ESPON

EUROPEAN SPATIAL PLANNING OBSERVATION NETWORK

ESPON project 1.2.3

Identification of Spatially Relevant Aspects of the Information Society

Second Interim Report
January 2006

Co-financed by the European Community through the Interreg III ESPON Programme

This report represents the interim results of a research project conducted within the framework of the ESPON 2000-2006 programme, partly financed through the INTERREG programme.

The partnership behind the ESPON programme consists of the EU Commission and the Member States of the EU25, plus Norway and Switzerland. Each partner is represented in the ESPON Monitoring Committee.

This report does not necessarily reflect the opinion of the members of the Monitoring Committee.

Information on the ESPON programme and projects can be found on www.espon.lu

The web side provides the possibility to download and examine the most recent document produced by finalised and ongoing ESPON projects.

This basic report exists only in an electronic version.

Warsaw University, Centre for European Regional and Local Studies (EUROREG)
October 2005

Foreword

This is the Second Interim Report of ESPON Project 1.2.3 "Identification of Spatially Relevant Aspects of the Information Society". The project started officially on June 27, 2005. The Subsidy contract between ESPON Monitoring Authority and Warsaw University EUROREG (Lead Partner) was signed on 6th October 2005. The partnership agreements between all Project Partners and the Lead Partner were signed before the end of October last year.

The Information Society is a new phenomenon influencing regional development within Europe. The understanding of IS impacts on spatial processes is crucial when formulating adequate policy recommendations. Thus the project aims at integrated analysis of three IS components: technological, economical and social in order to understand the territorial aspects of the Information Society and assess whether the ICTs and initiatives on the Information Society are making space more coherent and promoting a balanced and sustainable development of the territory of the EU or are exacerbating disparities between regions, both inside and across countries.

The project is expected to define concepts and to find appropriate territorial indicators, typologies and instruments as well as methodologies to identify trends with special reference to regions concerning the development of the Information Society and taking into account typologies developed by other ESPON projects (on polycentrism, urban-rural relationship, transport trends and R&D impact).

As ESPON project 1.2.3 belongs to the first strand of the ESPON projects, covering thematic issues of major spatial developments, it holds an important position for the elaboration of the whole programme by contributing to the preparation of the common ground for the investigation of IS related themes in relation to the spatial structure in Europe. Among other newly launched projects and due to the role of the IS in the context of the Lisbon Strategy, ESPON project 1.2.3 can be expected to serve as a strong scientific basis for the propositions of the Commission in view of the reform of post-2007 Structural Funds.

To achieve such ambitious objectives, the findings of the project will be based on literature analyses, statistical comparisons and empirical studies. They will have a more general meaning for a broader context of the European spatial and cohesion policies, as well as for the national and regional development policies in the member states of the EU. The methodology applied in the project will fulfil all the requirements

referring to the indicators collected, data analysis, and references to earlier ESPON projects.

The presented report is the result of joint effort of the all project partners under the leadership of Warsaw University, EUROREG.

The transnational project group (TPG) is composed of seven scientific institutions from different European countries. These institutions are listed below in alphabetic order by country of origin.

Department of Social Geography and Regional Development, Faculty of Science DSGRD-UP, Charles University in Prague, Czech Republic

Karelian Institute, University of Joensuu UJOE, Finland

Institute for Regional Development and Structural Planning – IRS, Erkner, Germany

Department of Planning and Regional Development DPRD, University of Thessaly, Greece

Institute of Economics of the Hungarian Academy of Sciences IE-HAS, Hungary

1112 Budapest, Budaörsi út 45
Tel.: (36-1-) 309-2600
Fax: (36-1) 319-3136

Department of Economics and Institutions, Faculty of Economics, University of Rome "Tor Vergata", URTV, Italy

Warsaw University, Centre for European Regional and Local Studies (EUROREG), Poland

The ESPON Programme was launched after the preparation of the European Spatial Development Perspective (ESDP), adopted by the Ministers responsible for Spatial Planning of the EU in May 1999 in Potsdam (Germany) calling for a better balanced and polycentric development of the European territory. The programme is implemented in the framework of the Community Initiative INTERREG III. Under the overall control of Luxembourg, the EU Member States have elaborated a joint application with the title "The ESPON 2006 Programme – Research on the Spatial Development of an Enlarging European Union". The European Commission adopted the programme on 3 June 2002.

See http://www.espon.lu for more details.

The views expressed in this report do not necessarily reflect the opinion of the ESPON Monitoring Committee.

Table of contents

Figures

Tables

Maps

1 Introduction

1.1 Thematic scope and context

The Information Society (IS) definition in literature and in official documents of the European Union is not explicitly formulated. On one hand the IS is described as a telecommunication society, from the other as a learning, innovative and creative society. Therefore the descriptions of the spatial impact of IS is determinated by the adopted approach (Cornford, J., Gillespie A., Richardson R., 1999).

However, regardless of the diversity of definition we are certainly witnesses of important shifts in the global economy – from an industrial towards a knowledge-based or information economy. The recent observations and the wide range of literature indicate that one of the main characteristics of the modern world is the growing significance of knowledge and information in determining economic performance, which leads to a new economic paradigm where innovation processes play a fundamental role (Toffler A., 1997; Drucker P.F., 1999; Thurow L., 1999; Naisbitt J., 1997; Dunning J.H., 2000) simultaneously inducing new modes of knowledge production (Kujath H., 2005).

Against this background we can identify and describe several spatial trends observed in Europe. These are as follows:

1. In the knowledge-based economy (K-BE) paradigm the ability to create innovations and participate in multi-level networks have become the source of stable competitive advantage (Lundvall B.A, Johnson B., 1994). Those regions in which competitive, innovative firms are concentrated do attract new investment and are able to improve their technical and institutional infrastructure, as well as to offer good living conditions for the "world class" (Kanter R.M., 1995). The territories less accessible, with obsolete social and economic structures, are lacking these advantages and have to rely on competing with costs of production.
2. Therefore, the chances for such backward regions seem to be even smaller in the knowledge-driven economy than it had been the case in the previous model of industry-based growth (Malecki E.J., 1997; Gorzelak G., Jałowiecki B, 2000). Two factors seem most responsible for this change: the growing role of the transnational companies, at the expense of the interventionism of the state, and the growing importance of the "innovative milieu" for innovation-driven businesses (Castells M., Hall P., 1994; Camagni R., 1999).

3. The last observation is strengthened by the fact that - as research proves (M. Castells, Oxford 2001) - the concentration of companies working within and for the Internet are even more concentrated spatially than the companies of other sectors. The expectations that the internet will allow for a more even spread of economic activities have not materialised. With the exception of computing- and call-centres (which, however, concentrate mostly skilled "digital-workers", and not the highest professionals), most of Internet-related services are concentrated in big cities – i.e. where the customers of internet-providers are located. Consequently, metropolitan areas, in this context, are nodes of intra- and interregional networks of knowledge production (Schmidt, S., 2005).
4. Thus, in general, the metropolitan areas (identified within ESPON program as MEGAs – Metropolitan European Growth Areas) are the regions best prepared to develop the information and communication technologies and take advantage of the virtues of the knowledge-based economy and the information society (IS) (Gawlikowska-Hueckel K., 2003). However, according to the current experience, there is evidence that there are cases in which these areas seem to cut the ties with their regional hinterlands and with the more distant peripheral regions, and tend to increase the exchange within the global metropolitan network (Gorzelak G., Smętkowski M., 2005). Thus, the least advanced regions loose relative distance to the ones better endowed with the assets and skills needed for the K-BE and the development of the IS.
5. Given the actual almost saturation level of ICT – like the cellular phone and Internet - in most regions of Europe, the qualitative dimension of the use rather than the quantitative level of adopting these technologies is an important factor which influences the impact of the ICT on economic development. The business use of the Internet varies strongly across European countries and regions (ESPON 1.2.2 Final Report), as well as the spread of e-administration, e-education and e-culture. In the higher developed and technologically more advanced countries the use of the ICT is more profound and shapes the socio-economic process in a deeper way than this in poorer countries and regions, where the ICT is more used on the "consumption" (personal communication, passive use of internet for entertainment and communication) rather than on the "creation" side.
6. The national policies of the member states vary strongly with respect to IS implementation (including i.e.: ICT development, technology promotion and innovation support). Several countries have long ago

recognised the importance of the wide and development-related use of ICT as a factor supporting their development and increasing their competitiveness due to greater technological and innovative potential. Some other seem to be delayed in this respect, and their activities rely more in programming than in real actions. Similar differences may be found in the policies introduced by particular regional authorities (Dabinett G., 2001; *The Structural Funds …,* 2001).

7. It may be stated that the many members of the EU would rather resemble the second group of countries – which are more active in programming the accelerated creation of the knowledge-based economy and information society rather than being involved in real activities and actions.
8. The Lisbon Agenda (*eEurope, 2000*), although promising and challenging, has in fact be implemented at a very slow, unsatisfactory pace, and has had a much weaker effects on the EU on the whole and its member states than the national polices of the most advanced countries within the EU. The promising revision of the Lisbon Agenda is still to be implemented.

1.2 General objectives

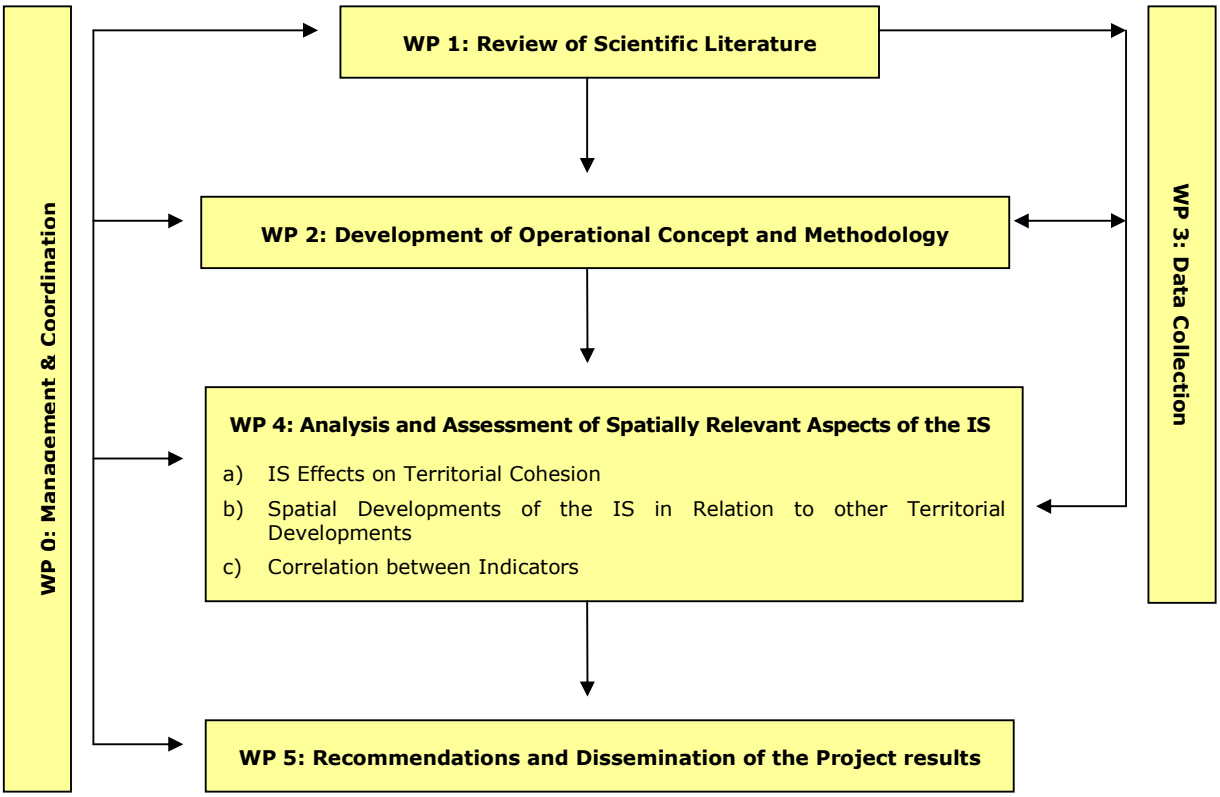
The research project basically focuses on the following objectives:

1. Analysis of the Information Society from a territorial perspective – identification of information society's state and trends, typology of spatial units form the perspective of the level of development of information society, relations between traditional regional competitiveness indicators and indicators specific for information society;
2. Analysis of the Information Society's territorial aspects at macro-, meso- and micro-levels – effects of the information society on spatial development in different types of regions, relocation of economic activities in relation to changing transport patterns.
3. Formulation of policy recommendations for macro-, meso- and micro-levels – identification of possible policy initiatives supporting cohesion in terms of ICT availability and use and in accordance with the most recent understanding of Cohesion Policy (Communication from the Commission, 05.07.2005).

1.3 Project structure

In order to obtain a clear and streamlined structure of the project, the tasks presented in the Terms of Reference and the award criteria in the restricted call for tender have been grouped into work packages (Figure 1).

Figure 1 Graphical presentation of the project's components



The Second Interim Report contains mainly the results of WP2 on development of methodology and WP3 on data collection. Moreover, some preliminary results of the analysis and assessments undertaken within WP4 are presented as well, on both macro (whole ESPON space) and meso levels (country level).

However, the final results of the project 1.2.3 are not yet ready. Therefore, a verification of the hypotheses is still to be worked developed, as is formulation of policy recommendations.

1.4 Project management and coordination

Several partners, including EUROREG, IRS and UJOE were attending the ESPON Seminar in Manchester (7-8 November 2005), when the ESPON project 1.2.3 was presented for the first time within the session devoted to new lunged ESPON projects.

The second project meeting of ESPON project 1.2.3 was held in December 2005 in Erkner (Germany). The discussions on the qualitative methodology as well as on case studies methodology (on both country and regional levels) were the main points in the agenda. Partners agreed as well on the final selection of the regional case studies in every. Moreover the outcomes of the data availability and preliminary results of the analysis on macro level (whole ESPON space) were presented and discussed.

Besides issues related to the project's organization and tasks division financial reporting have been clarified also in order to ensure a smooth and successful running of the project at the end of the first reporting period.

Due to the relative short time period of ESPON project 1.2.3 (June 2005-May 2006) the TPG faces a tight time schedule, which requires strong project management and coordination. Research and analysis in the context of work packages are running parallel to each other, thus a close communication; clear division of responsibilities and tasks is needed. For several working steps this is organised by elaboration of templates and guidelines by the work package responsible (EUROREG/IRS/UJOE). These will serve as common basis of analysis conducted by all partners (e.g. template for data collection, template for country case studies, guidelines for the regional case studies).

2 Methodological approaches

On basis of the common concept of the IS presented in the FIR a threefold differentiation of the IS has been developed, which distinguishes between a technological, an economic and a social dimension of the IS.

Table 1 Comparison of IS related data availability for a sample of six countries, from national sources at different spatial levels for one specific year (2004*)

	Regional level				
Indicator	**NUTS 1**	**NUTS 2**	**NUTS 3**	**NUTS 4**	**NUTS 5**
ICT infrastructure and use					
Number of mobile (cellular) phones subscriptions per 100 inh.	CZ FI	CZ FI	CZ FI		
Number of cable modem subscriptions per 100 inh.	CZ	CZ			
Number of xDSL subscriptions per 100 inh.	CZ	CZ FI	CZ FI		
Proportion of households with a computer	CZ FI	HU	HU		
Proportion of households with internet access at home	CZ DE FI GR	CZ DE FI HU	CZ FI HU		
Proportion of households with broadband internet access at home	CZ FI	CZ FI	CZ FI		
Share of enterprises with internet access	GR	PL	HU		
Share of enterprises with own homepage		PL			
Share of enterprises receiving orders over Internet		PL			
ICT sector & R&D & Education					
ICT sector employment, % of total (as defined by OECD)	DE	DE	DE		
ICT sector value added, % of total (as defined by OECD)					
R&D expenditure	CZ FI	FI	CZ FI		
Private R&D expenditure	CZ FI	FI	CZ FI		
R&D personnel and researchers, % of work force	CZ DE	DE	CZ		
Number of patents	CZ FI	FI	CZ FI	FI	
Proportion of population with completed secondary education	CZ FI	FI	CZ FI	CZ FI	CZ FI
Proportion of population with completed tertiary education	CZ FI	FI	CZ FI	CZ FI	CZ FI
Purpose of use: e-Government etc.					
Percentage of population using the Internet for interacting with public authorities	CZ	CZ			
Percentage of population having used the Internet in relation to training and educational purposes	CZ				
Percentage of population using Internet to seek health information whether for themselves or others	CZ				
Percentage of population having ordered/bought goods or services for private use over the Internet in the last three months	CZ	CZ			

* In several cases, data for other indicators are available for other (previous) years in the different countries.

The first dimension comprises above all the availability and use of ICT for enterprises and households. The second is related to the development of relevant sectors (ICT, R&D or knowledge intensive services), the value added created in these sectors and research intensities and their output (e.g. patents). The social dimension, finally, describes the role of education and ICT in the citizens life and includes aspects such as e-government.

This threefold differentiation allows to specifically structure the indicators which could possibly be used for an analysis of the IS. Nevertheless, the review of data availability has clearly indicated the data constraints, which in turn, affect methodological opportunities. These data constraints go far beyond the constraints exerted by the availability of data in the ESPON database or any other EU or other international resources. Most data available for many countries of the ESPON space are, however, not available at NUTS 2 or even NUTS 3 level, but on country level only. In addition, data could often only be found for one indicator and one year, sometimes even at different years across the countries. Based on these findings, national statistical sources were deliberately searched for relevant data. Yet, again it turned out that for hardly any indicator preliminary listed the majority of the six reviewed countries could provide regional data, as is indicated in Table 1. Furthermore, data measures are often differing slightly which does not allow an easy comparison across countries. Even the consideration of older data from years before 2004 does not change the impression given in Table 1.

Given these limitations, the role of national (and regional) reviews within the overall methodology becomes quite apparent. This the more, since tentative findings indicate, that one year can make quite a big difference with regard to the development of the IS and since country-related effects seem to be prevailing. The latter is particularly due to policies specific to the country and institutional settings e.g. with regard to the provision of ICT infrastructure availability.

Consequently, it can be expected, that the regional analysis of selected countries, which is to be supplemented with regional in-depth case studies, can achieve much more specific results than the overall ESPON review. Therefore, the TPG follows a stepwise process analysing different kinds of data at different spatial levels. Furthermore, the proposed methodology also distinguishes between different logical steps which are inherent to the project's objective. This twofold differentiated methodology is depicted in Table 2.

The darker the shade of the field in the table, the more promising is the respective combination of spatial and analytical steps. These different perspectives largely occur as of above stressed limits on data availability and comparability for the ESPON territory.

Table 2 Spatial and analytical steps of proposed methodology

		Analytical steps		
		Descriptive analysis	**Impact analysis**	**Spatial Assessment**
Spatial levels	**Whole ESPON national & regional analysis**			
	National analysis of selected countries			
	Regional case studies			

These different spatial and analytical steps should be kept in mind for the development of the methodology. Furthermore, for these different spatial levels and analytical steps, the above threefold thematic differentiation is to be applied as far as possible.

2.1 Descriptive analysis

The descriptive analysis can be conducted on all three different spatial levels mentioned above. In addition, this approach also ensures the consideration of the three spatial levels (macro, meso and micro) as utilised in ESPON. As of limited regional ESPON-wide comparable data, however, the ESPON-wide and macro-level description for many indicators is likely to be limited to the national level.

In view of the common concept developed in the FIR and the above threefold differentiation between the technological, economic and social dimension of the IS, the descriptive analysis is differentiated accordingly. Thus, different indicators, as they are listed and differentiated in Table 1, are considered. However, depending on their availability across countries, the descriptive analysis for the different spatial levels and between selected countries and regions can vary considerably. This

approach ensures to develop insights into the IS, which could not be realised by means of an overall comparable approach for the whole ESPON territory only.

Depending on the availability of comparable data over time, the descriptive analysis also aims at indicating dynamics of the IS rather than only static data at one point of time. In addition, the combination of different indicators will certainly be useful for testing some of the research hypotheses. This also aims at the typology development for which first approaches are presented in this report.

2.1.1 Macro-level analysis

The descriptive analysis on the macro-level for the whole of the ESPON territory largely aims at the development of IS related typologies. As mentioned above, many such variables and indexes are only available on national level rather than for regional breakdowns. In order to obtain typologies on the regional level, however, such data need to be crossed with other regionally available data, which can be expected to be related to the IS development. As tentative empirical analyses indicate, regional GDP per capita appears to be an indicator appropriate for such typology development.

Therefore, on macro-level, typologies for the different thematic dimensions could distinguish between regions with a high or low IS attainment which is combined with high or low GDP per capita performance. Below, Figure 2 illustrates the structure of such a typology at the example of the technological dimension of the IS.

With regard to the technological dimension, for instance national multidimensional indexes such as the Network Readiness Index (NRI) or the Digital Access Index (DAI) could be applied. By this way it is ensured, that single aspects within the dimension do not dominate the developed typology. Nevertheless, such data are not able to depict regional deviations in the respective IS dimension. Thus, such typologies need careful interpretation and further analysis on meso- and micro-level. These further considerations are likely to explain the occurrence of 'high-low' respectively 'low-high' regions. One possible explanation could be related to inner-country differences in the availability of modern ICT means, which are not visible on the NUTS 0 level, but become evident when comparing different indicators or indexes across several countries.

Figure 2 Methodological approach to macro-level typology development for the IS at the example of the technological dimension

		GDP per capita	
		High	Low
Technological dimension of the IS	High	High-high Top IS regions High national level of technological IS dimension coincides with high regional GDP per capita levels	High-low Peculiar IS regions Despite a high national level of technological IS attainment regional GDP per capital level is relatively low
	Low	Low-high Potentially developing regions High regional per capita GDP performance despite limited technological IS level	Low-low Restricted IS regions Regionally lagging GDP per capita coincides with low national level of technological IS aspects

If such a typology is developed for each of the dimensions, the attempt will be made to combine these in a more comprehensive typology which could then differentiate between altogether twelve types of regions. Such an approach combines the four types of regions with the three thematic dimensions.

2.1.2 Meso-level analysis

Due to the limited regional data availability for the most of the ESPON space only few aspects of the above dimensions can be considered for more than the selected countries. Therefore, the methodological approach to the meso-level analysis will concentrate on national reviews of the IS taking into consideration regional breakdowns of different aspects of the three above thematic dimensions of the IS.

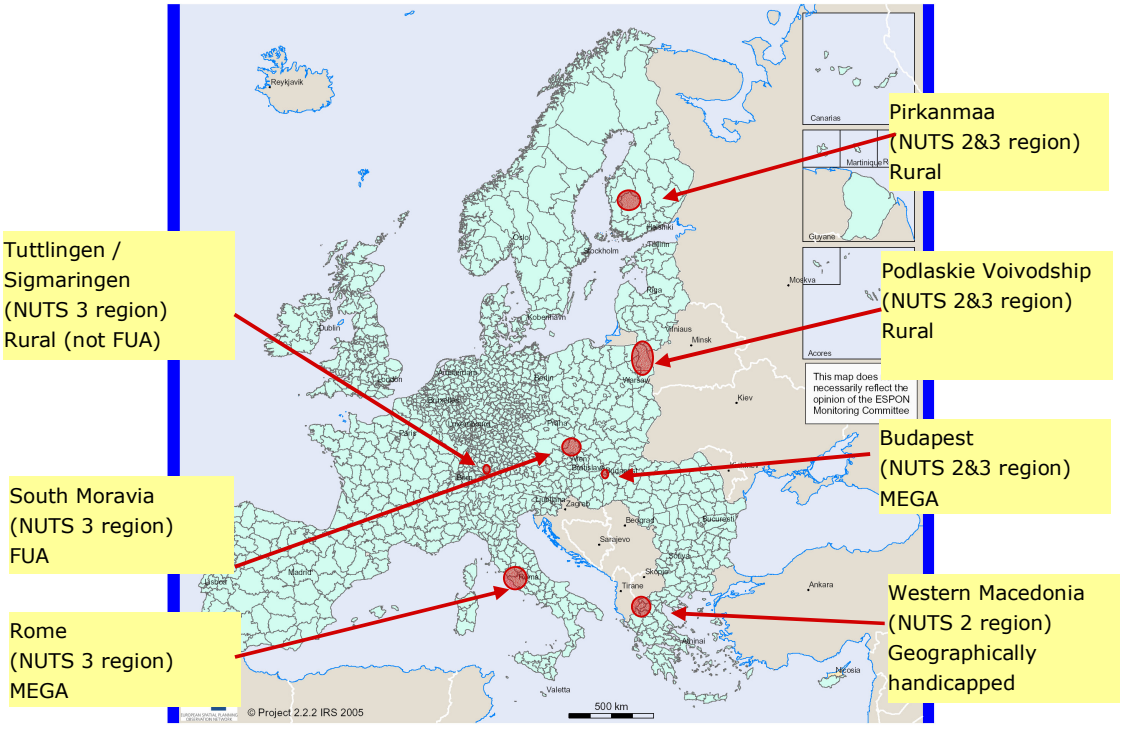
The number of national case studies has been limited to the seven Partners' countries of origin in order to obtain high quality information and achieve reliable results of the analysis. According to the template developed by the TPG (Appendix II), the first part of the national case studies was devoted to the description of the IS state and trends for the regions of the respective countries. This part of the analysis was based on the set of common indicators within the three thematic categories of the IS described above. As many indicators as possible of the above shown Table 1 have been included in the country studies. The results of the survey on data availability showed that it is hardly feasible to base the descriptive part of the country case studies on the set of common and comparable indicators. Therefore other relevant and for the particular country available indicators were considered as well. The basic level for the analysis was the NUTS 2 level, but wherever possible, lower regional levels were analysed as well. The description has not been limited to the static analysis. The trend description for the period 2000-2004 was included as well, as far as time series data were available.

First interim results of the descriptive part of these country studies are given in this report (see chapter 4.1).

2.1.3 Micro-level analysis

The regional case studies will be carried out in all seven countries participating in the project; with one case study per country. The selection of regions and spatial coverage of the case studies has to comply with the projects' needs, especially in the situation of quantitative data limitations. Thus different kinds of regions, which apparently participate to different extents and in different ways in IS developments will be investigated. Several types of regions of special interest of the ESPON 1.2.3 project are indicated in the Terms of Reference and as such they are included in the research –MEGAs, FUAs, rural regions and geographically handicapped regions.

Figure 3 Regional case studies selection



The case studies will be conducted in selected NUTS 2 or NUTS 3 regions, according to the following distribution of cases by countries (Figure 3).

The selection of the regional case studies is associated with the geographic location of the Project Partners in order to assure the highest quality of the analysis and to overcome the resources' shortages. Furthermore, the number of case studies has to be relatively limited in order to be able to cover a rather broad thematic scope adequate for the objective of the project. Nevertheless, the case study selection also takes account of North-South and East-West divisions of the ESPON territory and as such considers a number of different conditions in which the IS evolves.

From the descriptive analysis point of view, the most important outcome of the regional case studies will be the description of IS state and trends within the given region in the relation to the IS development across different sectors of this region: households, public authorities, enterprises. The sources of information will vary among case study regions, as the identification of IS manifestations depends on the research undertaken so far in the given region. However the empirical research results will be conducted on comparative bases in all cases. The following four spheres will be examined in each case:

1. **Households.** By collecting existing data - if available - information should be provided on private computer ownership and connectivity to Internet.
2. **Public administration.** An assessment of the role of Internet and Intranet within the offices of public authorities in the studied regions will be provided. This will be achieved by the following activities: a) interviews with officials of the local governments; b) analyses of the web pages of these governments.
3. **Businesses.** Another objective is the assessment of the use of Internet for commercial purposes. Since there is no possibility of conducting direct surveys of businesses within the given time frame, indirect methods of data collection will be applied, such as: a) interviews with the representatives of selected business organisations, like chamber of commerce, business associations etc. These interviews should provide an overview of the importance of Internet in current business operations within the survey region; b) an e-mail questionnaire (ca 100 units surveyed) sent to a sample of firms selected on the basis of their presence in the telephone register. This analysis will be preceded by an analysis of the web pages of the selected firms.
4. **Educational system.** Education is one of the most crucial spheres of building and developing the Information Society, since it creates behavioral patterns and provides competences to the youngest generation. Two most essential fields will be investigated: a) how do schools provide knowledge about the ICT techniques, and what is their equipment used for ICT classes; b) what is the role of ICT

techniques in the educational process; to what extent are the pupils encouraged to use information collected through the internet in their daily educational efforts. These two issues will be investigated through interviews with the appropriate educational institutions on the regional level and through direct visits to the potentially "best" and "worst" schools in the region. On this occasion information about the spread of computers, access to internet and the ways of its use in pupils' households may be collected as well.

2.1.4 Research hypotheses

The following research hypotheses are related to the descriptive analysis:

Though the IS can be characterised through a number of features, they will vary between different types of regions.

From this hypothesis it follows, that it might be necessary to consider different regional characteristics for the different types of regions. For instance the relation between business and private use of modern ICT might significantly vary, depending on the regions' intensity of economic activities.

Even within one or another type of region, the features can at least partly vary due to different niches of specialisation.

The second hypothesis especially follows theoretical considerations of different kinds of metropolitan regions, which regarding their knowledge-intensive service production are e.g. differentiated between *global cities* and *serve-industrial cities* (For further differentiation related to metropolitan areas see e.g. Kujath, H.J., 2005: Knoten im Netz).

2.2 Impact analysis

Due to the limited availability of comparable data for the whole ESPON space, quantitative impact analysis will have to remain rather simple. Therefore, the rather qualitative approach of the country and regional case studies will be highly important for conducting the impact analysis of the IS at lower spatial levels.

Generally, the impact analysis in ESPON project 1.2.3 aims to explain in which way the IS affects global socio-economic indicators such as GDP per capita or unemployment rates. Since the IS cannot be described as such by one comprehensive indicator (as it could be thought of for the measurement of the impact of one specific policy), it is necessary to relate various aspects of the IS to the above mentioned global indicators. Here it is again reasonable to follow the logical structure of the previously described three thematic dimensions of the IS.

2.2.1 Macro-level analysis

In quantitative terms, the above mentioned consideration of stock data at different points in time could represent a starting point for the impact analysis, which is also useful for below introduced spatial assessment. However, altering indicator definitions over time respectively varying time references across countries could easily affect results. Thus, such measures need careful consideration.

In addition, simple correlation analyses can be conducted for comparable data. This could indicate varying strengths of the relation between technological, economic respectively social aspects and, for instance, GDP per capita. However, such analyses can not clearly identify the direction of influence. This can only be supplemented on the basis of corresponding theoretical considerations with regard to the role of the IS for socio-economic development. Yet, with the help of mutual consideration of the corresponding findings for the meso- and micro-level analysis outlined below, this analysis can be particularly helpful for the development of policy recommendations.

2.2.2 Meso-level analysis

In accordance with the already mentioned data restrictions, meso-level analysis largely concentrates on selected countries. Therefore a twofold approach will be chosen. The first approach is a purely quantitative method, which considers the coincidence of various regional technological, economic and social IS aspects with regional levels of the GDP per capita. This approach represents the linkage between the macro-level analysis and the following more qualitative analyses elements. It can show, to what extent the more general findings of the macro-level analysis are supported or contradicted by regional data relations.

The second approach deepens these findings, as it considers more qualitative aspects of the IS development and refers especially to IS-specific national policy influences within the framework of a country study. The second part of the country studies template is focused on the description of the country-specific IS development policy, which will give an opportunity for international comparison among the seven countries. The analysis will lead to the depiction of the role and the importance of the IS development policy in the given country in comparison to other state policies. Moreover, on the basis of main IS policy documents, the definitions of the IS phenomenon and the priorities of IS policy as well as the responsibilities related to the IS policy implementation are going to be described and compared. This kind of investigation will allow to deepen knowledge on IS perception in different countries, on changes in

IS definitions and the role of IS over time and its main areas of influence.

Both parts of this analysis aim at determining the most important relations between different aspect of the IS in a country, which can support a focused regional case study design. Furthermore, this country-specific consideration can possibly stress the role of different relations of various IS aspects with GDP per capita etc. in different countries.

2.2.3 Micro-level analysis

The most important results of the regional case studies for the impact analysis would be the relations of IS indicators (with regard to the three IS dimensions) within the given region against the background of a general description of the region and its position in the regional setting of the regarded country (e.g.: level of development, economic structure, human capital development).

The outcomes of the comparison of case studies will allow for statements regarding the general project's hypothesis on the relation between the level of regional socio-economic development and the spread of ICT techniques, technological advancement and the level of development of the Information Society.

2.2.4 Research hypotheses

The following research hypotheses are related to the impact analysis:

The development of an IS depends to a great extent on the role of the state, and on its tendency to supports the creation of adequate prerequisites for the IS either in a more centralised way or rather in a decentralized manner, fostering an innovative environment also in disadvantaged regions.

Such a hypothesis is closely linked to the context dimension and assumes that the context dimension in different regions and countries can be more or less supportive for the development of an IS.

The role of human capital and adequate and flexible education systems becomes increasingly important in an IS.

This hypothesis is based on the observation, that in highly advanced economies it becomes increasingly difficult for citizens with low educational attainment to participate in economic development. They suffer from foreign competitors and job losses. Thus, in order to achieve an IS in which the majority of the population can participate and use modern information sources, adequate education systems are needed in different types of regions.

2.3 Spatial assessment

Beside the descriptive analysis and the analysis of spatial impacts of IS developments, these developments are also to be assessed concerning spatial objectives. For reasons regarding operationalizing, this spatial assessment is envisaged for selected EU objectives only, thereby concentrating on spatial convergence, competitiveness, cooperation, regional diversity and the polycentricity objective. Consequently, this assessment aims at mirroring the observed IS developments, policy measures and observed relations to global socio-economic indicators against ESDP objectives. This way it is analysed, to what extent the regions of the ESPON space progress in terms of one or the other IS-related objective, simultaneously assessing cohesion-related achievements of the IS.

2.3.1 Macro-level analysis

Due to the regional data restrictions across the ESPON space, the macro-level analysis can only very roughly consider a few of the spatial objectives. This is even more true when looking at the extremely low availabilitiy of time series data. Therefore, the most appropriate approach appears to be the consideration of the relationship between the observed patterns of the IS in terms of the different thematic dimensions and specific ESPON typologies, such as the urban-rural, polycentricity or potential accessibility typologies.

2.3.2 Meso-level analysis

For the spatial assessment on the meso-level, the second part of the country case study is of high importance, as it aims at analysing the policy documents related to IS development (e.g. strategies for ICT and R&D development, as well as other relevant document). The outcomes of the comparison will allow to find out how far these documents are related to spatial development. Among other things, the case study template includes an analysis of references regarding the diagnosis of IS state and trends on the regional level. Moreover, the IS policy documents will be checked in order to identify their regional context (i.e. are there any special aims, instruments, etc. provided for different types of regions: metropolitan areas, big cities, rural and geographically handicapped). Additionally, on the basis of the available evaluation reports, a description of the IS policy influence on spatial development (with special references to cohesion, polycentricity and location changes) will be provided.

Finally, if feasible, some examples of the regional IS strategies will be given and described.

On that basis some conclusions on the different IS spatial impacts could be formulated.

2.3.3 Micro-level analysis

Regional case studies are important for the purposes of spatial assessment on the micro-level. The aim of the regional case studies is to answer the following questions:

- Has the IS development influenced the spatial behaviour of the most important actors in the three sectors: households, public administration and enterprises?
- Have the changes in spatial behaviour influenced the levels of cohesion and polycentricity?
- What kinds of activities were undertaken by regional and local policymakers to improve cohesion and polycentricity with regard to IS in the region (bottom-up approach)?

These questions have to be answered for example by consideration of changes in enterprises location in the given region due to the IS development. Since such changes can lead to more even spread of the industry or services and could in this way influence the economical performance of the region and improve its position in comparison to the others. Another method that could be employed in order to follow this kind of thinking is an analysis of demographic processes in the case study regions which may be influenced by the IS technologies dissemination. Development of IS could work in favour of more balanced settlement structure.

these findings could be followed then by consideration of the regional IS policy directions in order to find out for example whether the policy interventions are promoting new areas for business or whether they develop some incentives for teleworking.

2.3.4 Research hypotheses

The following research hypotheses are related to the spatial assessment:

Backward, peripheral and other disadvantaged regions have a smaller chance to catch up and build up growth because of the lack of important prerequisites like e.g. ICT networks.

This hypothesis is quite technical oriented and thus considers only the technical dimension of the IS. Nevertheless, it might be useful for a possible access to understanding the lack of IS developments in such

regions. Thus, it is a hypothesis which is impact-related and from which – depending on the respective empirical findings – possible policy recommendations might be developed.

Depending on the level of economic development, the regions in the different geographical parts of Europe are not equally affected by the spatial impacts of the IS. Centralisation - decentralisation tendencies vary.

This hypothesis can be used to found the selection of case studies and the importance of the inclusion of Western, Eastern, Northern as well as Southern European regions. As especially in the new member states numerous economic indicators point towards centralisation developments around a small number of MEGAs. This raises the question, in how far this aspect is also translated into the features of the IS, taking into account the society's developments beyond economic activities.

While metropolitan regions basically are the best prepared for the restructuring towards a knowledge-based economy and information society, their success varies in dependence of the persistence of structures created in the industrial society and the ability for stimulating the restructuring processes. This also affects the strengths of ties between metropolitan regions and their hinterland.

This hypothesis depicts one possible relation between the core of the IS and economic impacts. In this context also policies could matter, if they influence the persistence of existing structures. It is also a hypothesis, which relates the metropolitan development of the IS to the micro-level, as compared to other hypotheses which focus more predominately on the macro-level.

2.4 Development of policy recommendations

Due to the quite different methodological approaches to be followed for the different spatial levels, and the respective information available, policy recommendation development will have to be based on comprehensive analytical reviews, considering simultaneously macro-, meso- and micro-level analyses as well as the results of the different analytical steps. Thus, policy recommendations could possibly not strictly differentiate between the three spatial levels. However, they shall focus on different options in terms of alternative or complementing policy objectives and possibly differentiate between the three dimensions of the IS, which are considered in the analytical process.

3 Preliminary results of the IS state in Europe

3.1 Introduction

A survey of existing data and indicators on the IS in Europe was presented in our FIR. It pointed out that their availability sets strict constraints to a quantitative territorial analysis of IS in Europe and formulation of regional typologies for the EU25+2+2. The conclusions from the analysis which was presented in the FIR can be summarized in the following three points:

1. The conceptual definition of IS remains unclear. This is seen in the empirical work: unharmonized data collecting formats, diverse number and scope of indicators, and different methodological approaches of collecting data. However, the survey of the recent European IS indicators projects indicates three general operational categories of IS: the narrow technological, the intermediate techno-economic, and the broad all-inclusive definition.
2. European-wide territorial data on IS are scarce, or even totally lacking. Moreover, the available IS data below the NUTS0 level is incomplete for comparison in the ESPON space – in those areas where regional data is available, it covers only a limited subset of the EU29 countries.
3. Given the resources and time allocated to this project, collection of raw data from national sources by the project team was seen unrealistic. Tentative collection of IS indicators in the seven ESPON 1.2.3 partner countries provided further evidence on it. The results are presented in Table 3, which sums up the availability of the selected IS indicators in the TPG countries in 2004. In general, the results clearly show that while a number of territorial indicators are available in each country, the data from existing national sources are far too heterogeneous for the needs of international comparisons.

As a whole, the evidence from our survey leads to the conclusion that territorial data on IS is not readily available for more than a couple indicators in a few of the EU25+2+2 countries. Given the magnitude of the missing data and the amount of the resources available to this project, the raw data collection by the project team was also seen as an unrealistic option.

This implies two possible ways to characterize the key task of the project – characterization of the IS from a territorial perspective. Firstly, a macro-meso analysis of the spatial aspects of IS can be based on existing country-level data and indicators on IS in the whole ESPON space. This is a practical solution, given the fact that IS appears to be

predominantly a country-level phenomenon since IS policies are often made on the national level, and this approach also allows a typologization of the IS. The second, meso-micro perspective, complements the "general picture" by providing a more detailed analysis of the IS's characteristics and trends in selected ESPON subspaces and case-regions. The present section takes a look at the first perspective, whereas the second view is articulated in some detail in other parts of this report.

Table 3 IS indicator availability for the ESPON 1.2.3 TPG countries in 2004

#	Indicator	Availability, % of countries		
		National	NUTS2	NUTS3
	ICT infrastructure and use			
1	Number of mobile phones subscriptions per 100 inh.	86%	29%	29%
2	Number of cable modem subscriptions per 100 inh.	71%	14%	0%
3	Number of xDSL subscriptions per 100 inh.	71%	0%	0%
4	Proportion of households with a computer	86%	43%	43%
5	Proportion of households with internet access at home	86%	71%	43%
6	Proportion of households with broadband internet access at home	86%	29%	29%
7	Share of enterprises with internet access	71%	29%	14%
8	Share of enterprises with own homepage	57%	14%	0%
9	Share of enterprises receiving orders over Internet	43%	14%	0%
	ICT sector & R&D & Education			
10	ICT sector employment, % of total (OECD definition)	43%	14%	14%
11	ICT sector value added, % of total (OECD definition)	29%	0%	0%
12	R&D expenditure	71%	29%	29%
13	Private R&D expenditure	71%	29%	29%
14	R&D personnel and researchers, % of work force	57%	29%	14%
15	Number of patents	57%	14%	14%
16	Proportion of population with completed secondary education	43%	14%	29%
17	Proportion of population with completed tertiary education	43%	14%	29%
	Purpose of use: e-Government etc.			
18	Percentage of population using the Internet for interacting with public authorities	86%	14%	0%
19	Percentage of population having used the Internet in relation to training and educational purposes	57%	0%	0%
20	Percentage of population using Internet to seek health information whether for themselves or others	57%	0%	0%
21	Percentage of population having ordered/bought goods or services for private use over the Internet in the last three months	71%	14%	0%

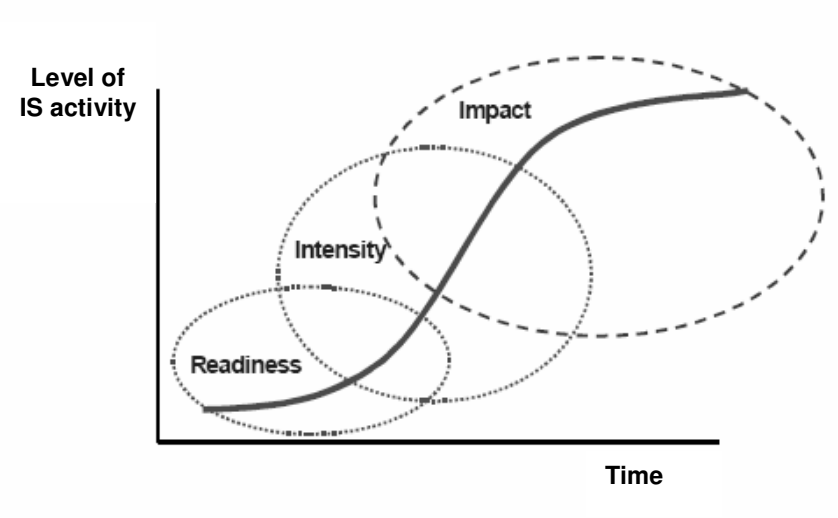
The set-up of this chapter is as follows: Firstly, we introduce the general background of our approach by presenting the aspects of IS indicators with respect to the IS lifecycle framework. Then we use composite IS indices to illustrate the territoriality of IS in Europe, and to present some tentative findings on spatial differentiation in the ESPON space. Finally we turn our focus on typologies, and present a tentative view on how different dimensions of territorial patterns across the European space can

be identified. The typologies will be developed further and analyzed in the final report of this project.

