the aim to take advantage of the opportunities given by the information and communication technologies, as well as to steer the changes caused by these appliances to a positive direction for the society. This obviously comes from the thought that the progressive development of information society has beside the numerous positive consequences a lot of negative influences as well. As seen previously it could be mentioned for example that not all of us could take part the same way in information society, namely new regional and social inequalities may evolve. By the recognition of this the first plans, programs or strategies took shape already at the beginning of the '90s in order to act upon the new environment and requirements of the information age.

Information strategies are the most stressful tools within information society development. This strategy heightens the development of information infrastructure, the informatization of social systems and IT-industry policy (or the development of information economy), hence making a uniform platform to perspective plans. In many cases information strategies are communicated just as information society development programs, with direct concentration of governmental resources and systematic realization of long-term operative programs (Karvalics 1998).

The Hungarian way of national and regional information society development was of course not without preliminaries: it followed basically the EU trends. The European strategic documents, such as the “White Book” in 1993, the “Bangemann-report” in 1994 (Bangemann 1994), “eEurope” in 1999, “i2010” in 2005 or the Digital agenda from 2010 etc. had a significant influence on Hungary’s information development policy. Hungary recognised the necessity of the development of the information infrastructure relatively early (in the form of the Information Infrastructure Development Program or later the National Information Strategy, and National Information Infrastructure Development Program). Real information development program was however only created in 2001 (National Information Society Strategy), which later was developed to the most important document of the Hungarian Information Society Strategy in autumn 2003. This national strategy formulated both 10-15 years long plans and accentuated programs for 2004-2006. The document’s main system of aims were formulated in accordance

with the strategies of the EU highlighting topics like the enhancement of economic competitiveness, the improvement of life quality, or the broadening of the application of ICTs, which henceforward represent an infrastructure-oriented way of development. The real – empirical – operation of development policy of information society raises some questions at the same time: as far as the main aspect of the policy is concerned, it seems that information society development is not a primer direction of horizontal development, but only a side-line, therefore development acts were only done since they coincide with development directions of other branches. Nowadays, by recognizing the still existing necessity of information society development Hungarian professionals together with governmental participants are also trying to keep this development task among the main policy goals. As an important step the “Parliament of the Information Society” was brought to life in 2011 (and continued in 2012 as well) to collect and share the main development tasks and solutions among professional and governmental participants.

At the same time also regional aspects of information society improvement have emerged in development policies. The regional side of the Hungarian Information Society Strategy is represented by Regional Information Society Strategies, which assign regional aims of development. These documents are following primer concepts of eEurope and the national strategy, but in accordance with the previously created local or regional programs and concepts. The main goal of preparing IT strategies was the determination of tasks, which could be made during information society development more efficiently on local or regional level than on the level of central government. As a result of the 66/2004 Governmental order regional development councils received 140 million HUF to accomplish information society development programs fittingly to the expectations of the Ministry of Informatics and Broadcasting. The aim of the decentralised usage of this money was to create the regional strategies (or to actualize the previously prepared ones), additionally the detailed elaboration of programs and projects in relation with information society, which could be served as bases for applications to EU tenders, as well as for the creation of a regional monitoring system of the society.

Regional Information Society Strategies were accomplished in 2004-2005 in all regions. They include all the plans, which were needed to be achieved by the regions during the period of the Hungarian Information Society Strategy, namely in 10-15 years. Documents were prepared by regional agencies or passed out to companies, so thus people could take part in planning, who really see the possibilities hidden in the region and know the region-specific characteristics and local problems.

All the regional strategies attempted to put a emphasis on the reduction of regional inequalities within their area. These documents, however, do not specify causes and patterns of

inequalities in detail, rather based on main statements of research materials. The mentioned experimental calculations were mostly based on complex identification of the development level of information society by the application of multivariable datasets. These, however had not much influence on real texts and major directions of the strategies.

