New spatial motives of inequalities in the information age: the example of Hungary

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Abstract

Spatial features and inequality processes of the information revolution are standing in the focal point of the paper. The aim is to evaluate the spatial characteristics of the information economy and society, and to emphasise the new elements by the application of the terms of spatial sciences (e.g. space, place, distance etc.). The overall aim of the paper is to describe traditional and new features within the role that information economy and society or the information and communication technologies (ICTs) play in spatial inequalities and regional differences.
The type of space being applied in examinations principally influences basic terms of spatiality of information economy and society. Also the concept of place can be revalorised: it actually dissolves in virtual space, since the role of discrete place disappears by the possibility of spatial independency, while on the other hand spatial dependency differentiates space again and appreciates selected places. The importance of physical distance is unambiguously decreasing and changing, instead the role of network distance and social distance can be emphasised. Last but not least ICT may cause concentration or deconcentration of IT services and activities that can foster or moderate the role of centres and peripheries. From the complex system of interconnectedness the dimensions of digital divide, or the circumstances of inequalities of development and competitiveness can be traced out. In order to determine spatial patterns of inequalities estimations were prepared on different regional levels mostly on Hungarian examples.

Key words: ICT, information society, information economy, virtual space, digital divide

JEL Classification: O18, O30, R12

Introduction

Numbers along many aspects interpreted and described the popular phrases of information economy and society; consequently from the confusion of diversity ambiguous establishments may also be emerged. The necessity of moving towards a standardised terminology came up already by several authors, although it still can not be spoken about overall accepted, professionally supported consensus. This has also notable influence on arguments of theoretical and empirical researches embedded in the environment of regional science. On systematisation of different ways of interpretations as well as on the connecting regional influences and consequences an other study was presented on an earlier conference [1], for that very reason this paper has not the aim to clarify conceptual frames.

In the mirror of the basic terminologies of social space theories, this study delineates spatial characteristics of information economy and society. It aims to mention the aspects, in which spatiality of information economy and society can be defined, as well as the tangible and abstract or theoretical motives of spatiality. Finally from the complex system of interconnectedness the traditional and new differentiating role of information economy and society will be evaluated,

also concluding recent features of regional differences, those of having information economy origins.

"The end of geography" versus "geography matters"

The extreme wordings of "the end of geography" and "death of distance", as well as formulas of "geography matters", together with the same content appearing expression of "the revenge of distance" and "geography returns" are calling attention on recent geography's interesting duality in the research of the information economy and society. These seemingly funny, on the other hand gruesomely straight phrases are undoubtedly extreme, trying to emphasize the empirical considerations, those of mentioning remarkable novelties in the information age. Behind these terminologies actually the alteration of the aspect of traditional geography is hidden, as well as the concealed notice or simply recognition that one should be cautious concerning recent usage of geographical terms.

The big "battle" is to be discovered between the two most comprehensive reactions, the aspects advertising the end of geography and those emphasising reconsidered (or rediscovered) importance of geography. One of them has the starting point that in the aura of the possibilities ensured by new information and communication technologies the everyday troubles originated from spatiality disappear, namely the ardently wished dream, the overcoming on space may become reality. The other aspect on the contrary sees the reshaping of justification of geographical theories and notions in the age of information and communication networks. This opinion – in a sense – does not say anything in particular, only that social processes and spatial relations of differences are still decisive parts of our life.

Before the 90s never ever came up any similar thought, which could have seen emerged the ignorance of geography or spatiality in the world, discounted the utopian, perhaps futuristic, but no way empiric concepts of science. Later the altered possibilities of interactions generated by the information and communication technologies were obviously superposed on everyday life, making previous considerations of geography unimportant in the space of information economy. In connection with the seemingly immediate appearance of communication possibilities of ICT and particularly the internet and intranet technologies the radical compress of space-time relations were often supposed, which may result the complete "destruction" of space through time [2], [3], [4], [5]. In certain compositions this new digital and globalised world is similar to a pinhead, or at least to its "sense" [6].