3.2 Spatial patterns of the IS in Europe – a macro-meso analysis

Table 3 shows that our survey of the availability of IS indicators covers the technological characteristics (ICT infrastructure and use), the economic side (ICT sector, R&D, Education), and the social aspects (Purpose of use) of the information society. These three dimensions relate to the three operational categories of IS mentioned above: the technological dimension corresponds with the narrow view, the technological and economic dimensions with the intermediate view, and the set of indicators as a whole with the broad view of the IS.

Figure 4 Life-cycle of Information Society and research needs



Source: OECD 1999 with some modifications

The division in Table 3 can also be linked with the life-cycle framework provided by the OECD, highlighting that various IS indicators can be interpreted in terms of evolutionary stages of IS (see Figure 4). The IS lifecycle is seen to range from the stage of readiness and intensity to that of impact. In the first stage only enabling factors are of importance, whereas in the later stages, the availability, use and impact of IS (e.g. technologies) gain prominence. Comparing this setting with Table 3, it can be argued that the presented indicators are mostly linked with the intensity stage of IS, but some of them can also seen to measure impacts: the economic part focusing on the operational restructuring, and the purpose of use on the social inclusion and participation.

The life-cycle approach has also been applied in the collection of IS indicators (Statistics Finland 2005). In this framework the readiness phase of IS includes, for example, indicators measuring the availability of ICT infrastructure, and opportunities and skills needed for using ICT, such as general computer skills. The intensity or growth phase concentrates on the coverage and means of ICT use; the relevant indicators measure, for instance, computer, internet and e-mail penetration. In other words, these two phases largely focus on measuring the digital divide and the knowledge gap - the phenomenon that some people have better access to ICT and information than others. The third, impact or outcome phase, measures the operational restructuring caused by the use of ICT, and in the social inclusion and participation in the IS.

Irrespective of its limitations, the life-cycle approach reveals the methodological and practical difficulties associated with the comparisons between the countries at different stages of IS development. In international comparisons, the indicators should take into consideration the complex dynamics of IS development – the specificity of each IS indicator category in each country in each point of time – and combine all this information into a synthetic measure.

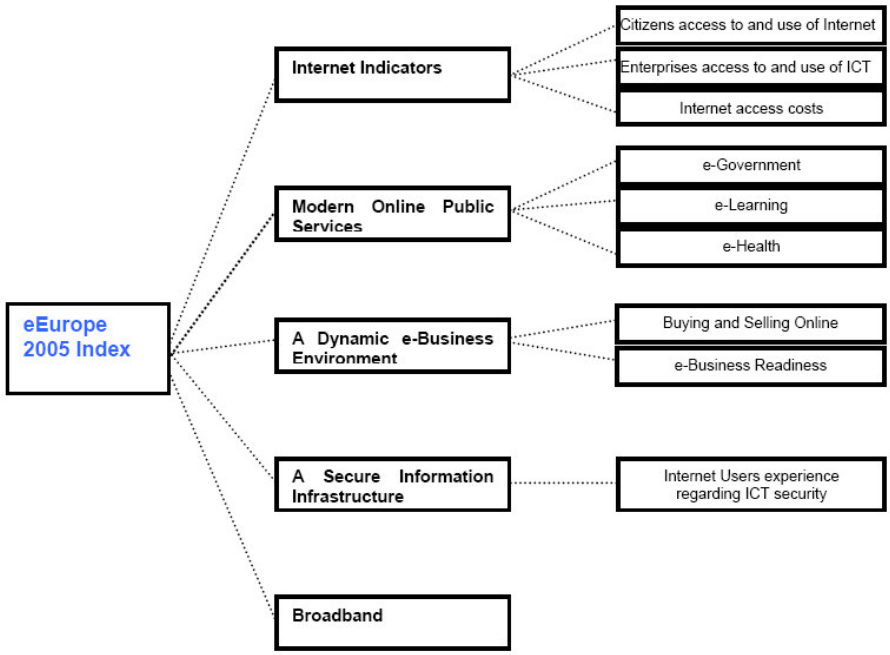
There are only a few such indices available, describing the characteristics of IS in European countries. Perhaps the most comprehensive ones are the ITU Digital Access Index (DAI) from 2002, the eEurope Index from 2004 and the Network Readiness Index (NRI) provided by the World Economic Forum in 2005. In the following we take a closer look at the two most recent indices, the eEurope Index and the Network Readiness Index. These indices are so-called composite indices, which summarize the information of several indicators or sub-indices in order to give an overall picture of the state of Information Society in a country. The overall aim is to compare the countries in terms of IS performance.

The eEurope 2005 Index is calculated for 28 countries, aiming to benchmark the new member states and the candidate countries with the EU15 countries. Thus it includes Turkey but excludes Norway and Switzerland. The composite index is an average of the following five sub-indices: Internet Indicators, Modern Online Public Services, Dynamic Business environment, Secure Information Infrastructure, and Broadband. Appendix 1 provides a more detailed description of the index (INSEAD 2004).

These sub-indices are developed to suit for the needs of the e-Europe 2005 action plan. The action plan manifests that by the year 2005 member states should have a widespread broadband availability and a secure information infrastructure for a dynamic e-business environment and modern online public services. The data for the indicators was derived from several international statistical sources, including the World

Bank, Pyramid Research, ITU and the World Economic Forum. The eEurope 2005 index is measured on a scale from 1 to 7. Figure 5 represents the contents of the eEurope 2005 index (INSEAD 2004).

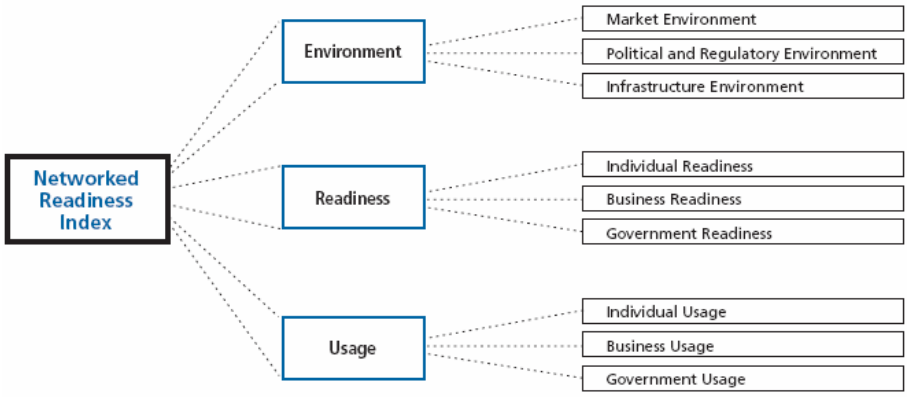
Figure 5 The eEurope 2005 Index



Source: INSEAD 2004

The Networked Readiness Index (NRI, WEforum 2004, 2005) looks at 104 economies, including all 29 ESPON countries. The NRI is formed of the three main categories: the environment for ICT development consisting of market environment, political and regulatory environment and infrastructure environment, the ICT readiness of individual, business and government sector, and the ICT usage of these three sectors. The data for the index is collected by questionnaires managed by the WEforum and by statistics from international agencies. The index is measured on a seven point scale, previously from 1 to 7 (WEforum 2004) and recently from -3 to 3 (Weforum 2005). 0 represents the composition of the index, and Appendix III shows the contents of the index in detail.

Figure 6 The Networked Readiness Index



Source: WEforum 2004

In comparison to the NRI, the eEurope index considers the availability of public services more broadly and the use of eCommerce in addition to eBusiness readiness. The eEurope index also uses the access and use of ICT technology in two components: first, on general level, and secondly, it considers especially the case of broadband. Moreover, the component measuring the security of ICT can also be considered as emphasizing the technological nature of the index. Thus the ICT technology can be interpreted as having the weight of 3/5 (or 9/15) in the calculation of the indicator.

In contrary to the eEurope 2005 index, the NRI puts some weight (1/3) on environmental factors. The NRI also measures readiness by issues related to educational and affordability factors. The technological side of the NRI concentrates on the usage of ICT technology, and misses ICT access indicators. The usage of ICT is measured by the weight of 1/3 (or 5/15). It thus seems that the eEurope index is noticeably more technology-oriented (Bogdanowicz et al. 2003).

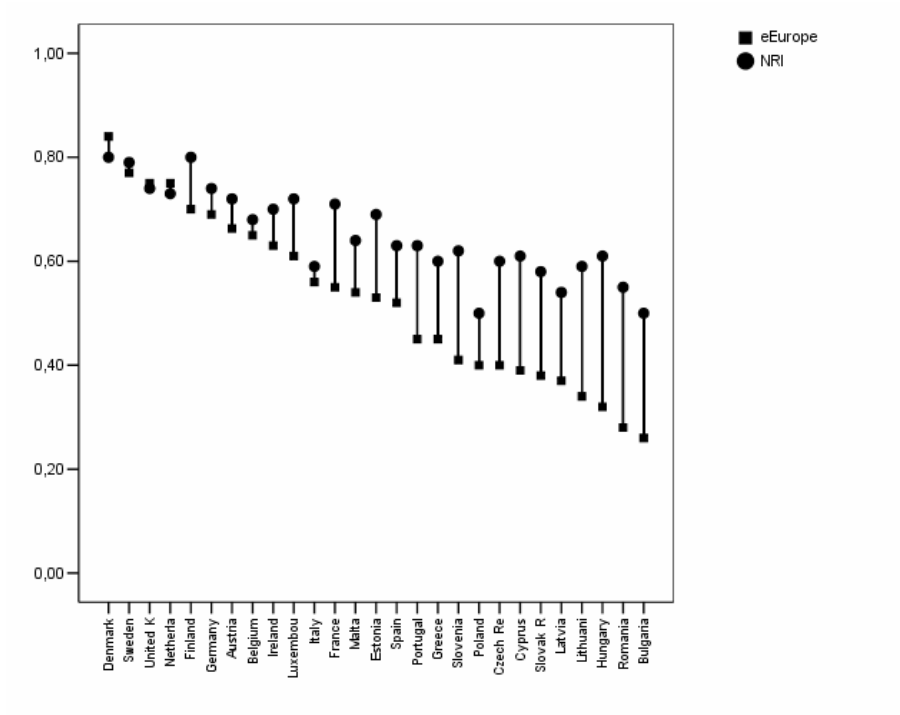
Table 4 ESPON country scores of the eEurope and NRI indices

	e-Europe 2005		NRI		DIFFERENCE	AVERAGE
	INSEAD (2004)	(Scale: 0-1)	WEForum (2005)	(Scale: 0-1)	(Scale: 0-1)	(Scale: 0-1)
Austria	4,64	0,66	1,01	0,72	-0,06	0,69
Belgium	4,56	0,65	0,74	0,68	-0,03	0,66
Bulgaria	1,82	0,26	-0,51	0,5	-0,24	0,38
Cyprus	2,72	0,39	0,25	0,61	-0,22	0,50
Czech Republic	2,78	0,4	0,21	0,6	-0,20	0,50
Denmark	5,9	0,84	1,6	0,8	0,04	0,82
Estonia	3,74	0,53	0,8	0,69	-0,16	0,61
Finland	4,92	0,7	1,62	0,8	-0,10	0,75
France	3,86	0,55	0,96	0,71	-0,16	0,63
Germany	4,85	0,69	1,16	0,74	-0,05	0,72
Greece	3,14	0,45	0,17	0,6	-0,15	0,52
Hungary	2,22	0,32	0,24	0,61	-0,29	0,46
Ireland	4,41	0,63	0,89	0,7	-0,07	0,66
Italy	3,91	0,56	0,1	0,59	-0,03	0,57
Latvia	2,62	0,37	-0,23	0,54	-0,17	0,46
Lithuania	2,4	0,34	0,13	0,59	-0,25	0,47
Luxembourg	4,27	0,61	1,04	0,72	-0,11	0,67
Malta	3,77	0,54	0,5	0,64	-0,10	0,59
Netherlands	5,28	0,75	1,08	0,73	0,02	0,74
Norway	-	.	1,19	0,74	-	0,74
Poland	2,78	0,4	-0,5	0,5	-0,10	0,45
Portugal	3,17	0,45	0,39	0,63	-0,18	0,54
Romania	1,99	0,28	-0,15	0,55	-0,27	0,42
Slovak Republic	2,67	0,38	0,03	0,58	-0,20	0,48
Slovenia	2,86	0,41	0,37	0,62	-0,21	0,52
Spain	3,65	0,52	0,43	0,63	-0,11	0,58
Sweden	5,36	0,77	1,53	0,79	-0,02	0,78
Switzerland	-	.	1,3	0,76	-	0,76
United Kingdom	5,24	0,75	1,21	0,74	0,01	0,75
AVERAGE	3,69	0,53	0,61	0,66	-0,13	0,60

The two indices can also be reflected against the presented lifecycle of IS in Figure 7. The NRI clearly measures IS readiness: both the environment and the readiness components can be interpreted to measure this part of the lifecycle (see, 0). The eEurope 2005 index, however, does not include readiness except for technological availability. Moreover, the usage component of the NRI is linked to the Intensity phase of the IS lifecycle, as do the technological components (Internet indicators, broadband, security) of the eEurope 2005 index. The eEurope 2005 index indicates the Impact phase by its components measuring modern public services and eBusiness environment. In the NRI such a measure of the Impact phase is missing. Thus the eEurope 2005 index measures the information society from a more advanced point of view, whereas the approach of NRI is more conventional. As a result, the less advanced information societies seem to present a bigger difference between these two indices. This is also supported by the fact that the difference (eEurope-NRI) of these two indices correlates negatively with the indicator readings (eEurope: $p = -0.92$ & NRI: $p = -0.67$), implying that less advanced information societies get relatively better readings by

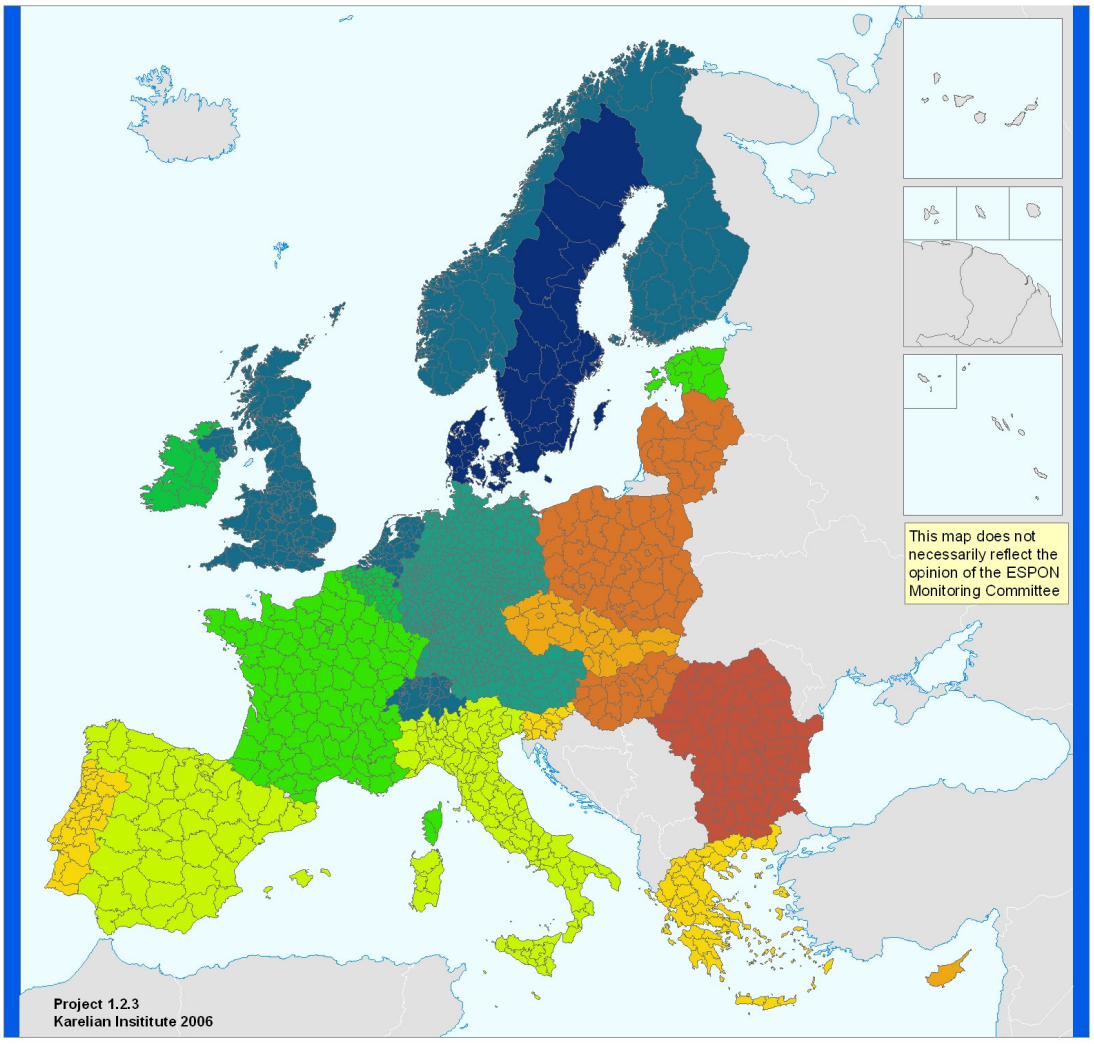
the NRI index. The relationship of the eEurope and NRI indicies is illustrated in Figure 7.

Figure 7 A comparison of the eEurope and NRI indices in the ESPON countries.



Map 1 presents the constructed composite IS index. The overall spatial pattern of the IS in Europe is clear: There are similar north-south and east-west divisions among the ESPON29 space as found for the availability of ICT infrastructures by the ESPON TPG 1.2.2. As we would expect, northern countries seem to have a more advanced IS compared to the southern countries. Furthermore, the new member countries (including Romania and Bulgaria) seem to lag behind the EU15 countries. However, there are exceptions to this pattern such as Estonia, which seems to be a more advanced IS in comparison to the Mediterranean member countries and new member states.

Map 1 The composite index of the IS in Europe based on eEurope (2004) and NRI (2005)



The index reveals significant differences in terms of IS performance in Europe. This pattern can be interpreted against the lifecycle presented in Figure 4 as follows: the composite index ranging from 0 to 1 can be interpreted to represent a degree of IS maturity. It has to be noted, however, that the indices seem to put more weight on measuring the readiness, use and availability of technology, whereas the impact phase of IS receives lesser weight. This means that the score 1 possibly does

not mean a fully implemented IS, and the potential upper limit for the IS development is probably higher than 1. Here, however, 1 is seen as a proxy of the upper limit of IS, and the values of the composite index are used to illustrate the evolutionary stage of the IS in the ESPON space. A logistic curve with an upper asymptote of 1 was chosen to represent the overall development pattern, and the ESPON countries' index scores positions on this standard S-curve were calculated. The ESPON countries are plotted against the IS lifecycle in Figure 8.

Figure 8 The stages of IS development in Europe

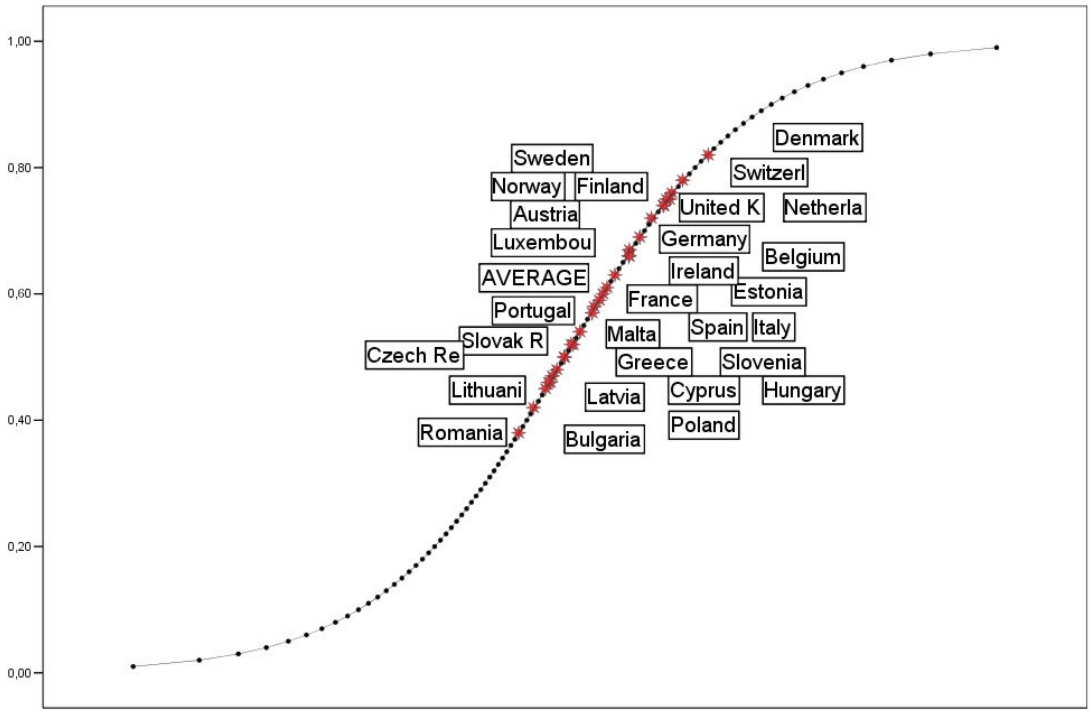


Figure 8 reveals that the ESPON countries represent a relatively broad range of the IS lifecycle. As the composite index probably has a positive bias, the actual situation might be that the ESPON countries are located in all the three stages of the lifecycle concept: readiness, intensity and impact. Generally, the Nordic and northern ESPON countries could be seen to be at the impact stage, whereas, for example, Romania and Bulgaria represent the less developed information societies at the readiness stage.

The fact that ESPON countries are located in multiple stages of the IS lifecycle is challenging from the viewpoint of the eEurope monitoring process. The lifecycle framework implies the collection of different types of indicators at different stages of IS. If the countries are at different

stages, this would mean that the set of indicators should be tailored to meet the different information requirements at each stage of the IS cycle. This, of course, has also implications on the overall meaning of benchmarking and comparing such different countries with each other.

3.3 Towards typologies on IS

As the availability of the (territorial) IS indicators is found to be limited, the constructed IS composite index is used to provide an overall picture of the state of IS in Europe. This picture will be developed further by regionalizing the index. The results will be presented in our final report, and the following examples should be considered as tentative illustrations of this methodology.

This approach is complemented by indicators which are available on a regional scale, and can be considered measuring the different aspects of IS. These aspects may include some key sub-indices of the NRI and eEurope indices or the categories in Table 3 (technological, economical, social). As it can seen in Table 5, there seems to be a relatively strong relationship between the IS level and some of the so-called key Structural Indicators, which are presented by the EU Commission to measure the progress made towards the Lisbon objectives.

Table 5 Correlations of IS index with some overall performance indicators of EU[1]

Economic performance and competitiveness			Social cohesion	
GDP per capita 2004	Labour productivity 2004	Employment rate 2004	Inequality of the income distribution 2004	At-risk-of-poverty rate 2003
.77	.73	.85	.26	.80

The overall aim of the analysis is to give an insight on how territories relate with each other with respect to different aspects of the IS. Appendix I – Level of GDP per capita and selected Information Society indicatorsgives examples of the relationship between GDP per capita and some IS society indicators on regional level. This methodology also enables the formation of territorial typologies. Figure 9 shows a tentative schema of utilizing this methodology in typology building.

[1] See, Eurostat (2005) for data and definitions of Structural Indicators.

Figure 9 Tentative typology based on a cross tabulation of GDP per capita and IS index.

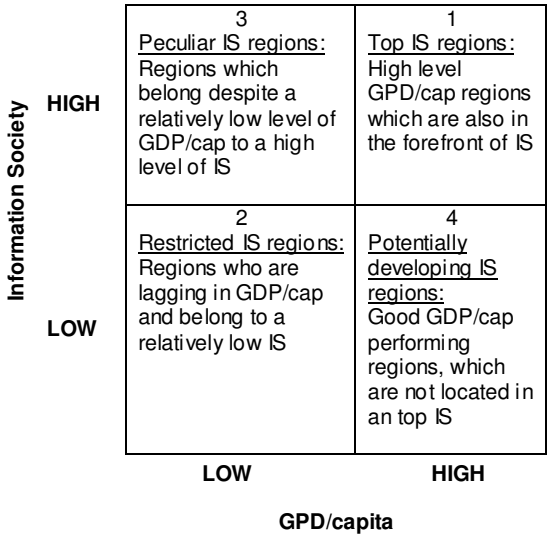
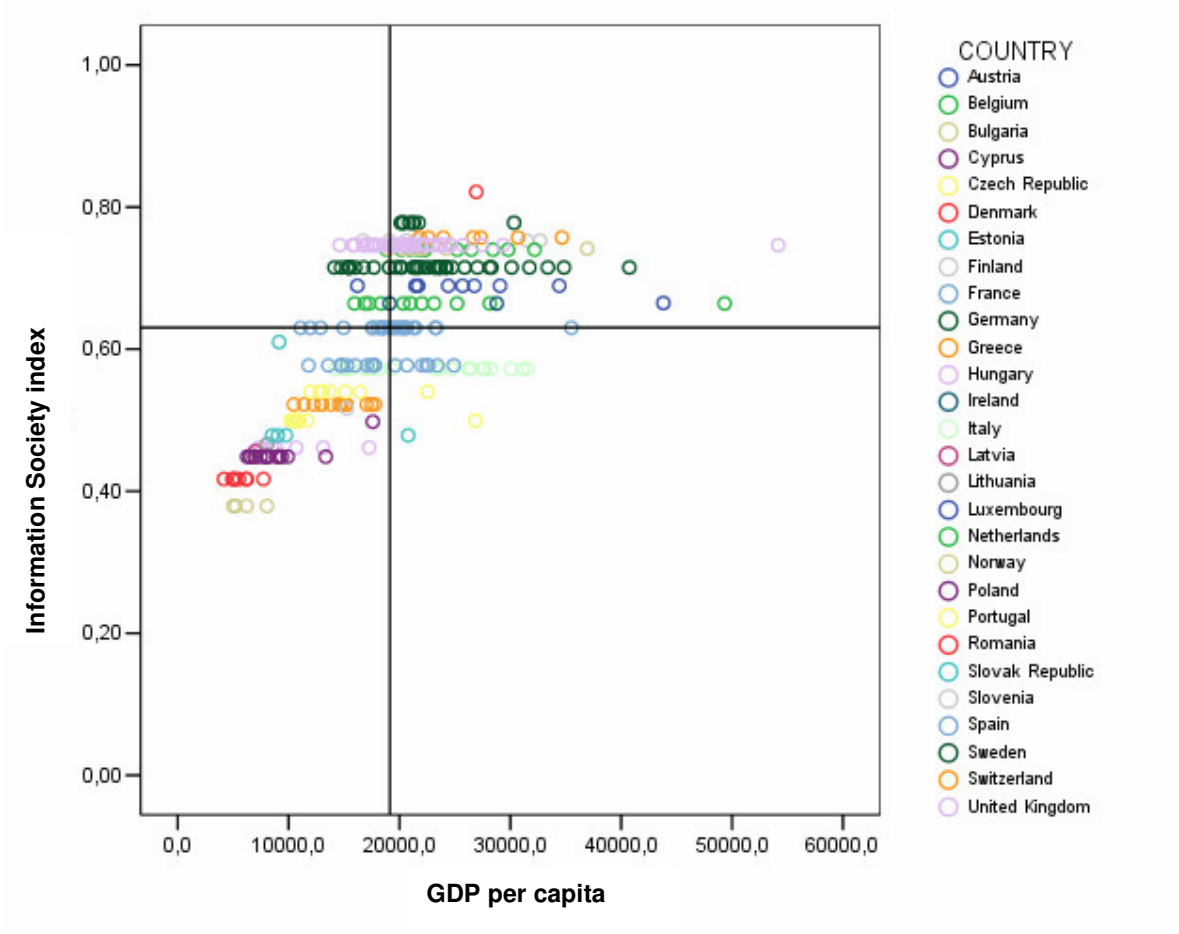


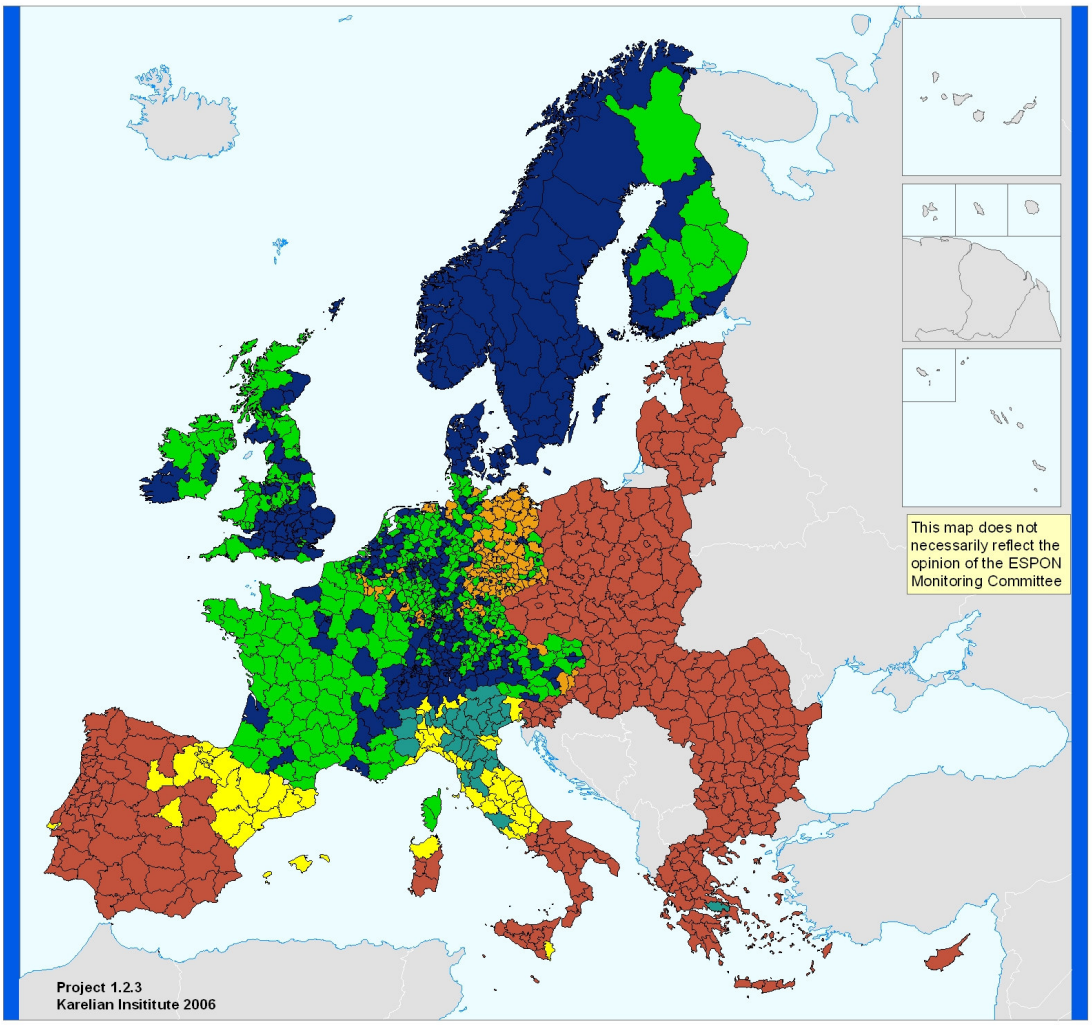
Figure 9 plots and compares the position of NUTS 2 regions according to the GDP per capita in them and the IS index value of the country. The level of IS in a country on the Y-axis and the level of GDP per capita in NUTS2 regions in the year 2000 on the X-axis. In this initial illustration, the categories are formed by dividing the countries into two by their mean scores, as indicated by a vertical and a horizontal line in the Figure 9. It shows that there is a clear positive relationship between the level of IS development by country and the economic performance measured by NUTS2 regions. The second notable feature is that regional variation in GDP per capita tends to increase as IS index increases. This may indicate that a similar pattern emerges at the regional scale of IS development, i.e. regional differences in IS increase with increases in the GDP and IS index.

Figure 10 The relationship between IS index and GDP per capita at NUTS 3 level.



This methodology provides four categories of ESPON territories, which could be interpreted as typologies, as in Figure 9: 1) Restricted IS territories; 2) Potential IS territories; 3) Peculiar IS territories; and 4) Top IS territories. Plotting the information of Figure 10 on a map reveals the location of these territories (Map 2). The top territories in this respect seem to be located in the northern and western part of the ESPON space. The peculiar IS territories – territories having low GDP but still belonging to a high IS – are located in the same countries with the top IS territories. This is of course an outcome of the used mean division methodology, but also speaks for a presence of a strong country effect.

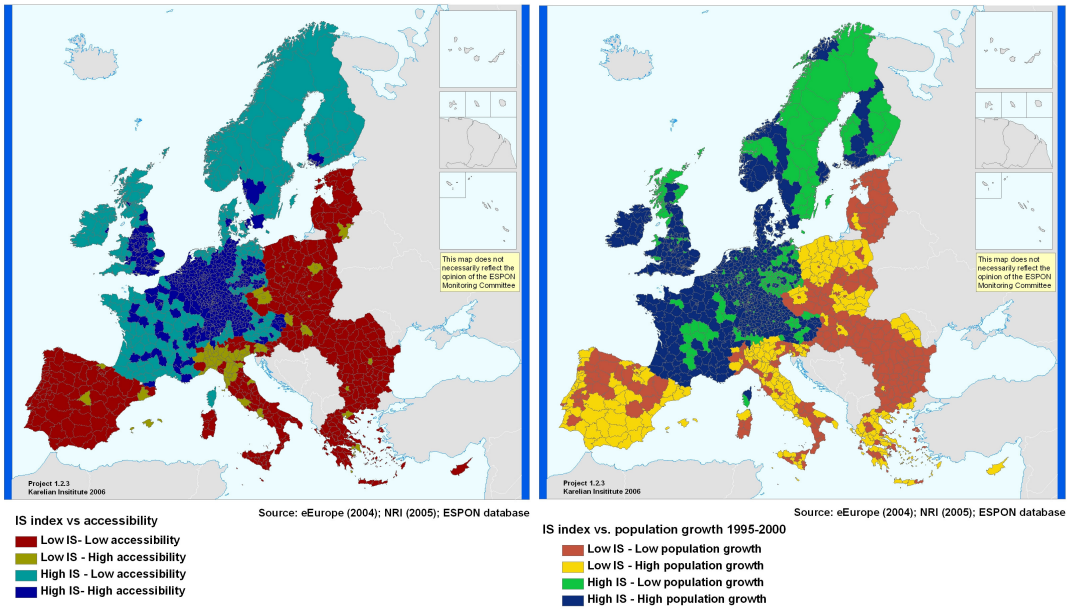
Map 2 Information society performance vs. GDP per capita – draft.



The national IS information can also be reflected on other ESPON indicators. Map 3 illustrates two examples: how IS performance relates to multimodal accessibility and population growth at NUTS 3 level, i.e. do low accessibility or low population growth regions suffer also from belonging to a low IS category? Map 3 shows that while in some parts of

Europe IS seem to compensate for accessibility; these examples do not reveal any systematic spatial pattern associated with these two settings.

Map 3 Information Society index vs. multimodal accessibility and population growth 1995-2000, draft illustrations of the non-systematic pattern of IS performance



While performance differences in IS development seem to be surprisingly strongly related to the overall performance indicators (see, Table 5), the country level cross tabulation with territorial background indicators provides only a limited view on the territorial aspects of the IS in Europe. This do not question the methodology, but manifests the need for a detailed analysis at finer spatial scale: Are the observed relationships between the IS and some background variables (e.g. GDP per capita) due of the existence of "spurious correlations", do these relationships also exist below the country level, and does such a regional analysis expose new information about the relationships between IS development and its background factors?

3.4 Concluding remarks for further work

The analysis has identified particular problems with the availability of regional data on IS. Therefore the results to date are mainly based on the constructed composite index, which was related to the lifecycle concept of OECD. ESPON countries are located in all the three stages of this schema – readiness, intensity and impact – which means that

significant differences in terms of IS performance in Europe are observed. Not surprisingly, north-south and east-west divides seem to be the most apparent macro-meso divisions in this respect. Northern European countries, and particularly Nordic countries, seem to generally have a more developed IS compared to the southern and eastern Europe. Furthermore, the new member states (including Romania and Bulgaria, but excluding Estonia) seem to lag behind the general European pattern.

The approach will be developed further in order to be able to break the presented index down into territories to reveal the diversity of Europe's regions. The analysis can also be complemented by the information of case studies, and it can be extended by including more background indicators, for example, by combining the information from cross tabulations of proxy indicators from the three aspects of the IS. A particular attention is given to the lifecycle framework and its utilization in the formation of typologies. For example, readiness could be measured by general educational indicators, and use and impact could be approximated by the results of ESPON 1.2.2. While the impact phase would be hard to approximate with any indicator, an analysis of this kind would provide much information about the situation of the less advanced IS territories. As a final step, the typologies could then be compared with some key ESPON typologies.

4 Preliminary results of the country case studies

The below analysis of the IS state and trends on the meso-level is limited to the descriptive part only, as the research undertaken by project Partners has not been completed yet. Thus, it is impossible to conduct an impact analysis and a spatial assessment at this stage of the project.

As the research undertaken is still in progress and only the first descriptive parts of the country case studies have been finished by six Project Partners, the present chapter is based on the results available so far. The descriptive analysis basically consists of the list of indicators used, a short presentation of conclusions as well as an indication of the data shortages.

4.1 Descriptive analysis – Czech Republic

Indicators used on regional level
Technological dimension
GPD per capita in CZK (2004)
ILO unemployment rate % (2004)
Registered unemployment rate % (as 30.11. 2005)
Individuals´ access to mobile phone for private use (measured by GDP per inhabitant)
Information and communication technologies in households, 2003 (%)
Economical dimension
Total and private R&D expenditure
Structure of GERD according to the regions (at NUTS 3 level) in 2002-2004
Structure of BERD according to regions (at NUTS 3 level) in 2002-2004
R&D personnel in the Czech Republic by regions 2002-2004
Number of patents
Proportion of population with completed secondary and tertiary education
Social dimension
Percentage of population having ordered/bought goods or services for private use over the Internet
Percentage of population who use teleworking and Internet banking
Percentage of population using the Internet for interacting with public authorities

Source: Appendix IV – Country case study – Czech Republic (first part)

Czech Republic is still lagging behind western European countries regarding ICT and its use in all analysed spheres. The development of IS on the regional level relatively strongly differentiated as the penetration rates among economically lagging regions with obsolete social and economic structures are rather low, significantly lower than the national level.

One of the main constrains of the analysis was the data availability as there are only few indicators regarding the IS development on the regional level and these have been collected only for last two years.

Therefore it is hard to say what the main characteristics of the long-term development are, if, for example, the development of IS is faster in lagging regions which thus could catch up and partly overcome their backwardness. Yet, it can be said that regarding telecommunications, the penetration rate are close to its "full coverage" and this could not be taken as a constraint. More significant disparities have been found in Internet penetration which is still very low in peripheral and economically weak regions as high-speed or broadband internet connection is accessible rather in big towns (meant particularly by its price but partly also physically). Probably main reason, besides its price, is insufficient motivation of the population to acquire these services. This could be partly due to the disparities regarding educational attainment.

4.2 Descriptive analysis – Finland

Indicators used on regional level
Technological dimension
Number of mobile (cellular) phones subscriptions per 100 inh.
Number of cable modem subscriptions per 100 inh.
Number of xDSL subscriptions per 100 inh.
Proportion of households with a computer
Proportion of households with internet access at home
Economical dimension
ICT sector employment, % of total (as defined by OECD)
ICT sector value added, % of total (as defined by OECD)
R&D expenditure
Private R&D expenditure
R&D personnel and researchers, % of work force
Number of patents
Percentage of population using the Internet for interacting with public authorities

Source: Appendix V – Country case study – Finland (first part)

Finland has so far fared well in international comparisons regarding IS development, competitiveness, and particularly, telecommunications. The telecommunications infrastructure in Finland is perhaps one of the most advanced in Europe. The telephone network in Finland is 100% digital, Finland's mobile phone market (together with the markets of the other Nordic countries) is one of the most developed in the world, and also the Internet has grown more rapidly in Finland than in many other countries.

The basic telecom network is equally available everywhere in Finland – except in ultimately remote and very isolated places. Regional differences in supply exist only in more advanced services (such as broadband internet connections), such that cities and other densely populated localities are in a better position. However, these differences seem or are at least expected to lessen over time.

The supply of broadband access services in Finland is constrained by low demand, lack of competition in certain areas, and poor profitability especially in sparsely inhabited areas The factors hindering demand include lack of knowledge and know-how, high prices of services and terminal devices as well as low quality of content services. The territorial differences in the uptake and use of ICT seem to be strongly related to the regional differences in these socio-economic factors (family size, age, education etc.) and the territorial differences in supply side conditions (availability etc) are likely of only secondary importance in the long run.

In regional development, the restructuring of economic base has resulted in a spatially uneven and polarized process, in which the growth in economic activities, employment and population in Finland are increasingly concentrating in a few cities and regions. In particular, the locality decisions of knowledge-intensive firms seem to be based on know-how already existing in the locality. This seems to favour only a few existing growth centres, which complicates the closing of development gaps across regions and between centres and their hinterlands.