Regional Information Society Strategies formulated typically the same strategic aims (development of information infrastructure, implementation of e-government, creation of knowledge based economy and society etc.), since they had to fit in with national development strategies. The regions aimed at including all national development directions in regional documents, but with different weights. The region of Central-Hungary formulated a significantly different aim (putting the reduction of inequalities and the society-centered development in the foreground) than the region of South-Great Plains (naming the expansion of ICT in order to advance life quality). According to our experiences generally the more developed a region, the more significant shift can be seen from infrastructure development to the direction of human resource development. This is justified also on Fig. 4., which represents structural inequalities drawn upon the factors of information society of the regions. Regional structural models reflecting the level of information society development give a comprehensive picture on regional characteristics. Beside that these models show the variance of regions, they make possible to see also the structural disproportions of the regions, for example by demonstrating the deviation from the average in infrastructural factors or in the level of qualification, a proxy indicator of social adaptation.

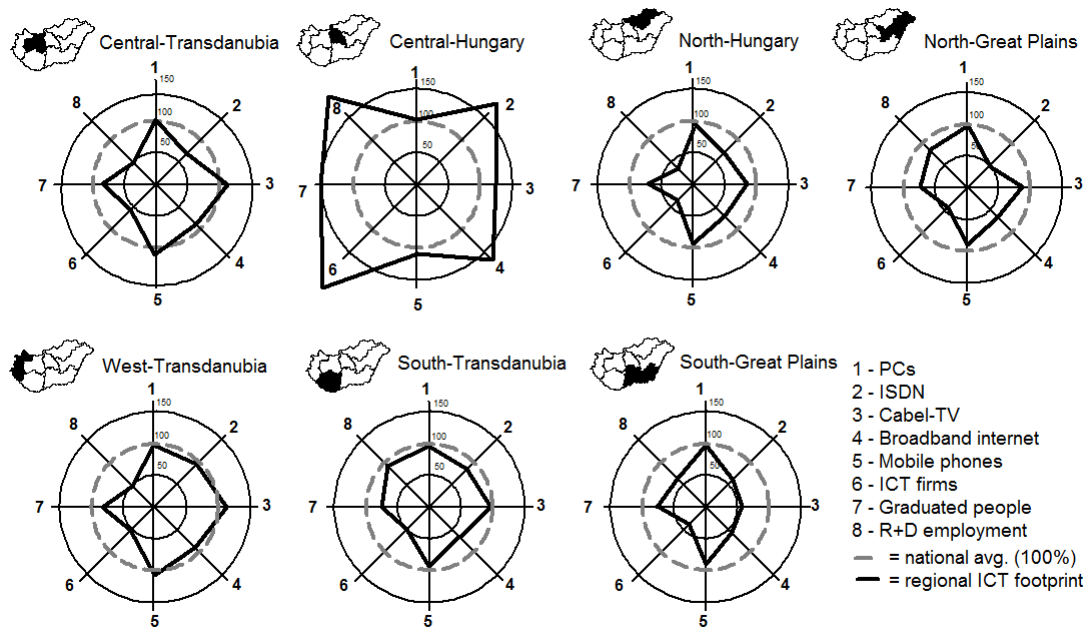


Fig. 4. "Information footprints" of Hungarian regions (2010)

The strong concentration of ICT tools and adaptivity seems to be justified on the level of regions in Hungary. It is beyond doubt that the region of Central-Hungary including Budapest has the highest values above national average, therefore strategic aims of this region understandably differs from others. While this region is significantly different from other parts of the country, there can be seen smaller but still decisive differences among other regions. The regions of West-Transdanubia and Central-Transdanubia have values around or sometime over national average in many indicators. Meanwhile regions of the Great Plains or North-Hungary in most cases can reach values only less than 75% of national average. The results certify the existence of digital divide, as well as its stability within the country, which was confirmed by the unchanged results of the 2001, 2003, 2005, 2007 and 2010 models.