Theories representing "death" of geography are basically arguing with wide interpreted influences of globalisation, as well as with consequences of digitalisation, of them neither seem to be considerable. According to Kevin Morgan the representatives of this opinion are largely overestimate "distance-dissolving" effects of information and communication technologies, while the key problems with these claims are that they conflate spatial reach with social depth and they forget that the rapid diffusion of information and codified knowledge does not mean that tacit knowledge and understanding are also so freely available. He is of the opinion that they treat geography as simply physical space, when it needs to be understood rather as relational space.

Those are standing against the radical transformation of spatial relations, the geography's revaluation and decreasing importance, who are representing the other end of the discussion arguing with the importance of geography. The theory of "geography matters" actually just rediscovered basic terms of geography, respectively realised that previous geographical principles are also standing their ground in a brand new environment; the rules are exactly the same, only

the comprehension needs some mental twists. As if we reordered the elements of the contents of our recent geographical terms, while having the substantive meaning unchanged.
It is important that possibilities of information communication network connections and infrastructural grounds of bandwidth, which determine the speed of communication connections, are still unequally distributed in space. This new form of communication is dependent on real world's spatial bounds, on geographical position of access points, materiality of cables, as well as on other infrastructural etc. influences outside the world of wires.
The statement that the above-mentioned radically different narratives parallel exist is unwarrantable until someone recognises that in reality it is about different aspects of the same thing. The concept professing the "end of geography" is focusing on equalising effects of globalisation, while representatives of the concept of "geography matters" accept the standpoint of spatial differences those appear in national, regional and local frames.

Spaces of information economy and society

If we postulate the regional science's definition of external spaces, then in the context of information economy and society only the space could be named external, which definitely had the momentum of localisation or the attachment to geographical (physical) space. The obvious localisation is made possible on the one hand by assigning data to traditional spatial units, settlements, municipalities or regions, on the other hand by spatial delineation of material objects with known geographical positions. All the formations that could be identified along these cross-sections are possible to be visualised in physical space, and herewith form the specific external space of information society.
Cable networks of information transference are representing the specific at the same time significantly important material fundamentals of the communication infrastructure that is forming the technical system of conditions of the information society. Actually the most important "public utility" of the information society, the cable system of information transmission plays the main role in the infrastructure-centred version of the external space of the information economy and society.
As by lots of social phenomena, in the case of information society we can often stumble upon social components, having system of connections or relations to each other showing spatial characteristics on their own. These internal spaces of the society can not be geographically localised at all. The new type internal spaces of information society offer huge volume of new experiences essentially originated from the simple formula that if it is really spoken about space, then geographical terms have their alternatives also in this environment. Virtual space or cyberspace is perhaps the best expression in professional circles on what could be named as specific inner space of the information society. One could have the opinion that cyberspace is only one of the appearing forms of inner spaces of the information society, namely also further inner spaces exist, however – as later experiences proved – all the other variants have some kind of a motive, which is in relation with basic terms and definitions of cyberspace, in other words only differences of denomination could appear. As a result of the information societal transformation, or to be more precise through the diffusion of new technical achievements – within that primarily the information networks – the new spatiality that emerged is sometimes also respected by the term of network space (e.g. [7]), or other times mentioned as information space [8]. The altered sense of space is also immanent of this expression, while unlike virtual or cyber formulas, this phrasing emphasises or at least suggests an other element of new spatiality: the changes arisen from information management.

Concerning its character cyberspace is quite divers and complex. This space could be characterised as some kind of a conceptional space of the flow of information and communication, which space came to existence through elemental combination of the digital world's hardware materiality, the software of computers, the telecommunication networks and human mind. Virtual space is not technology or infrastructure, but rather a medium, in which complex convergence of computers, communication and people seems to come true [9]. Cyberspace itself can not be touched or seen, however certain tools make it possible (e.g. telephones or internet browsers). Cyberspace is real virtual, namely invisible creation to which at the same time real material consequences are connecting (e.g. commerce of real goods in e-commerce solutions of virtual space).