4.3 Descriptive analysis – Germany

Indicators used on regional level
Technological dimension
Proportion of households with mobile (cellular) phones subscription
Proportion of households with ISDN subscription
Proportion of households with a computer
Proportion of households with internet access at home
Proportion of households with DSL subscription
Share of enterprises with internet access
Share of enterprises with own homepage
Economical dimension
R&D expenditure
ICT sector employment, % of total (as defined by OECD)
ICT sector value added, % of total (as defined by OECD)
R&D expenditure in mill.Euro per 1000 inh
R&D personnel per 1000 inhabitants
High tech patents per million inhabitants
Social dimension
Percentage of population using the Internet for interacting with public authorities
Percentage of population having ordered/bought goods or services for private use over the Internet in the last three months

Source: Appendix VI – Country case study – Germany (first part)

Even more than 10 years of after the reunification of Germany, for many socio-economic indicators strong disparities between Eastern and Western Germany prevail. Particular problem fields in this context are the continuing high unemployment rates especially in East Germany and the demographic development, which implies shrinking regions. These

concentrate in peripheral and above all in large parts of East Germany. In addition, with regard to many socio-economic indicators also a less distinct North-South division can be observed.

Besides this geographical division Germany is also faced with a spatial division between metropolitan and urban areas on the one hand side and more rural and peripheral areas on the other hand. Due to the differing population composition in these different types of regions a digital divide apparent between the population of different age and education also reigns in spatial terms. Thus, in particular the peripheral regions in East Germany have the least favourable position in terms of IS related indicators, even if this is not visible on NUTS 2 level maps. These general findings hold for both, the technical as well as the economic dimension of the IS.

4.4 Descriptive analysis – Greece

Indicators used on regional level
Technological dimension
Number of mobile (cellular) phones subscriptions per 100 inh.
Proportion of households with a computer
Proportion of households with internet access at home
Proportion of households with broadband internet access at home
Share of enterprises with internet access
Share of enterprises with own homepage
Economical dimension
R&D expenditure (as part of GDP)
Private R&D expenditure (business R&D expenditure/GDP)
Number of patents (patent applications/million inh.-1999)
Proportion of population with completed secondary and tertiary education

Source: Appendix VII – Country case study – Greece (first part)

According to the latest data released by EUROSTAT, Greece still holds one of the last positions in almost all IS indicators.

Without doubt, in recent years the range, quality and cost of telecommunications infrastructure and services in Greece have improved considerably. The digitalisation of the network has been completed to more than 95% for urban areas and 85% for the whole of the country, while the quality of services is improving steadily.

The above are, to a high extend, also true at regional level. One should take into account that in the region of Attiki most aspects of the Information Society seem to be more developed.

The development of the Information Society in Greek regions does not seem to follow a specific pattern. With the exception of the region of

Attiki, which scores highly in almost all available regional indicators, there are no regions that systematically perform better or worse.

While in the last four years national studies regarding IS issues are conducted, these deal mostly with the whole of the country and contain little data for the Greek NUTS 2 regions. Additionally, these studies are based on population samples and do not measure the total of the population, although they have a low margin of error.

At the regional level, however, no studies or statistics are available. The regional Operational Plans for the Information society that have been developed in recent years, despite the fact that they include an assessment of IS status in the region, provide a limited information, at least in terms of statistical data.

Another problem that exists is that a number of indicators and data sets are not available for every year and some are not available for the years after 2000. Thus, it is difficult to measure progress in time or make comparisons between regions.

4.5 Descriptive analysis – Hungary

Indicators used on regional level
Technological dimension
Number of mobile (cellular) phones subscriptions per 100 inh.
Number of cable modem subscriptions per 100 inh.
Number of xDSL subscriptions per 100 inh.
Proportion of households with a computer
Proportion of households with internet access at home
Proportion of households with broadband internet access at home
Share of enterprises with internet access
Share of enterprises with own homepage
Share of enterprises receiving orders over Internet
Economical dimension
ICT sector value added, % of total (as defined by OECD)
ICT sector employment, % of total (as defined by OECD)
R&D expenditure
R&D personnel and researchers, % of work force
Proportion of population with completed secondary and tertiary education
Number of patents

Source: Appendix VIII – Country case study – Hungary (first part)

The overall conclusion of the research is that the phenomena connected to the development of information society are detectably present in the socio-economic processes of Hungary. On the national level the signs of development are undeniable. The indicators considered have an increasingly greater impact on the regional processes; however the Central Hungarian Region is still dominant on the national scale.

The capital city and its environs act as a water head of the country in various respects, and there is doubt, that they form the focal point and major scene of modernisation. Beside this region, there are three distinguishable territorial types. The first type includes the regional units centred around universities, which by their intellectual potentials stand out from their surroundings as they give impetus to the development of information society. The second type is connected to the west of the county, a region characterised with favourable economic position and the new image of modernity. Both the working culture of people and the structural characteristics of the economy guarantee further dynamic growth. The third kind of area means the rest of the country, where development is late in all respects and where the local economy and the social capital are relatively weak.

4.6 Descriptive analysis – Poland

Indicators used on regional level
Technological dimension
Proportion of households with a computer
Proportion of households with internet access at home
Share of enterprises with internet access
Share of enterprises with own homepage
Share of enterprises purchasing goods and services over Internet
Economical dimension
R&D expenditure
Private R&D expenditure
R&D personnel
Number of patents
Proportion of population with at least secondary education

Source: Appendix IX – Country case study – Poland (first part)

Although with regard to the results of many Information Society indicators the position of Poland was improving in 2000-2004, overall assessment of the level of Information Society development in Poland is still unsatisfactory. IS in Poland in many aspects (e.g. R&D expenditures *per capita* and as a share in GDD, number of patents per 1mln inhabitants) has reached a level well below the EU15 average and, what is even more alarming, worse than some of the other EU New Member States (Czech Republic, Hungary, Slovakia, Slovenia).

Concerning regional differences some tendencies observed are related to the permanent spatial patterns of the Polish economy. One of the most evident is the dominating position of the Mazowieckie voivodship's (where the capital city is situated) with regard to many indicators (households with a computer, R&D spending and employment, number of

patents, level of education), which sometimes play the leading role together with other economically strong voivodships with big science centres. It is important to notice though that the significant IS performance of the Mazowieckie voivodship is mainly due to presence of Warsaw, as that particular region is characterised by the biggest intraregional disparities.

At the same time the East – West divide is not very significant while describing IS state in Poland on the NUTS 2 level and some promising phenomena are occurring as well. Apparently the performance of some less developed regions (for example Podlaskie voivodship) in technological dimension of the IS development is surprisingly well above the Polish average.

According to the research conducted by CSO having a computer is definitely more common in big cities than in the rest of the country and it depends on the level of a given family's income. Presence of children in households is an important factor in favour of having a computer and having access to the internet. The most important barriers to internet access at home in Poland are: high equipment and access costs, lack of computer skills, lack of interest.

Some of the above stated hypotheses cannot be fully proved because of serious data shortages. The CSO in Poland has been collecting data on R&D also on NUTS 2 level since the beginning of 90, but other data, for example: ICT sector development, broadband access or whole IS social dimension indicators is not available on the regional level. Additionally, the present studies are essentially based on population samples (households and enterprises) and do not measure the total of the population.

5 Next working steps

The next steps in qualitative analysis are related to further development of the approach undertaken in chapter 3 in order to enable breaking the presented index down into territories to reveal the diversity of Europe's regions. That will lead to typologies development for the ESPON space. As regards quantitative approach next steps are focused on the preparation of the final versions of the country case studies as well as regional case studies by each Project Partner.

As a final step the results of the country case study would be integrated with the results of qualitative analysis and regional case studies' results in order to present project results accordingly to the three analytical steps and three spatial levels introduced in Chapter 2 (see Table 2). Then, the verification of the hypotheses developed in the FIR will be possible as well as policy recommendations will be proposed.

The next project meeting is scheduled on 3-4 March 2006 in Budapest (Hungary). During the meeting every Project Partner will be asked to present draft results of the regional case studies in order to have the case studies overview. The hypothesis verification and possible directions of policy recommendations with reference to the three-level approach adopted by ESPON Programme will be brought up for discussion as they are crucial for the final projects results. Moreover, the Project partners will agree on the next working steps timetable and detailed task division leading towards Final Report. The outcomes of MC Second Interim Report's evaluation will be taken into account when considering the details of the future project direction.

Several project partners, including EUROREG, IRS and UJOE will attend as well the ESPON Seminar in Salzburg (13-14 March 2006), when the ESPON project 1.2.3 will be discussed during the workshop.

6 References

1. Bogdanowicz, M., Burgelman, J-C., Centeno, C., Gourova, E., Carat, C. 2003. "Factors of regional/national success in Information Society developments: Information Society strategies for candidate countries," First Monday, volume 8, number 10 (October). Available at:

http://www.firstmonday.org/issues/issue8_10/bogdanowicz/index.html

2. Camagni, R., Innovation Networks: Spatial Perspectives, Belhaven, London 1999.
3. Castells, M., Hall, P., Technopoles of the World, Routledge, London 1994.
4. Castells, M., *The Internet Galaxy. Reflections on the Internet, Business and Society*, Oxford Univ. Press, Oxford 2001.
5. *Cohesion Policy in Support of Growth and Jobs: Community Strategic Guidelines, 2007-2013*, Communication from the Commission, Brussels, 05.07.2005, COM(2005) 0299
6. Cornford, J., Gillespie A., Richardson R., *Regional Development in the Information Society: A Review and Analysis,* CURDS, University of Newcastle upon Tyne 1999.
7. Dabinett, G., *EU mainstreaming of the information society in regional development policy,* Regional Studies 2001 No. 35 (2).
8. Dosi, G., *Sources, procedures and microeconomic effects of innovation*. Journal of Economic Literature, 26, 1988.
9. Drucker, P.F., *Post-Capitalist Society*, HarperBusiness, New York, 1993.
10. Dunning, J.H., *Regions, Globalisation and the Knowledge Economy*, Oxford University Press, New York 2000.
11. *eEurope. An Information Society for All, Communication on a Commission Initiative for the Special European Council of Lizbon, 23-24 March 2000.*
12. Eurostat (2005): Eurostat yearbook 2005. Available at: http://epp.eurostat.cec.eu.int/portal/page?_pageid=1133,47800773,1133_47803568&_dad=portal&_schema=PORTAL
13. Gawlikowska-Hueckel, K., *Procesy rozwoju regionalnego w UE. Konwergencja czy polaryzacja*, Wydawnictwo Uniwersytetu Gdańskiego, Gdańsk 2003.
14. Gorzelak, G., Jałowiecki, B., *Konkurencyjność Regionów*, Studia Regionalne i Lokalne 2000 No.1 (1).
15. Gorzelak, G., Smętkowski, M., *Metropolia i jej region w gospodarce informacyjnej*, Wydawnictwo Naukowe Scholar, Warszawa 2005.
16. INSEAD (2004): eEurope 2005. A study of the degree of alignment of the New Member States and the Candidate Countries. Prepared for SAP By INSEAD. Available at: http://www.cisco.com/global/DE/pdfs/publicsector/sap_report.pdf
17. Kanter, R.M., *World Class. Thriving Locally in the Global Economy*, Simon &Schuster, New York 1995.
18. Kujath, H.J., *Die neue Rolle der Metropolregionen in der Wissensökonomie*, Kujath, H.J.: *Knoten im Netz – Zur neuen Rolle der Metropolregionen in der Dienstleistungswirtschaft und Wissensökonomie*, LIT Urban and Regional Sciences, No.4, Münster 2005.
19. Malecki, E.J., *Technology and Economic Development. The Dynamics of Local, Regional and National Change,* Longman Scientific & Technical, London 1997.
20. OECD (1999): Defining and Measuring E-Commerce: A Status Report. DSTI/ICCP/IIS(99)4/FINAL.

21. Schmidt, S., *Metropolregionen als Hubs globaler Kommunikation und Mobilität in einer wissensbasierten Wirtschaft?* Kujath, H.J.: *Knoten im Netz – Zur neuen Rolle der Metropolregionen in der Dienstleistungswirtschaft und Wissensökonomie*, LIT Urban and Regional Sciences, No.4, Münster 2005.
22. Statistics Finland (2005): Suomalaisten viestintävalmiudet 2000-luvun vuorovaikutusyhteiskunnassa osa 2. Katsauksia 2005/2.
23. Thurow, L., *Przyszłość kapitalizmu*, Wydawnictwo Dolnośląskie, Wrocław 1999.
24. Toffler, A., *Trzecia fala*, PIW, Warszawa 1997.
25. WEFORUM (2005): Global Information Technology Report 2004-2005. Executive Summary and Networked Readiness Index Rankings. Available at: http://www.weforum.org/site/homepublic.nsf/Content/Global+Competitiveness+Programme%5CGlobal+Information+Technology+Report
26. WEFORUM (2004): Global Information Technology Report 2003-2004. Network Readiness Index and Methodology. Available at:
27. http://www.weforum.org/pdf/Gcr/GITR_2003_2004/Framework_Chapter.pdf

7 Appendix I – Level of GDP per capita and selected Information Society indicators

(in the separate file)

8 Appendix II – Country Case Study's template

(in the separate file)

9 Appendix III – The eEurope 2005 Index and The Networked Readiness Index

(in the separate file)

10 Appendix IV – Country case study – Czech Republic (first part)

(in the separate file)

11 Appendix V – Country case study – Finland (first part)

(in the separate file)

12 Appendix VI – Country case study – Germany (first part)

(in the separate file)

13 Appendix VII – Country case study – Greece (first part)

(in the separate file)

14 Appendix VIII – Country case study – Hungary (first part)

(in the separate file)

15 Appendix IX – Country case study – Poland (first part)

(in the separate file)

ESPON

EUROPEAN SPATIAL PLANNING OBSERVATION NETWORK

ESPON project 1.2.3

Second Interim Report

Appendix I

Level of GDP per capita and selected Information Society indicators

Co-financed by the European Community through the Interreg III ESPON Programme

Table of contents

Figures

Objective of the analysis

In order to access level of relationship between GDP per capita and other IS society indicators on regional level the following exercise has been conduct. In selected case studies countries scatter diagrams of GDP per capita and indicators reflecting different aspects of information society (R&D, innovativeness and IT technologies) was prepared. The idea underlying the analysis was to adapt corrective coefficient to GDP per capita in case of the hypothetical situation that higher developed regions are above the line of regression while lagging regions below. The coefficient should allow to create maps for regions of ESPON countries with higher accuracy.

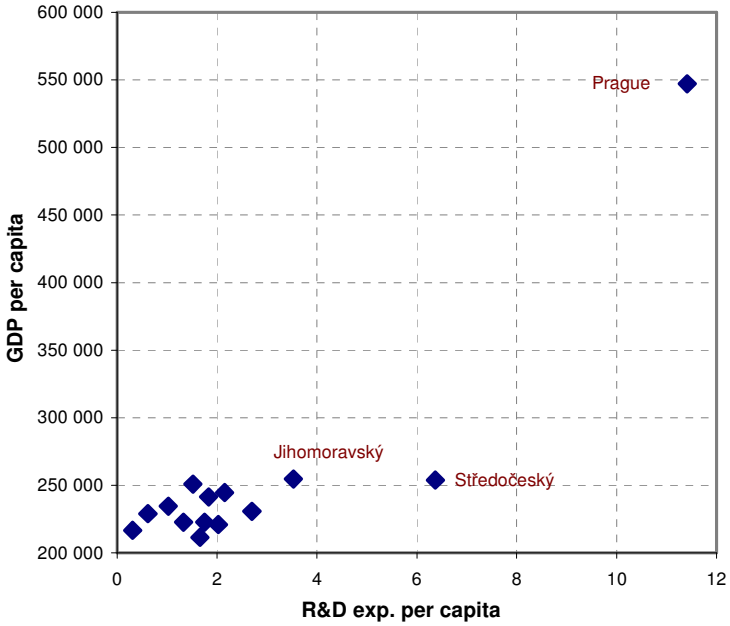
Results

As a result of exercise no clear evidence of typical correlation between GDP per capita and selected IS indicators across the selected countries has occurred. Therefore it was decided not to adapt any corrective coefficient to GDP per capita in the field of regional breakdown of data available only on country level.

The Czech Republic

Figure 1 **GDP per capita and R&D expenditures per capita (a) 14 regions with Prague and (b) 13 regions without Prague**

(a)



(b)

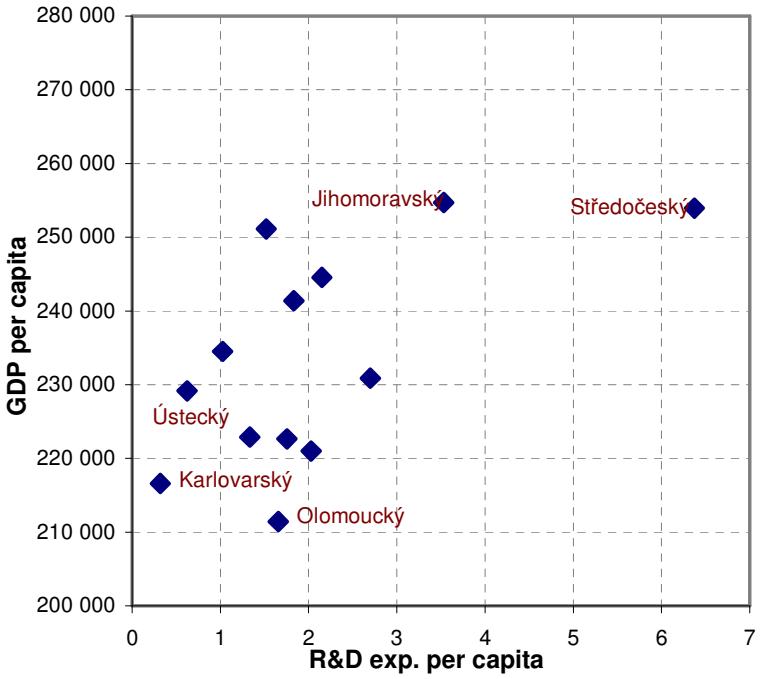
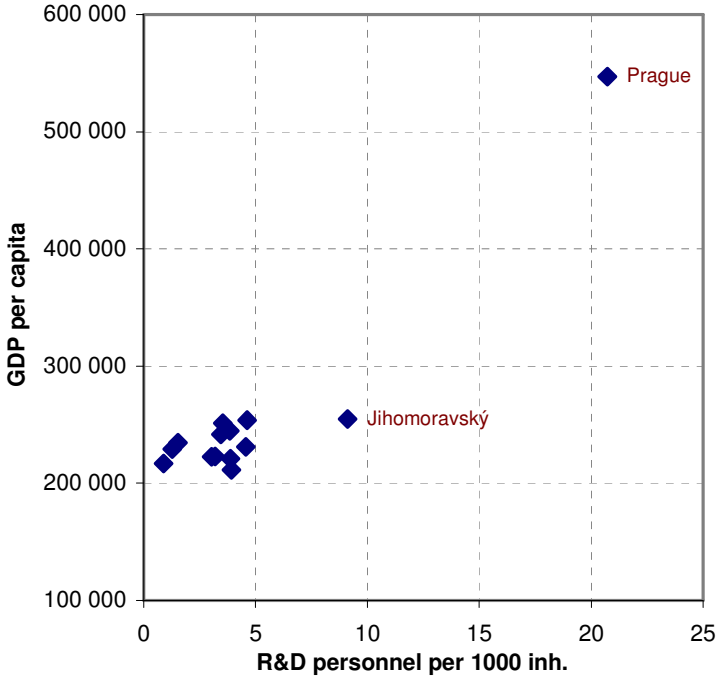


Figure 2 **GDP per capita and R&D personnel per 1000 inhabitants (a) 14 regions with Prague and (b) 13 regions without Prague**

(a)



(b)

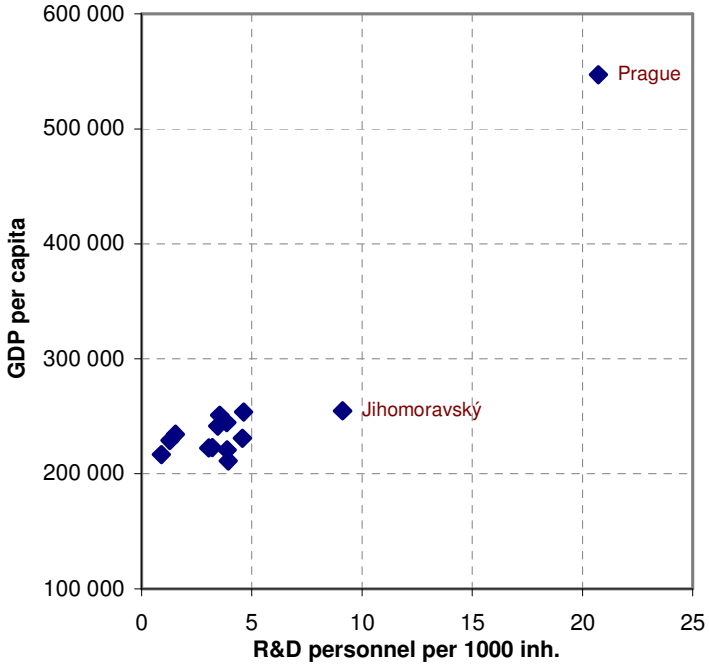
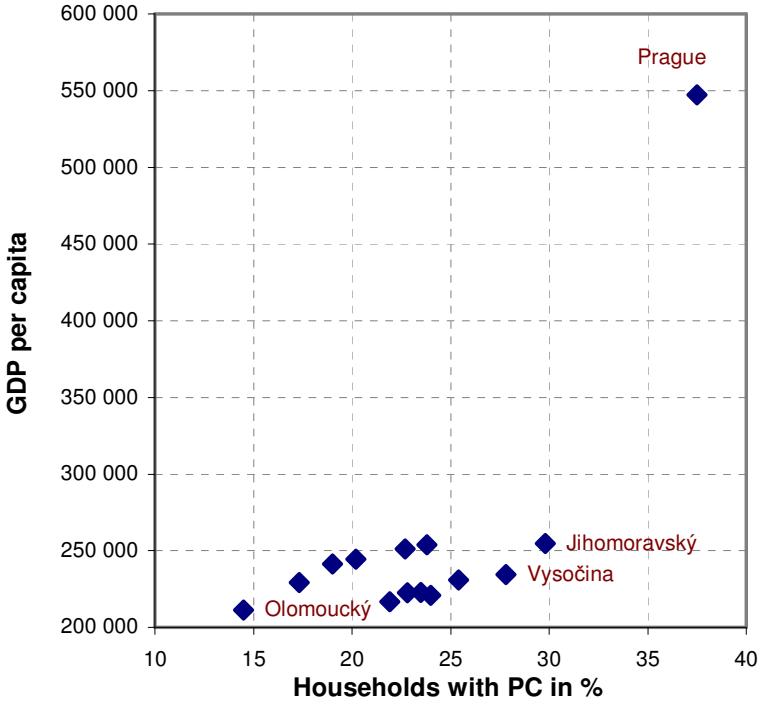


Figure 3 **GDP per capita and households with computers (a) 14 regions with Prague and (b) 13 regions without Prague**

(a)



(b)

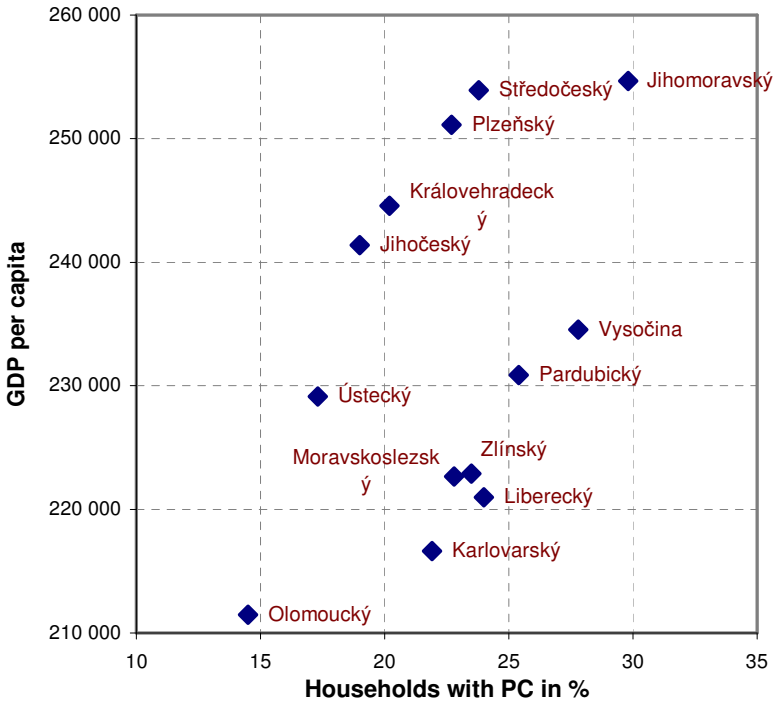
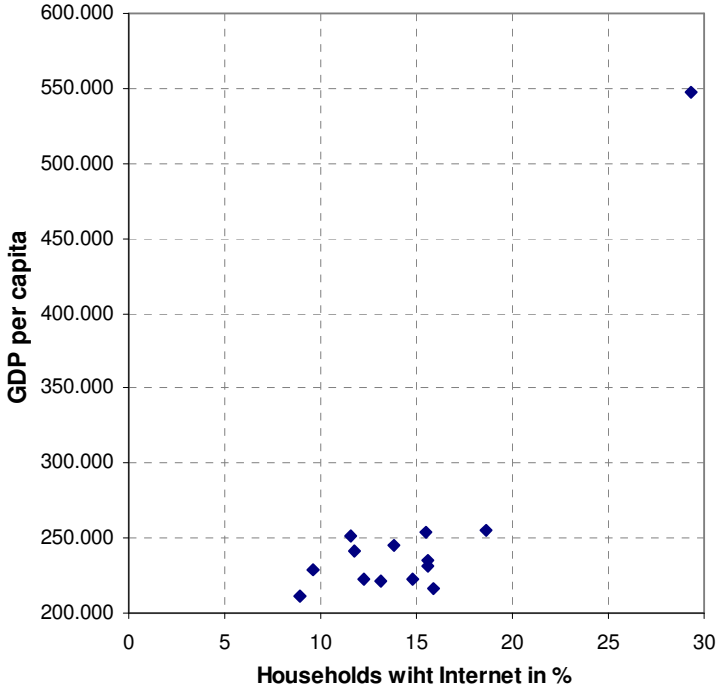
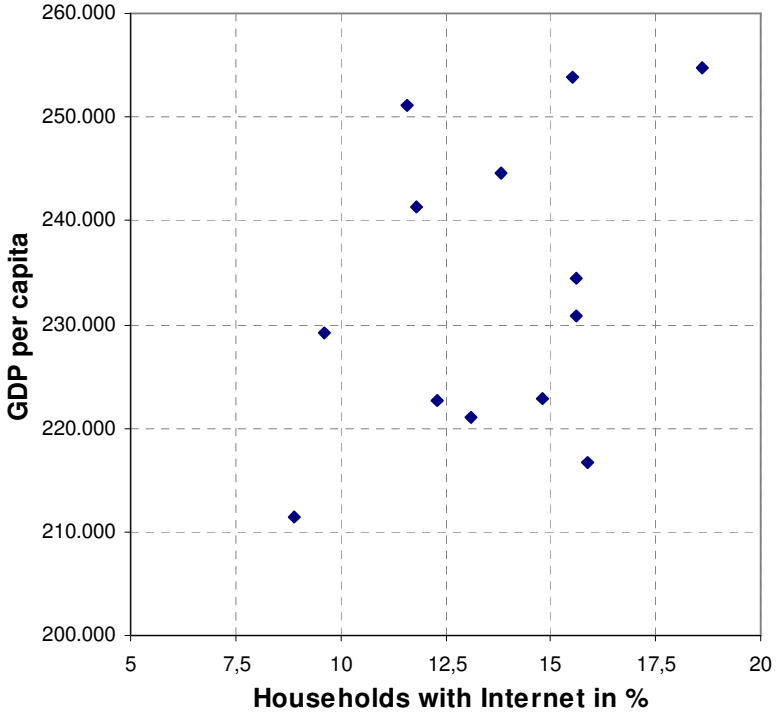


Figure 4 **GDP per capita and households with Internet access (a) 14 regions with Prague and (b) 13 regions without Prague**

(a)



(b)



Finland

Figure 5 GDP per capita and R&D expenditure per capita

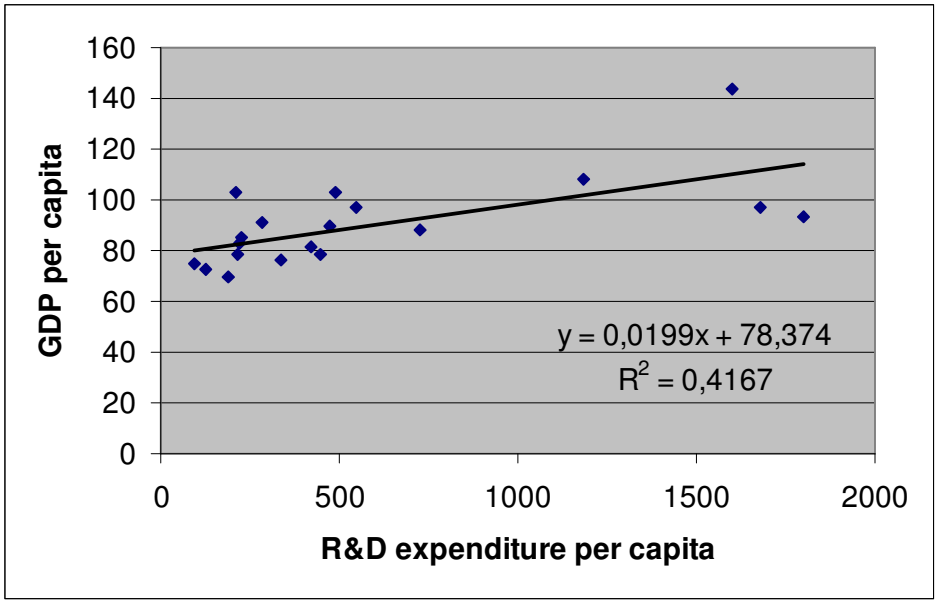


Figure 6 GDP per capita and R&D personnel per 1000 inhabitants

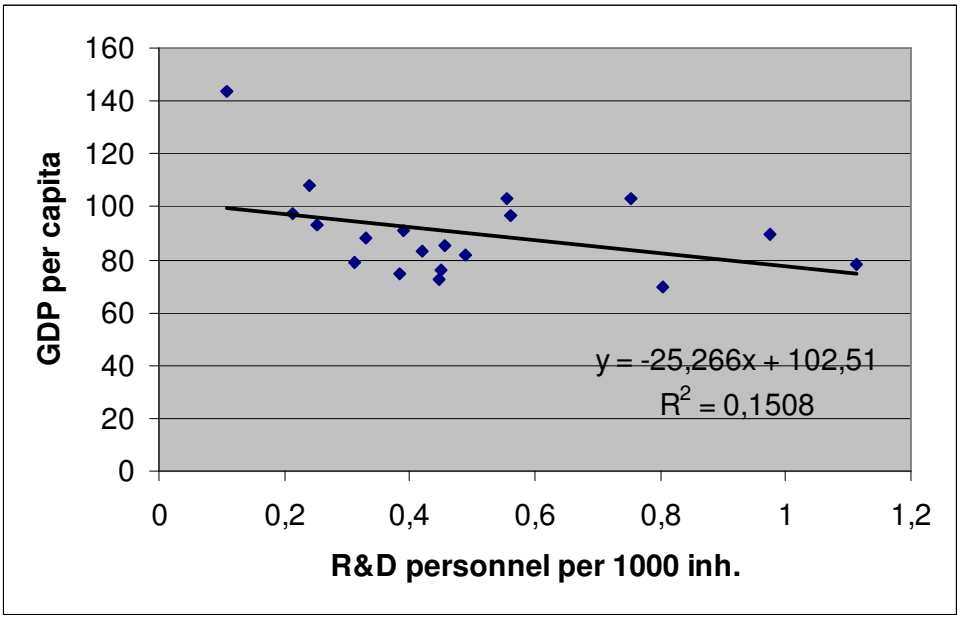


Figure 7 **GDP per capita and patent applications per 1000 inhabitants**

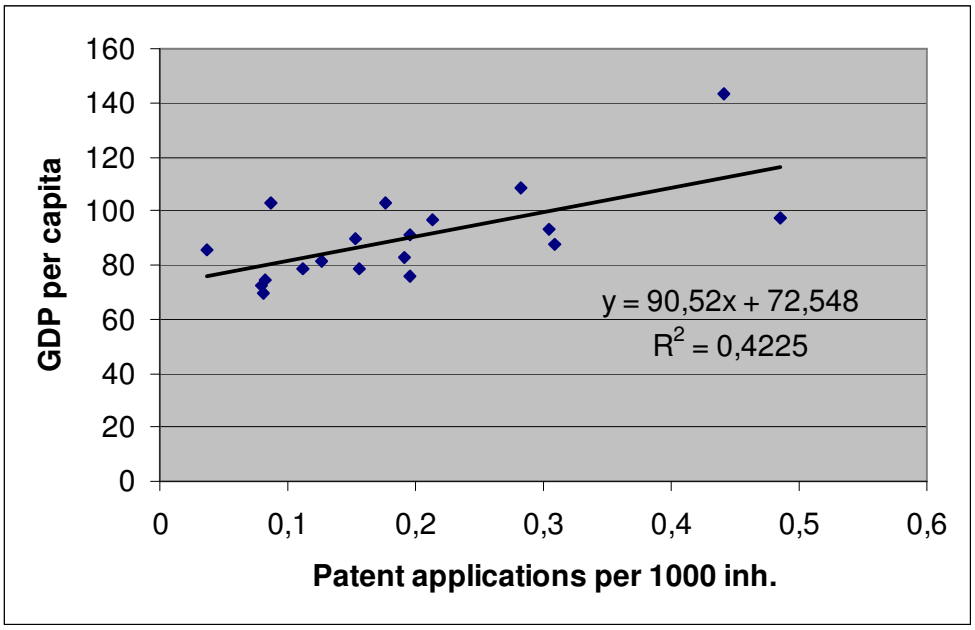
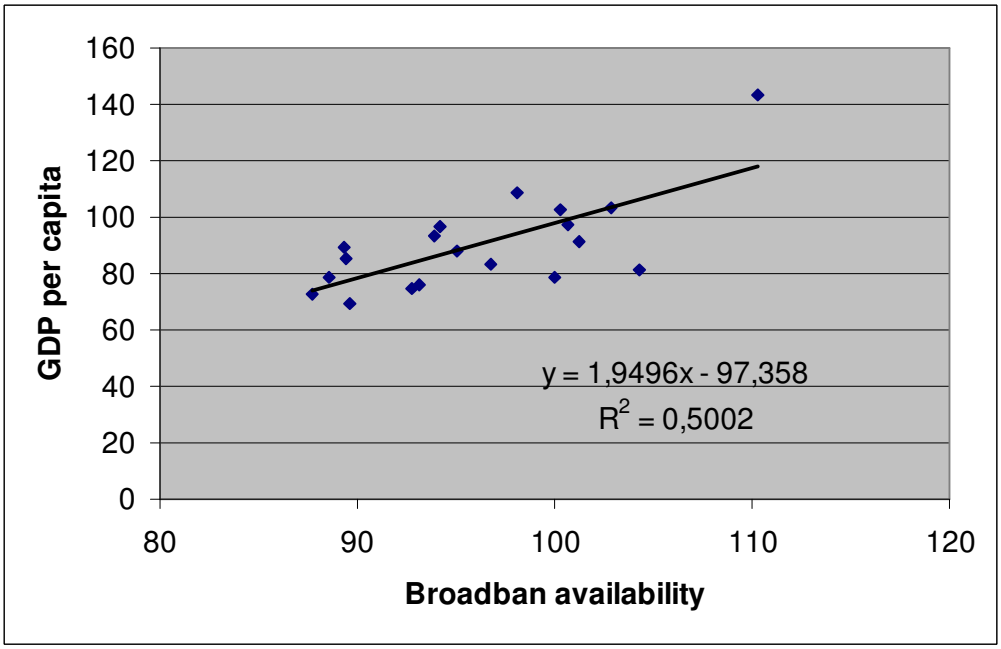


Figure 8 **GDP per capita and broadband availability**



Germany

Figure 9 GDP per capita in PPS and households with ISDN

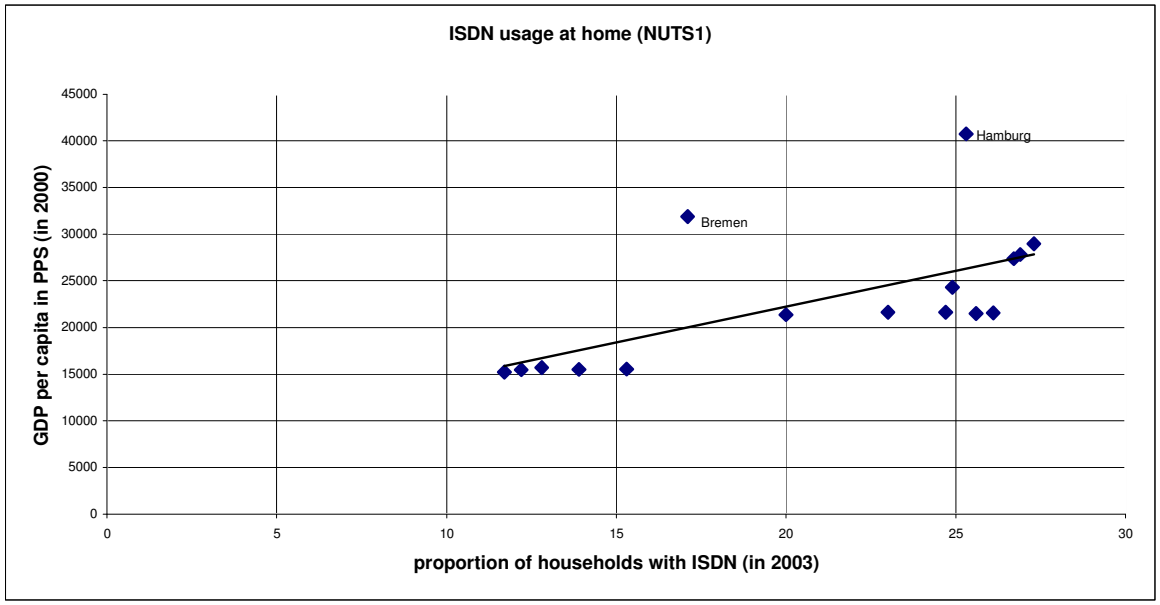


Figure 10 GDP per capita in PPS and proportion of households with a PC

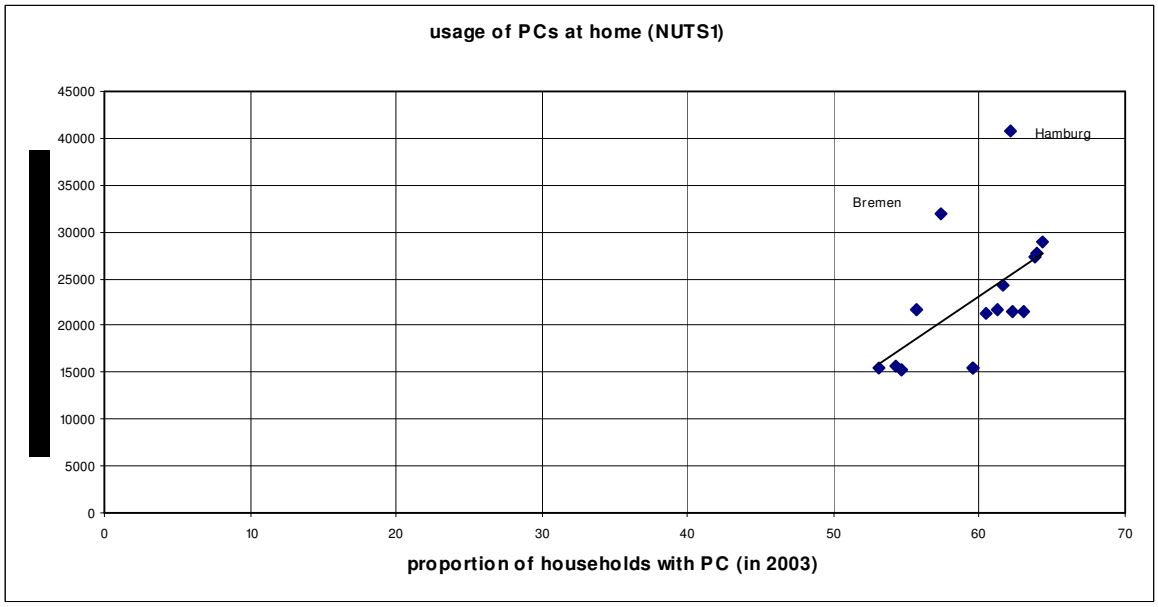


Figure 11 GDP per capita in PPS and households with Internet access [%]

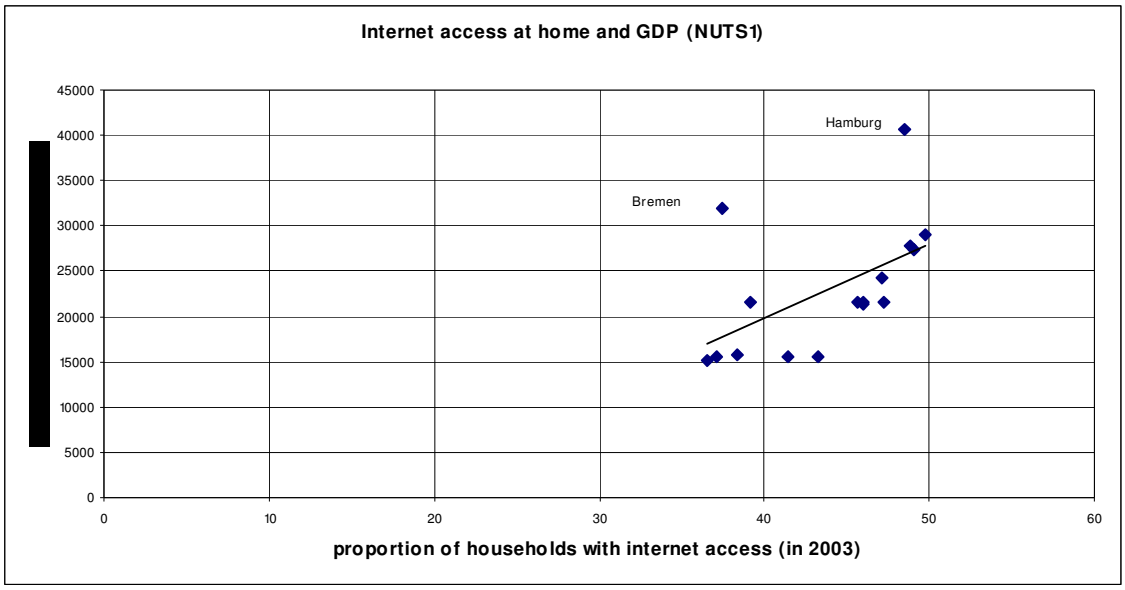


Figure 12 GDP per capita in PPS and people with secondary education [%]