Both national and regional strategies deal with the reduction of regional differences, namely on questions of fostering regional inclusion. A declared aim of the Hungarian Information Society Strategy is therefore the “reduction of cultural distances arisen from geographical and inherited disadvantages”, so thus the abolishment of digital gap, which appears directly or indirectly in every documents also on regional level. The solution of it can be very diverse, but it is already joyful that regional strategies try to achieve this goal not only by infrastructure development, but also or rather with tools of human resource development.

5 EXPERIENCES OF REGIONAL DEVELOPMENT POLICY

Since the 2004-2005 completion of regional strategies it was rightly expected that ever broader results of information society development could be seen. Real experiences of development policy are however not so reassuring, since the aims and thoughts formulated in regional strategies did not come true or became realized only indirectly.

Interviews made with fellows of regional development agencies tried to discover the real possibilities of the application of this policy tool by focusing on the afterlife and consequences of Regional Information Society Strategies. It aimed to reveal the problems of regional information society development, the attitude of the agencies, as well as the developments took place since the publication of the regional strategies (Jakobi & Lendvai 2009). According to the opinion of the fellows of the agencies the efficiency of the strategies are questionable. A concordant judgement was that however the creation of Regional Information Society Strategies had sense, they mostly were rather prepared as “bookshelf documents”. These materials belong to the group of non-used documents, having the main reason of the lack of sources in the background, the termination of the anyway small sources put behind the strategies. At the beginning 10-12 million HUF were available for one region yearly (which was not enough even for the shallow completion of the thoughts formulated in the strategies), later this source also

ran out by the reorganisation and discontinuance of the Ministry of Informatics and Broadcasting. It follows from the level of efficiency that concrete developments connected to Regional Information Society Strategies were realized nowhere in the country, on the contrary other developments (e.g. in connection with regional operative programs) sometimes indirectly influenced the topic of information society development. A positive example can be the region of West-Transdanubia, where as a result of some bottom-up initiatives and the demand of the public and the private sector, the idea of regional information society development is not idle. Among regional operative programs only the West-Transdanubian one contains concrete priority aiming at the development of information society.

Development of information society in itself is not treated as a main direction of development according to some of the regional agencies. They do not think in coordinated development, rather prefer to drive these processes to market basis. Other regions on the contrary would certainly deal with information society development, but have neither material nor labour sources for this aim. It seems the attitude of regions to information society development is ad hoc, like in case of other development processes. It is only positive if there happens to be a person, who takes up this topic and is able to assure the management to deal with this important thing. That's why like a common thought could emerge the demand to shape up an organisation for coordinating information society development, which could manage and harmonize development actions and possibilities.

Regional information society development is not a forgotten area despite the until now unsuccessful instrument of Regional Information Society Strategies. Among successful or at least intensively applied local development tools of the last years or already a decade can be mentioned the system of telehouses, the starting up of distant work programs, the evolution of regional websites and portals, or the development of the network of e-Magyarország access points. Some disparate pilot-like initiatives of the regions (e.g. wifi-village in South-Transdanubia or e-Learning academy in Western-Transdanubia) are showing that some of the thoughts drawn up in Regional Information Society Strategies could perhaps prevail in the regions by getting around the ways of traditional development policy.

6 CONCLUSION

By the application of complex indices in determining ICT-based competitiveness in Hungary it seems that inherited regional differences are still present in this issue. Traditional and new inequalities are parallel in the information society, in which the most important structural elements of regional disparities are therefore the differences between centres and peripheries on regional level, and the differences between cities and villages on small regional level, while in

the digitally divided world of cyberspace new social gaps between “people inside” and “people outside” are remarkable.

Although there was a promising regional response on ICT-based inequalities and an early enough recognition to narrow digital divide in Hungary, the creation of Regional Information Society Strategies were not adequate to solve all problems on their own. Since the lack of financial sources the pace of ICT-based development was not as fast as expected, resulting that inequalities remain basic questions of recent days. However, the topic of reducing differences by ICT-based development policy is not forgotten: it could get under way by some new tenders and constructions of national plans based on relatively large EU sources. On the other hand the governmental institutions of recent Hungary are expected to deal with this topic more efficiently in order to increase regional competitiveness and to reduce social differences.

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