Concepts of defining cyberspace as a medium perceive only functional content of virtual space, and do not really take its social and economic influences into consideration. Namely fundamental character of the cyberspace is that it has social origin as a whole. A social demand led to its born, and the technical improvement of socio-economic development made its physical frames, in which man placed his consciousness with that becoming part also of virtual space.

Spatial relations that emerged through interlacing of individual computers are reflecting spatial characteristics of the real world a specific way. In this sense cyberspace makes up space matching relativistic theories with ordered side-by-side position of spatial connections as spatial components. Absolutistic theories of spatial science on the contrary, or in line with this are on the opinion that cyberspace is the ether, which takes up and fills out spheres inside and in between computers [10]. Absolutistic space theory is also supported by the experience that users of virtual space may enter the sphere by logging in from outside, consequently expounding this world as a separate entity.

Space of flows – as Castells [11] formulated – is fluid and offers wide moving possibilities for enterprises, which hereby may become independent of real physical space [12]. The network organisation, which typifies information and communication interactions of the economy and society, formed the characteristic structure of virtual space in the form devoid of traditional spatial constraints.

The diversity of interpretations or conceptual approaches of cyberspace is obviously originated from the fact that representatives of theories talk about not always the same cyberspace. Eventually it is evident that a complex phenomenon like information society has a rather diverse appearance of inner space. Therefore, this inner space of information society is formed by spaces – in plural – of the virtual world.

The different types of spaces of information society – although having strong individual characteristics – can after all be organised to a logical chain, which arranges these different variants from physical space to spaces existing only conceptually (Figure 1.). Each type of space owns specific spatial characteristics, even so forming traditional and new spaces of information economy and society together.

The basis of the space of information society is given by real world's physical space, where entities, to which contents of information society are twitted, can effectively be found and localised. Conventional geography of real space serves as reference base for other spaces. On this comes network space containing the internet infrastructure, the fibre and satellite networks, other technological elements of data communication, as well as servers and users represented by IP-addresses. While all components of such networks are embedded in real space, the traffic in between them follows its own spatial order, herewith forming the space of telecommunication. The third level is represented by the metaphorical space of the web's multimedia contents and hyperlink connections (web space). It can be repeatedly seen that the existence of this space is

depending on physical networks, but the structure of web space is simply determined by topological frameworks. At last, on the topmost layer are the 3D virtual worlds, which are standing the closest to the concept of imaginary environment. While these seem to be similar to real world, the moving rules of such cyberspaces are merely different from those experienced in traditional space for instance in that they make it possible to switch between pseudo 3-dimensional forms of moving and spatial jumps of topological connections.