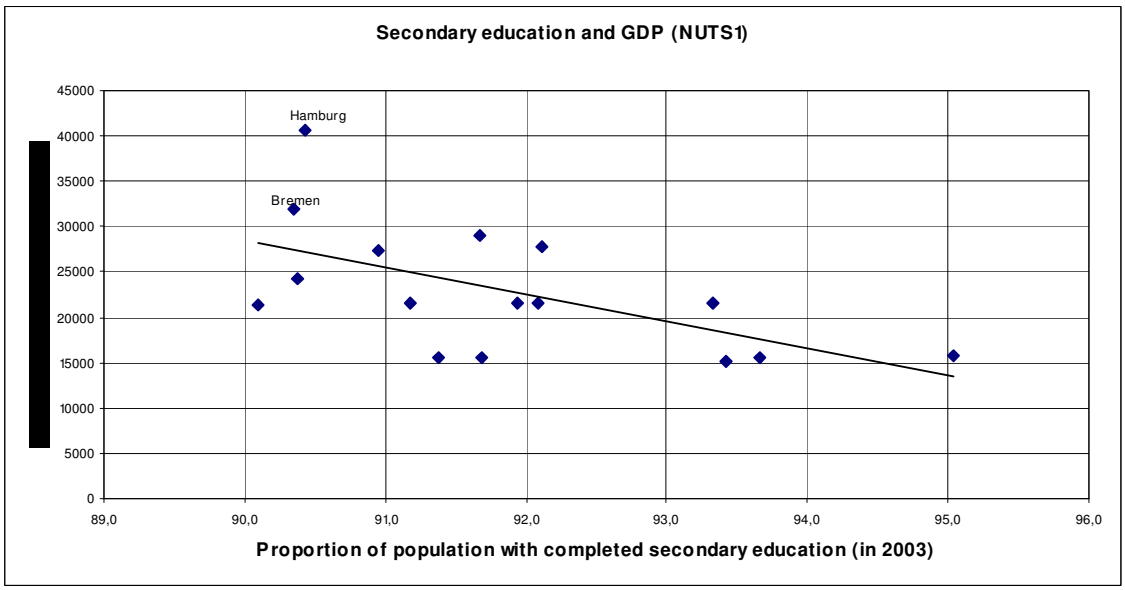


Figure 13 GDP per capita in PPS and people with tertiary education [%]

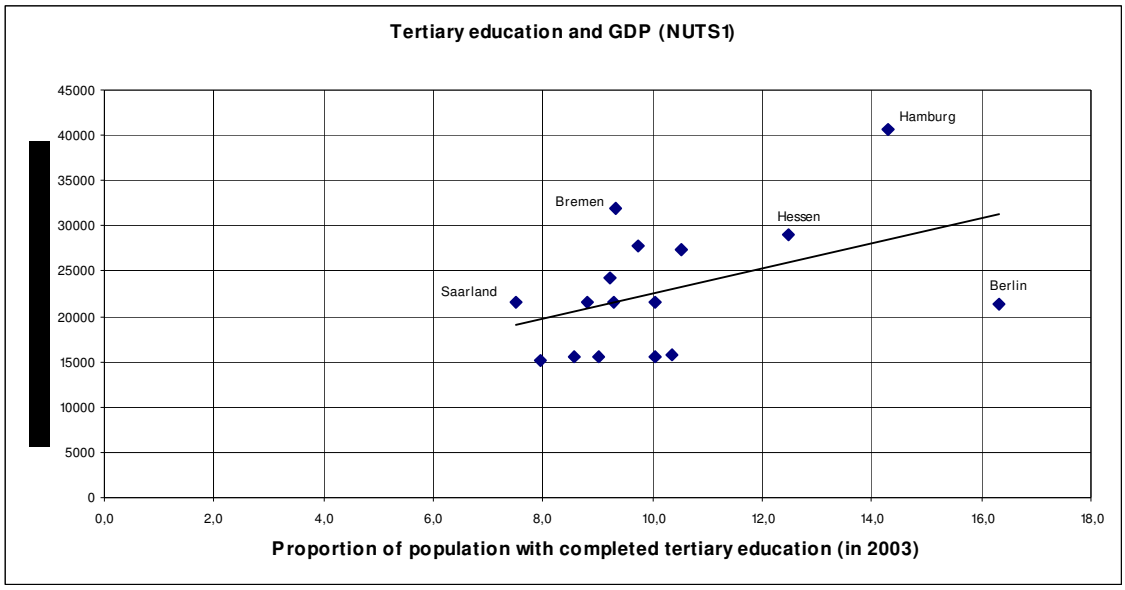


Figure 14 GDP per capita in PPS and firms with Internet access [%]

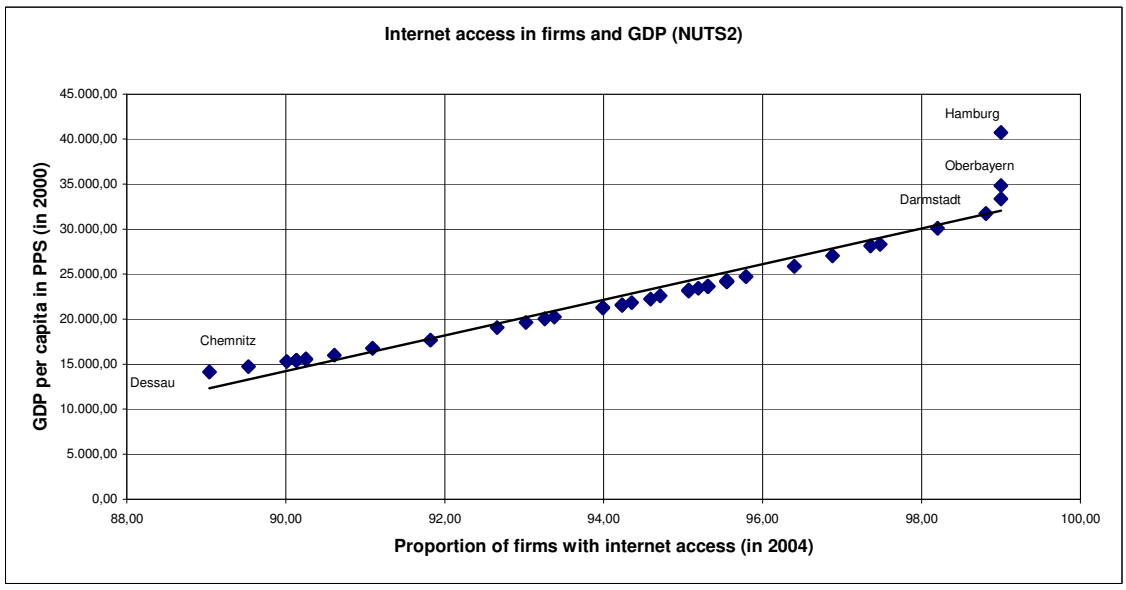


Figure 15 GDP per capita in PPS and firms with websites [%]

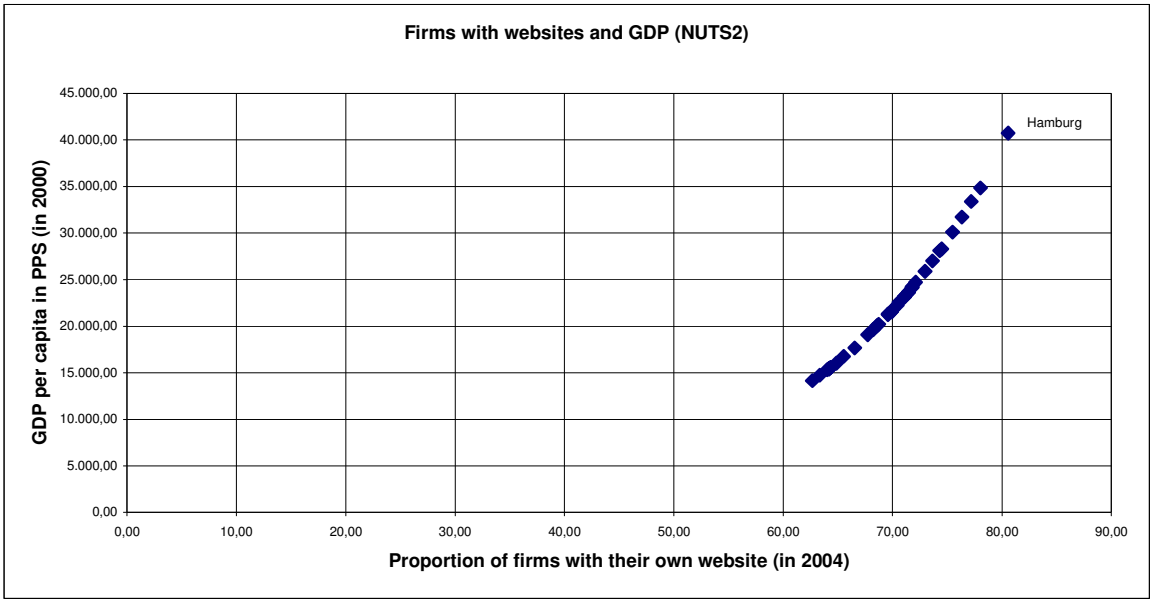


Figure 16 GDP per capita in PPS and high-tech patents per million inhabitants

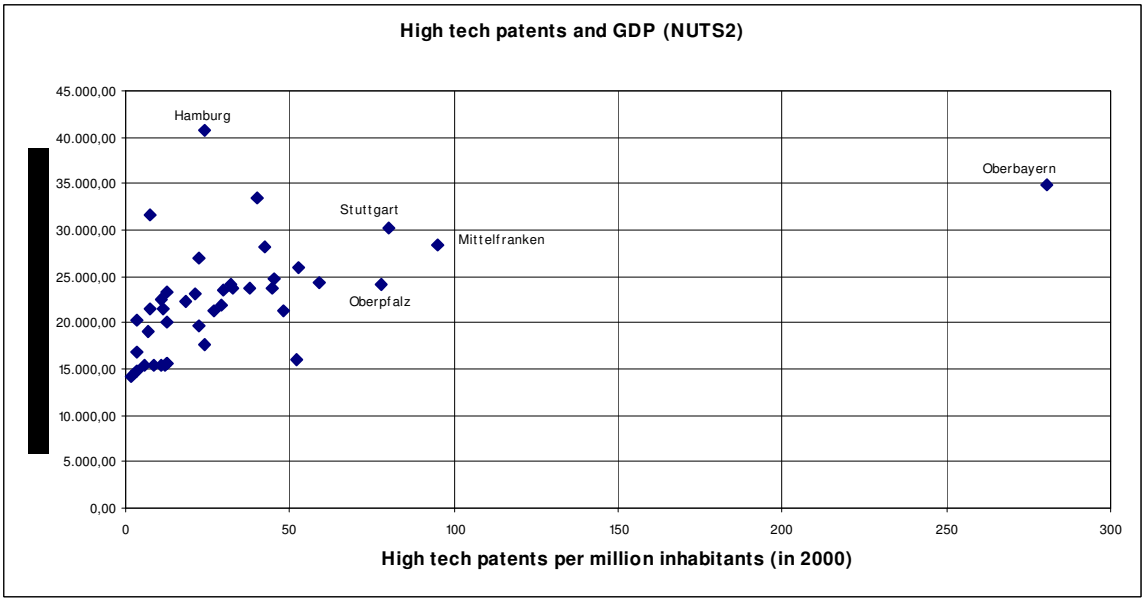


Figure 17 GDP per capita in PPS and R&D expenditures per 1000 inhabitants

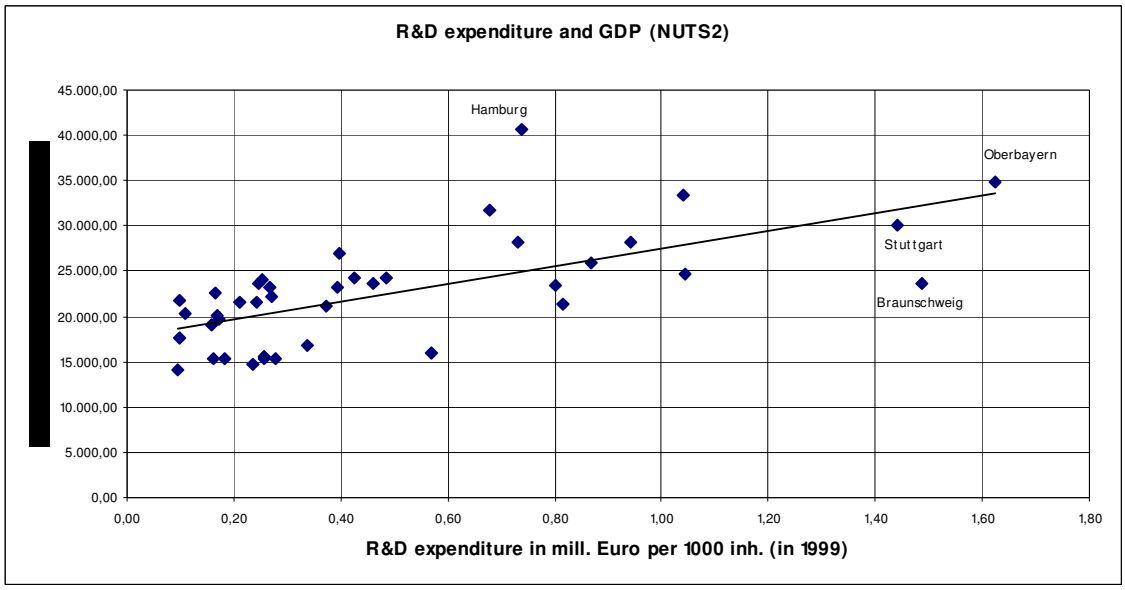
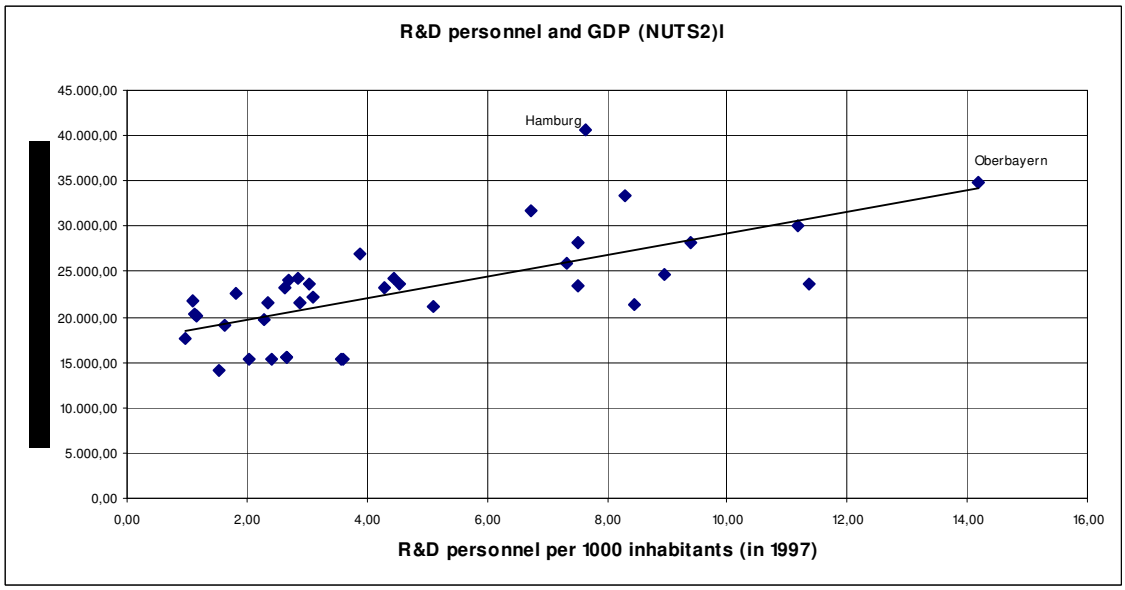


Figure 18 GDP per capita in PPS and R&D personnel per 1000 inhabitants



Greece

Figure 19 GDP per capita and R&D expenditures (as % of GDP)

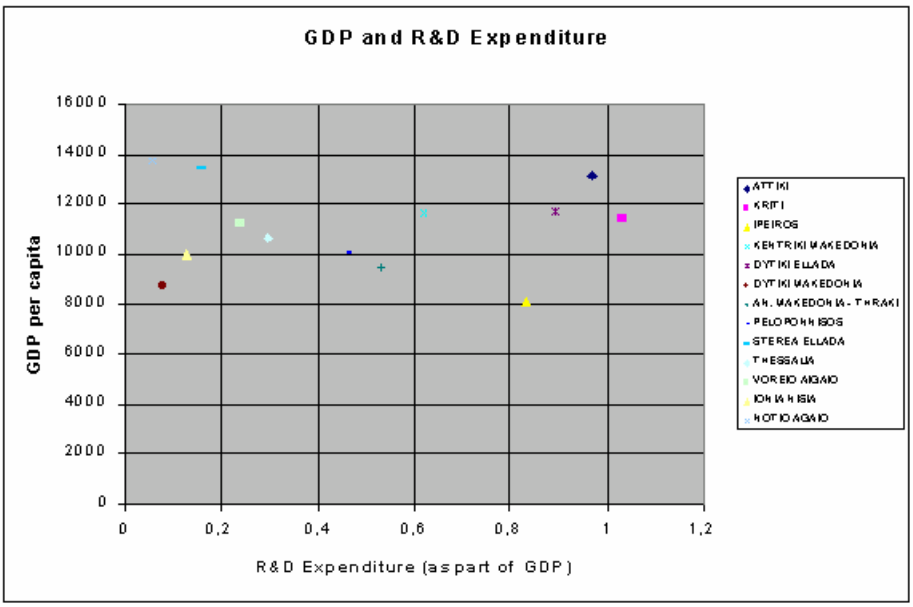


Figure 20 GDP per capita and households with internet access

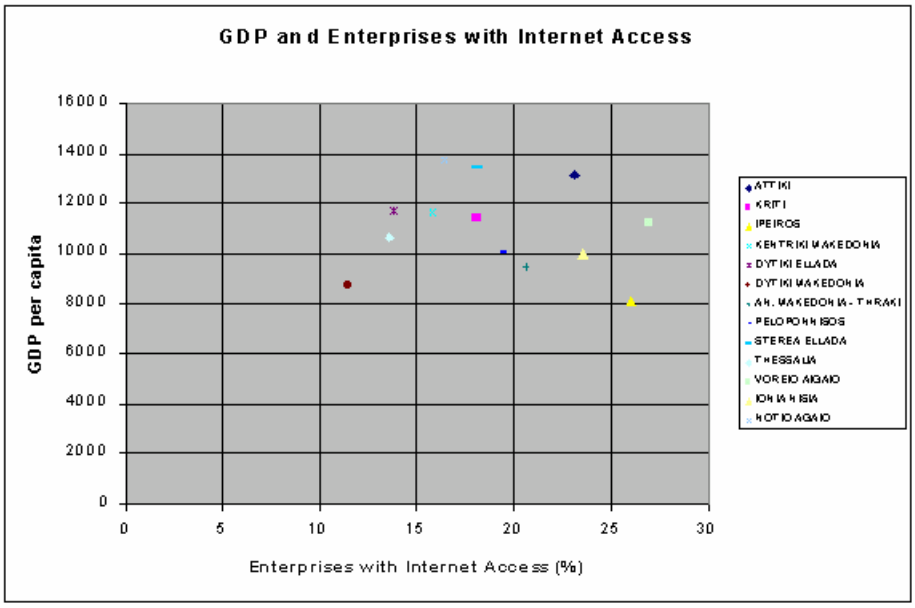
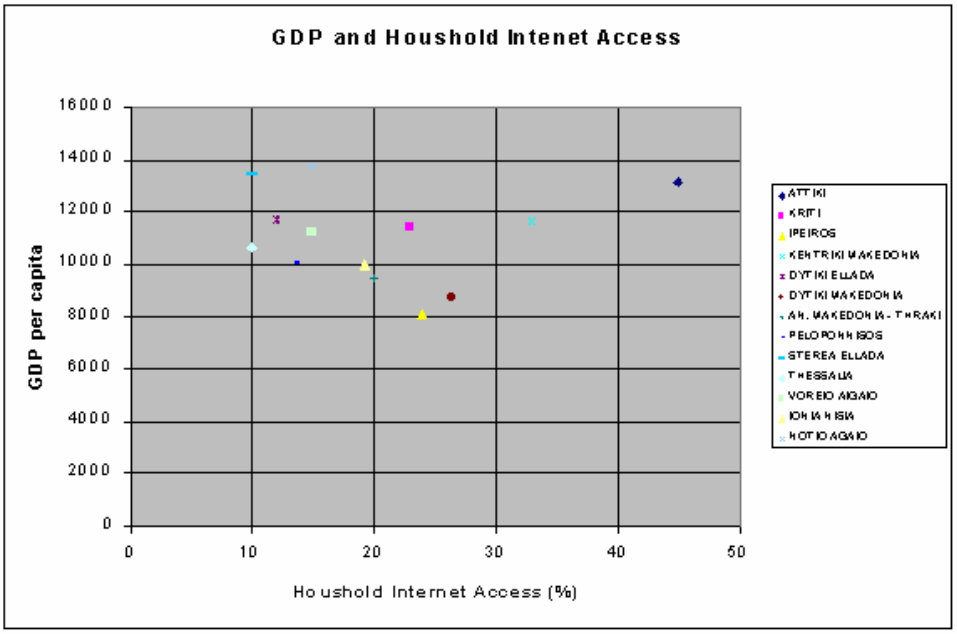


Figure 21 GDP per capita enterprises with internet access



Hungary

Figure 22 GDP per capita and proportion of households without computer

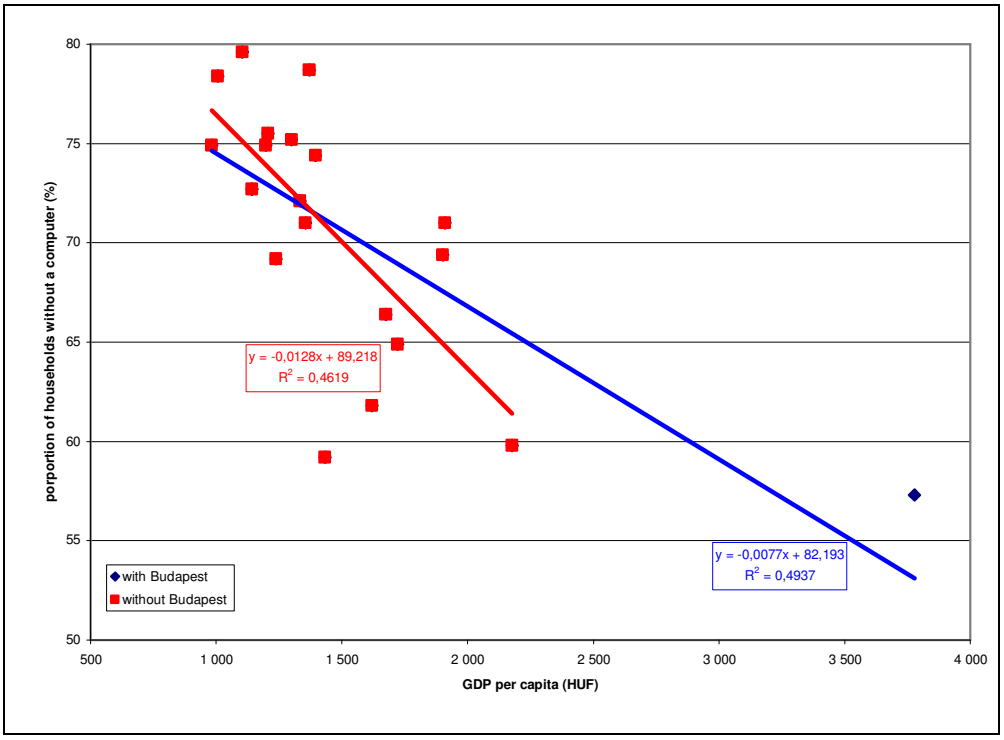


Figure 23 GDP per capita and proportion of households with more computers

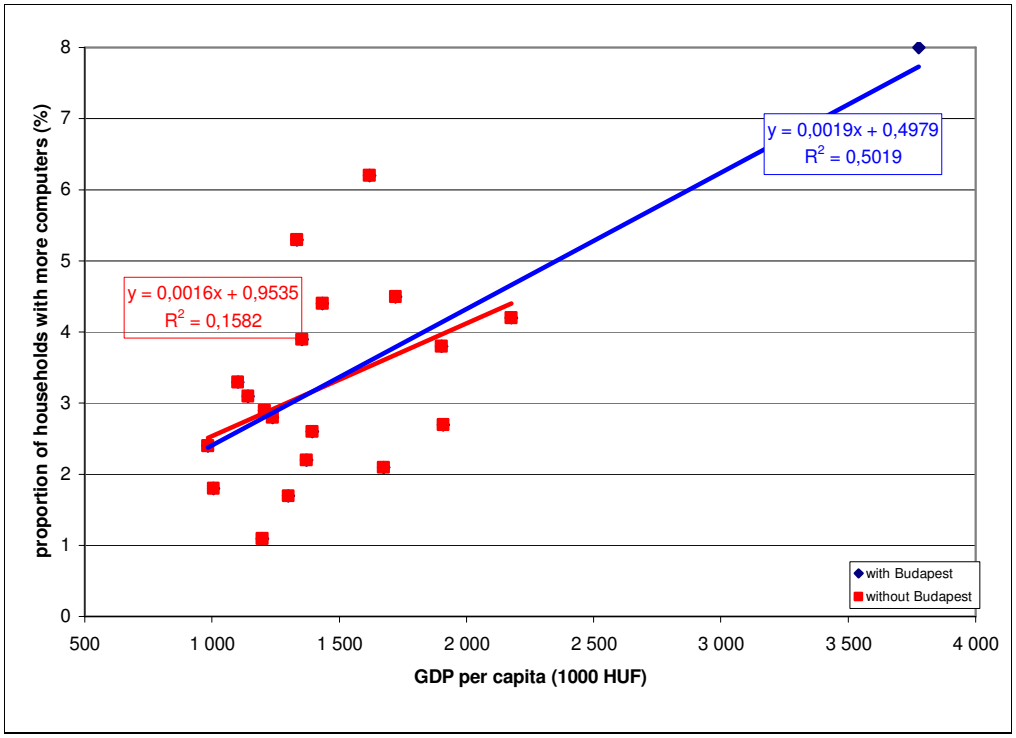


Figure 24 GDP per capita and proportion of households with internet access

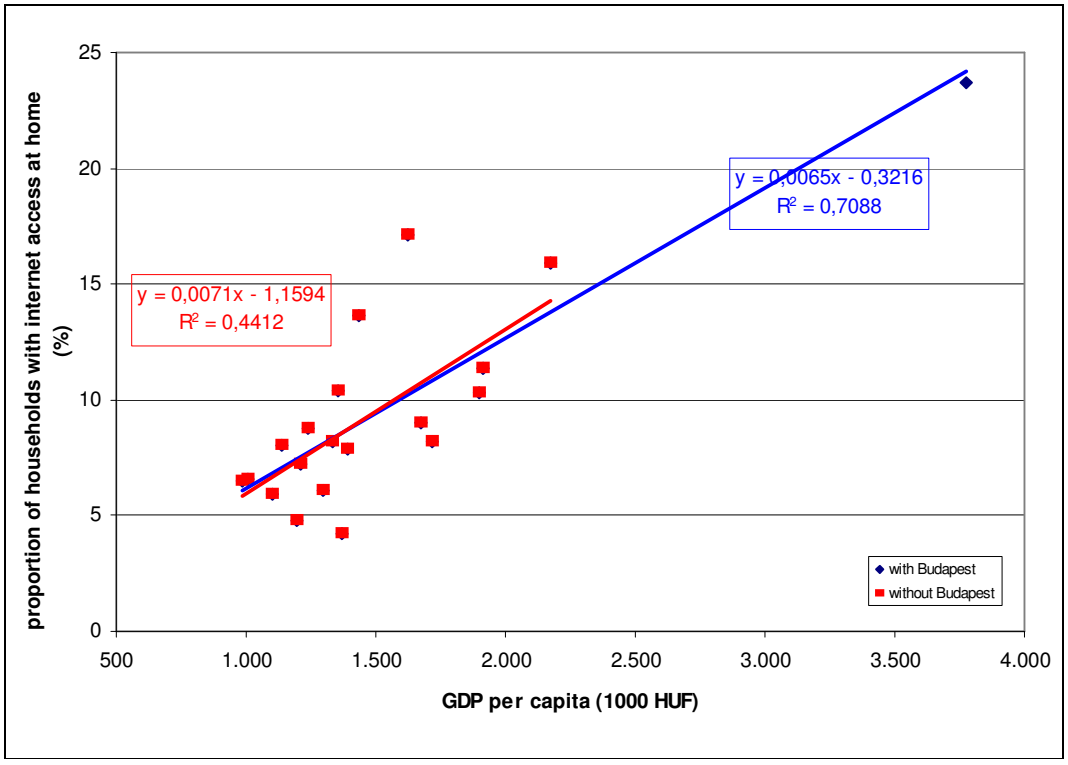


Figure 25 GDP per capita and share of enterprises with internet access

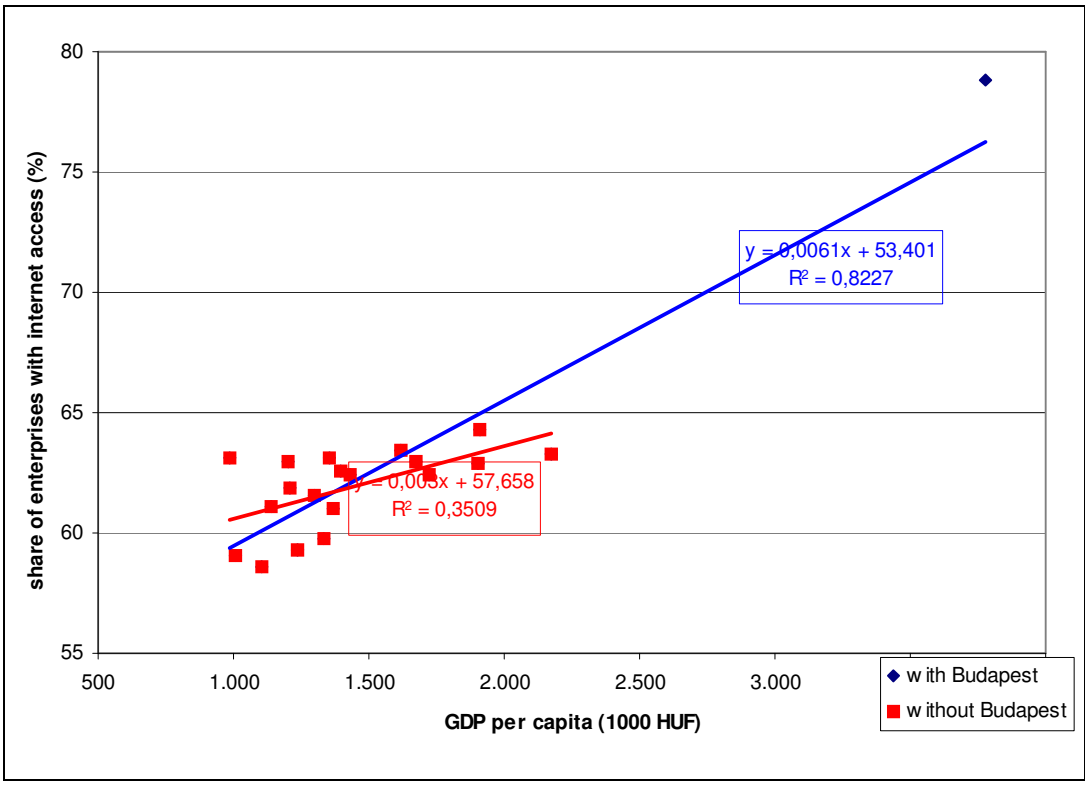


Figure 26 GDP per capita and share of enterprises with own homepage

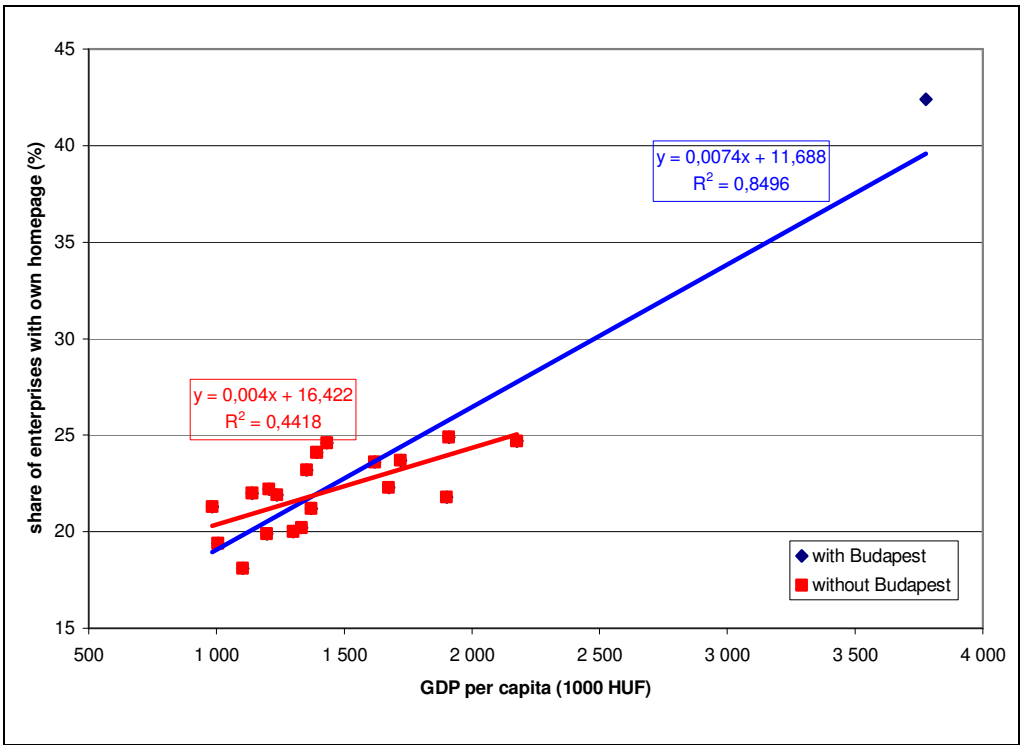
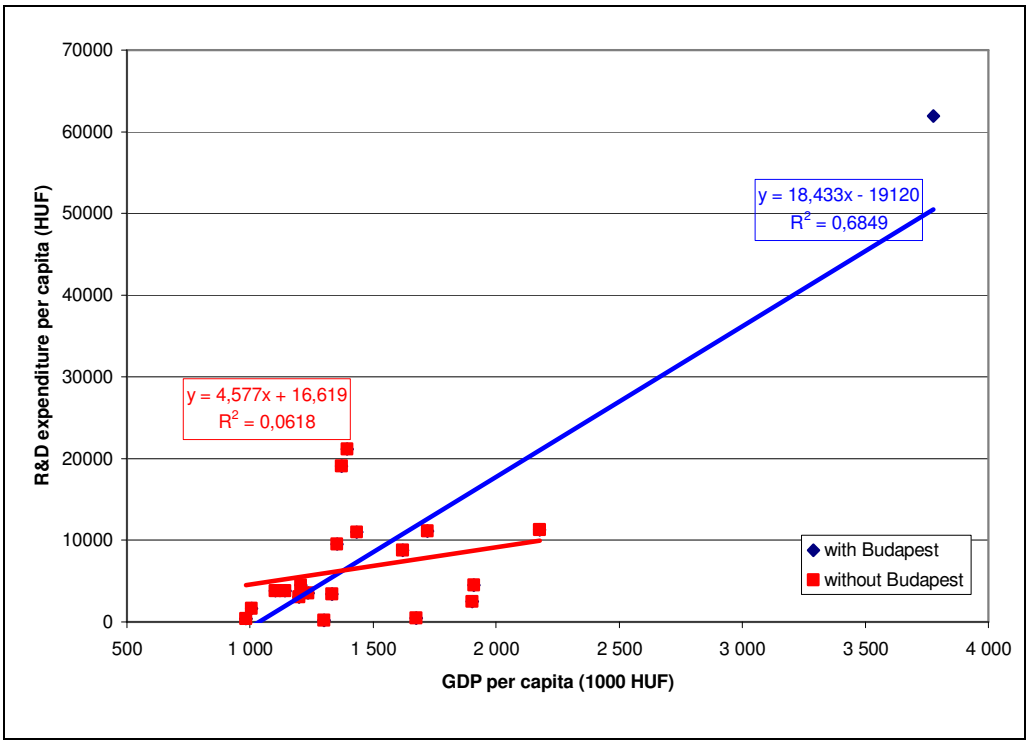


Figure 27 GDP per capita and R&D expenditure per capita



Poland

Figure 28 GDP per capita and R&D per capita

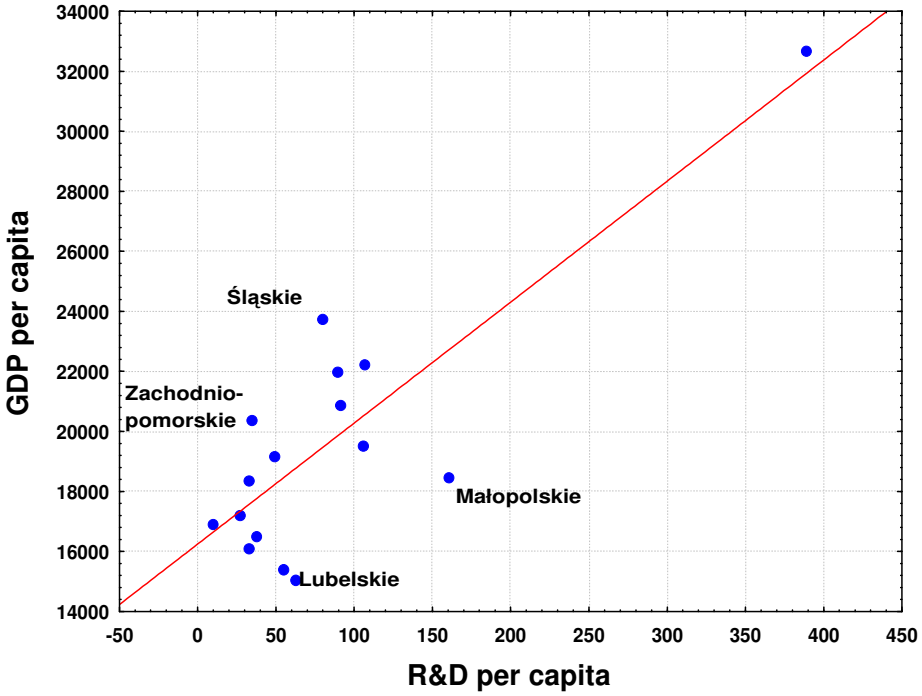


Figure 29 GDP per capita and employed in R&D per 1000 inhabitants

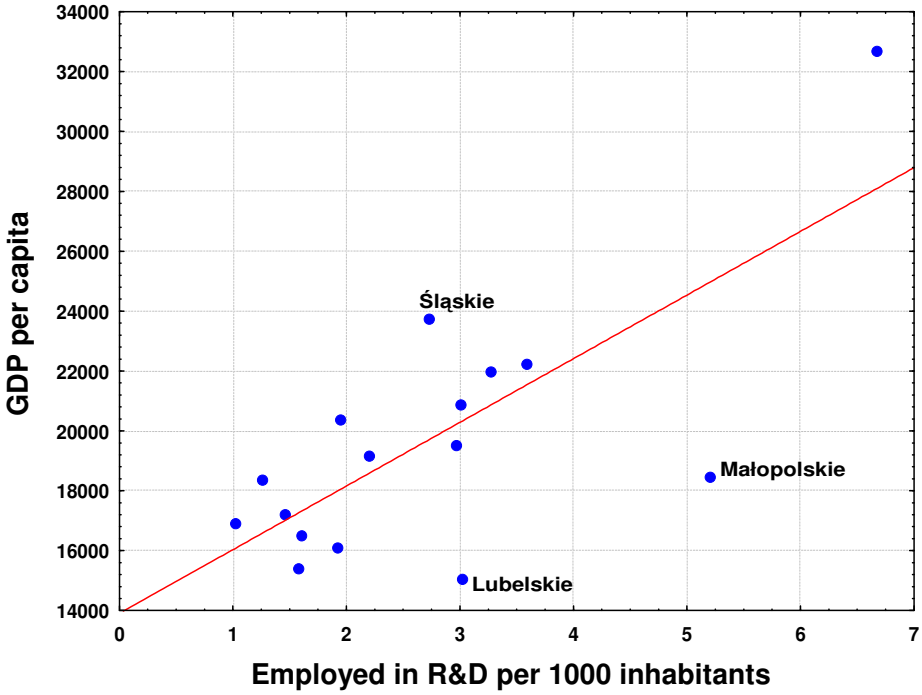


Figure 30 GDP per capita and patents per 1000 inhabitants

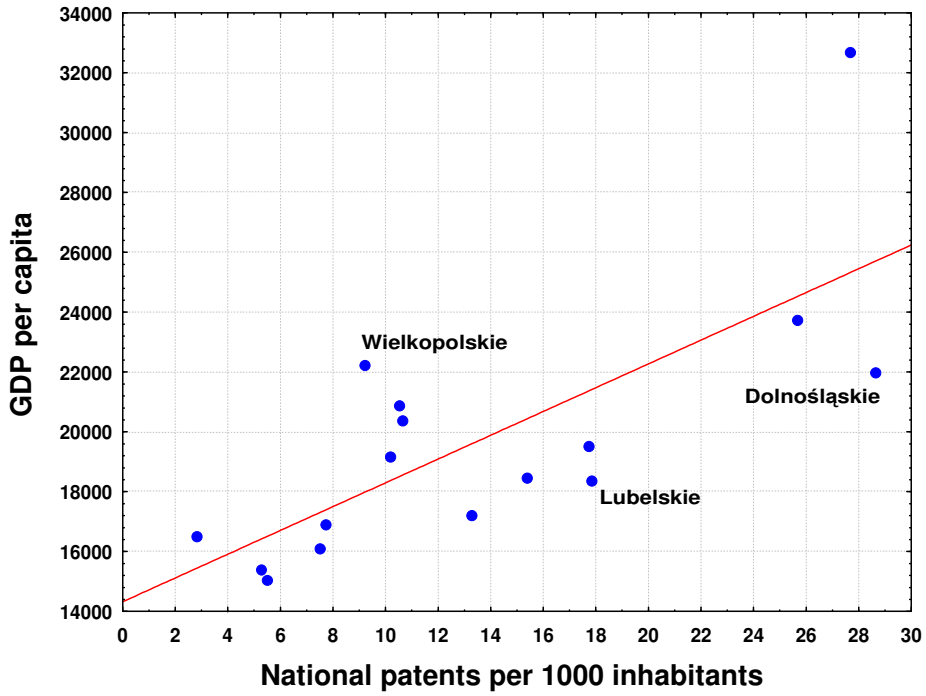
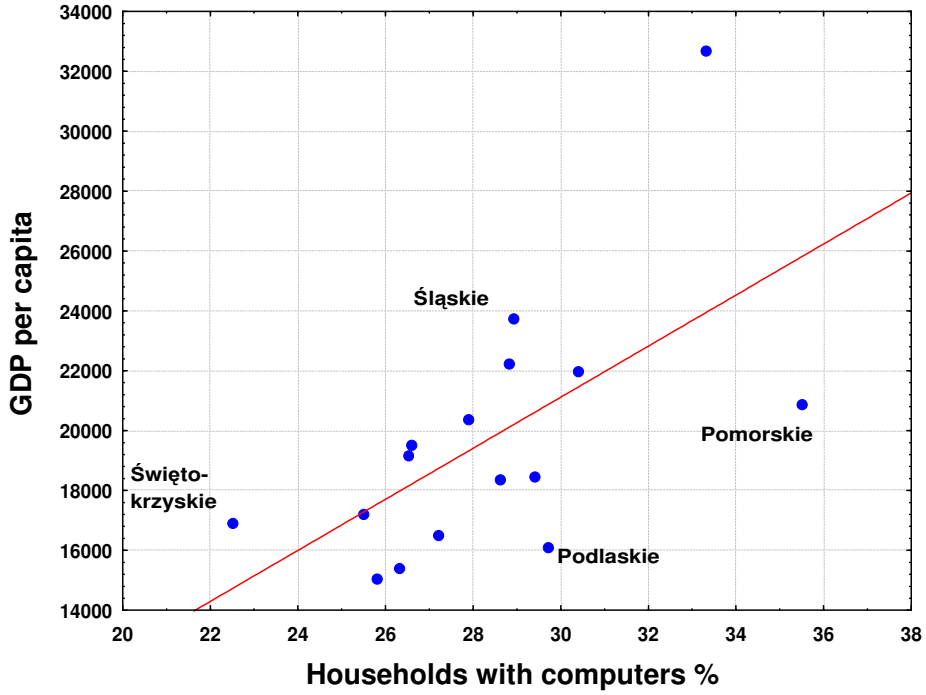


Figure 31 GDP per capita and households with computers [%]



ESPON

EUROPEAN SPATIAL PLANNING OBSERVATION NETWORK

ESPON project 1.2.3

Second Interim Report
Appendix II

Country case study
Template

Institution	Person responsible	e-mail, telephone

Co-financed by the European Community through the Interreg III ESPON Programme

Table of contents

Figures

Tables

1 Description of IS state and trends on regional level

(5-6 pages plus maps and graphs)

The results of survey on data availability show that it is very difficult to base the descriptive part of the case study on the set of the common indicators. Therefore please use the indicators included in the tables below or other relevant available for your country. Every part of the descriptive chapter should be supplemented by the table with the set indicators used.