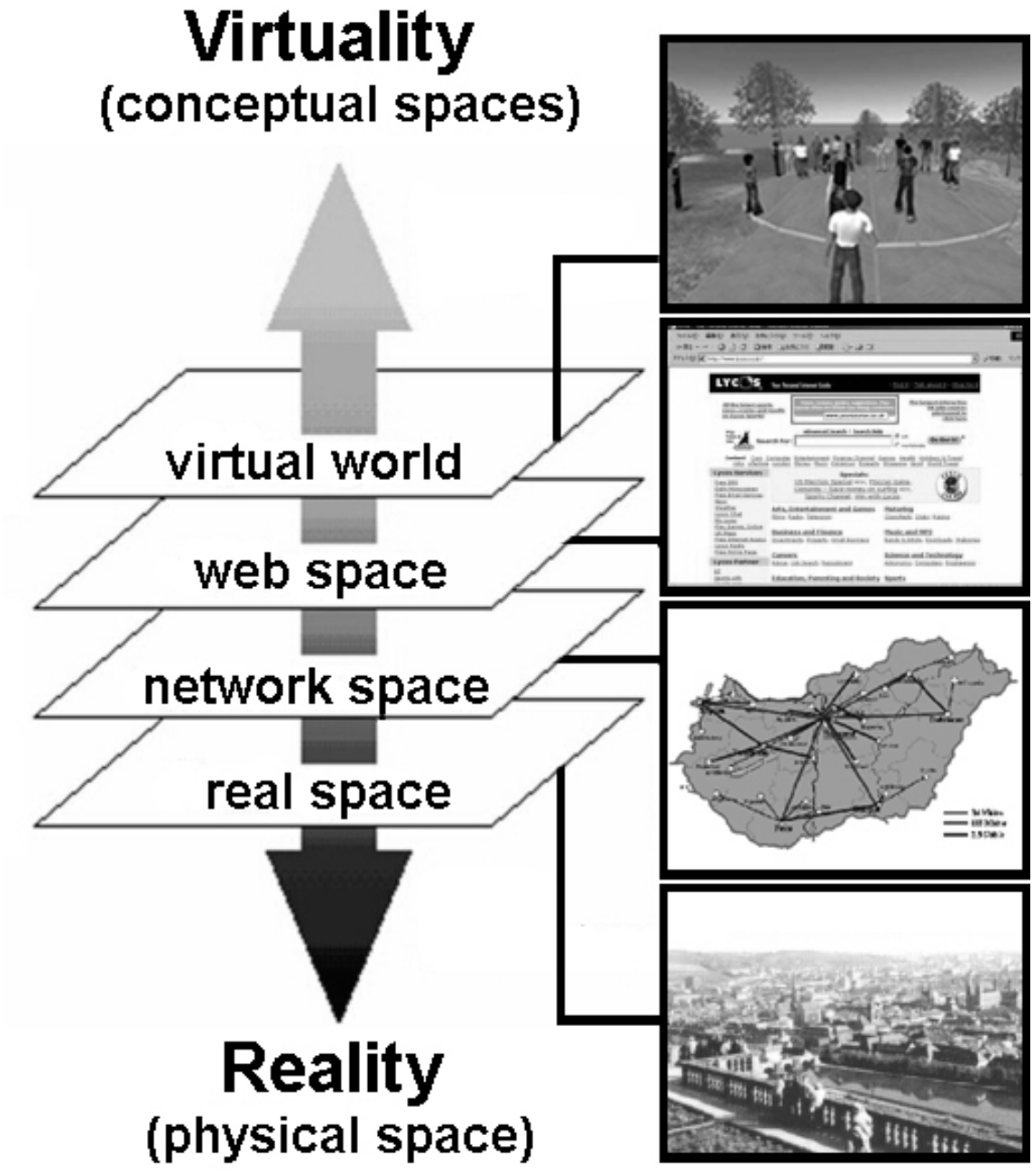

Figure 1.: Different types of information spaces (own construction after Shiode [13])

Traditional and new differentiating role of the information economy and society

Dimensions of inequalities in information economy and society are tracing out with different characteristics along spatial categories. Essentially these are the features that substantiate geography of information economy and society, and they figure the peculiarity on the ground of that spatiality of this economy and society can be disassociated from spatiality of traditional, non-information societies and economies. Social and economic changes have revaluated influencing power of spatial categories, which can be summarised in Table 1.

Table 1.: The role of major spatial categories played in inequalities in the traditional and in the information society

Spatial categories of inequalities	Role played in inequalities	
	traditional (non-information) society	information society
Place	Places are discrete The quality of place is not important	Discrete places dissolve Place in itself is not important Place of accessibility is important
Location	Central and peripheral location is decisive in geography and in the society	ICT concentrates and deconcentrates, ICT fosters both centres and peripheries
Border (horizontal division)	Separating role of borders is important in sustaining inequalities	Traditional borders dissolve, new social borders (gaps) emerge
Hierarchy (vertical division)	Role in hierarchy is important in the society	Role in hierarchy is important in the society and in the networks
Distance	Physical and social distance are both important	The role of physical distance get reduced, the role of social distance is still important
Moving	Distance and way of movement are both important	Flows, immediateness and mobility are important

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. In the background of regional differences there are (also) general social distinctions, namely income, education, gender or age differences of the population. 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

[14]. 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 settlement 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.

A significant scientific interest is indicated in becoming acquainted with international inequalities of information economy and society, which was manifested in that several different models and examination methods emerged recently in connection with global inequalities. According to the formula of the general methodology of global inequality examinations the following experiment aims at discovering international differences of competitiveness of information economy and society. This multivariable examination tried to create an index in the modern technology and information oriented world, which can properly explain the differences originated from social, economic and infrastructural effects. Each of the four predetermined components of the calculation contains two indicators:

Infrastructural bases
- PCs per capita (ITU, 2005)
- Internet hosts per 10000 people (ITU, 2005)

Social grounds
- Compound school enrolment ratio (HDR-UNDP, UNESCO 2004)
- Literacy rate in adult population (UNESCO, 2004)

ICT in society
- Internet users per 100 people (ITU, 2005)
- Cell-phone subscribers per 100 people (ITU, 2005)

ICT in economy
- Computer, information, communication and other commercial services as percent of commercial services (World Bank, 2003)
- e-Commerce revenues as percent of the GDP (www.netprofiteurope.com)

Based on the dataset of 163 countries a complex index of competitiveness could have been created using 8 indicators. Data were represented as percent of the maximum value and averaged by countries with the following simple formula:

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

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

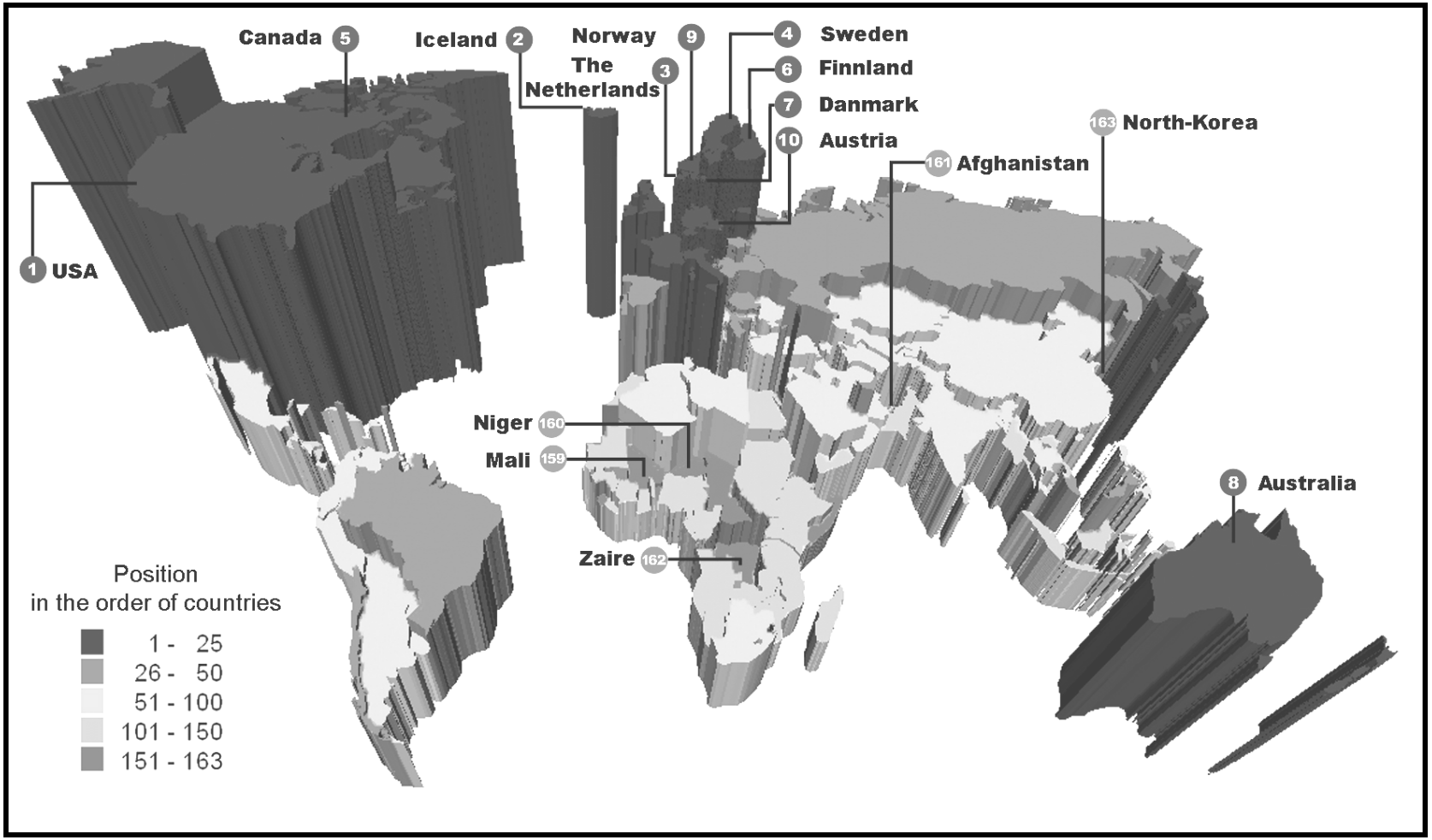

Figure 2. Differences of information society competitiveness in countries of the world