The basic level for the analysis in NUS 2 level, but if it's possible the intraregional differences should be analysed as well.

If the time series are available for the period 2000-2004 please include the trend description as well.

1.1 General information about the regional development

This part should give the regional picture of the country. It will be a starting point for the farther analysis as well as point of reference for the conclusions (1.4). Please include the information on administrative structure of the country as well as description of the state and trends with regard to: GDP, unemployment, economic structure, settlement structure, location of enterprises.

1.2 State and trends related to IS technical definition

Number of mobile (cellular) phones subscriptions per 100 inh.
Number of cable modem subscriptions per 100 inh.
Number of xDSL subscriptions per 100 inh.
Proportion of households with a computer
Proportion of households with internet access at home
Proportion of households with broadband internet access at home
Share of enterprises with internet access
Share of enterprises with own homepage
Share of enterprises receiving orders over Internet

1.3 State and trends related to IS economical definition.

ICT sector employment, % of total (as defined by OECD)
ICT sector value added, % of total (as defined by OECD)
R&D expenditure
Private R&D expenditure
R&D personnel and researchers, % of work force
Number of patents
Proportion of population with completed secondary education
Proportion of population with completed tertiary education

1.4 State and trends related to IS social definition.

Percentage of population using the Internet for interacting with public authorities
Percentage of population having used the Internet in relation to training and educational purposes
Percentage of population using Internet to seek health information whether for themselves or others
Percentage of population having ordered/bought goods or services for private use over the Internet in the last three months

1.5 Conclusions

- *State of the IS development on the regional (NUTS 2) level*
- *Main trends of the IS development in regions in last 4 years (2000-2004)*
- *Main findings relation to correlations between IS and socio-economic indicators (e.g. GDP, unemployment, etc.)*
- *Data availability constrains*

2 Description of the state IS development policy

(5-6 pages plus maps and graphs)

2.1 Importance of the IS development policy

When the state IS development policy was introduced? Does the IS development policy play the important role in comparison to other policies. To what extent general strategic policy documents (e.g.: National Development Plan) have been related to IS development?

2.2 Policy documents, responsibility (main actors)

Is there one main state IS policy document developed? If there are several documents, asses to what extend they are coherent. What institution(s) is(are) responsible for the IS policy implementation?

(If it is feasible, please fill in the below table)

Policy documents:
IS main document (if such does exists)
ICT related
R&D related
Other relevant

2.3 Aims of the IS development policy

What are the main aims of the state IS development policy?

2.4 IS definitions

Were there any IS definitions used in the IS policy documents? If yes – what definitions? Have the definitions been change in time (for example from more technical towards more socio-economical)?

2.5 Reference to the regional level and spatial development

Does the diagnosis of the IS state and trends contain the regional breakdown? What are the main IS trends and problems on regional level identified in the IS policy documents?

How far is the IS policy regionally differentiated (i.e. are there any special aims, instruments, etc. provided for different types of regions: metropolitan areas, big cities, rural and geographically handicapped).

If the evaluation reports are available, describe their relation to the IS influence on spatial development (cohesion, polycentricity, location changes).

2.6 IS policy on regional level

Are there any regional strategies concerning IS or R&D development? When they were developed? Please give some examples, describe the aims of these strategies and asses the implementation process.

References

ESPON

EUROPEAN SPATIAL PLANNING OBSERVATION NETWORK

ESPON project 1.2.3

Second Interim Report
Appendix III

The eEurope 2005 Index
and The Networked Readiness Index

Co-financed by the European Community through the Interreg III ESPON Programme

1 The eEurope 2005 Index (INSEAD 2004) and The Networked Readiness Index (WEFORUM 2005)

The eEurope 2005 Index is defined as follows:

eEurope 2005 Index = 1/5 Internet Indicators + 1/5 Modern Online Public Services + 1/5 Dynamic e-Business environment + 1/5 Secure Information Infrastructure + 1/5 Broadband

A. Internet Indicators Component Index is defined as follows:

Internet Indicators = 1/3 Citizens access and use of Internet + 1/3 Enterprise access to and use of ICT + 1/3 Internet access costs

1. Citizens access and use of Internet sub index is defined by the following data variables:

1.01 Internet access from home, 2002/3

1.02 Regular and occasional Internet Usage, 2002/3

1.03 Intensity of Internet Usage, 2002/3

1.04 E-mail usage, 2002/3

1.05 Internet Users per 100 inhabitants, 2003

1.06 ISDN subscribers per 100 inhabitants, 2003

1.07 Internet usage at home, 2002/3

1.08 Internet usage at work, 2002/3

1.09 Percentage of households online, 2003

1.10 Personal computers per 100 people, 2002

2. Enterprises access to and use of ICT sub index is defined by the following data variables:

2.01 Employees with Internet access, 2002/3

2.02 Business PCs installed per 100 inhabitants, 2002

2.03 Internet hosts per 10000 inhabitants, 2003

2.04 Teleworking usage, 2002/3

2.05 Teleworking intensity, 2002/3

2.06 Competition in the ICT sector, 2003

2.07 ICT market value relative to GDP, 2002

3. Internet access costs is defined by the following variable:

1.01 Cost of 20 hours of Internet use, 2003

B. Modern Online Public Services Component Index is defined as follows:

Modern Online Public Services = 1/3 e-Government + 1/3 e-Learning + 1/3 e-Health

1. e-Government is defined by the following variables:

4.01 Government online presence, 2003

4.02 Online income tax returns, 2002/3

4.03 Online job search, 2002/3

4.04 Online requests for personal documents, 2002/3

4.05 Online book search in public libraries, 2002/3

4.06 Government online services, 2003

4.07 ICT prioritisation by government, 2003

4.08 Government ICT promotion success, 2003

2. e-Learning is defined by the following variables:

5.01 Use of online electronic learning materials, 2002/3

5.02 Use of offline electronic learning materials, 2002/3

3. e-Health is defined by the following variables:

6.01 Health related online searches, 2002/3

6.02 Internet use by the disabled, 2002/3

C. The Dynamic e-Business Environment Component Index is defined as follows:

Dynamic e-Business Environment = 1/2 Buying and Selling Online +1/2 e-Business

Readiness

1. Buying and Selling Online is defined by the following variables:

7.01 Individuals making online purchases, 2002/3

7.02 B to B e-Commerce, 2002

7.03 B to C e-Commerce

2. e-Business Readiness is defined by the following variables:

8.01 Laws relating to Information Technology, 2003

D. A Secure Information Infrastructure Component Index consists of the experience

Internet users have with respect to ICT security. It is comprised of the following

variables:

9.01 Online Privacy, 2002/3

9.02 Secure Online Commerce, 2002/3

E. Broadband Component Index consists of the following variables:

10.01 DSL Broadband Access, 2002/3

10.02 Broadband Users, 2002

10.03 Bandwidth per capita, 2002

The Networked Readiness Index is defined as follows:

Networked Readiness Index = 1/3 Environment + 1/3 Readiness + 1/3 Usage

I. The Environment component index is defined as follows:

Environment Component = 1/3 Market Environment Subindex + 1/3 Political and Regulatory Environment Subindex + 1/3 Infrastructure

Environment Subindex

I.1. Market Environment Subindex is defined by the following variables:

1.01 State of cluster development

1.02 Venture capital availability

1.03 Subsidies for firm-level R&D

1.04 Quality of scientific research institutions

1.05 Availability of scientists and engineers

1.06 Brain drain

1.07 Utility patents

1.08 ICT manufactured exports

1.09 ICT service exports

I.2. Political and Regulatory Environment Subindex is defined by the following variables:

2.01 Overall administrative burden

2.02 Quality of the legal system

2.03 Laws relating to ICT

2.04 Competition in the ISP sector

2.05 Foreign ownership restrictions

2.06 Efficiency of the tax system

2.07 Freedom of the press

I.3. Infrastructure Environment Subindex is defined by the following variables:

3.01 Overall infrastructure quality

3.02 Waiting time for telephone lines

3.03 Telephone mainlines

3.04 Public pay telephones

3.05 Internet servers

II. The Readiness component index is defined as follows:

Readiness Component = 1/3 Individual Readiness Subindex + 1/3 Business Readiness Subindex + 1/3 Government Readiness Subindex

II.1. Individual Readiness Subindex is defined by the following variables:

1.01 Public expenditure on education

1.02 Adult illiteracy

1.03 Tertiary enrollment

1.04 Radios

1.05 Television sets

1.06 Households online

1.07 Quality of math and science education

1.08 Affordability of local fixed line calls

1.09 Affordability of Internet telephone access

1.10 Affordability of Internet service provider fees

II.2. Business Readiness Subindex is defined by the following variables:

2.01 Ease of obtaining telephone lines

2.02 Cost of business phone subscription

2.03 Extent of staff training

2.04 Quality of business schools

2.05 Scientists and engineers in R&D

II.3. Government Readiness Subindex is defined by the following variables:

3.01 Government prioritization of ICT

3.02 Government procurement of ICT

3.03 Government online presence

III. The Usage component index is defined as follows:

Usage Component = 1/3 Individual Usage Subindex +1/3 Business Usage Subindex + 1/3 Government Usage Subindex

III.1. Individual Usage Subindex is defined by the following variables:

1.01 Personal computers

1.02 ISDN subscribers

1.03 Cable television subscribers

1.04 Internet users

III.2. Business Usage Subindex is defined by the following variables:

2.01 Computers installed in businesses

2.02 Firm-level technology absorption

2.03 Prevalence of foreign technology licensing

III.3. Government Usage Subindex is defined by the following variables:

3.01 Government success in ICT promotion

3.02 Government online services

ESPON

EUROPEAN SPATIAL PLANNING OBSERVATION NETWORK

ESPON project 1.2.3

Second Interim Report
Appendix IV

Country case study -Czech Republic
(first part)

Department of Social Geography and Regional Development, Faculty of Science, Charles University of Prague	Jiří Blažek Pavla Žížalová, Marie Macešková	blazek@natur.cuni.cz

Co-financed by the European Community through the Interreg III ESPON Programme

Table of contents

Figures

Tables

1 Description of IS spatial trends in the Czech Republic

1.1 General information about the regional development of the Czech Republic

The reform of the public administration started after the collapse of centrally planned economy in the Czech Republic. First step was the reestablishment of the democratic system on the local level, next it continued by abolishing 8 regions and leaving on the district level only the state administration. The rationale was to cut the mutual ties of the former nomenclatura cadres and to decrease bureaucracy (Blažek 1999a). This left a huge discrepancy as there were only the municipal and state levels and there emerged many problems such as the lack of institutions responsible for managing services and dealing with issues on above the municipal level. Moreover, the central ministries faced difficulties in executing their competence and therefore set up a network of regional branches (so called "deconcentrated offices"). The establishment of these regional branches was uncoordinated, consequently nearly all ministries designed their own network of regional branches (Blažek 1999a). Therefore, in 1997 Parliament approved a constitutional law stating that from the year 2000 the Czech Republic will consist of 14 self-governing regions.

The Czech Republic entered the transformation period as a country with relatively minor inter-regional disparities. This was the result of strong equalization policy pursued under communism, which was quite effective but very inefficient and leading towards more and more lagging behind the west European countries in the sphere of societal development (Blažek 1999b). However, in the mid 1990s the regional disparities swiftly emerged and grown further on the basis of the whole complex of interconnected factors such as economic structure, industrial and entrepreneurial tradition, geographic position, educational structure, development of technical infrastructure and the state of environment (Blažek 1996, Hampl 1999). In the same period, the rate of economic growth plummeted and reached even negative values and the rate of unemployment more than doubled between 1995 and 1998 (Blažek 1999b). This change and development of regional disparities in the Czech Republic could be also understood as comeback to natural trajectory of socio-economic development. Eventually, the transformation emerged the regional disparities and potential which was inhibited for more than 40 years.

One of the specific characteristic of the regional disparities of the Czech Republic is a very strong dominance of the capital city of Prague in case of economic product/level while in case of unemployment rate this could not be seen.

The following Table 1 shows regional disparities among 14 Czech regions regarding main economic indicators. Regarding this table, it is obvious that the regional disparities among regions without the capital city of Prague are significant only when considering the unemployment rate. Thus, regional disparities in unemployment rate are the most important ones among the Czech regions. This is due to the fact that the transformation and resctructuralization has affected mostly strongly industrialized, lagging regions with obsolete economic structure. In the past, these belonged to the economic base of the previous Czechoslovakia and therefore their economic level was quite high. Now, they are facing very serious problems which are reflected in high unemployment rates. Among these regions we could find Moravskoslezský, Ústecký, Karlovarský and partially Olomoucký and Jihomoravský regions.

Table 1 Main indicators by Czech regions (NUTS II level)

NUTS III Region	GPD per capita in CZK (2004)	ILO unemployment rate % (2004)	Registered unemployment rate % (as 30.11. 2005)
Hl. m. Praha	547 096	3,9	3,2
Středočeský	253 912	5,0	6,0
Jihočeský	241 389	5,1	9,6
Plzeňský	251 106	6,0	9,8
Karlovarský	216 639	10,4	6,9
Ústecký	229 146	15,2	7,4
Liberecký	220 991	6,2	13,7
Královéhradecký	244 549	6,1	9,8
Pardubický	230 880	6,1	7,6
Vysočina	234 530	7,0	6,0
Jihomoravský	254 684	7,7	5,9
Olomoucký	211 467	12,1	14,6
Zlínský	222 885	7,7	7,6
Moravskoslezský	222 638	14,2	8,7
Czech Republic	271 161	8,2	8,4
Variation coefficient - incl Praha - %	32,0	42,3	35,3
Variation coefficient - without Praha - %	6,0	39,8	30,6

Source: *CZSO – Regional National Accounts 2004*

The previously "preferred" regions, thus with higher economic level, have faced worse economic development than regions with lower original economic level. These values are presented in the following table 2. This explains why contemporary regional disparities (considering regions without the capital city of Prague) are much higher regarding the unemployment rate than when regarding economic product.

Steadily leading regions, regarding economic development, are the capital city of Prague, Jihomoravský and Plzeňský region. Among these could be also included Středočeský region whose relatively low values are related considered as a result of its "ripping" from the capital Prague (esp. extensive commuting to Prague).

Table 2 GDP development by regions

Region	Regions rank - GDP per capita		GDP, constant prices 1995 = 100
	1993	2004	
Hl.m Praha	1	1	136,4
Středočeský	14	3	133,5
Jihočeský	7	6	119,1
Plzeňský	2	4	114,5
Karlovarský	4	13	102,0
Ústecký	6	9	103,1
Liberecký	10	12	114,4
Královéhradecký	11	5	122,1
Pardubický	9	8	118,7
Vysočina	13	7	122,1
Jihomoravský	3	2	121,0
Olomoucký	12	14	116,4
Zlínský	8	10	110,6
Moravskoslezský	5	11	112,4

Source: *CZSO – Regional National Accounts 2004*

As it was mentioned above, regional disparities in level of economic development are not the key ones in the CR, yet, and unsatisfactory economic development is reflected rather by the differences in the rate of unemployment. The unemployment rate of regions with rather low economic dynamic exceeded strongly national level and moreover, in these regions are also concentrated most of the structurally affected and economically weak districts.

Consequently, on the basis of above-used indicators, the Czech regions could be grouped as follows:

1) The capital city of Prague and Středočeský region – this area absolutely dominates both by economic level and its dynamic. The difference between this area and the rest of the regions is the biggest one. Although, the "engine" is the capital Prague, the linkages with its surroundings are increasing every time more and more (Hampl 2001).

2) Successful regions – thanks to their advantageous geographical position, relatively good and favourable economic structure and good social quality, these regions performed quite well in economic development and recorded only fairly low unemployment. This group is composed by Královéhradecký, Jihočeský, Plzeňský, Liberecký and Pardubický regions. Besides, region Vysočina could be considered also as a member of this category particularly thanks to low

unemployment rates and above-average economic dynamic. On the other hand, regarding the economic level, it still belongs below national average. Specific is also Jihomoravský region whose centre Brno improves its position while other parts of this region could be considered as problem areas.

3) The rest of the regions could be divided into two groups. The first one is composed of structurally affected regions – Ústecký, Moravskoslezský and partially Karlovarský regions – which have deeply fallen down. The second group comprises Zlínský and Olomoucký regions. In their case, they are lagging regions with positive development only in the main centres. Moreover, they could also be considered as peripheral due to their geographical position (Hampl 2001).

1.2 Spatial trends related to ICT infrastructure and use.

ICT infrastructure and use
Number of mobile (cellular) phones subscriptions per 100 inh.
Proportion of households with a computer
Proportion of households with internet access at home
Proportion of households with broadband internet access at home
Share of enterprises with internet access

1.2.1 Telecommunication penetration

Telecommunications play an important role in the IS. Satisfactory access to telecommunications equipment is the basic condition for the transformation of certain services into an electronic form (e-education, e-work, e-government etc.). The development of the telecommunications sector has been rapid in recent years (SIBIS 2004) which document the data from the Czech Statistics Office. The number of telephone lines increased from 24 per 100 inhabitants in 1995 to 131 per 100 inhabitants in 2003.

Table 3 Basic infrastructure of communication technologies (per 100 inh.)

	2000	2001	2002	2003
Main telephone lines in public network, total	80	106	120	131
Main telephone lines in public fixed network, total	38	38	36	36
Residential	26	26	25	24
Business	10	12	11	11
Mobile subscribers, total	42	68	84	95

Source: CZSO – Statistical Yearbook of the Czech Republic 2004

In the Czech Republic the fastest growth in usage has been experienced by mobile operators. Since the introduction of the services in 1996, the mobile market has seen astounding growth. Nowadays, three operators, Eurotel, T-mobile and Oskar-Vodafone operate on the Czech market and

count among them well over 10,5 million subscribers (the mobile operators' press releases - October 2005) compared to 10,2 million inhabitants.

Regional differences among NUTS II and NUTS III regions are shown in the following table 4. Disparities among the regions in the Czech Republic concerning individual's access to mobile phone are not strong, the least number of mobile phones per 100 inhabitants was scored in the Střední Morava region (68), the highest on the other hand in the capital Prague (81). These values seem to correspond with the economic level as the Střední Morava region is the least and Prague the most developed region (measured by GDP per inhabitant).

Table 4 Individuals´ access to mobile phone for private use

NUTS II / NUTS III Region	Mobile phone (in ths.)		Mobile phones (per 100 inh. 15+)	
	2003	2004	2003	2004
Praha hl. město	777,7	829,3	76	81
Středočeský kraj	652,1	717,0	68	75
Jihozápad	665,2	777,3	67	78
Jihočeský kraj	363,2	410,6	69	78
Plzeňský kraj	302,0	366,7	65	78
Severozápad	683,7	730,9	72	77
Karlovarský kraj	196,3	198,4	77	78
Ústecký kraj	487,4	532,5	71	77
Severovýchod	758,0	869,0	61	70
Liberecký kraj	225,5	235,5	63	66
Královehradecký kraj	275,0	317,7	59	68
Pardubický kraj	257,5	315,8	61	74
Jihovýchod	908,9	1032,4	65	74
Vysočina	307,4	329,6	71	76
Jihomoravský kraj	601,5	702,8	63	74
Střední Morava	634,3	702,1	61	68
Olomoucký kraj	324,7	360,4	60	67
Zlínský kraj	309,6	341,7	62	68
Moravskoslezský kraj	637,2	753,2	60	71

Source: *CZSO - ICT Usage Survey in Czech Households and among Individuals 2003, 2004*

1.2.2 PCs and Internet penetration

Computerization is another new trend of the Czech economy during the transformation period. The number of personal computers (PCs) has strongly increased during this period but the percentage of households with the access to, via one of its members, a personal computer in the Czech Republic (30 %) is still low compared with the average in the EU (55 % in EU 15, 50 % in EU 25, Eurostat 2004). Moreover, it is also rather low compared to New Member States (for example 58 % Slovenia, 39 % Slovakia, 32 % Poland, Eurostat 2004). Despite these relatively

low penetration rates, there has been significant growth: between 1998 and 2000 the growth rate in the number of PCs was 47 %, higher than in the EU and this also continued in the year 2001 when the PCs growth was 18,7 %(CZSO, 2003).

This rapid development can be observed in Internet use as well. This trend is shown by the results of several pieces of research carried out between 1995 and 2002 by SIBIS (SIBIS 2004). If one focuses on the age group 15 – 30, because this group is the most connected to, influenced by, and familiar with the Internet, in 1995 there were 4 % of respondents from the 15 - 18 age group who had access to the Internet, 13 % from the 19 - 23 age group and 16 % from the 24 -30 age group. In the year 2002 there were 80 % of respondents from the 15 - 18 age group who had access to the Internet, 74 % from the 19 - 23 age group and 68 % from the 24 -30 age group. This demonstrates the same trend as in telecommunications where a crucial factor influencing Internet penetration and its use is age.

However Internet penetration is still low compared to the EU average. What can mainly explain this situation (also regarding official policy and strategic documents) are income levels and the relatively high costs of Internet access, limiting the number of users in private households (20 hours of connection cost four times as much as in EU; Eurostat 2004). Only about 19 % of households have access to the Internet whereas in EU 25 it is about 43 %, which place the Czech Republic at one of the last places among all EU states. Very low and one of the lowest in EU is also the broadband penetration which was, according to Eurostat statistics, only 0,7 % in 2004 compared to 7,6 % for EU 25 (lower is the penetration rate only in Poland, Slovakia and Greece). However, regarding the CZSO statistic, the broadband penetration rate in the Czech Republic was slightly higher – approximately 1,5 % in 2003.

Very important are also regional disparities in the equipment of households with computer and connection to the Internet. The previous table 5 presents share of households equipped with basic information and communication technologies (ICT). The best-equipped region regarding ICT is the capital city of Prague, on the contrary, Olomoucký region is one of the least equipped. Quite interesting is also the position of Jihomoravský region, the region selected for the case study, where the PC and Internet penetration rate among households is the second highest and the broadband penetration is even the same as in the Prague region.

Table 5 Information and communication technologies in households, 2003 (%)

	Fixed telephone line	PC	Connected to Internet	incl.: Broadband
Czech Republic	**62,9**	**23,8**	**14,8**	**1,5**
Hl. m. Praha	88,0	37,5	29,3	3,9
Středočeský	72,7	23,8	15,5	1,0
Jihočeský	63,9	19,0	11,8	-
Plzeňský	65,7	22,7	11,6	-
Karlovarský	60,7	21,9	15,9	-
Ústecký	45,2	17,3	9,6	1,8
Liberecký	60,1	24,0	13,1	1,1
Královéhradecký	61,0	20,2	13,8	2,8
Pardubický	59,8	25,4	15,6	1,2
Vysočina	58,9	27,8	15,6	3,3
Jihomoravský	66,7	29,8	18,6	3,9
Olomoucký	52,3	14,5	8,9	1,7
Zlínský	66,1	23,5	14,8	-
Moravskoslezský	53,3	22,8	12,3	0,6

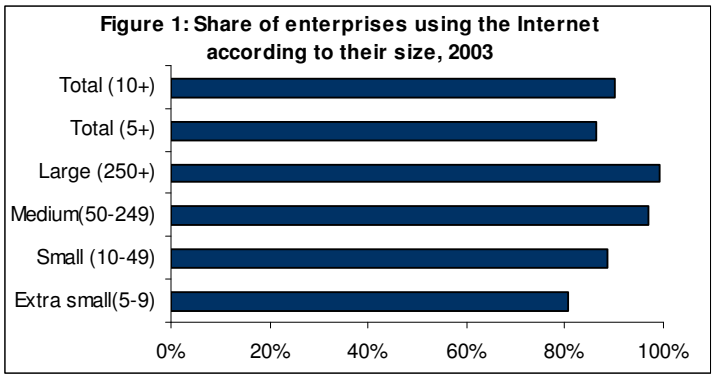
Source: *CZSO – Statistical Yearbook of the Czech Republic 2004*

1.2.3 Technology used by enterprises

Personal computer is considered to be basic working tool in contemporary knowledge-based economy or in the IS because it is necessary for usage of most modern information technologies not only among citizens and household but, particularly, in enterprise sector.

At the end of 2003 less then 59 500 Czech enterprises, approximately 93,4 % of total number of enterprises in business sector, owned more then 909 000 computers. Nearly all large and medium enterprises were using computer. Exceptions to be mentioned are enterprises which use outsourcing for these activities (CZSO - Survey on ICT Usage in Enterprises of the Czech Republic 2003).

Figure 1 Share of enterprises using the Internet according to their size, 2003



Source: *CZSO - Results of the Survey on ICT Usage in Enterprises 2003*

Spread of Internet usage in Czech enterprises is relatively high. At the end of year 2003 approximately 54 900 enterprises with 5 and more employees used connection to the Internet, which represent 86 % of all enterprises in this group. In comparison to the level recorded in year 2002, there was 4,5 percent point growth (CZSO 2003).

A share of broadband Internet connection with a speed higher then 128 kbps in enterprises with 10 and more employees was 52 %. In comparison to 2002 enterprises promptly upgraded their Internet connection to the higher speed connection and there was recorded a 38 percent points increase (CZSO 2003).

According to the CZSO survey, 67 % enterprises with 5 and more employees were using banking and financial services in 2003, which represents interannual increase by 13 percent points. High percentage of enterprises (around 58 %) ordered goods or services using e-mail and approximately 17 % used the Internet for recruitment. Also public authority web sites usage for obtaining information (61 % of enterprises) or forms (48 %) is quite high. Form sending or full electronic handling via the Internet is not so often. At the end of 2003 more then 53 % enterprises with 5 and more employees had their own web side homepage. (CZSO 2003). (for details see Appendix)

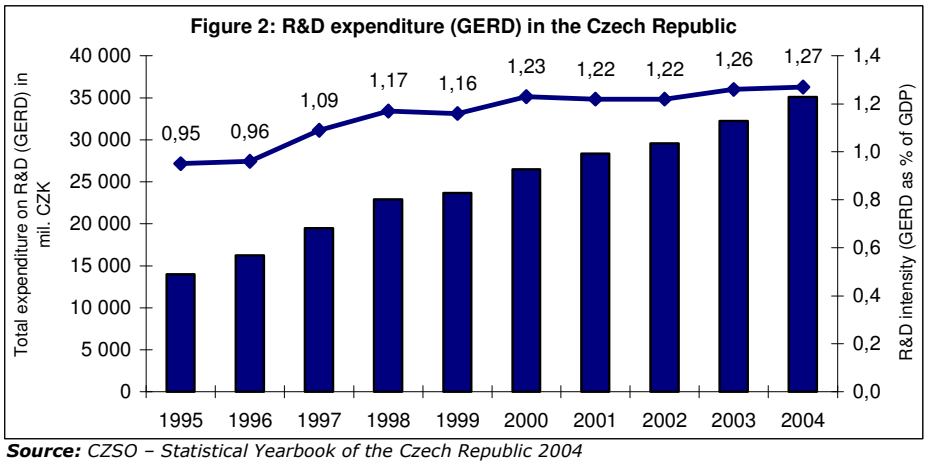
1.3 Spatial trends related to R&D activities and education.

R&D & Education
Total and private R&D expenditure
R&D personnel and researchers, % of work force
Number of patents
Proportion of population with completed secondary and tertiary education

Among crucial indicators measuring activities in research and development belong expenditures. In 2004, according to CZSO, total domestic expenditure on research and development (GERD) in the Czech Republic measured in current prices reached the value of 35 083 million CZK. Compared to the previous year, the total R&D expenditures (GERD) increased by 8,8 %. The share of total R&D expenditure (GERD) on GDP (R&D intensity) in 2004 was about 1,27 %.

The long-term development of the total R&D expenditures is presented in the following figure 2. Compared to the year 1995, the total R&D expenditures have increased by 151 %. In real terms the total R&D expenditure related to the price level of the year 2000, increased in the same period by 62 % (CZSO). The R&D intensity increased from 0,95 % to 1,27 % which is still rather low.

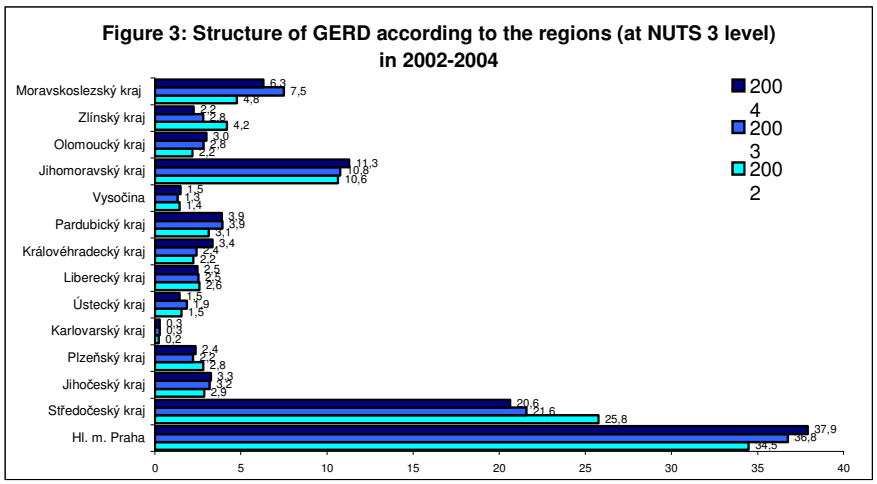
Figure 2 R&D expenditure (GERD) in the Czech Republic



Source: *CZSO – Statistical Yearbook of the Czech Republic 2004*

Focusing on the regional disparities, in 2004, the most of the financial expenditures on R&D was spent in the capital city of Prague. The expenditures here reached the value of 38 % from the total R&D expenditure. On the second place with the important share of 21 %, was Středočeský region. In Moravia, the highest share in total GERD was recorded in Jihomoravský region (11,3 %). Only these three above mentioned regions realized shares exceeding 10 %. On the contrary, the lowest expenditure according to the CZSO from all Czech regions had Karlovarský region (0,3 %). The main reason for the highest R&D expenditure in capital city of Prague is probably high concentration of national institutes carrying out R&D and also concentration of largest universities (total 8 universities with 36 faculties).

Figure 3 Structure of GERD according to the regions (at NUTS 3 level) in 2002-2004

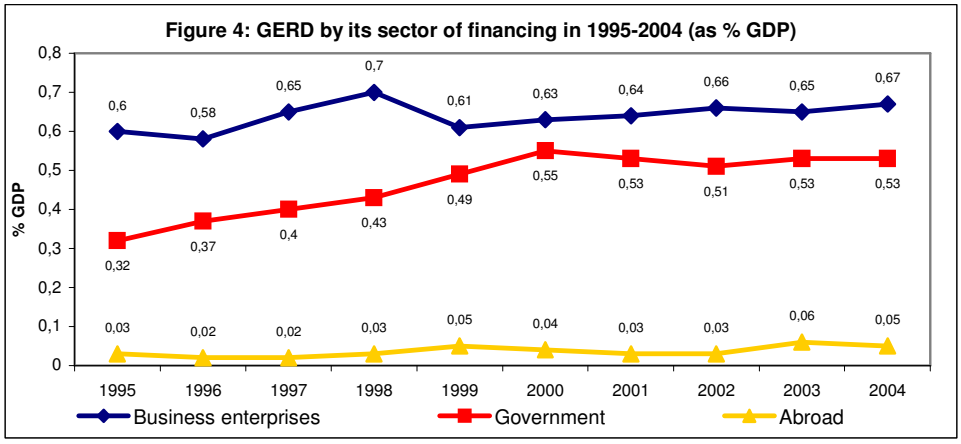


Source: *CZSO – Statistical Yearbook of the Czech Republic 2004*

In 2004, the most important financial source supporting R&D activities was business enterprise sector (BERD), which contributed to the total R&D expenditure by approximately 53 % and its share in GDP was 0,67

%. In 2004, the BERD expenditures reached 22 344 million CZK and since 1995 increased from the value of 9 099 million CZK. Compared to 2003, there was recorded an increase of BERD R&D expenditure by 13,6 %, the highest increase in the period 1995-2004. The second most important provider of financial sources was with 42 % share the government sector. These expenditures reached 0,53 % of GDP (CZSO).

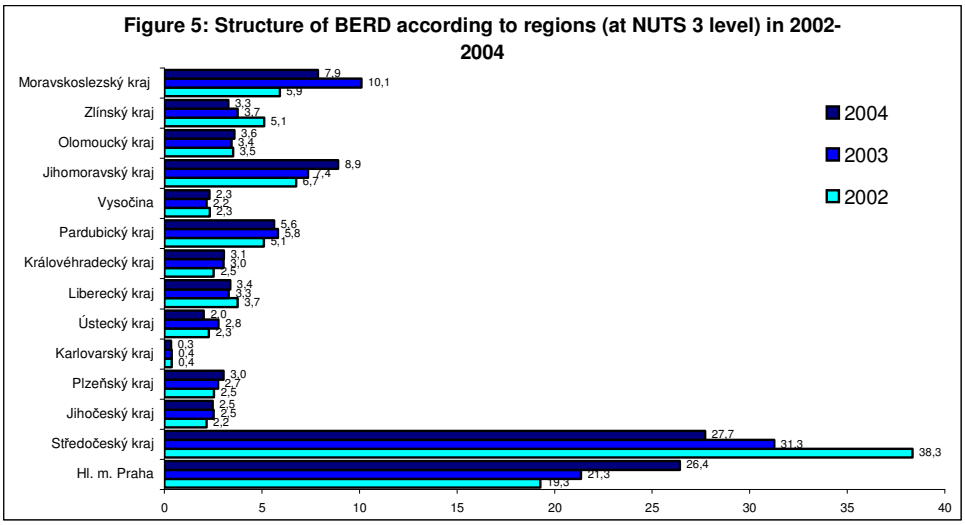
Figure 4 GERD by its sector of financing in 1995-2004 (as %GDP)



Source: *CZSO – Statistical Yearbook of the Czech Republic 2004*

If one focuses on regional disparities regarding BERD R&D expenditures, in 2004, the highest amount of the BERD R&D expenditure was spent in Středočeský region (28 %) even though its share decreased significantly between the years 2002 and 2004 (from 38 to 28 %).

Figure 5 Structure of BERD according to regions (at NUTS 3 level) in 2002-2004



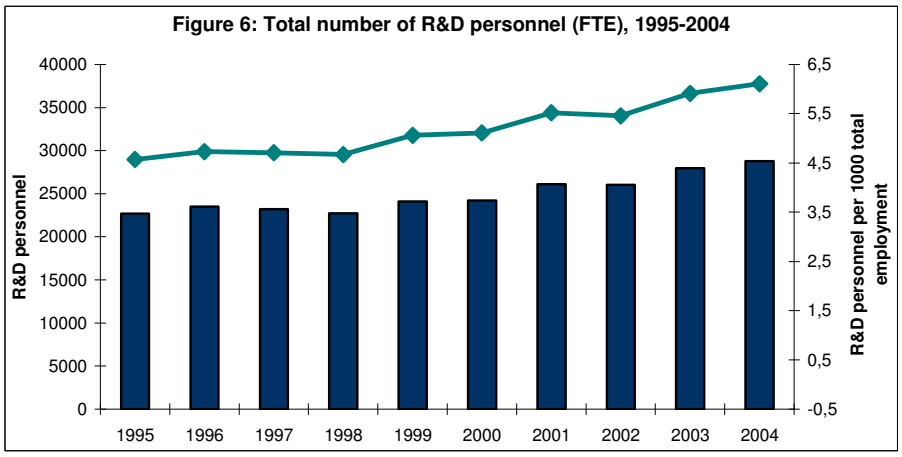
Source: *CZSO – Statistical Yearbook of the Czech Republic 2004*

The second most important region was the capital city of Prague, with the share of 26 %. The third region with the highest amount of R&D

expenditure was Jihomoravský region (8,9 %). For more details, see figure 5.

Another important indicator is the R&D basis, which in the Czech Republic included 60 148 employees at the end of 2004. In comparison with the previous year, the number of R&D personnel increased by about 8 percentage points. According to the indicator FTE (full-time equivalent), which is used for international comparison, 28 765 employees worked in full-time equivalent of working time in R&D in the year 2004. The annual growth of employees in FTE was 2,9 %. There were on the average 1,22 million CZK of expenditure on R&D per one employee in FTE in the year 2004 (CZSO).

Figure 6 Total number of R&D personnel (FTE), 1995-2004



Source: *CZSO – Statistical Yearbook of the Czech Republic 2004*

The highest number of personnel engaged in R&D was in the BERD in the year 2004 and its share reached 52,4 % from total personnel in FTE of the Czech Republic. The share of personnel engaged in R&D was 25,8 % in the Government sector, 21,2 % in the Higher Education sector and only 0,6 % in the Private Non-Profit sector (CZSO).

In 2004, the largest number of R&D personnel was recorded in the capital city of Prague and its share reached 40,2 %. Jihomoravský region with the share 17 % was the second region with higher number of personnel R&D, further follows Středočeský region with the share 9 %. The smallest number of personnel R&D in FTE was reported in Karlovarský region with a share of only 0,4 %.

Rather low increase of R&D personnel was registered in almost all Czech NUTS III regions. The highest increase between the years 2002 and 2004 was recorded in Karlovarský region (1,47) and in Olomoucký region (1,25) that are both economically weak regions and where the share on

total R&D personnel is one of the lowest in the Czech Republic. The only region where was recorded a slight decrease was Plzeňský region.

Table 6 R&D personnel in the Czech Republic by regions 2002-2004

	in % of total			in % of labour force			Index
	2002	2003	2004	2002	2003	2004	04/02
Hl. m. Praha	40,2	40,1	40,2	3,4	3,5	3,8	1,12
Středočeský kraj	8,8	9,4	8,7	0,8	0,9	0,9	1,11
Jihočeský kraj	3,6	3,7	3,6	0,6	0,7	0,7	1,13
Plzeňský kraj	4,0	3,1	3,2	0,8	0,6	0,7	0,90
Karlovarský kraj	0,3	0,5	0,4	0,1	0,2	0,2	1,47
Ústecký kraj	1,7	1,4	1,7	0,2	0,2	0,3	1,14
Liberecký kraj	2,9	2,8	2,8	0,7	0,7	0,8	1,07
Královéhradecký kraj	3,1	3,3	3,5	0,6	0,7	0,8	1,27
Pardubický kraj	4,0	3,8	3,8	0,9	0,8	0,9	1,07
Vysočina	1,4	1,2	1,3	0,3	0,3	0,3	1,05
Jihomoravský kraj	17,0	17,1	17,0	1,7	1,7	1,8	1,12
Olomoucký kraj	3,7	4,0	4,2	0,6	0,7	0,8	1,25
Zlínský kraj	3,1	3,0	3,1	0,6	0,6	0,7	1,15
Moravskoslezský kraj	6,2	6,6	6,4	0,5	0,6	0,6	1,15
Total	100,0	100,0	100,0	1,0	1,1	1,2	1,12

Source: *CZSO -Research and Development Indicators for the CR 2003, 2004*

Another very important R&D indicator, which actually evaluates research outputs, is the number of patents. For this analysis we focus only on the patents registered by the European Patent Office (EPO). Regarding this indicator the Czech Republic lags behind Western European Countries. In the Czech Republic there were approximately 12 patents per 1 million populations whereas in EU-15 the average was about 160 and in EU 25 approximately 134 (Eurostat). There are few reasons why NMS show rather low patent activity. First of all there exists very low innovation capacity of the research subjects, but one also has to mention that the process of registration of a new patent to EPO is very long and costly procedure (Chládek 2005).

There are no regional data for the Czech Republic in Eurostat Statistic section and therefore the regional analysis is based on the information from the Espacenet database that is administered by EPO. According to this database, among Czech regions the leader is the capital Prague with approximately 11 patents per 1 million inhabitants as average value for years 2002-2004. On the second place is Jihomoravský region (8,4) and then follows, in some respect surprisingly, Pardubický region (6,5). Above average also stand Moravskoslezský and Liberecký region.

In the context of structural changes of the world economy, it is necessary to underline a shift of the importance of traditional production factors (natural resources, labour, capital) towards technologies. Nowadays when transport costs are decreasing it is possible to import the traditional production factors quite cheaply. Consequently, more important is an ability to create innovations and to implement them

effectively into a production system and react flexibly to quickly changing conditions on the world markets. Thus, enhancement of human resources is a key element because highly qualified human resources are the basic factor of development and are connected to technological and economical growth and societal development. Adequately educated and trained human resources are also the crucial factor for future innovations.

A traditional indicator, which characterizes the quality of human resources, is the educational level, or more precisely proportion of population with completed secondary and tertiary education because the population with secondary and, in particular, tertiary education bring the biggest contribution.

According to Eurostat data the Czech Republic lags behind the EU-25 average regarding the share of population with tertiary education (10 % in the CR compared to 19 % in EU25 in 2004). The only exception, which exceeds this average, is the capital Prague where about 22 % of population have the tertiary education. Other Czech regions lie behind this value.

Table 7 Population by educational attainment and region (in %), 2001-2003

	2001		2002		2003		Index
	Secondary	Tertiary	Secondary	Tertiary	Secondary	Tertiary	03/01*
Hl. m. Praha	41,6	19,7	40,6	21,5	39,4	21,6	1,10
Středočeský kraj	29,4	6,6	29,7	6,7	29,9	7,3	1,10
Jihočeský kraj	30,6	7,2	30,9	8,5	32,4	8,6	1,19
Plzeňský kraj	29,9	7,8	30,6	8,4	31,5	8,0	1,03
Karlovarský kraj	28,6	5,8	28,7	5,6	30,1	6,4	1,11
Ústecký kraj	26,5	5,0	27,2	6,1	26,0	4,9	0,98
Liberecký kraj	27,4	6,4	28,6	7,0	30,4	7,3	1,14
Královéhradecký kraj	28,6	5,8	31,6	7,9	31,1	8,3	1,44
Pardubický kraj	29,4	7,4	30,4	7,9	30,4	7,9	1,07
Vysočina	29,4	5,6	29,0	6,9	28,2	7,4	1,32
Jihomoravský kraj	31,9	9,7	31,2	11,8	29,9	11,8	1,21
Olomoucký kraj	27,9	7,7	28,6	7,3	29,2	7,9	1,02
Zlínský kraj	28,6	7,0	28,9	7,8	29,5	8,1	1,15
Moravskoslezský kraj	28,5	7,7	28,1	7,9	28,1	7,9	1,03

Note: **tertiary education*
Source: *CZSO – Statistical Yearbook of the Czech Republic*

Table 7 presents shares of population with secondary and tertiary education according to Czech NUTS III regions and the CZSO statistics. This table confirms a strong position of the Prague region where almost two thirds of population have secondary or tertiary education, which is the highest share among all Czech regions. Prague as the capital city of the country takes up an extraordinary position among the regions as far as the offer of universities is concerned (8 universities with 36 faculties where 75 thousand students). These are used by both domestic and

foreign students. Moreover, Prague has a special position in secondary education, too. Prague also functions as an education centre for the Středočeský region and a large number of pupils commute to Prague to attend the secondary schools here (CZSO – Regional Portraits of Regions). Favourable situation also presents Jihomoravský region which could be considered as the second centre of learning.

1.4 Describe spatial trends in purpose of ICT use.

Purpose of use: e-Government etc.
Percentage of population using the Internet for interacting with public authorities Percentage of population having ordered/bought goods or services for private use over the Internet Percentage of population who use teleworking and Internet banking

Work with information and its classification have a significant position among human skills. PCs and the Internet are powerful tools in the process of gathering and analysing information. Computer literacy is beginning to play the same role as writing and reading did in the past. It can be assumed that lack of access and disadvantages in using PCs and Internet use will confirm already existing social divisions. From this point of view it is of vital importance to analyse PC and Internet access and usage patterns (SIBIS 2004).

The Internet in the CR is still used rather "statically" and its usage is oriented more towards information about goods and entertainment, eventually "downloading" information needed for work or studies or less interactive services. According to CZSO's survey, about 50 % of individuals use the Internet for searching for information about goods, entertainment and services regarding travelling and accommodation. However, only 5 % of individuals have used the Internet in last 12 month for purchase/shopping. Furthermore, according to Eurostat (2004), only 5 % of individuals used the Internet for financial services. For most occasional and non-Internet users the Internet is connected with advanced computer skills. In the Czech Republic 82 % of respondents say that the Internet requires advanced computer skills (SIBIS 2004).
The ability to manage modern communication tools such as Internet services is one of the most important prerequisites for the development and use of e-education. More than one third of the Czech population is confident in at least one Internet service. It seems that this phenomenon correlates strongly to age. Younger groups are more confident in more Internet services than older people. Greater confidence is linked to the use of Internet search engines and e-mail rather than to active participation in creating web pages (CZSO, SIBIS).

E-learning can play a decisive role in delivering learning systems which meet the demands of today's workers - and the unemployed. SIBIS distinguishes between two broad groups of e-learning technologies: offline e-learning (comprising multi-media learning material such as

computer programmes on diskettes, video tapes and CD-ROMs) and online e-learning (learning content being provided online through the Internet or the computer network of the employing organisation or school/ university). According to its survey e-learning on the online level was used by 5 % of the Czech labour force and no more than 3 % used offline electronic means.

Table 8 Internet commerce by individuals - individuals 15+ in %

	Have ever purchased over the internet		Purchased over the internet in the last 12 months	
	2003	2004	2003	2004
Praha hl. město	7,5	11,6	11,2	10,3
Středočeský kraj	7,3	6,6	17,2	4,5
Jihočeský kraj	2,3	5,6	6,5	4,8
Plzeňský kraj	2,2	4,6	6,4	4,1
Karlovarský kraj	3,0	5,7	5,9	5,7
Ústecký kraj	3,1	3,8	4,8	3,2
Liberecký kraj	5,6	7,8	16,8	7,1
Královehradecký kraj	3,5	7,3	11,0	6,1
Pardubický kraj	3,7	4,8	7,5	3,5
Vysočina	4,5	6,3	13,3	5,1
Jihomoravský kraj	4,9	5,4	10,7	4,8
Olomoucký kraj	3,5	5,2	10,5	4,0
Zlínský kraj	2,6	3,2	6,8	3,2
Moravskoslezský kraj	3,5	5,8	6,8	4,8

Source: *ICT Usage Survey in Czech Households and among Individuals 2003, 2004*

E-economy and e-commerce are in the early stages of development both in the Czech Republic and in the rest of Europe. According to SIBIS survey, of the services used by the Czech Internet users sub-group in the last 12 months preceding the survey:

- 72 % had found information about a product,
- 34 % searched for some health-related information,
- 21 % had looked for a job.
- 16 % had ordered a product or a service,
- 8 % had conducted on-line banking or bought financial product

In 2004, the highest share of individuals who have ever purchased over the Internet was recorded in the capital city of Prague (11,6 %). The second largest share of population who have ever purchased over the Internet had Liberecký region (7,8 %), followed by Královehradecký region (7,3 %). As there has been recorded a significant increase, it could be said that experience is a very important factor. Once the person has tried to purchase over the Internet and gets to know the advantages, they will probably do it again. A hypothesis can be formulated: in the Czech Republic e-commerce buyers are found more frequently among the more sophisticated Internet users who tend to be Internet users spending a longer time online (SIBIS 2004).

Working time flexibility is an important prerequisite for the complex utilisation of e-work. Work organisation gives employees more discretion over the organisation of work wherever this can be combined with the requirements of the real business, or even supporting business objectives (SIBIS 2004). In the Czech Republic the teleworking is in its beginnings and its penetration is very low (5 %, SIBIS 2004) and lags behind the EU.

Table 9 Internet activities of individuals, 2003 (% persons aged 15+)

	Internet banking	Teleworking	Related to public administration
Praha hl. Město	7,6	2,0	8,5
Středočeský kraj	3,2	0,8	4,1
Jihočeský kraj	1,3	0,1	1,4
Plzeňský kraj	1,2	0,6	1,8
Karlovarský kraj	2,1	1,2	3,6
Ústecký kraj	3,6	0,7	1,1
Liberecký kraj	4,5	1,6	4,2
Královehradecký kraj	2,8	0,7	4,2
Pardubický kraj	4,5	1,4	2,2
Vysočina	2,2	0,5	1,3
Jihomoravský kraj	3,4	2,8	5,4
Olomoucký kraj	4,7	0,2	2,8
Zlínský kraj	0,7	0,3	1,6
Moravskoslezský kraj	2,2	0,6	1,3

Source: *ICT Usage Survey in Czech Households and among Individuals 2003*

Again the regional disparities regarding teleworking offer very similar pattern to the previous ones but with some exceptions. The leader is Jihomoravský region with about 3 % of individuals who used teleworking in 2003. The capital city of Prague with 2 % is on the second position. On the contrary, very low share, under the national average, was recorded in Jihočeský and Olomoucký region.

Yet, it is very important to underline that both Internet banking and teleworking are still emerging phenomena in the Czech Republic, the values are very low and therefore the regional pattern is rather unstable.

E-government represents a core component of many governmental activities, programs and projects in the area of information society development and should play an important function in mediating government actions and its role will continue to grow as communication technologies become more widespread (SIBIS 2004). The Czech Republic has only started to implement e-government and there are only a few e-governmental services available (for example VAT, income tax (natural person and legal entity), road tax and real estate tax). In consequence of this fact data focused on these services are very limited.

There is only one indicator available in the regional breakdown – this is information about Internet activities of individuals related to public administration (table 9). Regarding the data available, the Prague clearly leads in the share of individuals who use the Internet for the activities related to public administration. The share in the capital city is more than two times higher than at the national level. On the other hand, it is necessary to assume that this rate is still rather low. The lowest share of individuals who use the Internet for activities related to public administration was recorded in Ústecký (1,1 %), Moravskoslezský and Vysočina region (1,3 %).

However, the same as in the case of Internet banking and teleworking could be said. E-government is still in its early phase and thus the regional values are rather low and could be unstable.

1.4.1 Information literacy survey

In February 2005, the Ministry of Informatics launched an information literacy survey, which aimed to map out the real situation regarding computer literacy in the Czech Republic, as there has been no reliable and systematic information on the issue so far. The survey results will also become a basis to define the Ministry of Informatic's subsidy schemes and will be a valuable source of information for the High-Speed Internet Forum that should start allocating subsidies next year to support the uptake of high-speed Internet access. The results will also be used for benchmarking with EU countries.

A total of 15,000 respondents took part in the extensive survey which has shown that over 27 % of Czechs over age 15 have basic computer skills. The survey classified those participants as "computer literate" who demonstrated their knowledge of basic IT terms, the ability to operate a computer and work with a word processor, spreadsheet program, graphics and the Internet. Besides, those who work best with computers were younger people under 35, people with higher education (at least a high school leaving examination), inhabitants of municipalities with a population over 20,000 and men. The lowest computer literacy – about 4 % – has the group of people with elementary education and unskilled jobs. On the contrary, above average are specialised professions such as lawyers (67 %), university teachers (57 %), policemen, firemen and soldiers (52 %) or government officials (45 %).

Moreover, according to the survey results, 58 % of the population have access to a computer and 50 % of adult population have access to the Internet or e-mail. About 84 % of people have access to a mobile telephone and 13 % to a laptop computer. People use computers most often to search for information on the Internet (76 %), for self-education

(63 %), playing music or movies (61 %) or at work (53 %). About 31 % of respondents purchased goods over the Internet and 26 % used internet banking.

1.5 Conclusions

Czech Republic is still lagging behind western European countries regarding ICT and its use in all analysed spheres. The development of IS on the regional level relatively strongly differentiated as the penetration rates among economically lagging regions with obsolete social and economic structures are rather low, significantly lower than the national level.

One of the main constrains of the analysis was the data availability as there are only few indicators regarding the IS development on the regional level and these have been collected only for last two years. Therefore it is hard to say what the main characteristics of the long-term development are, if, for example, the development of IS is faster in lagging regions which thus could catch up and partly overcome their backwardness. Yet, it can be said that regarding telecommunications, the penetration rate are close to its "full coverage" and this could not be taken as a constraint. More significant disparities have been found in Internet penetration which is still very low in peripheral and economically weak regions as high-speed or broadband internet connection is accessible rather in big towns (meant particularly by its price but partly also physically). Probably main reason, besides its price, is insufficient motivation of the population to acquire these services. This could be partly due to the disparities regarding educational attainment.

As well, the results do not lead to a conclusion that the differences in IS indicators among Czech regions do follow the differences in GDP per capita. This fact demonstrates following table where are presented the Pearsons correlation coefficients for selected IS indicators and GDP per capita as well as figures in the appendix. Significance was found only when the capital city was included. This is probably due to the fact that its position is highly above-average, considering both economic level and IS indicators. Among other regions, their performance was rather "unstable" as every regions scored differently according to different indicators. Yet, among leading regions, besides the capital city of Prague, were mostly Jihomoravský and Středočeský regions and among the lagging ones were Olomoucký and Karlovarský regions.

Table 10 Pearson's correlation coefficients (2004)

	Including Prague	Without Prague
GDP per capita and		
households in % with fixed telephone lines	0,79**	0,62*
households in % with PC	0,75**	0,42
households in % with Internet connection	0,87**	0,38
R&D expenditure per capita	0,90**	0,60
R&D personnel per 1000 inhabitants	0,94**	0,53

Note: ** correlation is significant at the 0,01 level, * correlation is significant at the 0,05 level
Source: own calculations

2 References

Asheim B. T. a Gertler M. S., 2004. The Geography of Innovation: Regional Innovation Systems. In: Fageberg a kol.: The Oxford Handbook of Innovation. Oxford: Oxford University Press, pp. 291-317.

Bangemann M., 1994. Europe and the global information society. http://europa.eu.int/ISPO/infosoc/backg/bangeman.html.

Blažek J., 1999a. Local and regional development and policy in the Czech Republic in the 1990s. In: Regional Policy Goes East: Essays on Trends and Lessons Learned for Regional Development Policy in Central and Eastern Europe, ed. by Hudak V., Huitfeldt H. and Meegan E., 1999. Institut for the East West Studies, Prague, Washington.

Blažek J., 1996. Vývoj meziregionálních rozdílů v transformačním období v ČR. Geografie – Sborník České geografické společnosti, 101, 4, pp. 265-277.

Blažek J., 1999b. (In)consistency and (in)efficiency of the Czech Regional Policy in the 1990s. In: Acta Universitatis Comenianae Geographica, Bratislava, Slovakia.

Blažek J., 2000. (In)consistency and (In)efficiency of the Czech Regional Policy in the 1990s, Informationen zur Raumentwicklung, Nr. 7/8, pp. 373-380.

Blažek J, Vozáb J., 2004. The Institutional and Programming Context of Regional Development in the Czech Republic: A critique, In: Drbohlav D., Kalvoda J., Voženílek (Eds): Czech Geography at The Dawn of the New Millenium, Olomouc, Česká geografická společnost, pp. 255-268.

Blažek J., Uhlíř D., 2005. Innovations and innovation policies in the Czech Republic: the case of Bohemian Regional Innovation Strategy. In print.

CDT, 2000. Bridging the Digital Divide: Internet Access in Central and Eastern Europe. Centre for Democracy and Technology, html version, 53 p. http://www.cdt.org/ international/ceeaccess/index.shtml

Dollar D., 1993. Technological differences as source of comparative advantage, American Economic Review, 83, 2, pp. 431-435.

Dunning J.H., Regions, Globalisation and the Knowledge Economy, Oxford Univ. Press, New York.

EC, 1997. Building the European Information Society for us all. European CommissionDirectorate-General for employment, industrial relations and social affairs, Brussels, p. 72.

EC, 2005a. Digital Divide Forum Report: Broadband Access and Public Support in Under-Served Areas, European Comission, Brussels. http://europa.eu.int/information_society/
eeurope/i2010/docs/implementation/ddf_report_final.doc

EC, 2005b. Cohesion Policy in Support of Growth and Jobs: Community Strategic Guidelines, 2007-2013. European Commission, Brussels, p. 39.

Fratesi U., 2003. Innovation Diffusion and the Evolution of Regional Disparities. ERSA Congress, p.27.
http://www.ersa.org/ersaconfs/ersa03/cdrom/papers/327.pdf

Hampl M., 2001. Regionální vývoj: specifika české transformace, evropská integrace a obecná teorie, Charles University, Faculty of science, Prague, p. 328.

Hampl., M. et al, 1999. Geography of Societal Transformation in the Czech Republic, Charles University, Faculty of Science, Prague, p. 242.

Chládek P., 2005. Regionální inovační systémy v České Republice (komparativní analýza). Master thesis, Prague: Faculty of Science, Charles University, p. 73.

IPTS (Institute for Prospective Technological Studies), 2003. Factors and Impacts in the Information Society a Prospective Analysis in the Candidate Countries - Report on the Czech Republic, p. 206.
http://fiste.jrc.es/download/EUR2127720CZ20FINALwithannex.pdf

Kanter R.M., 1995. World Class. Thriving Locally in the Global Economy, Simon &Schuster, New York.

Klieger T. 2000. The European Union And The Czech Republic: The Czech Republic's Approach To The Information Society And The New Economy: In Context Of The EU Enlargement (URL: http://www.h-propag.cz/eis/EUCRISA7.htm).

Mana M., 2001. Information Society Statistics, Czech Statistics Office, www.czso.cz

Perlín R., 1996. Problematika organizace státní správy a samosprávy (Problems of state administration and self-government), In: Hampl M. (ed): Geografická organizace společnosti a transformační procesy v České republice, Faculty of Science, Charles University, Prague, p. 315-332.

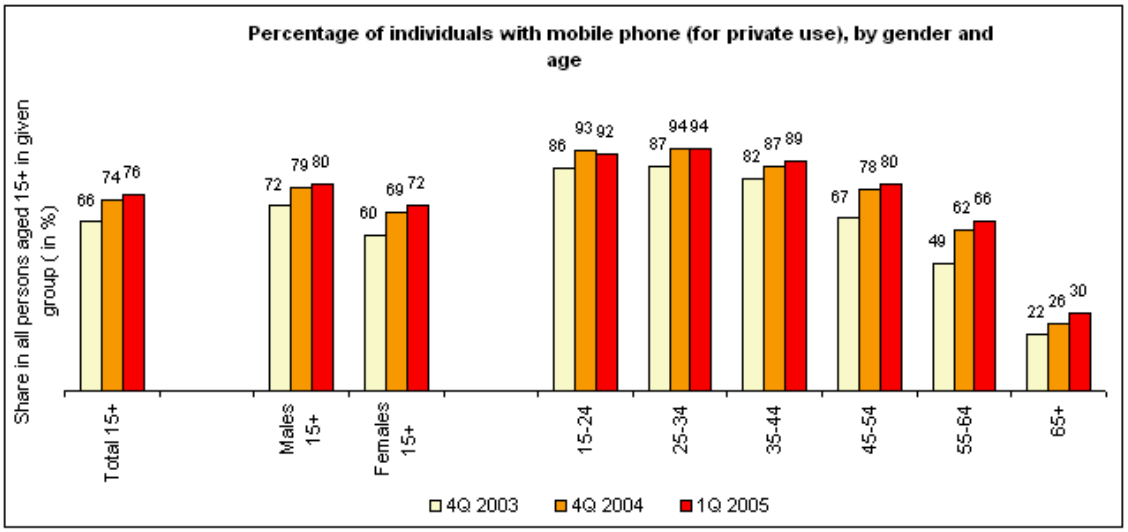
PwC, 2004. Final Report - Technical assistance in bridging the "digital divide": A Cost Benefit Analysis for Broadband connectivity in Europe. http://europa.eu.int/ information_society/eeurope/i2010/docs/implementation/pwc_final_report.pdf.

SIBIS, 2004. Statistical Indicators Benchmarking the Information Society: Czech Republic Country Report No. 2, p.67. http://www.sibis-eu.org/reports/country.htm.

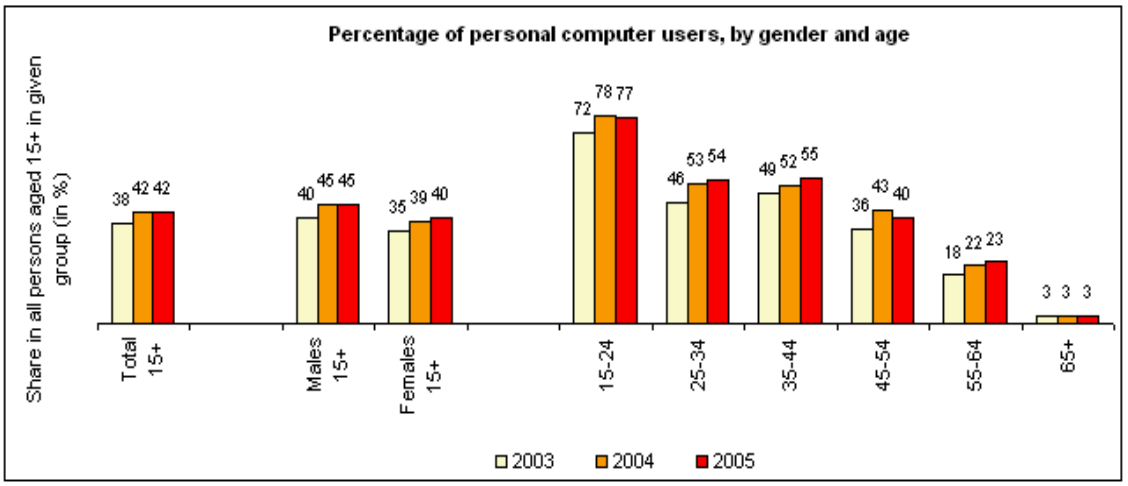
Technopolis, 2002. Final Report on Thematic evaluation of the Information Society. Technopolis Ltd., p. 110. http://europa.eu.int/comm/regional_policy/sources/docgener/ evaluation/doc/information_society.pdf

Uhlíř D., 2004. Regional versus National Development: What Sort of Policy for the New Czech Regions?, In: Drbohlav D., Kalvoda J., Voženílek (Eds): Czech Geography at The Dawn of the New Millenium, Olomouc, Česká geografická společnost, pp. 269-277.

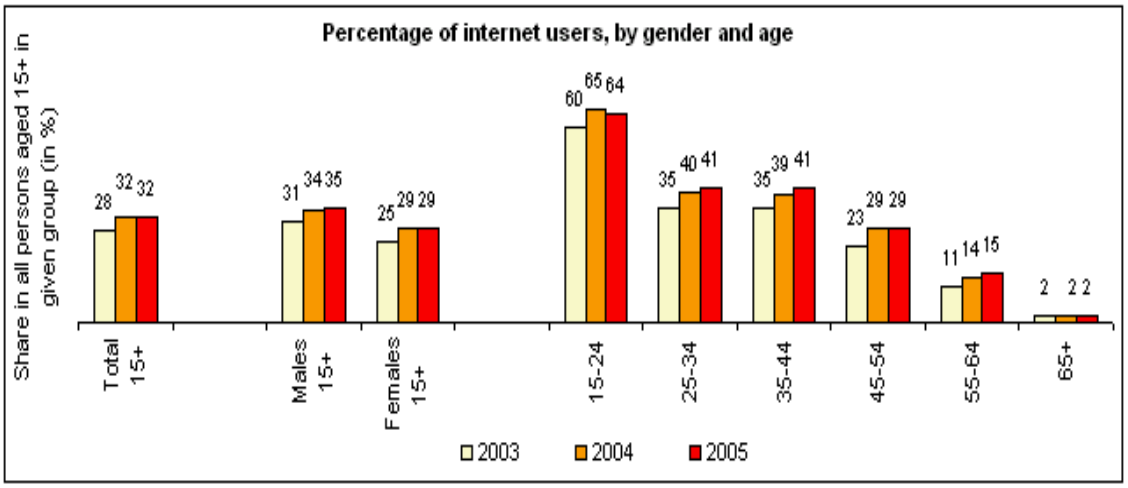
3 Appendix



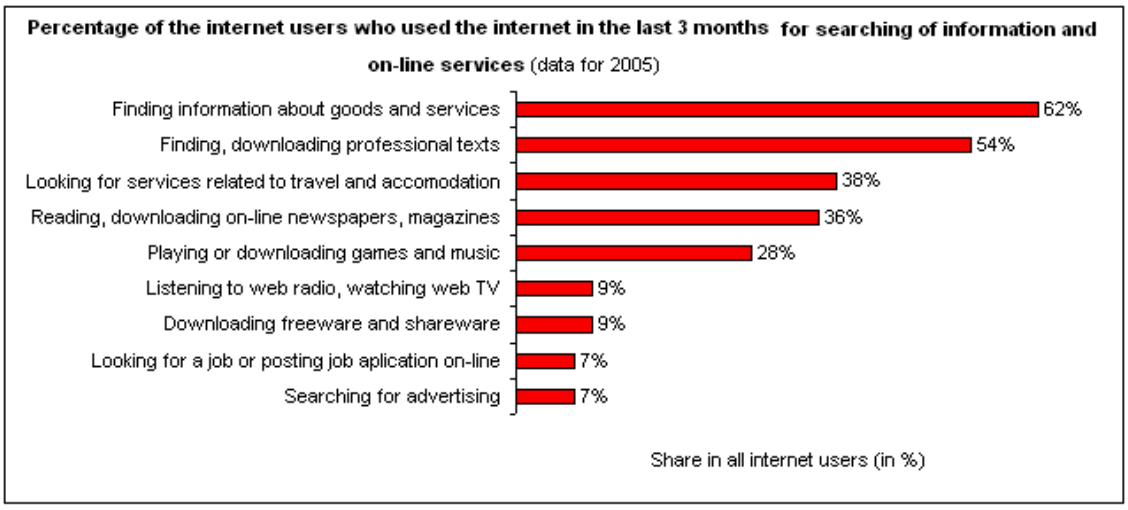
Source: *CZSO 2005*



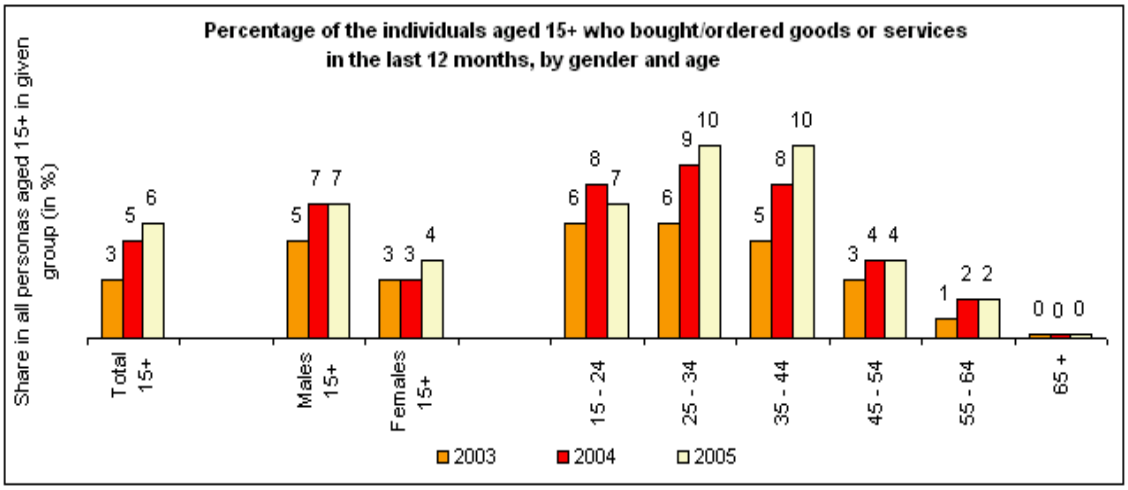
Source: *CZSO 2005*



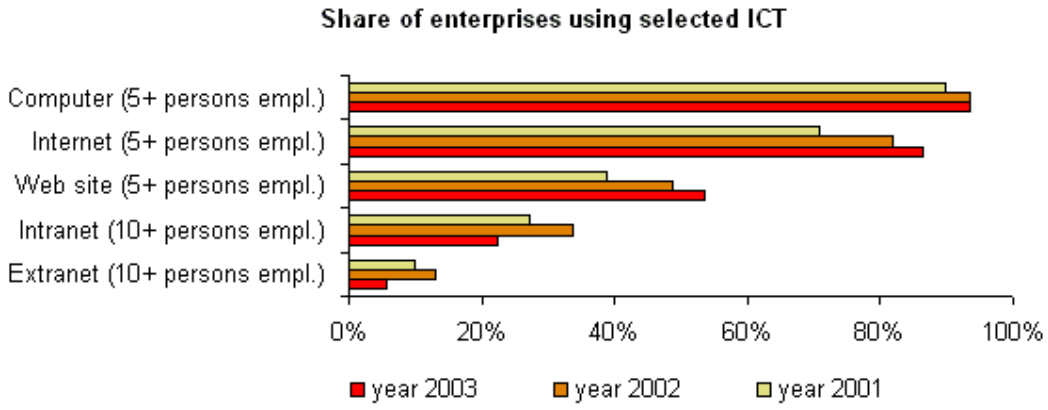
Source: *CZSO 2005*



Source: *CZSO 2005 – Survey was carried out in the 1st quarter 2005*



Source: *CZSO 2005 – Survey was carried out in the 1st quarter 2005*



Source: *CZSO 2004 – Results of the Survey on ICT Usage in Enterprises of the Czech Republic 2001-2003*

ESPON
EUROPEAN SPATIAL PLANNING OBSERVATION NETWORK

ESPON project 1.2.3

Second Interim Report
Appendix V

Country case study-Finland
(first part)

Institution	Person responsible	e-mail, telephone
Karelian Institute, University of Joensuu Finland	Timo Hirvonen (& Tommi Inkinen)	timo.hirvonen@joensuu.fi +358 13 251 4160

Co-financed by the European Community through the Interreg III ESPON Programme

Table of contents

Tables

1 Description of IS state and trends on regional level

1.1 General information about the regional development

Administrative system

According to the NUTS regional classification, Finland is divided into 6 major regions (NUTS2), 20 regions (NUTS3), 74 sub-regional units (NUTS4), and 432 municipalities. Most decision-making is done at the state and municipal level. The NUTS2-4 -levels have only limited powers, since they are neither the administrative units of the state nor the bodies of Finnish democratic decision-making system.

Settlement structure

By European standards, Finland is a sparsely populated, rural, and peripheral country. While its capital, Helsinki, is one of the fastest-growing city-regions in Europe, and Eastern and Northern parts of the country are among the regions with the fastest net migration outflow in Europe, the share of urban population in Finland (61%) is still one of the lowest in the EU. Many areas are characterised by extremely low population densities, such as major regions of Northern-Finland (2.6 inh. per km2) and Eastern Finland (9,9 inh. per km2). (OECD 2005).

The largest functional urban region (FUA) in terms of population and production in Finland is Helsinki (1.24 million inh.), comprising around one-fourth of the total population of the country. Only five other FUAs (Tampere, Turku, Lahti, Jyväskylä and Oulu) comprise more than 150 000 inhabitants. The number of medium-sized FUAs (50 000 – 150 000 inh.) is 21. Most of these are regional centres with remarkable public-sector functions, strengthened by regional administration systems, welfare reforms and new universities in 1960’s-70’s. As well as its medium-sized centres proper, Finland has dozens of sub-regional centres, comprising a population of more than a couple of thousands. They are functioning as the local and sub-regional nodes of the Finnish welfare system, have usually formed around medium-sized towns, and they commonly concentrate on a few key specialist fields, such as forestry and other resource-based industries. (Antikainen & Vartiainen 2005, OECD 2005).

Regional development and priorities of regional policy

At the beginning of 1990's Finland experienced a strong economic recession. The recession lead to a remarkable restructuring of industries, that many believe is the most significant background factor in the rapid recovery of the Finish economy after the mid-1990's. This is because during the restructuring process – according to Schumpeterian logic – some of the excess capacity was allocated to the non-traditional sectors, such as ICT, electronics industries, and particularly, mobile telephony, which soon occurred to be a great economic success. As the economic growth in traditional sectors has not been not especially fast, the growth in Finland has largely centred on this new era of electrical equipment production (i.e. mobile telephones and their switchboard equipment). The manufacture of them almost fivefold in the last decade, explaining one-third of the economic growth of 20 percent between 1990 and 1999. Nowadays the sector accounts for nearly one-third of goods exports from Finland, and it have replaced the paper industry as the most important export sector in Finland.

In regional development, the restructuring of economic base – which has been actively promoted by national policy – has resulted in a self-reinforcing process, in which the growth in economic activities, employment and population in Finland are increasingly concentrating in a few largest cities. In particular, the locality decisions of communications technology and other knowhow-intensive firms seem to be based on knowledge already existing in the locality. This seems to favour only certain major urban regions, and complicating the closing of development gaps across regions and between centres and their hinterlands. Predominantly agricultural areas and one-sided and small-scaled industrialized urban regions are in the poorest position.

On the other hand – thanks, for example, to the quite an even population spread, geographically relatively well-balanced city network, good infrastructure and geographically decentralised university system – there are still several potential growth nodes in various parts of Finland. In order to maintain the competitiveness of this country-wide urban system, the current focus in the Finnish regional policy is on the vitality of this urban network. According to this logic, regional innovation systems and growth-centre thinking are given a central position in national development policy in Finland in the last few years (see, Antikainen & Vartiainen 2005; Regional… 2001). The strategy is founded on the educational level of the population, the technological knowhow of main industries, and technological, industrial and science

policies promoting R&D and innovations. Developed telecommunications infrastructure as well as the fact that everyone should have the opportunity and basic skills to use the services of the Information Society, are seen as essential prerequisites for this strategy. Thus, the basic premises in Finnish Information Society and telecommunications policy are:

- competitive free markets and strong R&D policy promote the fast and nationwide diffusion of new competitive ICT-technologies,
- supply of services can be improved by providing fair operational preconditions to all players and by increasing the competition,
- instead of infrastructure investments, public sector should concentrate on increasing the demand for access services by investing in education, in development of public content services and in IT infrastructure in schools, libraries and other such places

1.2 State and trends related to IS technical definition

Number of mobile (cellular) phones subscriptions per 100 inh. **95.5% (2004)**
Number of cable modem subscriptions per 100 inh. **2.2% (2004)**
Number of xDSL subscriptions per 100 inh. **12.7% (2004)**
Proportion of households with a computer **64% (2005)**
Proportion of households with internet access at home **54% (2005)**
Proportion of households with broadband internet access at home **21% (2004)**
Share of enterprises with internet access **98% (2005)**
Share of enterprises with own homepage **76% (2005)**
Share of enterprises receiving orders over Internet **18% (2004)**

The history of the Finnish telecommunications markets differs to some extent from the usual case. Unlike most other countries, Finland has not had a single true incumbent operator with a nationwide monopoly in telecommunications networks. It has had a multi-operator market structure, which has been partly dominated by the local, private-owned monopolies. This market structure made the introduction of competition relatively easy, and Finland was among the first to open its telecommunications market to competition (gradually since 1985). This early start, together with a detailed, tight legislation and regulation to foster market-based expansion of new technologies, has led to a strong competition in Finland's liberal telecommunications market. This has had a beneficial impact on telecommunications know-how, innovativeness of telecommunications companies, and it has also resulted in one of the lowest telecommunications tariffs in the world.

Finland (as well as the other Nordic Countries) has long been among the forerunners in the development of Information Society in general, and

telecommunications in particular. For example, Finland has long been in the lead in terms of mobile phone connections. About a quarter of the households do not have a fixed line connection any more, and the number of these households is increasing, particularly in the households of only one or two persons. Historically, the regional provision of telecommunications services in Finland has been good, despite the fact that it is perhaps the most sparsely populated country in the EU. Overall, the telephone – mobile or fixed line – is equally frequent in the whole country, and in households of all sizes.

Not surprisingly, the broadband is currently seen as a key infrastructure of the Information Society in Finland. Thus its supply and availability have become important issues in public policies. A particular priority in the Finnish broadband policy is given to the market-based broadband roll-out, i.e. supply and demand side factors of the private investments. The overall aim is to decrease prices and increase demand by motivation etc. to encourage markets to finance the expansion of broadband. The existing and partly uneven spatial pattern of network expansion is seen more or less a temporary phenomenon: differences in terms of access are perhaps elementary in the ongoing rapid infrastructure development but are expected to fall in a very nearly future due to new wireless technologies and other access modes.

The diffusion of different broadband services has been rapid, and also the price level has decreased considerably in recent years. The ISDN access services are available to nearly every household in Finland. The availability of ADSL is somewhat lower, being available for all or nearly all households in about one in every four municipalities. Availability of broadband is higher in large and densely populated municipalities. The availability of other forms of Internet subscriptions is significantly lower. In general, households are connected to data networks (cable TV, Internet) mostly in the capital region and in other growth centres, but recently, the regional differences were reduced.

According to the Statistics Finland, Finland has one of the highest rates of computer Internet connectivity per capita in the world. Owning and use of computers and Internet seem to depend on family size, age and other socio-economic characteristic. For example, owning and use in small households and among the aged is growing slower than in other household types. Computers and Internet are also in use in almost all

enterprises. Country rankings may change according to the enterprise size classifications, but Finland generally has the highest ICT penetration rates in businesses.

1.3 State and trends related to IS economical definition.

ICT sector employment, % of total (as defined by OECD) **11.7% (2004)**
ICT sector value added, % of total (as defined by OECD) **17.5% (2004)**
R&D expenditure **5020 Mill. € (2004)**
Private R&D expenditure **3528 Mill. € (2004)**
R&D personnel and researchers, % of work force **2.93% (2003)**
Number of patents **2402 (granted, 2003)**
Proportion of population with completed secondary education **37% (2003)**
Proportion of population with completed tertiary education **24% (2003)**

An essential characteristic of the Finnish regional development is the strong concentration of R&D activities and ICT-industries in a few leading city regions and growth centres. The Finnish innovation policy is largely affected by this geographical fact. This brings us to the problem of the NUTS 2-level analysis. The aggregated entities include different regional types and locations, and the average-based outcome is far too generalising. Furthermore, it is important to notice that the locations with the highest ICT and R&D indicators also include their own "peripheral" areas. This problem is highlighted in the northern part of Finland, especially in the case of the city of Oulu and its technology cluster. The region of North Ostrobothnia, with Oulu as its centre, definitely constitutes a cluster for ICT innovations and development, but its impact does not reach the more remote regions that fit in the same NUTS2-area. As a result, the outcome presents the whole of Finnish Lapland as one of the techno-centres of Europe, which, of course, does not correspond to reality. In order to deepen the regional perspective, some key statistics regarding the R&D distribution on the NUTS 3 level in Finland are presented in Table 1.

Table 1 Regional variations of the R&D investments and personnel in Finland, NUTS3 (Source: Statistics Finland 2004).

	R&D investments							
	Total		Private sector		Public sector		Universities	
	Mill. €	%	Mill. €	%	Mill. €	%	Mill. €	%
Uusimaa	2143,8	42,7	1437,8	40,8	334,2	64,8	371,8	38,1
Itä-Uusimaa	43,3	0,9	43,2	1,2	-	-	0,1	0
Varsinais-Suomi	536,8	10,7	389	11	13,5	2,6	134,3	13,8
Satakunta	66,5	1,3	55,3	1,6	2,5	0,5	8,6	0,9
Kanta-Häme	70,2	1,4	34,4	1	31	6	4,7	0,5
Pirkanmaa	768,7	15,3	601,7	17,1	40,3	7,8	126,7	13

Päijät-Häme	43,5	0,9	39,7	1,1	1,3	0,3	2,5	0,3
Kymenlaakso	39,3	0,8	36,8	1	0,3	0,1	2,2	0,2
South Karelia	66,5	1,3	40,9	1,2	1,6	0,3	24	2,5
Etelä-Savo	20,1	0,4	8,4	0,2	3,4	0,7	8,4	0,9
Pohjois-Savo	112,6	2,2	42,5	1,2	13,4	2,6	56,7	5,8
North Karelia	56,9	1,1	15,8	0,4	10,6	2,1	30,4	3,1
Central Finland	193,6	3,9	111,6	3,2	16,7	3,2	65,3	6,7
South Ostrobothnia	18	0,4	13,4	0,4	1,2	0,2	3,4	0,3
Ostrobothnia	95	1,9	83,2	2,4	1	0,2	10,8	1,1
Central Ostrobothnia	15,2	0,3	10,5	0,3	2,3	0,4	2,4	0,2
North Ostrobothnia	669,3	13,3	535,8	15,2	28,7	5,6	104,7	10,7
Kainuu	16,4	0,3	11,9	0,3	1,5	0,3	3	0,3
Lapland	42,6	0,8	15,3	0,4	10,9	2,1	16,4	1,7
Åland	1,6	0	0,8	0	0,8	0,1	-	-
Finland	5019,7	100,0	3527,9	100,0	515,4	100,0	976,3	100,0

	R&D personnel							
	Total		Private sector		Public sector		Universities	
	Persons	%	Persons	%	Persons	%	Persons	%
Uusimaa	31491	42,1	15934	39,7	6759	63,6	8798	36,6
Itä-Uusimaa	521	0,7	512	1,3	-	-	9	0,0
Varsinais-Suomi	7574	10,1	4147	10,3	287	2,7	3140	13,1
Satakunta	1142	1,5	897	2,2	35	0,3	210	0,9
Kanta-Häme	1323	1,8	576	1,4	545	5,1	202	0,8
Pirkanmaa	9926	13,3	6212	15,5	641	6,0	3073	12,8
Päijät-Häme	964	1,3	772	1,9	72	0,7	120	0,5
Kymenlaakso	628	0,8	544	1,4	13	0,1	71	0,3
South Karelia	1187	1,6	553	1,4	55	0,5	579	2,4
Etelä-Savo	495	0,7	196	0,5	96	0,9	203	0,8
Pohjois-Savo	2637	3,5	738	1,8	369	3,5	1530	6,4
North Karelia	1308	1,7	284	0,7	248	2,3	776	3,2
Central Finland	3227	4,3	1479	3,7	298	2,8	1450	6,0
South Ostrobothnia	638	0,9	420	1,0	27	0,3	191	0,8
Ostrobothnia	1379	1,8	1037	2,6	29	0,3	313	1,3
Central Ostrobothnia	264	0,4	137	0,3	81	0,8	46	0,2
North Ostrobothnia	8459	11,3	5045	12,6	587	5,5	2827	11,8
Kainuu	354	0,5	217	0,5	53	0,5	84	0,3
Lapland	1215	1,6	367	0,9	421	4,0	427	1,8
Åland	42	0,1	23	0,1	19	0,2	-	-
Finland	74773	100,0	40089	100,0	10635	100,0	24049	100,0

It is essential to observe from Table 1 that three out of the four dominant NUTS3-regions in Finland – Uusimaa, Varsinais-Suomi

(largest city Turku) and Pirkanmaa (Tampere) – are located in the southern part of the country. The only exception is Northern Ostrobothnia (Oulu). Northern Ostrobothnia has experienced the fastest growth in terms of R&D investments, population and number of ICT firms within the last 10 years. A major factor behind this growth is the location of Nokia R&D facilities. All four dominant regions have Nokia production and research facilities in their area. It is also important to recognise the superiority of the financial volumes in private sector R&D compared to those in public the public sector, including universities.