Figure 2. shows the results representing countries with different sized blocks drawn as the value of the index. Higher elevation regions (e.g. North-America, Japan, Australia etc.) and regions of lower height (mostly Africa) are having conspicuous differences, which definitely (and figuratively) prove the existing digital gap theories on the global level. In this dimension of competitiveness the higher values can be experienced in case of the United States (81,9%), Iceland (73,9%), The Netherlands (71,3%) and Sweden (70,9%), while the lowest is shown by countries like Afghanistan (6,5%), Niger (7,1%) or Mali (9,1%). The lowest depression on the map could possibly be connected to North Korea, where no public internet is available at all. On the map of worldwide digital inequalities also blocks, which exceed their neighbourhood can be seen rarely representing developing countries that count development of information society especially important concerning concepts, strategies or economic policy. It is not by chance that Taiwan, Malaysia or even Israel has good results.

Regional models of the spatial structure of information society can foster experiences on basic dimensions of regional inequalities. In order to get more detailed picture of unequal spatial structure, estimations for lower regional levels are essential to be prepared (Figure 3.). This next experimental model takes into account the region's own structural disproportion e.g. the deviation from the average level of infrastructure or education, and meanwhile shows also differences between regions. As per the results on regional level strong spatial concentration of ICT infrastructure, services and social adaptivity seem to be justified in Hungary. The region of Central-Hungary robustly differs from other parts of the country, while differences among other regions are more varied, however, with relatively low standard deviation.