Statistical testing shows that the volume of R&D activities correlates highly with the number of university personnel and research personnel working in the region as well as the population size of the region. Moreover, the levels of innovation activity are the strongest in the largest cities or towns. It is also clear that policy guidance aims to support the creation of clusters through the "growth node" approach.

The budgeted Finnish public sector expenditure on R&D activities for 2005 was 1.01 percent of the gross national product (GNP). The percentage is the second highest in Europe, with France as the only country to exceed it. The average EU public expenditure on R&D is 0.75 percent of the GNP (Statistics Finland 2005). The total R&D expenditure in Finland in 2004, including private and university sector R&D investments, was 3.4 percent of the GNP, equalling some 5 billion euros. Over 55 percent of the total funding was directed to activities in the Helsinki Region.

1.4 State and trends related to IS social definition.

Percentage of population using the Internet for interacting with public authorities **39% (2004)**
Percentage of population having used the Internet in relation to training and educational purposes **18% (2004)**
Percentage of population using Internet to seek health information whether for themselves or others **34% (2005)**
Percentage of population having ordered/bought goods or services for private use over the Internet in the last three months **28% (2002)**

Information technology has been integrated into production, work and home life quite seamlessly in Finland. The provision of online services by Finnish authorities has increased in recent years. All ministries, state agencies and municipalities have their own website. Because of the early acceptance of strong encryption, e-business has also developed

quite briskly and reliably. Online banking is also very well established in Finland. According to the survey conducted in September 2000 by the Statistic Finland, all comprehensive schools, upper secondary schools and vocational schools had access to the Internet. In 2002 there were 4,300 public PCs available in Finland. More than 50% of these were located in public libraries.

It is clear that the uptake and use of ICTs is not a problem for people interested in technology. It is clear, however, that an open Information Society does not exist as such, due to lack of education and other factors that exclude some people from participating. According to a study by MINTC (2003) a significant part of the Finnish population is totally out of information society development: the majority of Finns still prefer the telephone and traditional person-to-person service, 30 % of the whole population avoid Internet use, 15 & have not used the Internet at all, 8 % have given up Internet use or reduced the use to the minimum. The reasons for this include high prices of broadband Internet connections, lack of public Internet terminals, and insufficient skills, experience and motivation. While education and the availability of fast Internet connections and public PCs may be highly useful in preventing this kind of social exclusion, it seems unlikely that the proportion of non-users of computers and the internet would decrease in a very near future.

It thus seems that the Finnish Information Society policy has not been fully able to respond to the needs of the citizens to a sufficient degree. It looks, for example, that Finland has not been able to expand electronic government in accordance with the expectations that followed the positive development that began in the mid-1990s. It also seems that the uptake of ICTs in the field of social welfare and health care has not yielded sufficient gains so far. The reasons for this are manifold, but the development in this field, as in public services more broadly, has been slowed down because of the lack of pre-designed models and nationwide standards. For example, in the field of social welfare, each municipality organises its own services and ICT acquisitions, and the significance of the intermunicipal cooperation is relatively low. Due to the decentralised decision-making system and a large number of municipalities, this kind of fragmentation poses a particular challenge in development of public eServices Finland.

In the Finnish broadband policy a number of practical measures are targeted to this issue: accessible eGovernment services and citizens' ability to utilize these expanding services. Particular attention is given to make these electronic services for citizens as customer-friendly, easy-to-use and secure as possible. Concerning the access, public libraries with the newest technologies and capable instructors are seen to be in a key position in this development.

1.5 Conclusions

Finland has so far fared well in international comparisons regarding IS development, competitiveness, and particularly, telecommunications. The telecommunications infrastructure in Finland is perhaps one of the most advanced in Europe. The telephone network in Finland is 100% digital, Finland's mobile phone market (together with the markets of the other Nordic countries) is one of the most developed in the world, and also the Internet has grown more rapidly in Finland than in many other countries.

The basic telecom network is equally available everywhere in Finland – except in ultimately remote and very isolated places. Regional differences in supply exist only in more advanced services (such as broadband internet connections), such that cities and other densely populated localities are in a better position. However, these differences seem or are at least expected to lessen over time.

The supply of broadband access services in Finland is constrained by low demand, lack of competition in certain areas, and poor profitability especially in sparsely inhabited areas The factors hindering demand include lack of knowledge and know-how, high prices of services and terminal devices as well as low quality of content services. The territorial differences in the uptake and use of ICT seem to be strongly related to the regional differences in these socio-economic factors (family size, age, education etc.) and the territorial differences in supply side conditions (availability etc) are likely of only secondary importance in the long run.

In regional development, the restructuring of economic base has resulted in a spatially uneven and polarized process, in which the growth in economic activities, employment and population in Finland are increasingly concentrating in a few cities and regions. In particular, the locality decisions of knowledge-intensive firms seem to be based on know-how already existing in the locality. This seems to favour only a few existing growth centres, which complicates the closing of development gaps across regions and between centres and their hinterlands.

References

Antikainen., J. & Vartiainen P., 2005. Polycentricity in Finland: From Structure to Strategy, Built Environment, Vol 31/2, pp.143-152.

Centre of Expertise Programme, 2004. Centres of expertise. Forum for successful information. <http://www.oske.net/in_english/> 29.6.2005.

European Commission, 1993. White paper on growth, competitiveness and employment: the challenges and ways forward into the 21st century. COM(93) 700 final. Brussels.

Government of Finland, 2003. Government policy programmes. Information society programme introduction <http://www.tietoyhteiskuntaohjelma.fi/en_GB/> 4.10.2004.

ITU, 2005. International telecommunication union statistics. <http://www.itu.int/ITU-D/ict/statistics/> 16 June 2005

MINTC, 2003. Internet Use in the Fringe Areas of Information Society, Publications of the Ministry of Transport and Communications 48/2003, Edita Ltd, Helsinki.

OECD, 1995. OECD Territorial reviews. Finland. OECD, Paris.

Regional Regional Development and Regional Policy in Finland. Summary of the Working Group Report. Prime Minister's Office: Publications 2001/2.

World Economic Forum, 2003. The Global Information Technology Report 2002–2003. New York: Oxford University Press.

ESPON
EUROPEAN SPATIAL PLANNING OBSERVATION NETWORK

ESPON project 1.2.3

Second Interim Report
Appendix VI

Country case study - Germany
(first part)

IRS	Person responsible	e-mail, telephone
	Dipl.Geogr. Kristine Müller	muellerk@irs-net.de; +49 3362 793 157
	Dr. Sabine Zillmer	zillmers@irs-net.de; +49 3362 793 186

Co-financed by the European Community through the Interreg III ESPON Programme

Table of contents

Figures

Tables

1 Description of IS state and trends on regional level

1.1 General information about the regional development

The **administrative structure** of Germany is strongly determined by the federal system. There are 16 'Bundesländer' forming the federation, decisions on various matters have to be made in coordination between the federation and the Länder.

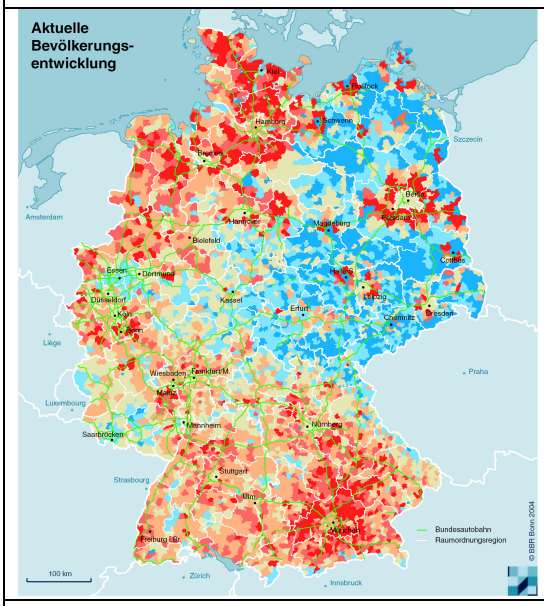
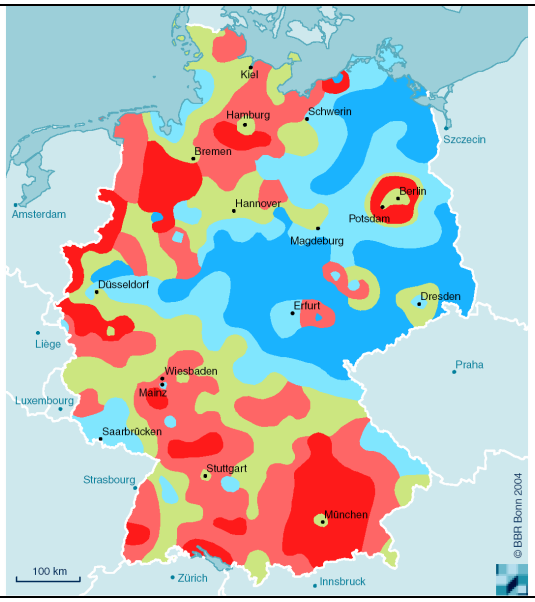
On NUTS 2 – level the Länder are subdivided into 41 governmental regions, but a much stronger degree of influence can be observed at the level of more than 400 districts ('Kreise', NUTS 3) and on the level of the municipalities themselves (NUTS 5) (see Table 1).

Table 1 Administrative units of Germany, 2003

16 federal countries ('Bundesländer')	NUTS 1
41 governmental regions/districts	NUTS 2
439 districts ('Kreise')	NUTS 3
539 administrative communities	NUTS 4
13176 municipalities ('Gemeinden')	NUTS 5

Germany is characterised by a "relatively balanced, decentralised concentration of the population, workplaces and infrastructure in cities, city regions and agglomeration areas as well as by large and coherent rural areas" (BBR, 2001, p.7). The development of the German spatial and **settlement structure** took historically place along with the development of the transportation infrastructure within the territory. One outcome are the big interconnected central areas like Hamburg, Berlin, Rhine-Ruhr, Rhine-Main, Stuttgart and Munich. Such areas have an outstanding position in the German spatial system which is composed of a dense and efficient network of cities with a differentiated order of higher, middle and lower functions according to the German "central place system". The main two processes urban areas are undergoing are an increasing strain on large urban agglomerations as well as a continuing suburbanisation, both implying negative consequences and challenges for regional development in Germany. Differences between urban and rural areas in terms of economic strength and life styles, however, are increasingly disappearing and rural areas are distinguished by a great diversity of their economic and social structures (see ESPON 2.4.2 FR Annex, Country Study Germany, p.11f).

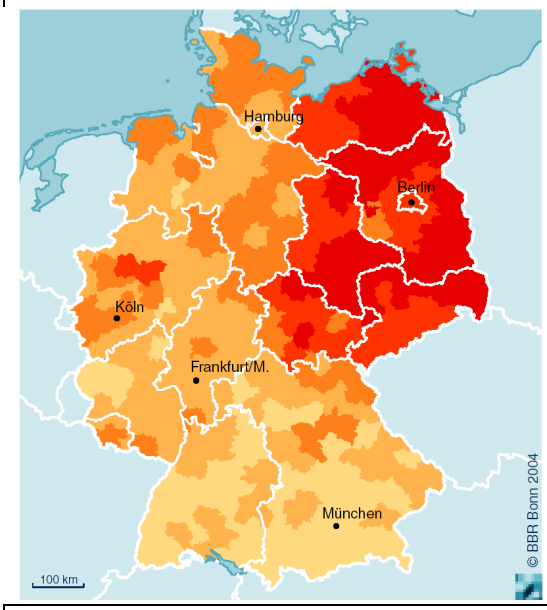
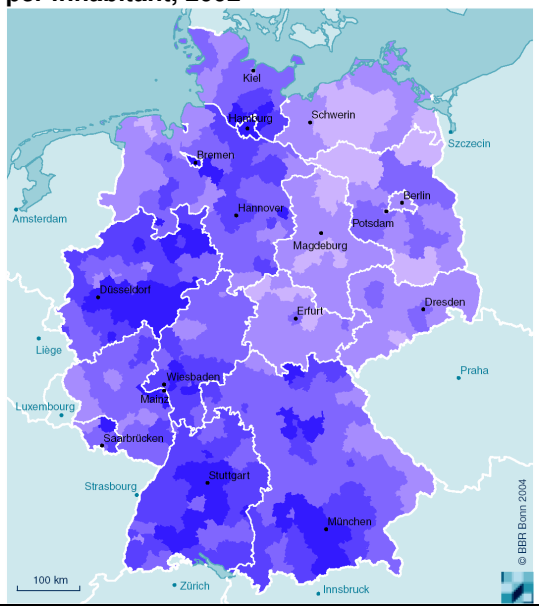
Figure 1 Population development between 1997-2003 & Prognosis of population development until 2020

Population development, 1997-2003	Prognosis of population development until 2020
	
Population development 1997 until 2003 in % below −5.0 -5.0 until below −1.5 -1.5 until below 1.5 1.5 until below 5.0 5.0 until below 7.5 7.5 and above	Change of population between 2002 and 2020 strongly decreasing slightly decreasing stable slightly increasing strongly increasing
Source: BBR (2005), p. 69	Source: BBR (2005), p. 70

One increasingly crucial element of spatial development is the **demographic development**, which in Germany is driven by a declining population, an increasing ageing of the population and an increasing out-migration of the young and qualified workforce from economically less prosperous regions to the more dynamic agglomerations. These trends are as well most pronounced in many East German regions where the contrast between growing and shrinking areas is still increasing and considerably higher than in the Western parts of Germany. Apart from the suburbanisation processes in the hinterland of Berlin and the surrounding areas of some smaller agglomerations, like Rostock, Halle, Leipzig and Dresden, for most parts of East Germany a further negative population development is expected as can be seen from Figure 1. However, also in Western Germany shrinking tendencies occur in many regions, especially in old industrialised densely populated areas and their nearby surrounding areas as well as some peripheral areas. Regions with

population growth in West Germany are the hinterland areas of the main agglomerations, like Hamburg, Munich, Stuttgart or Nürnberg, where suburbanisation tendencies cause population increases also in distant "intermediate areas". The population development within the basic typology of regions has to be also surveyed against the background of the massive migration from the new Länder to the old Länder. The loss of population in the periphery in the new Länder is disproportionately high with 4.5%. (see ESPON 2.4.2 FR Annex, Country Study Germany, p.14f).

Figure 2 Unemployment rate in 2004 & Available income of private households in € per inhabitant in 2002

Unemployment rate, 2004	**Available income of private households in € per inhabitant, 2002**
	
Unemployment rate in September 2004 in % below 7 7 until below 10 10 until below 15 15 until below 20 20 and above	Available income of households in 2002 in Euro per inhabitant below 13 500 13 500 until below 15 000 15 000 until below 16 500 16 500 until below 18 000 18 000 and above
Source: BBR (2005), p. 192	Source: BBR (2005), p. 46

With regard to the **labour market** the still existing East-West gap becomes apparent. Regions with high unemployment rates are concentrated in the Eastern parts of Germany. Especially regions neighbouring the East German regions are among those with relatively high unemployment rates as compared to other West German regions. On the other side, the lowest unemployment rates concentrate in the

South and South-West of Germany (see 2.4.2 FR Annex, Country Study Germany, p.6).

Regional income differences are particularly pronounced between East and West Germany. Although East German regions are catching up, only Berlin and Potsdam reached a level in purchasing power which is similar to many West German regions while regions with the highest purchasing power levels are the agglomeration regions of West Germany (see Figure 2). Besides this overall East-West economic differential, in both parts of Germany peripheral rural areas and regions characterised by "old" industries and economic sectors in crisis (e.g. coal, steel, shipbuilding) experience the greatest difficulties of **economic restructuring** leading to high unemployment rates and low income levels. (see ESPON 2.4.2 FR Annex, Country Study Germany, p.13).

1.2 State and trends related to the technical dimension of the IS

Indicators used:

Proportion of households with mobile (cellular) phones subscription
Proportion of households with ISDN subscription
Proportion of households with a computer
Proportion of households with internet access at home
Proportion of households with DSL subscriptions
Share of enterprises with internet access
Share of enterprises with own homepage

Germany is undergoing a very dynamic development of the IS in general, but at quite varying paces concerning different aspects. With regard to some aspects concerning the spread and usage of ICT, Germany is still behind in international comparison. The use of mobile phones is well advanced, as is the spread of PCs at home. Almost two thirds of all German households own a PC, more than half of the population is online, which is above European average (BITKOM 2005, p.3,5).

About one third of the inhabitants utilizes ISDN, which used to be much more common in Germany as compared to most other countries (BITKOM 2005, p.6). For the future, it is expected, that these numbers will not grow much anymore, since DSL is taking over.

Table 2 Selected indicators for ICT use in Germany on NUTS 1 level

‚Bundesländer' (NUTS 1)	Number of mobile (cellular) phones subscriptions per 100 households	Number of ISDN users per 100 households	Proportion of households with a computer	Proportion of households with internet access at home
Baden-Württemberg	69,1	26,7	63,8	49,1
Bayern	72,4	26,9	63,9	48,8
Berlin	68,4	20	60,5	46
Brandenburg	73,6	15,3	59,5	41,4
Bremen	67,6	17,1	57,4	37,5
Hamburg	69,8	25,3	62,2	48,5
Hessen	73	27,3	64,3	49,8
Mecklenburg-Vorpommern	71,9	12,2	53,1	37,1
Niedersachsen	73,9	25,6	62,3	46
Nordrhein-Westfalen	76,3	24,9	61,6	47,1
Rheinland-Pfalz	74,2	24,7	61,2	45,7
Saarland	70,4	23	55,7	39,2
Sachsen	67,7	12,8	54,3	38,4
Sachsen-Anhalt	70,5	11,7	54,7	36,5
Schleswig-Holstein	73,4	26,1	63	47,2
Thüringen	68,2	13,9	59,5	43,3
Germany	**73**	**23,4**	**61,4**	**46**

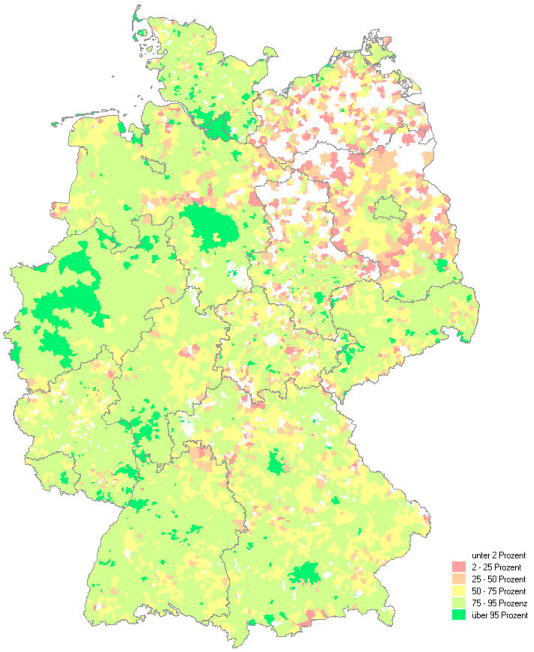
Source: destatis/Statistical Office of the 'Länder', 2003.

Digital TV or fast internet connections are generally spread to a relatively low degree in Germany. The development of broadband has been delayed since TV-Cable networks were not appropriate for 'fast data access'. In 2003 the government started the initiative „Deutsche Breitbandinitiative" (German Broadband Initiative), and the number of users has been growing since. Broadband in Germany is based on DSL, while cable, satellite and fibreglass are almost nonexistent for the use of broadband (BITKOM 2005, p.8).

As the map in Figure 3 shows, the availability of DSL is pretty high for large parts of the country, but some peripheral and rural parts in central and North-Eastern Germany are left out. To a certain degree the usage of DSL follows this pattern. But there are other regions as well, where the usage pattern quite noticeably deviates from the access to DSL. This raises the question about the special aspects being at work in these regions, delaying or even hindering the spread of DSL.

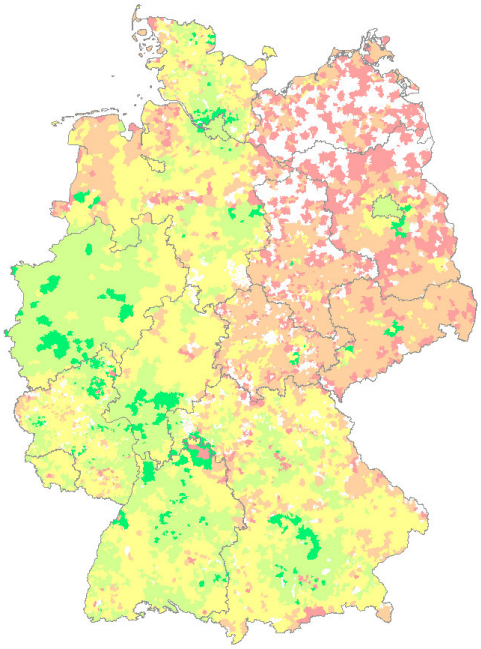
Figure 3 DSL availability and use in Germany, proportion of households per municipality (NUTS 5)

Availability of DSL



below 2 %
2 – 25 %
25 – 50 %
50 – 75 %
75 – 95 %
above 95 %

Usage of DSL



below 7,5 %
7,5 - 15 %
15 – 22,5 %
22,5 - 30 %
above 30 %

Source: Plan Online (2005), p. A 33, A 34

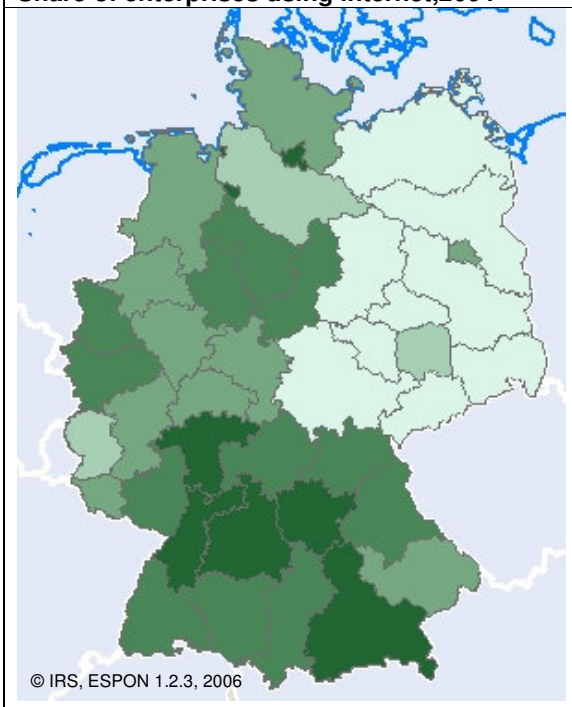
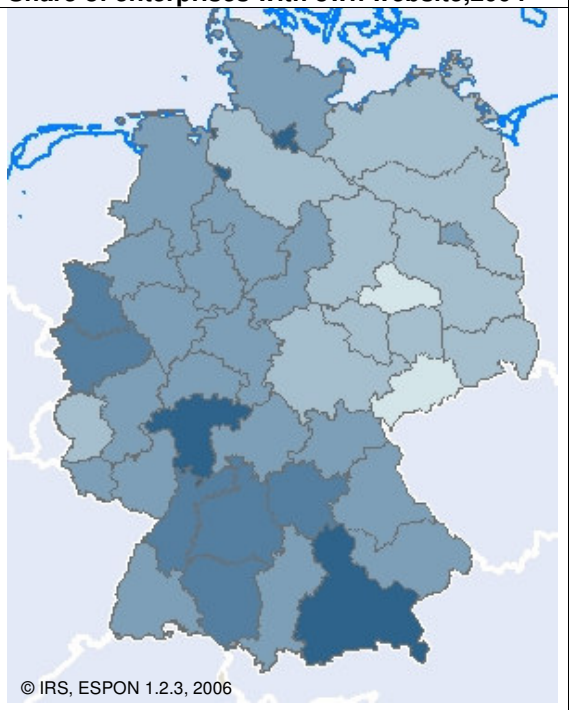
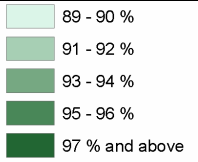
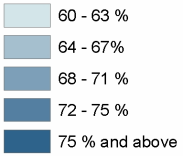
An online survey of the German broadband initiative indicated, that the large majority of non-users accounted missing access as a reason. This finding indicates, that even within municipalities access differs to a considerable extent. For a much smaller share of the survey respondents (less than one fifth) high running costs were a reason not to use DSL technology. Further reasons which could be related to social, economic or demographic structures would need additional data comparisons on NUTS 5 level.

Generally speaking it can be stated, that German **enterprises** have recognized the advantages of ICT and are using them intensively, though not as much as in the USA (BITKOM 2005, p.3). The share of enterprises with internet access accounts of 95%, and the proportion of enterprises

receiving orders over the internet has doubled from 9% in 2003 to 18% in 2004 (Eurostat online 2005).

As Figure 4 reveals, there occurs an East-West divide in the use of internet by firms, even if the shares of firms only vary by around 10 percentage points. With the exception of Berlin, in all parts of Eastern Germany the share of firms using the internet is lower than in West Germany. Apart from that, a less distinct North-South division can be observed. The highest values have been recorded for regions which are situated in Bavaria, Baden-Württemberg and Hesse.

Figure 4 Share of enterprises using internet & with own website

Share of enterprises using internet,2004	Share of enterprises with own website,2004
	
	
source: ESPON 1.2.2 Annex table p.102 (estimates, 2004)	Source: ESPON 1.2.2 Annex table p.102 (estimates, 2004)

The right hand map of Figure 4 indicates the spatial pattern of firms with an own website. Generally, firm internet use patterns are confirmed by these patterns, though variation in percentage points is somewhat larger. Nevertheless, the distinction between the regions of Eastern and North-Western Germany appears less visible. In addition, similarly to the

internet use, the metropolitan regions which form a separate NUTS 2 region (Hamburg, Bremen and Berlin) always appear with higher shares than their surrounding regions.

1.3 State and trends related to IS economic definition

Indicators used:

ICT sector employment, % of total (as defined by OECD)
ICT sector value added, % of total (as defined by OECD)
R&D expenditure in mill.Euro per 1000 inh.
R&D personnel per 1000 inhabitants
High tech patents per million inhabitants

The German **ICT sector** is constantly progressing, while not catching up with the leading countries in ICT. Yet, the ICT sector develops differently with regard to demand and employment. The demand in the sector of ICT products and services has been growing (from 2003-2004 by 2 %), with the growth being particularly focussed on software and ICT-services (BITKOM 2005, p.3). The German labour market has been showing stagnating and even declining numbers of employees in the ICT sector over the last couple of years. The numbers have been slowly rising again in 2005, with additional jobs being created mostly in software development and ICT services. In the field of the production of ICT equipment the opportunities for employment are expected to diminish in the near future (BITKOM 2005, p.21).

Table 3 Development of the German ICT sector

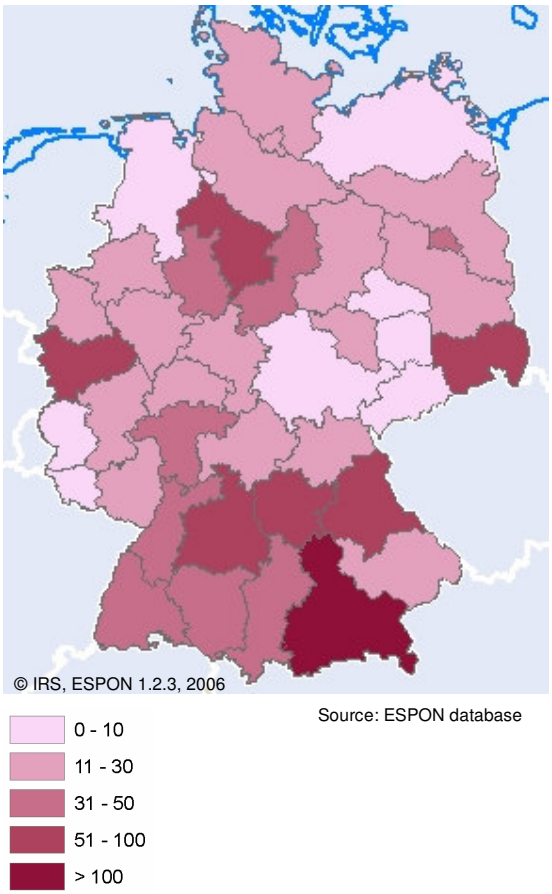
	2002	2003	2004
Change of ICT market value in %, related to previous year (as defined by OECD)*	-2.5	0.4	2.4
R&D expenditure (% of GDP)**	2.49	2.52	2.42

Source: * EITO 2004, 276
** eurostat online 2005

Germany performs very well concerning its overall number of **patents** per year. Basic innovations for many technological products have been made in Germany over the last years. It is the transfer of ideas into marketable products where Germany does not show that much strength (BITKOM 2005, p.22). The regional distribution of high-tech-patents in Figure 5 indicates again an East-West division in terms of patent intensities. Most regions with the lowest relative numbers of patents are located in Eastern Germany. Besides, in most of the Western German

states, there are also regions with quite low relative patent numbers as compared to the German average. The performance of Upper Bavaria is outstanding with a relative number of patents three times as high as that of the region with the next highest relative patent number (Middle Franconia). Until the mid 1990s, the difference between Upper Bavaria and the following regions was not as high. Yet, differences in relative patent numbers are rather high in the state of Bavaria, while in contrast, e.g. in Baden-Württemberg nearly all NUTS 2 regions contribute to comparable extents to patent numbers.

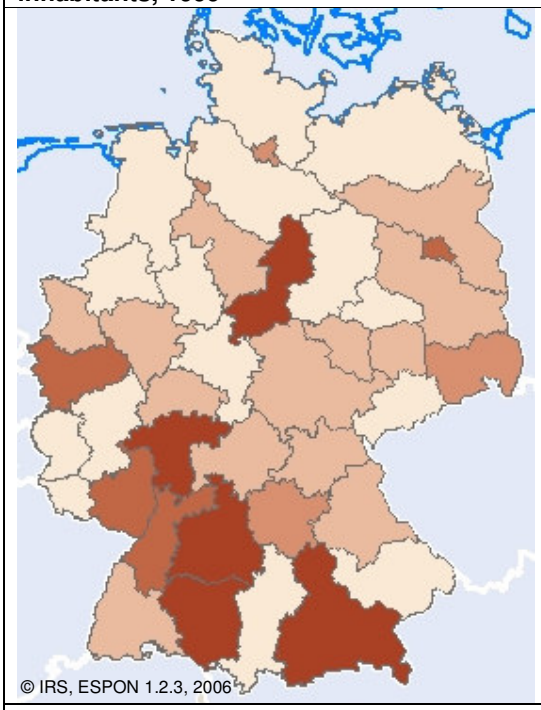
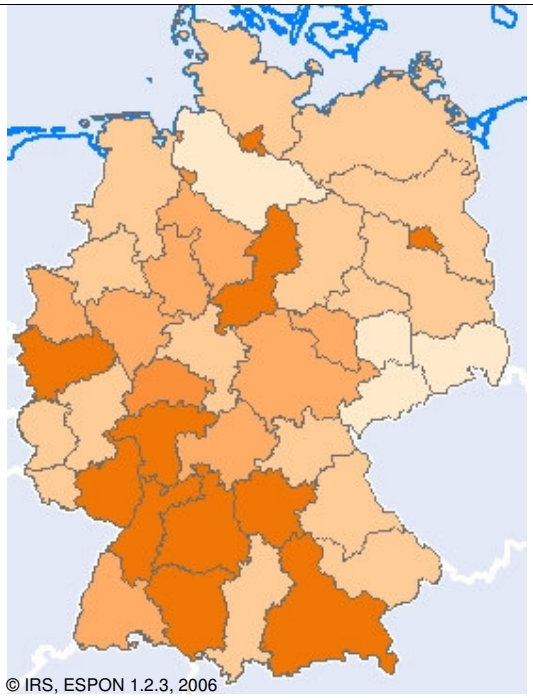
Figure 5 Number of high-tech patents per million inhabitants (NUTS 2)



R&D expenditures of Germany lie above the EU average of 2%. In line with EU objectives, the German government has expressed its ambitions to raise this proportion up to 3 % over the coming years (BITKOM 2005, p.23). In contrast to many other indicators, for both, R&D expenditure and **R&D personnel**, the often prevalent East-West division is not visible in Figure 6. Instead, it is more a North-South division, with selected low R&D oriented regions in the South and very few regions with high R&D orientation in the North of Germany. Besides some metropolitan regions,

which form their own NUTS 2 region, the latter holds in particular for the Braunschweig region, where the headquarter of Volkswagen is located.

Figure 6 R&D expenditure in mil. Euro per 1000 inhabitants in 1999; R&D personnel per 1000 inhabitants in 1997

R&D expenditure in mil. Euro per 1000 inhabitants, 1999	R&D personnel per 1000 inhabitants, 1997
	
0 - 0,25 0,26 - 0,50 0,51 - 0,75 0,76 - 1,00 > 1,00	0 - 1,00 1,01 - 3,00 3,01 - 5,00 5,01 - 7,00 > 7,00
Source: ESPON database	Source: ESPON database

Regarding the usage of ICT within the **educational system**, Germany is far behind in comparison. A much better infrastructure in schools is needed in order to build up the appropriate knowledge and technological competence (BITKOM 2005, p.3).

Empirical studies show, that ICT use is related to the level of educational attainment. Citizens with higher (secondary or tertiary) education tend to make use of the internet much more intensively than those with a lower educational degree (see Booz Allen & Hamilton 2000, S. 16). Furthermore, the availability of PCs and internet connection is much more advanced in schools preparing students for higher education, like the German 'Gymnasium' or 'Realschule', compared to the ordinary

'Hauptschule'. In this way, the tendency of higher educated students developing a stronger orientation towards ICT use is further strengthened.

1.4 State and trends related to IS social definition.

Indicators used:
Percentage of population using the Internet for interacting with public authorities Percentage of population having ordered/bought goods or services for private use over the Internet in the last three months

So far most **e-government** services are reduced to providing access to information. Germany is lagging behind in European comparison in that aspect. In 2003 not even half of the 20 most important administrative services (e.g. registering a car or applying for an identification document) have been available online (BITKOM 2005, p.17).

In 2006, the introduction of 'health cards' is planned. This is expected to bring induce a great reduction in costs as well as the avoidance of misuse of insurance cards. It is also regarded as a good chance for German ICT enterprises to develop additional knowledge on ICT systems (BITKOM 2005, p.16).

Table 4 ICT use of private households for public and private interaction

	2002	2003	2004
Percentage of population using the Internet for interacting with public authorities	14.0	23.3	31.3
Percentage of population having ordered/bought goods or services for private use over the Internet in the last three months	17	24	29

Source: eurostat online 2005

1.5 Conclusions

Even more than 10 years of after the reunification of Germany, for many socio-economic indicators strong disparities between Eastern and Western Germany prevail. Particular problem fields in this context are the continuing high unemployment rates especially in East Germany and the demographic development, which implies shrinking regions. These concentrate in peripheral and above all in large parts of East Germany. In addition, with regard to many socio-economic indicators also a less distinct North-South division can be observed.

Besides this geographical division Germany is also faced with a spatial division between metropolitan and urban areas on the one hand side and

more rural and peripheral areas on the other hand. Due to the differing population composition in these different types of regions a digital divide apparent between the population of different age and education also reigns in spatial terms. Thus, in particular the peripheral regions in East Germany have the least favourable position in terms of IS related indicators, even if this is not visible on NUTS 2 level maps. These general findings hold for both, the technical as well as the economic dimension of the IS.

References

BBR (Federal Office for Building and Regional Planning), edit., 2001. Spatial Development and Spatial Planning in Germany. Bonn.

BBR (Federal Office for Building and Regional Planning), edit., 2005. Raumordnungsbericht 2005. Bonn.

Booz Allen & Hamilton, 2000. Digitale Spaltung in Deutschland. Ausgangssituation, Internationaler Vergleich, Handlungsempfehlungen.

BITKOM, 2005. Daten zur Informationsgesellschaft. Status Quo und Perspektiven Deutschlands im internationalen Vergleich. Berlin.

Destatis online (www.destatis.de)

EITO-EEIG, 2004. European Information Technology Observatory 2004. Frankfurt a.M.

ESPON, 2004. Telecommunication services and networks: territorial trends and basic supply of infrastructure for territorial cohesion (2002-04).(ESPON Project 1.2.2) Final Report, Annex, www.espon.lu

ESPON, 2005. Integrated analysis of transnational and national territories based on ESPON results (2004-06) (Project 2.4.2) Final Report, Annex, Country Study Germany, www.espon.lu

Eurostat online

Plan Online, 2005. Bericht zum Breitbandatlas. Atlas für Breitband-Internet und digitalen Rundfunk des Bundesministeriums für Wirtschaft und Arbeit. Rangsdorf.

ESPON

EUROPEAN SPATIAL PLANNING OBSERVATION NETWORK

ESPON project 1.2.3

Second Interim Report
Appendix VII

Country case study - Greece
(first part)

Institution	Person responsible	e-mail, telephone
University of Thessaly	Asoc. Prof. P. Skayannis	leonska@uth.gr +30 24210 74469
	Petros Rodakinias	prod@uth.gr, +30 24210 74476

Co-financed by the European Community through the Interreg III ESPON Programme

Table of contents

Tables

1 Description of IS spatial trends in Greece

The results of survey on data availability show that it is very difficult to base the descriptive part of the case study on the set of the common indicators. Therefore please use the indicators included in the tables below or other relevant available for your country. Every part of the descriptive chapter should be supplemented by the table with the set indicators used.

The basic level for the analysis in NUTS 2 level, but if it's possible the intraregional differences should be analysed as well.

1.1 General information about the regional development of Greece

Under the 1997 law on decentralised government in Greece, the country is divided into 13 regions (NUTS 2 Level) forming devolved units of state administration. They have their own budget, administration services, and are run by the general secretary (genikos grammateas), appointed by the president on the prime minister's recommendation with the consent of the government.

The general secretary is the head of all the region's services and can be considered the executive of the regional administration as well as the representative of the central government in the region. The general secretary presides over a regional council (periferiako simvoulio) which is the decision-making body of the region. The latter comprises the prefects in the region, a representative of each urban municipality and rural community in the region, and representatives of the regional branches of various organizations. The following table shows some of the data available for the 13 Greek regions:

Table 1 GDP, employment, unemployment and number of enterprises in Greek regions (NUTS 2 level)

NUTS2	GDP (2000)	Employment (% of population) (2000)	Unemployment (% of workforce) (2001)	Number of Enterprises
ATTIKI	13140,50	45,1	10,4	212602
KRITI	11394,70	38,6	5,8	27281
IPEIROS	8074,50	26,7	11,9	12746
KENTRIKI MAKEDONIA	11670,90	37,1	10,8	86678
DYTIKI ELLADA	11737,80	31,6	9,9	21923
DYTIKI MAKEDONIA	8771,70	30,5	15,8	11216
AN. MAKEDONIA - THRAKI	9443,70	39,7	9	21923

PELOPONNISOS	10029,10	30,2	8,1	23753
STEREA ELLADA	13470,60	23,9	13,3	20801
THESSALIA	10663,20	34,9	11,6	29260
VOREIO AIGAIO	11226,40	30,2	6,1	8157
IONIA NISIA	9987,50	36,6	6,7	14123
NOTIO AGAIO	13714,10	35,7	9,7	19374

Source: http://www.innowestmac.gr

Table 2 Gross Value Added (GVA) by sector and region for 1995 and 2001.

SECTOR	PRIMARY (%)		SECONDARY (%)		TERTIARY (%)	
	1995	2001	1995	2001	1995	2001
GREECE	9,9	7,0	6,4	21,43	67,7	71,58
AN. MAKEDONIA - THRAKI	20,8	16,9	10,8	25,01	52,0	58,05
KENTRIKI MAKEDONIA	10,9	6,7	7,3	22,98	64,3	70,34
DYTIKI MAKEDONIA	11,3	12,6	2,1	30,86	51,4	56,54
THESSALIA	21,3	17,5	8,0	20,86	54,7	61,62
IPEIROS	16,6	9,8	5,0	16,14	68,7	74,06
IONIA NISIA	13,2	7,4	2,6	9,74	78,1	82,84
DYTIKI ELLADA	17,4	13,2	7,9	17,95	60,9	68,89
STEREA ELLADA	10,6	9,9	10,9	40,14	41,2	49,91
PELOPONNISOS	21,9	13,8	4,9	27,01	55,5	59,19
ATTIKI	1,3	0,6	5,3	19,49	81,1	79,94
VOREIO AIGAIO	12,4	13,3	14,9	18,10	64,7	68,56
NOTIO AGAIO	7,3	5,7	1,9	7,26	81,9	87,01
KRITI	21,4	10,8	3,7	10,71	67,4	78,45

Greece is a regional country in the EU. Based on the indicator that measures peripherality, in relation to distance, as well as economic potential (in terms of GDP in Purchasing Power Units), all NUTS 2 regions in Greece (all regions are eligible for target 1 actions) range from 85.90 in Attiki (lowest) to 99.56 in Notio Aigaio (highest) – whereby a score of 0 is for the most central region and a score of 100 is for the most secluded and less developed region.

Regional differences in Greece are not as great as in other European countries. At the regional level, there is significant correlation between income level and unemployment. Regions with higher development levels show lower levels of unemployment and have a lower average of long term unemployment (compared to other European regions). At the same time, lesser developed regions (e.g. Dytiki Makedonia and Ipeiros) show high unemployment levels and a high percentage of long term unemployment (long term unemployment, in any case is high in Greece:

In 2002 and 2003 reached 5.1% of the total workforce, 1.8% higher than the EU-15 average) (http://www.innowestmac.gr; MoE&SP, 2004). The high levels of long term unemployment indicate that, at least in some Greek regions, the main issue is not only the increase of jobs but the facilitation of access to the employment market for a large portion of the population (http://www.innowestmac.gr).

As far as entrepreneurial activity is concerned, there are three main characteristics:

- The vast majority of enterprises in Greece are SMEs (97.8), employing 10 or less people and 98% of these SMEs employ less than 5 people.
- There is a high sectoral concentration of activities in the commerce sector, where 44% of Greek enterprises belong.
- A high regional concentration of SMEs exists, with 59% of enterprises having their HQs in the Region of Attiki (and especially in the city of Athens) and 17% of the enterprises having their HQs in the Region of Kentriki Makedonia (mostly in the city of Thessaloniki).