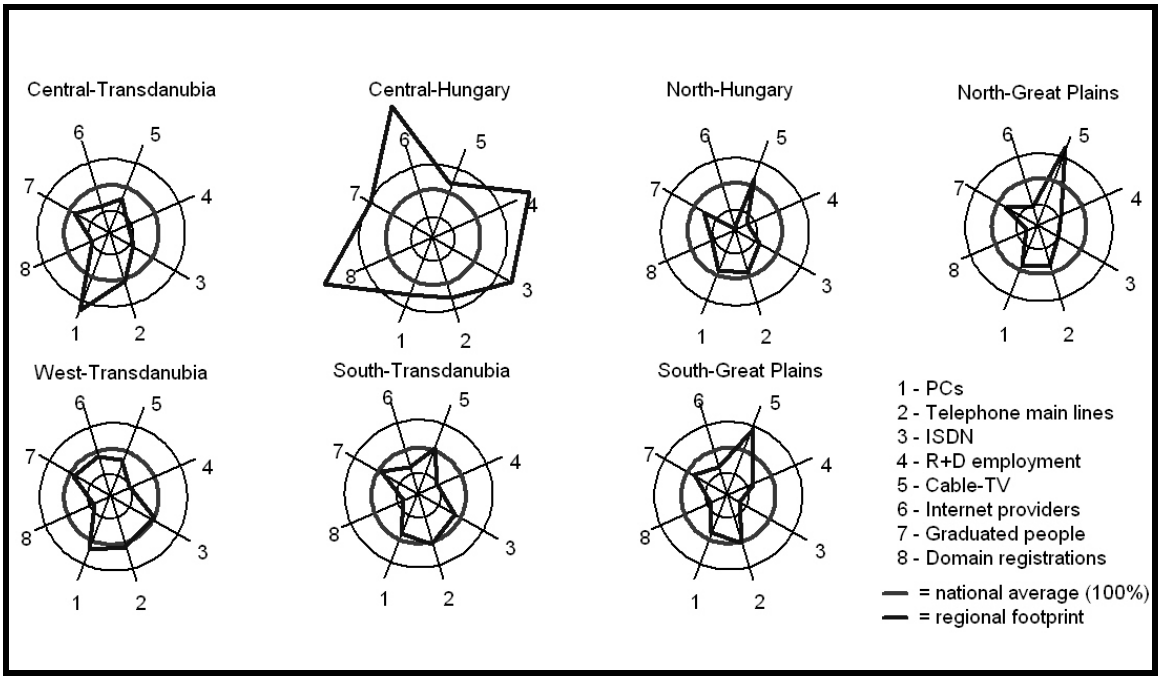

Figure 3.: „Information footprints" of Hungarian regions (2001)

The last picture represents results of a more detailed examination of Hungary's spatial structure of development of the information economy and society (Figure 4.). The map shows results of a calculated complex index of small-regions (NUTS4 or LAU1), with definite differences by settlement-hierarchy, which could be indirectly seen in above average attendance of town regions. Also regional differences between eastern and western parts of the country, particularly the lagging of the Alföld (Great-Plains) regions are remarkable.

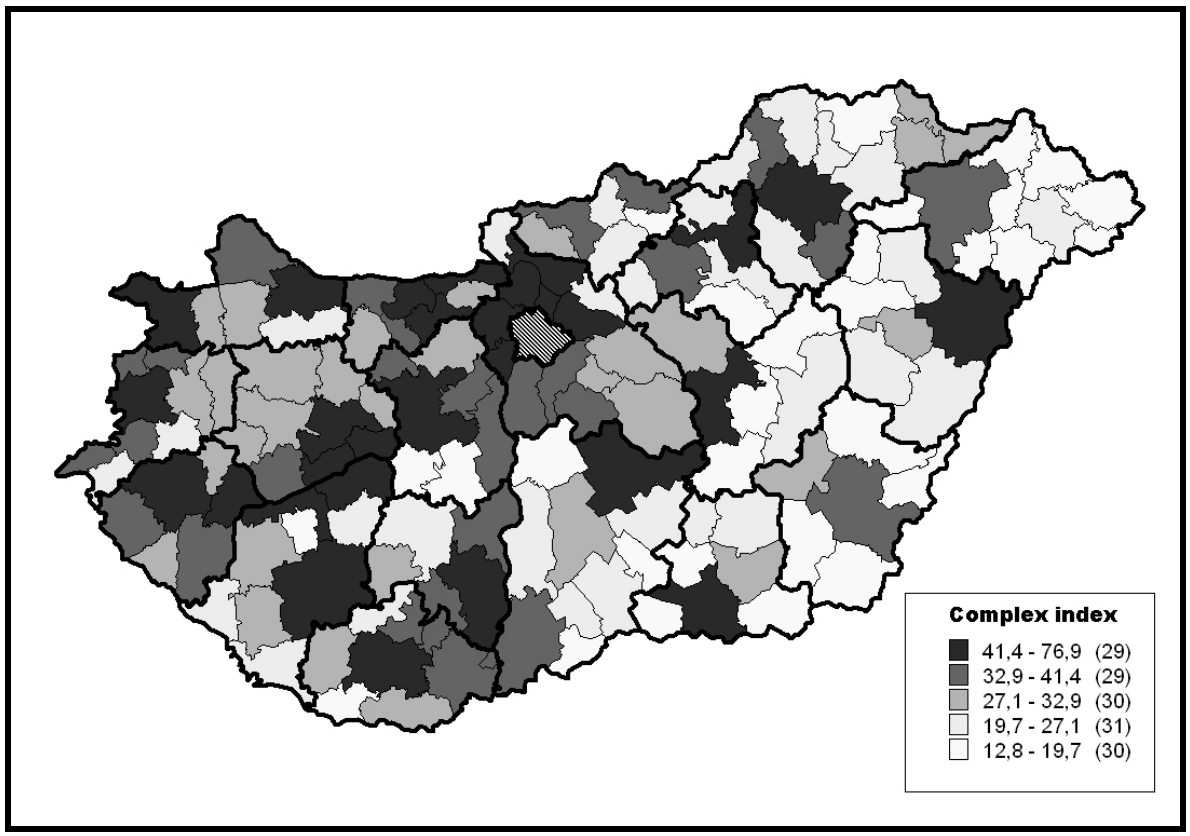

Figure 4.: Complex information index of small-regions in Hungary (2003)

Conclusion

There exists nowadays a lot of theoretical approaches in connection with information society those basically determine the spatial frames of examinations. The research reveals the necessity of the parallel usage of approaches emphasizing the role of space, and treated as traditional in this context, and the approaches of rejecting spatiality, and named new in this sense.

According to results of the research, on the one hand inherited regional differences happen again in this medium, however, on the other hand through revalorisation of distance and place the regional differences got into new light. Traditional and new inequalities are parallel in the information society. Most important structural elements of regional inequalities are the differences between developed and less developed countries on global level, the differences between centres and peripheries on regional level, and the differences between cities and villages on small regional level, while in cyberspace new social gaps between "people inside" and "people outside" are remarkable.

References

[1] JAKOBI, Á. (2005) Revaluating regional influences of ICT factors in Hungary. In: *45th European Congress of the Regional Science Association*, CD-ROM, Vrije Universiteit, Amsterdam. Available at: http://www.ersa.org/ersaconfs/ersa05/papers/677.pdf

[2] ATKINSON, R. (1998) Technological change and cities. *Cityscape: A Journal of Policy Development and Research* 3., pp. 129-171.

[3] BRUNN, S. D. – LEINBACH, T. R. (eds) (1991*) Collapsing space and time: Geographic Aspects of Communication and Information.* Harper Collins Academic, New York, USA.

[4] CAIRNCROSS, F. (1997*) The death of distance. How the communication revolution will change our lives.* Harvard Business School Press, Boston, USA.

[5] MORGAN, K. (2001) The exaggerated death of geography: localised learning, innovation and uneven development. *The Future of Innovation Studies Conference*, The Eindhoven Centre for Innovation Studies, Eindhoven University of Technology.

[6] NEGROPONTE, N. (1995) *Being digital*. Coronet, London.

[7] SUCHÁČEK, J. (2004) *The Emergence of the Geography of Networks.* Net Culture Science / Netz Kultur Wissenschaft. http://www.kakanien.ac.at/beitr/ncs/JSuchacek1.pdf

[8] FABRIKANT, S. I. (2000) The Geography of Semantic Information Spaces. *GIScience 2000 – First International Conference on Geographic Information Science*, Savannah, Georgia, USA. http://www.giscience.org/GIScience2000/papers/016-Fabrikant.pdf

[9] DODGE, M. (2001) Cybergeography. *Environment and Planning B: Planning and Design*, volume 28, pp. 1-2.

[10] SARDAR, Z. – RAVETZ, J. R. (1995) Cyberspace: to boldly go… *Futures*, 7., pp. 695-698.

[11] CASTELLS, M. (1996) *The Rise of the Network Society*. The Information Age: economy, society and culture. Blackwell Publishers, Oxford.

[12] KITCHIN, R. M. (1998) Towards geographies of cyberspace. *Progress in Human Geography*, 3., pp. 385-406.

[13] SHIODE, N. (2003) A geographical interpretation of cyberspace: preliminary analysis on the scaling tendency of information spaces. In Boots, B. N. – Okabe, A. – Thomas, R. (eds.) *Modelling Geographical Systems: Statistical and Computational Applications, Geojournal Library*, 70., Amsterdam: Kluwers, pp. 275-293.

[14] OECD (2001) *Understanding the Digital Divide*. OECD Publications, Paris.