1.2 Spatial trends related to ICT infrastructure and use.

Indicators used
Number of mobile (cellular) phones subscriptions per 100 inh.
Proportion of households with a computer
Proportion of households with internet access at home
Proportion of households with broadband internet access at home
Share of enterprises with internet access
Share of enterprises with own homepage

Table 3 ICT Infrastructure and use in Greece

	National level		
Indicator	**2002**	**2003**	**2004**
ICT infrastructure and use			
Number of mobile (cellular) phones subscriptions per 100 inh.	58.5	64.7	69.4
Number of cable modem subscriptions per 100 inh.	-	-	-
Number of xDSL subscriptions per 100 inh.	-	-	-
Proportion of households with a computer	27.2	30.5	29.9
Proportion of households with internet access at home	12.4	15.2	17.1
Proportion of households with broadband internet access at home	21.7	26.9	26.9
Share of enterprises with internet access	19.6	19.6	28.1
Share of enterprises with own homepage	4.6	5.7	6.7
Share of enterprises receiving orders over Internet	-	-	-

Source: (MoNE & MoI,PA,D) (2001a, 2002a, 2003a, 2004a 2001b, 2002b, 2003b, 2004b)

Table 4 ICT Infrastructure and use indicators at regional level (2002)

NUTS2	Proportion of households with internet access at home	Enterprises with Internet Access	Percentage of Enterprises with Internet Access
ATTIKI	44,9	49111	23,1
KRITI	22,9	4941	18,1
IPEIROS	23,9	3314	26,0
KENTRIKI MAKEDONIA	33	13695	15,8
DYTIKI ELLADA	12	3026	13,8
DYTIKI MAKEDONIA	26,4	1279	11,4
AN. MAKEDONIA - THRAKI	19,9	4516	20,6
PELOPONNISOS	13,5	4584	19,3
STEREA ELLADA	10	3765	18,1
THESSALIA	10	3979	13,6
VOREIO AIGAIO	14,9	2194	26,9
IONIA NISIA	19,2	3319	23,5
NOTIO AGAIO	14,9	3177	16,4

Source: (MoNE & MoI,PA,D) (2002a, 2002b)

ICT infrastructure and use indicators in Greece show an increase in almost every case from 2002 to 2004, with the exception of the percentage of households owning a computer which shows a slight decrease from 2003 to 2004 (however, the margin error of the studies from which the data is derived from is greater than this decrease from 2003 to 2004). Cellular phone subscriptions are high, but all other indicators range at relatively low levels, while their increase for each year is also relatively low.

The number of cellular phone subscriptions per 100 inhabitants is high with a noticeable increase in just two years (from 58.5 in 2002 to 69.4 in 2004). The proportion of households with a computer is less than one third of the total of households and the increase in two years has been less than 3%, even with a slight decrease in 2004. The numbers for households with internet access are even lower, reaching 17.1% with a 4.7% increase from 2002 to 2004.

As far as enterprises are concerned, the proportion of enterprises with internet access has significantly increased from 19.6 in 2002 to 28.1 in 2004, even though there was no noticable increase from 2002 to 2003. The proportion of enterprises with their own homepage, however, has remained at fairly low levels, with an increase less than 2%.

At the regional level, only to sets of data are available: the proportion of (a) households and (b) enterprises with internet access. For the first indicator, the region of Attiki (where the city of Athens is located) is

leading with 44.9%, far above the second region which is Kentriki Makedonia with 33%. The lowest scoring regions are those of Sterea Ellada and Thessalia, both at 10%.

The proportion of enterprises with internet access is higher for most regions with that of Voreio Aigaio taking the lead with 26.9% Ipeiros follows with 26%, while Attiki is at the fourth place with 23.1%. Dytiki Makedonia, which was the third highest ranking region in the first case, is last in relation to this indicator.

1.3 Spatial trends related to ICT sector, R&D activities and education.

Indicators used
R&D expenditure (as part of GDP)
Private R&D expenditure (business R&D expenditure/GDP)
Number of patents (patent applications/million inh. - 1999)
Proportion of population with completed secondary education
Proportion of population with completed tertiary education

Table 5 ICT sector & R&D & Education in Greece

	National			
Indicator	**2001**	**2002**	**2003**	**2004**
ICT sector & R&D & Education				
ICT sector employment, % of total (as defined by OECD)	-	-	-	-
ICT sector value added, % of total (as defined by OECD)	-	-	-	-
R&D expenditure (as part of GDP)	0.65	-	-	-
Private R&D expenditure (business R&D expenditure/GDP)	0.21	-	-	-
R&D personnel and researchers, % of work force	-	-	-	-
Number of patents (patent applications/million inh. - 1999)	7.1	-	-	-
Proportion of population with completed secondary education	43.8	-	-	-
Proportion of population with completed tertiary education	16.4	-	-	-

Source: http://www.innowestmac.gr and www.statistics.gr

Table 6 R&D Indicators at regional level

NUTS2	R&D expenditure as part of GDP (1999)	Regional R&D expenditure breakdown (2001)
ATTIKI	0,97	51,59
KRITI	1,03	9,53
IPEIROS	0,83	2,88
KENTRIKI MAKEDONIA	0,62	18,23
DYTIKI ELLADA	0,89	7,01
DYTIKI MAKEDONIA	0,08	0,62
AN. MAKEDONIA - THRAKI	0,53	3,49
PELOPONNISOS	0,46	1,11
STEREA ELLADA	0,16	1,74
THESSALIA	0,3	1,95
VOREIO AIGAIO	0,24	1
IONIA NISIA	0,13	0,58
NOTIO AGAIO	0,06	0,28

Source: http://www.innowestmac.gr

Data related to this set of indicators is not readily available at the moment, at least not for the time period after 2000-2001. Consequently, it is not possible to determine the evolution of these figures in Greece for the last four years. It is evident, however, that in 2001, Greece lagged behind the rest of the EU. R&D expenditure and private R&D expenditure were considerably lower that the EU average and the patent applications per million inhabitants were 7.1, when the EU average was 129.9.

At regional level, only R&D expenditure data was available. R&D expenditure as part of GDP, in 1999, was fairly low in all Greek regions, with the region of Kriti taking the lead, followed by Attiki, Ipeiros and Dytiki Ellada. The lowest scoring regions are those of Voreio Aigaio, Ionia Nisia and Notio Aigaio. Looking at the regional R&D expenditure breakdown, the region of Attiki (where the city of Athens is located) stands out, as it accounts for more than half (51.59%) of R&D expenditure in Greece. Distant second is the region of Kentriki Makedonia with 18.23%. The regions of Voreio Aigaio, Ionia Nisia and Notio Aigaio account for only 1%, 0.58% and 0.28% of the country's R&D expenditure, respectively.

1.4 Spatial trends in purpose of ICT use.

Indicators used
Percentage of population using the Internet for interacting with public authorities Percentage of population having used the Internet in relation to training and educational purposes Percentage of population using Internet to seek health information whether for themselves or others Percentage of population having ordered/bought goods or services for private use over the Internet in the last three months

Table 7 Purpose of use indicators in Greece

	National		
Indicator	**2002**	**2003**	**2004**
Purpose of use: e-Government etc.			
Percentage of population using the Internet for interacting with public authorities	4.9	6.3	5.7
Percentage of population having used the Internet in relation to training and educational purposes	8	7.2	7.8
Percentage of population using Internet to seek health information whether for themselves or others	1.3	1.4	1.1
Percentage of population having ordered/bought goods or services for private use over the Internet in the last three months	1.6	2.8	2.3

Source: (MoNE & MoI,PA,D) (2001a, 2002a, 2003a, 2004a)

Regarding the indicators that show the purpose of use of the internet in Greece, data is available only at national level, since there is no regional breakdown of the results of the annual studies conducted for this purpose. Table 6 shows an increase in all indicators from 2002 to 2003, except for the use of internet for educational purposes, but a slight decrease is noted from 2003 to 2004. This fact could be explained either by the margin of error of the survey the data is derived from (+/- 1.8), or from the fact that while the number of people with an internet connection has increased, they use the internet for different purposes (e.g. entertainment).

The percentage of population using the internet for health purposes is very low, probably because there is very little related content available in the Greek language. The percentage of population using the internet to buy products/services is also fairly low, a fact that can be connected to the low percentage of Greek companies with their own homepage.

1.5 Conclusions

- State of the IS development on the regional (local) level

Overall expenditure on ICTs is one of the most widely used indicators of IS development. In Greece such expenditure represented about 4% of GDP in 1998, marking a 16% annual increase from 2.4% of GDP in 1992. Despite this increase, expenditure on ICTs (telecommunications, equipment, software, information services, etc.) was still at the lowest level among EU member states in 2000, where the average was about 6% of GDP. Even today, according to the latest data released by EUROSTAT, Greece still holds one of the last positions in almost all IS indicators. This low proportion was also evident in the use of PCs. According to the 1999 figures only 12 out of every 100 inhabitants used a computer, while the corresponding EU average was 31% (only recently PC use in Greece reached 30%). Since 2000, these figures have increased at a limited pace in most cases (MoNE & MoI,PA,D, 2001; http://epp.eurostat.cec.eu.int).

Without doubt, in recent years the range, quality and cost of telecommunications infrastructure and services in Greece have improved considerably. The digitalisation of the network has been completed to more than 95% for urban areas and 85% for the whole of the country, while the quality of services is improving steadily (MoNE & MoI,PA,D, 2001).

The above are, to a high extend, also true at regional level. One should take into account that in the region of Attiki most aspects of the Information Society seem to be more developed.

- Main trends of the IS development in regions in last 4 years (2000-2004)

Since the formulation and implementation of the Operational Programme "Information Society" (OPIS), IS development in Greek regions has accelerated. With a focus on ICT infrastructure development and access facilitation to ICT services, most Greek regions have been steadily improving their performance in IS related areas.

The main trends of regional IS development, according to the regional Operational Plans, are:

- The development of appropriate and adequate infrastructure
- The support of innovation through the use of ICTs
- The integration of ICTs in critical sectors of local economies (e.g. tourism)

- The development of digital content (local content)
- The training and skill improvement of local workforce in areas related to IS

- Main findings (relation to other indicators, e.g. GDP, unemployment, etc.)

The development of the Information Society in Greek regions does not seem to follow a specific pattern. With the exception of the region of Attiki, which scores highly in almost all available regional indicators, there are no regions that systematically perform better or worse.

An attempt to discover correlations with other non IS indicators, such as GDP or unemployment rates, shows that no such correlations exist. IS performance in Greek regions, does not seem to follow economic, employment, or R&D trends. Regions with very low economic performance scores may score high in certain IS indicators, while the opposite is true for regions with high economic performance scores.

One of the major reasons for this phenomenon is the fact that there is a very high concentration of infrastructure, services and activities in the city of Athens and, consequently in the region of Attiki. Other reasons may include the existence of universities in certain regions (which influence ICT use, R&D and the existence of infrastructure), or differences in the economic structure and activities between regions.

It can be observed that the regions of Kriti, Notio Aigaio and Ionia Nisia that show high scores in certain indicators, such as percentage of enterprises with internet access (see table 4), have GVA percentages in the tertiary sector above the country average. This can be attributed to the fact that these regions' economies are heavily dependent on tourism. The other regions which have a higher percentage of the GVA in the tertiary sector are Atttiki and Ipeiros. For Atiiki, which includes Athens, this comes as no surprise. Ipeiros could be considered a special case, because it is a poor region (one of the poorest in EU), but it hosts a large university and the city of Igoumenitsa, which is a gate of the country to Italy (as a tourist waypoint).

- Data availability constrains

While in the last four years national studies regarding IS issues are conducted, these deal mostly with the whole of the country and contain little data for the Greek NUTS 2 regions. Additionally, these

studies are based on population samples and do not measure the total of the population, although they have a low margin of error.

At the regional level, however, no studies or statistics are available. The regional Operational Plans for the Information society that have been developed in recent years, despite the fact that they include an assessment of IS status in the region, provide a limited information, at least in terms of statistical data.

Another problem that exists is that a number of indicators and data sets are not available for every year and some are not available for the years after 2000. Thus, it is difficult to measure progress in time or make comparisons between regions.

2 References

Deniozos, D., 2005. Country Report: Greece, European Trendchart of Innovation". Athens.

Ministry of Development, General Secretariat of Research and Technology (MoD/ GSRT), 2001. "R&D in Greece", Athens.

Ministry of Employment and Social Protection (MoE&SP), 2004. National Action Plan for Employment, Athens.

Ministry of National Economy (MoNE), 1999a, Development Plan 2000 – 2006, Athens.

Ministry of National Economy (MoNE), 1999b, Regional Development Plan 2000 – 2006. Athens.

Ministry of National Economy (MoNE) (forthcoming), Development Plan 2007 – 2013, Athens.

Ministry of National Economy and Ministry of Interior, Public Administration and Decentralisation (MoNE & MoI,PA,D), 2001. Operational Programme Information Society (OPIS), Athens.

Ministry of National Economy and Ministry of Interior, Public Administration and Decentralisation, General Secretariat of Information Society (MoNE & MoI,PA,D), 2002. Strategy Document for the Information Society (White Book for the Information Society), Athens.

Ministry of National Economy and Ministry of Interior, Public Administration and Decentralisation (MoNE & MoI,PA,D) (forthcoming), "Digital Strategy 2007 – 2013", Operational Programme Information Society, Athens.

Ministry of National Economy and Ministry of Interior, Public Administration and Decentralisation (MoNE & MoI,PA,D), 2001a, 2002a, 2003a, 2004a, National Survey for New Technologies and IS, Athens.

Ministry of National Economy and Ministry of Interior, Public Administration and Decentralisation (MoNE & MoI,PA,D), 2001b, 2002b, 2003b, 2004b. Survey for the Use of ICTs by SMEs, Athens.

Ministry of National Economy and Ministry of Interior, Public Administration and Decentralisation (MoNE & MoI,PA,D),2002, 2003. Annual Implementation Report for OPIS, Athens.

www.statistics.gr, National Statistical Agency of Greece (site active in January 2006).

www.infosoc.gr, Operational Programme "Information Society" (site active in January 2006).

www.oke.gr, Economic and Social Council of Greece (site active in January 2006).

http://epp.eurostat.cec.eu.int, EUROSTAT (site active in January 2006).

http://www.ebusinessforum.gr, E-businness Forum (site active in January 2006).

www.gsrt.gr, General Secretariat for Research and Technology (site active in January 2006).

www.edet.gr, Greek Research and Technology Network (GRNET) (site active in January 2006).

http://www.innowestmac.gr, Innovation Observatory of Western Macedonia (site active in January 2006).

http://www.observatory.gr, Observatory for the Information Society (site active in January 2006).

ESPON project 1.2.3

Second Interim Report
Appendix VIII

Country case study -Hungary
(first part)

Institution	Person responsible	e-mail, telephone
IE HAS	Károly Fazekas, Pál Valentiny	fazekas@econ.core.hu valentin@econ.core.hu

Co-financed by the European Community through the Interreg III ESPON Programme

Table of contents

Figures

Tables

1 Description of IS state and trends on regional level

1.1 General information about the regional development

In Hungary – like in other East-Central European countries – the regional disparities regarding the development standards of information society are in line with the basic characteristics of regional differences determined by the standard of general economic development. In all the countries examined, the present situation is rooted in the planned economy of the socialist era with the practice of creating regional equality in an artificial way. The regional convergence of Hungary before 1990 and that of the traditional market economies differed mainly in the economic sector dominating the process. In the modern market economies regional convergence has been based on the expansion of the tertiary sector, while in the socialist period the present new market economies saw the clue to more balanced regional development in the primary and secondary sectors rather than the infrastructure and services. The relative regional balance was based on the over-subsidization of production sector (heavy industry), mass production, regionally levelled wages and incomes – all financed at the expense of international indebtedness in many countries. The change of system meant more than returning to the constitutional state and the market economy but also to the market-based trends generating regional disparities unavoidably concomitant to the changes. Just by the reason of the previous relative balance, in all the countries concerned the change of system was coupled with an increase in disparities regarding regional development and income.

The major directions of regional development in today's Hungary are influenced by the new structures, new economic and social institutions and actors established after the change of system. However, so far the mechanisms of globalisation (which assess the network of connections and human resources on an international scale) the problems arising with the establishment of information systems and the protection of environment seem to have had more substantial impact on the development potentials. Deviations from the previous spatial structure as well as the recent processes are detectable by the analyses of the GDP regional index, which is internationally widely used for analysing development standards (see Table 1).

Table 1 Regional economic disparities in Hungary, 1975–2003. GDP per capita, Hungary = 100)

counties (NUTS3) regions (NUTS2),	1975	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Budapest	139	182	183	189	191	191	196	203	204	212	208
Pest	61	76	72	73	77	77	80	78	83	88	89
Central Hungarian Region	114	147	146	148	151	150	154	156	158	164	163
Fejér	106	96	99	103	117	124	114	119	103	94	95
Komárom-Esztergom	131	80	86	89	86	84	83	84	92	93	105
Veszprém	116	80	84	81	80	81	80	84	84	79	79
Central Transdanubia	117	86	91	92	96	98	94	97	93	89	92
Győr-Moson-Sopron	111	103	109	110	109	121	131	134	120	118	120
Vas	82	103	107	109	114	117	118	114	100	99	105
Zala	88	94	92	93	91	90	90	84	85	87	92
Western-Transdanubia	96	101	103	105	110	110	115	114	104	103	108
Baranya	108	84	80	78	80	79	78	76	76	74	75
Somogy	71	76	76	75	70	69	69	67	69	68	68
Tolna	77	94	92	91	84	86	89	81	84	78	72
Southern-Transdanubia	88	84	82	80	78	77	78	74	75	73	71
Borsod-Abaúj-Zemplén	111	70	76	71	69	69	67	64	64	62	63
Heves	100	73	74	74	72	73	72	71	75	73	73
Nógrád	77	62	59	57	53	57	55	54	56	55	54
North-Hungarian Region	102	70	73	69	67	68	66	64	66	64	64
Hajdú-Bihar	83	83	78	78	76	76	72	71	74	73	75
Jász-Nagykun-Szolnok	93	79	77	76	75	72	67	66	69	68	66
Szabolcs-Szatmár-Bereg	59	62	61	59	58	57	55	53	57	54	55
North-Plain Region	77	74	71	70	69	68	64	63	66	64	65
Bács-Kiskun	79	77	79	76	73	71	70	66	69	68	66
Békés	89	80	78	76	72	69	68	66	66	62	61
Csongrád	109	94	93	93	90	89	86	82	81	77	77
South-Plain Region	91	83	83	81	78	76	75	71	72	69	68
Rate of maximum/minimum values	2,36	2,94	3,1	3,32	3,6	3,35	3,56	3,83	3,64	3,93	3,85
Rate of maximum and minimum values without Budapest	2,22	1,66	1,85	1,93	2,21	2,18	2,38	2,53	2,14	2,19	2,22

Source*:* 1975: estimated by József Nemes Nagy; 1994–2003: CSO. The maiximum value of each area is underlined.

The major conclusions of the analyses are:

Constancy i.e. the presence of factors steadily generating disparities, as well as the striking changes in position equally characterise the regional processes and the regional structure of Hungary. The first characteristic is best exemplified by the marked duality between the capital city and the rest of the country, and the steady relative backwardness of the Great Plain area. The second is represented by depressive development paths related to the transformation of industry and also spectacular sudden advances. (Indicative of the relative stability of regional structure the value of correlation coefficient calculated for the GDP/capita of counties of 1975 and 2002 is 0,58 – the same index disregarding the capital city is 0,38).

The new, partially modified, more fragmented spatial structure had fully developed by the middle of the 1990s. Since then only negligible fluctuation has been found in the major figures (analogous with the figures above the values of correlation for 1994 and 2002 are extremely high: 0,95 and 0,81).

While the basic trend in the relation of the capital city and the country is divergence, the relations within the country (Budapest disregarded) are characterised with downward levelling as well as returning waves of differentiation (see the maximum and minimum rates in Table 1.). The capital city is the one and only regional unit, which kept increasing its relative advantage during the whole examined period. Its negative counterparts are Borsod-Abaúj-Zemplén, Békés and Csongrád counties, which to date – for various reasons – have got more and more relegated to the background. Recently the country started to show growing instability i.e. in some of the western counties dynamics seems to have broken. The most typical example is Fejér county, but similar sings have appeared in the development path of Győr-Moson-Sopron és Vas counties.

The standard of economic development in more than half of the counties (in 11 counties) was closer to the national average in the "blooming era of socialism" than today. Today, it is only Budapest and Pest county (inseparable from the capital city) that occupy the relative prime position. The position of the re-industrialised western counties mentioned above was the best between 1998 and 2000. Counties of the South-Transdanubian Region showed the signs of stability until the middle of the 1990s but recently have been left without resources essential for growth.

The first part of the transition period was ruled by the crisis symptoms concomitant to the deconstruction of the structures of the previous system. The economic statistical information available for the first couple of years - following the change of socio-economic system – suggest growing instability in economy. In this early period (until 1993-1994) of transition the regional processes could be characterised with the unequal

spatial appearance of crisis phenomena (such as a general decrease in income, drastic fall in investments and unemployment). By now these crisis factors – in a more moderate intensity – have started to show an even distribution in the country, while regarding the most critical crisis areas they remained more fixed in space. Since the middle of the 1990s the mainly macro economic signs of renewal have appeared, which seem to be the clue to local and regional success.

The transition period was not only coupled with regional rearrangement but reformulated the major underlying structure of regional disparities. While before the change of system regional differences appeared with respect to the standard of general infrastructure, the availability of public services by now the inequalities of income and employment became the dominant factors of regional disparities. This structurally new regional arrangement is a common characteristic of the East-Central European region in transformation.

In contrast with the major positional changes having taken place in the first part of the 1990s, Hungary after the turn of the new century is more dominated by stability in the spatial structure, yet the development prospects of a number of counties and regions are still uncertain and vulnerable. In this apparent stability the continuous presence of three basic spatial characteristics can be discovered.

The first and the most deeply rooted among these is the economic, social and cultural gap between the capital city and the rest of the country. In Hungary there is no another region or town which would show such high standard of development as Budapest does. Besides being the prime power centre of Hungary Budapest also stands out as a water head in an economic and demographic sense. Its economic potential reaches far over the borders of the country and it gradually grows into a regional centre of Central Europe. With immense power does the city attract the impulses necessary for development: financial capital, highly educated human capital. It also provides the prospect of a relatively higher profit and standard of living. 60% of the foreign capital investments has been realised in Budapest. The city offers the best employment possibilities in the country and the wages are also the highest here. As a consequence of sub-urbanisation the socio-economic role has greatly exceeded the administrative borders of Budapest by now. In the surroundings of the capital city the villages develop into towns and small settlements start to upgrade rapidly.

The second fundamental spatial characteristic is the west-east duality which cuts the country into two in almost all respects. This phenomenon perceptible most intensely in economy dates back far to the past centuries, the transitional era following the socio-economic turn only exacerbated the already existing differences. Today the most essential

resource of the regions is location, the geographical position i.e. the capital flow carrying the potential of modernity as well as innovation has upgraded the western Hungarian regions located the closest to the sources of these inputs. Other factor of the Western regions' becoming a target area of capital and innovation is that the economy had not been based on the completely bankrupted heavy industry. Besides, the people's working culture, entrepreneurial activity and adaptability to innovation totally differ from the characteristics of people living in the east of the country. The Great Plain has remained an agricultural area, only few urban centres managed to change for a more modern image. The North-Hungarian Region has not been able to recover from the shock caused by the collapse of the unilateral economy based exclusively on heavy industry, which is well indicated by the extremely high unemployment rates of Borsod-Abaúj-Zemplén and Nógrád counties (see Table 2).

Table 2 The annual average rate of registered unemployment for counties (%)

Counties	1990	1993	1996	1999	2002	2003
Budapest	0,1	6,6	5,7	3,7	2,2	2,4
Baranya	1,1	13,2	12,2	11,6	11,2	11,9
Bács-Kiskun	1,1	16,0	10,9	10,0	8,8	9,4
Békés	1,1	16,3	14,0	13,0	11,2	11,5
Borsod-Abaúj-Zemplén	2,3	20,2	18,0	19,5	19,1	19,6
Csongrád	1,0	11,7	9,3	8,5	8,1	8,5
Fejér	1,0	12,5	10,4	8,3	6,4	7,1
Győr-Moson-Sopron	0,5	8,2	7,4	4,8	4,0	4,1
Hajdú-Bihar	0,9	16,6	15,6	15,6	12,8	13,1
Heves	1,6	15,2	13,6	12,3	9,8	10,0
Jász-Nagykun-Szolnok	1,6	17,1	14,8	13,7	10,2	10,7
Komárom-Esztergom	1,0	14,4	12,0	10,1	6,7	6,0
Nógrád	2,4	21,3	17,0	16,2	13,8	14,6
Pest	0,5	11,0	7,8	6,0	3,7	3,7
Somogy	1,4	11,6	12,5	12,2	11,5	12,2
Szabolcs-Szatmár-Bereg	2,6	20,6	19,7	18,7	16,7	17,7
Tolna	1,6	14,7	13,4	12,9	10,0	10,7
Vas	0,4	9,1	7,2	5,6	4,5	5,0
Veszprém	0,9	11,9	9,9	8,2	6,6	7,0
Zala	0,8	10,3	9,8	7,7	6,4	7,0
National average	1,0	12,9	11,0	9,7	8,0	8,3
Maximum/minimum	26,0	3,2	3,5	5,3	8,7	8,2

Source: National Employment Office.

The third characteristic is the rural-urban duality palpable in all the regions. It simply means that the settlements with larger population are in better economic position than the less populous ones.

1.2 State and trends related to IS technical definition

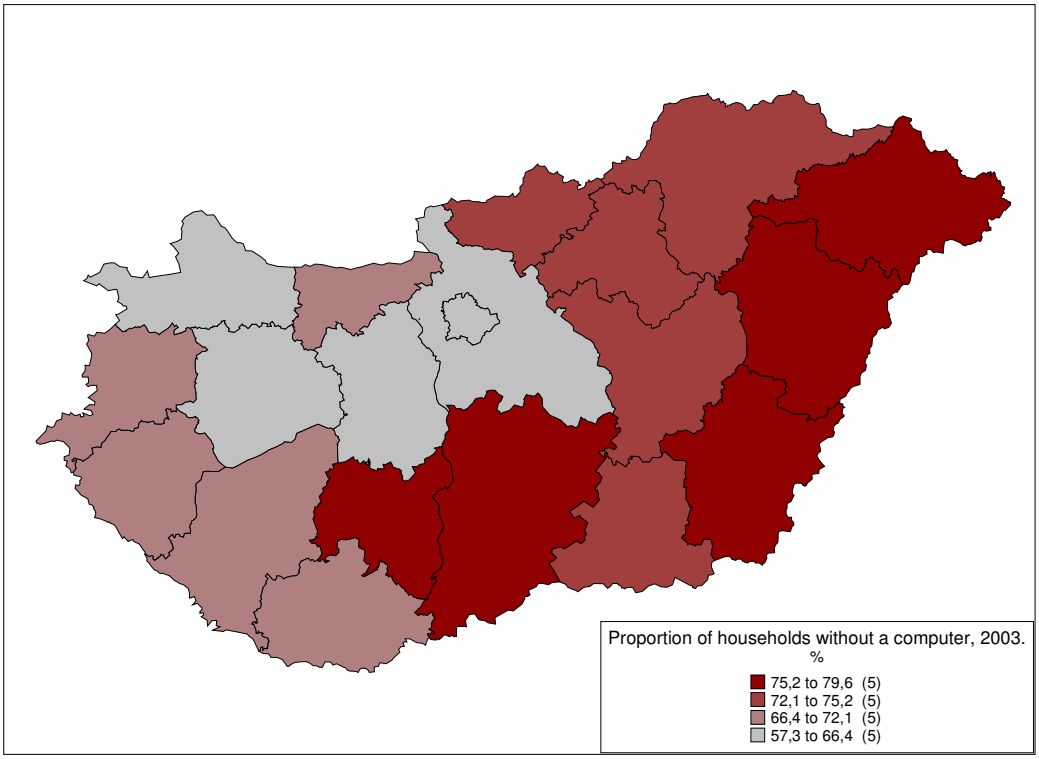
Number of mobile (cellular) phones subscriptions per 100 inh.
Number of cable modem subscriptions per 100 inh.
Number of xDSL subscriptions per 100 inh.
Proportion of households with a computer
Proportion of households with internet access at home
Proportion of households with broadband internet access at home
Share of enterprises with internet access
Share of enterprises with own homepage
Share of enterprises receiving orders over Internet

There are only few types of data available on the regional differences regarding the spatial distribution of info-communication equipment. What is available is the product of estimations based on sampling and not on full scale data provision. Consequently, in the case of Hungary from among the indicators best characterising IS we can only analyse the degree of computer-supply and use as well as the Internet- use of households and enterprises with more than 10 employees.

According to the data less than one-third of the households have a computer, therefore in Hungary it is still more typical that the families do not have a PC of their own.

The national indicators analysed hide considerable regional inequalities (Figure 1.).

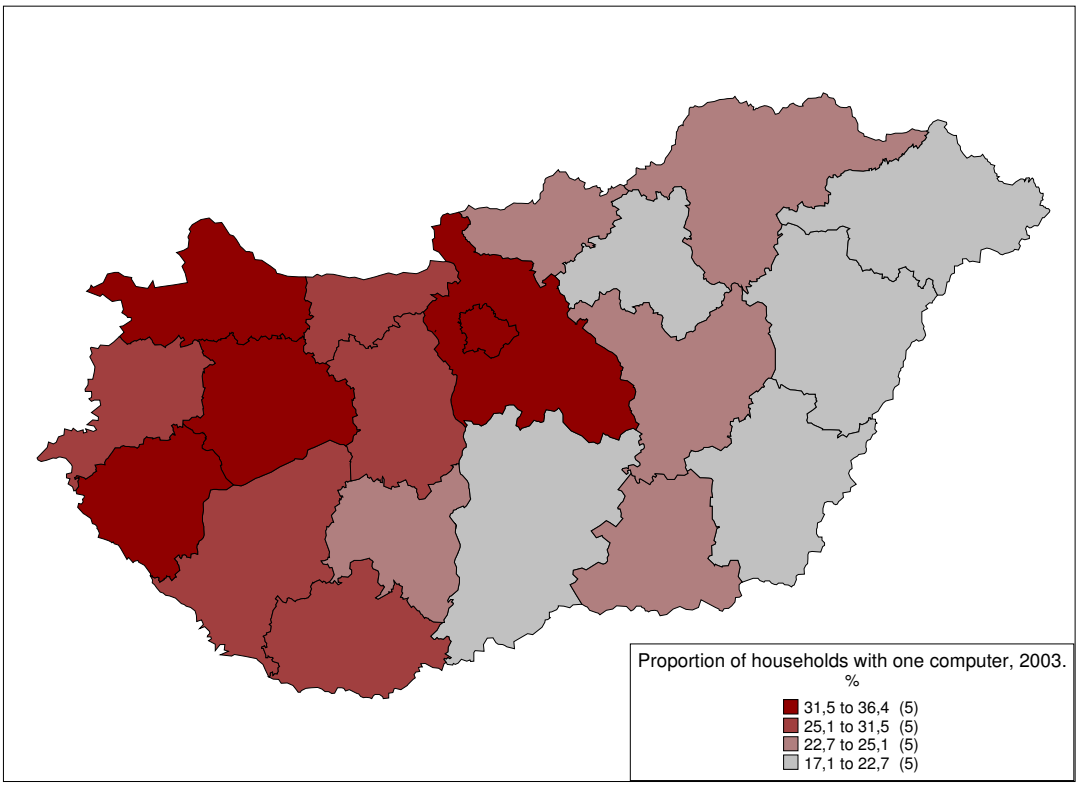
Figure 1 Proportion of households without a computer, 2003.



Source of data: Az Információs Társadalom helyzete Magyarországon 2003. végén. Version 1.0. *Magyar Információs Társadalom Stratégia és Monitoring jelentések.* No. 33. p. 315.

The households in the possession of a PC have higher representation in the economically more advanced counties and regions, in the capital city and its environs as well as in the Central and Western Transdanubian Regions. In Transdanubia from among the NUTS III. level regional units (the counties) only the agrarian-type Tolna county – with no real centre – has a lower then average value for this indicator (Figure 2.).

Figure 2 Proportion of households with one computer, 2003.

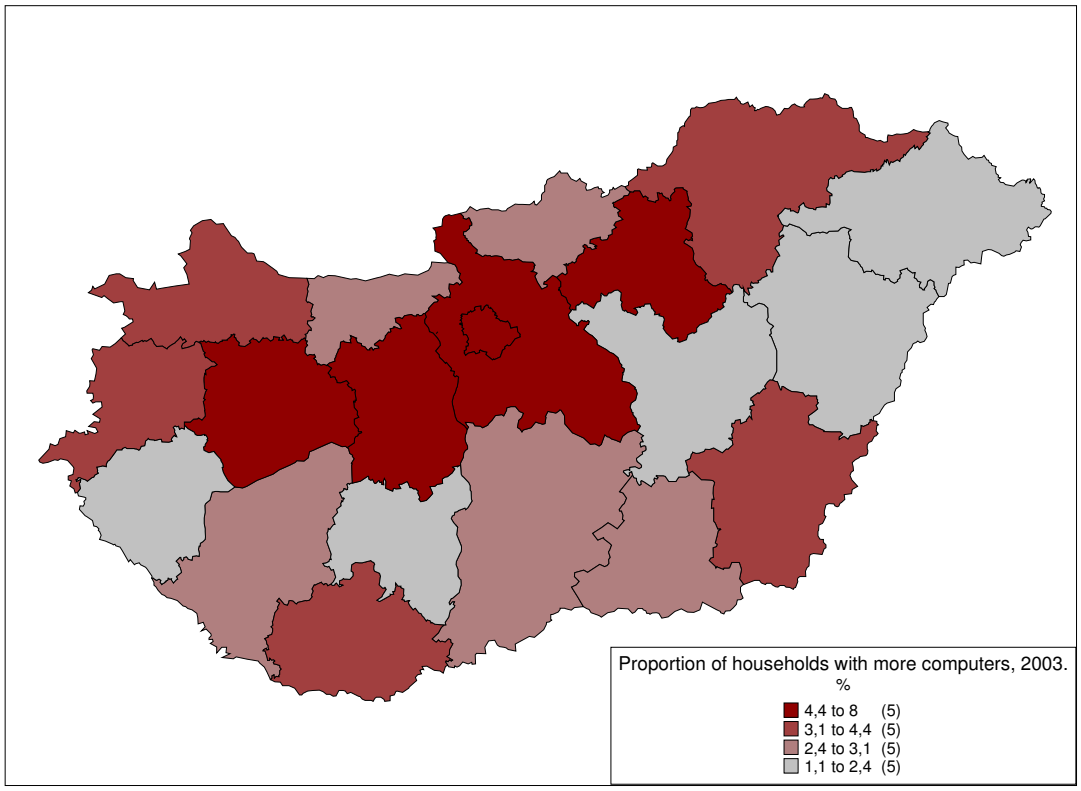


Source of data: Az Információs Társadalom helyzete Magyarországon 2003. végén. Version 1.0. *Magyar Információs Társadalom Stratégia és Monitoring jelentések.* No. 33. p. 315.

Regarding its economic character the county has more in common with the South-Plain region, its economic productivity and achievements are greatly improved by the Nuclear Power Plant of Paks. Examining the computer-supply of households in the light of economic development, we found marked connection in the variables. In general it can be stated that in Hungary it is still the question of financial conditions to equip the household with a PC or a notebook. It is more complicated to find the logic in the spatial arrangement of the households with more than one computer. In this case the per capita GDP indicator serves with weaker explanatory force for the regional differences especially if Budapest – as a "point" in extremely good situation – is removed from the examination. As the data set suggests, the highest rate of households with more than one

computer can be found in the Central-Hungarian Region, which supports the theory of development-dependency. However, there are a few counties (Békés and Heves), where in spite of the modest economic achievements and degree of computer-supply the rate of households with more than one computer is around the national average (Figure 3.).

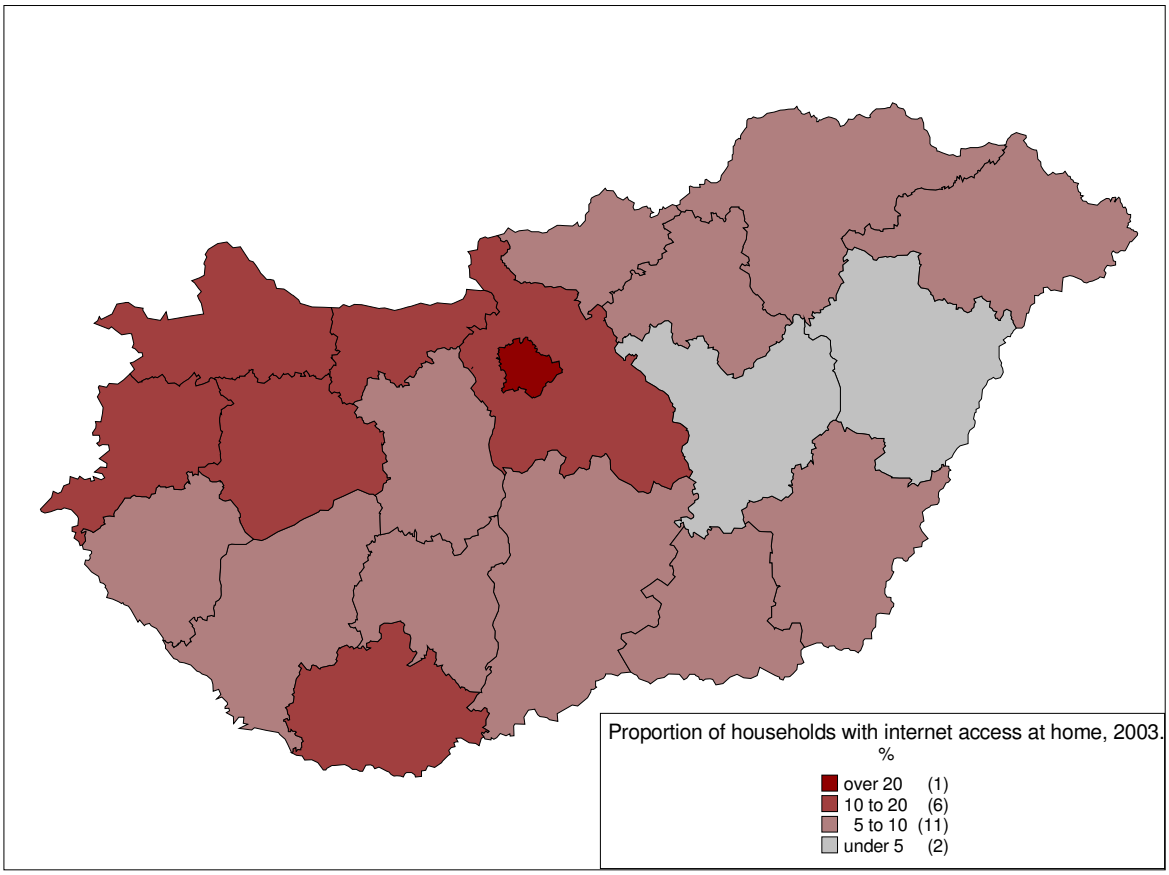
Figure 3 Proportion of households with more computers, 2003.



Source of data: Az Információs Társadalom helyzete Magyarországon 2003. végén. Version 1.0. *Magyar Információs Társadalom Stratégia és Monitoring jelentések.* No. 33. p. 315.

It possibly means that even in the less developed areas there is a social stratum which by its financial situation can afford and is in need of the everyday use of computers and – by all means in relation with availability of proper equipment – the Internet. In 2003 18% of the households had access to Internet. The regional disparities in this regard also seem to be explained by economic productivity, nevertheless, besides the financial possibilities many other factors influence the density of households with Internet connection. In this respect too the Central Hungarian Region is in the best situation, while it is followed by Transdanubia and the Northern-Hungarian Region and finally the Great Plain (Figure 4.).

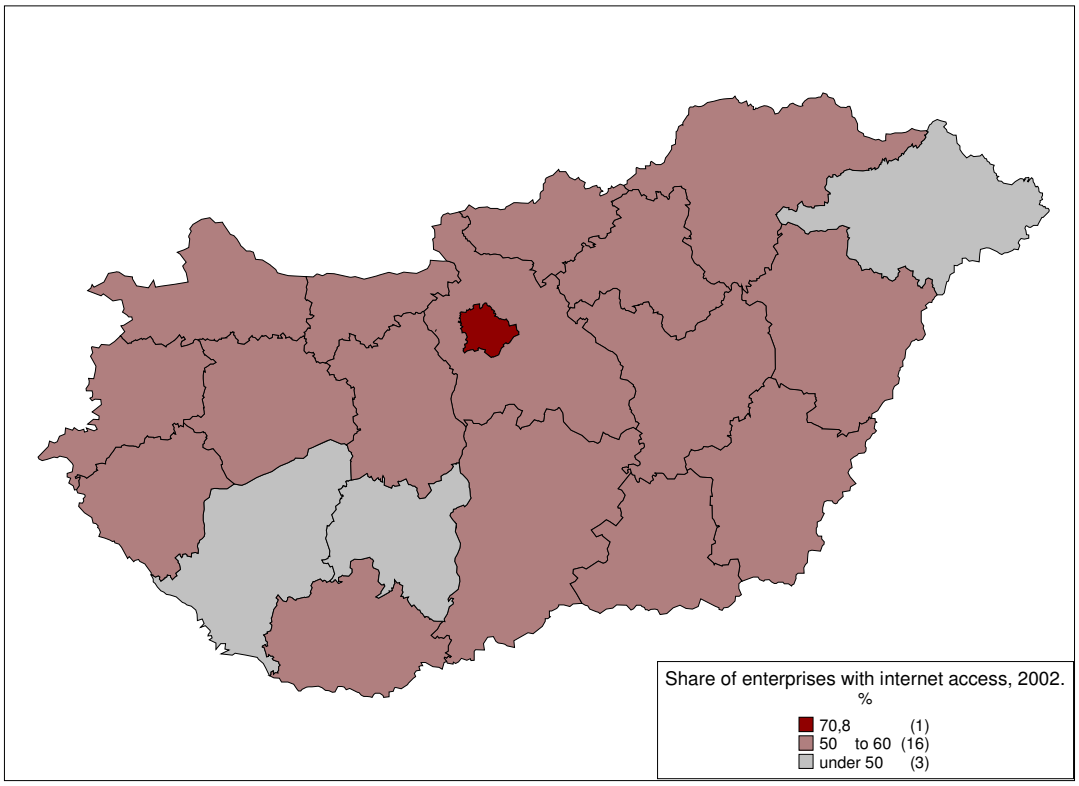
Figure 4 Proportion of households with internet access at home, 2003.



Source of data: Az Információs Társadalom helyzete Magyarországon 2003. végén. Version 1.0. *Magyar Információs Társadalom Stratégia és Monitoring jelentések.* No. 33. p. 318.

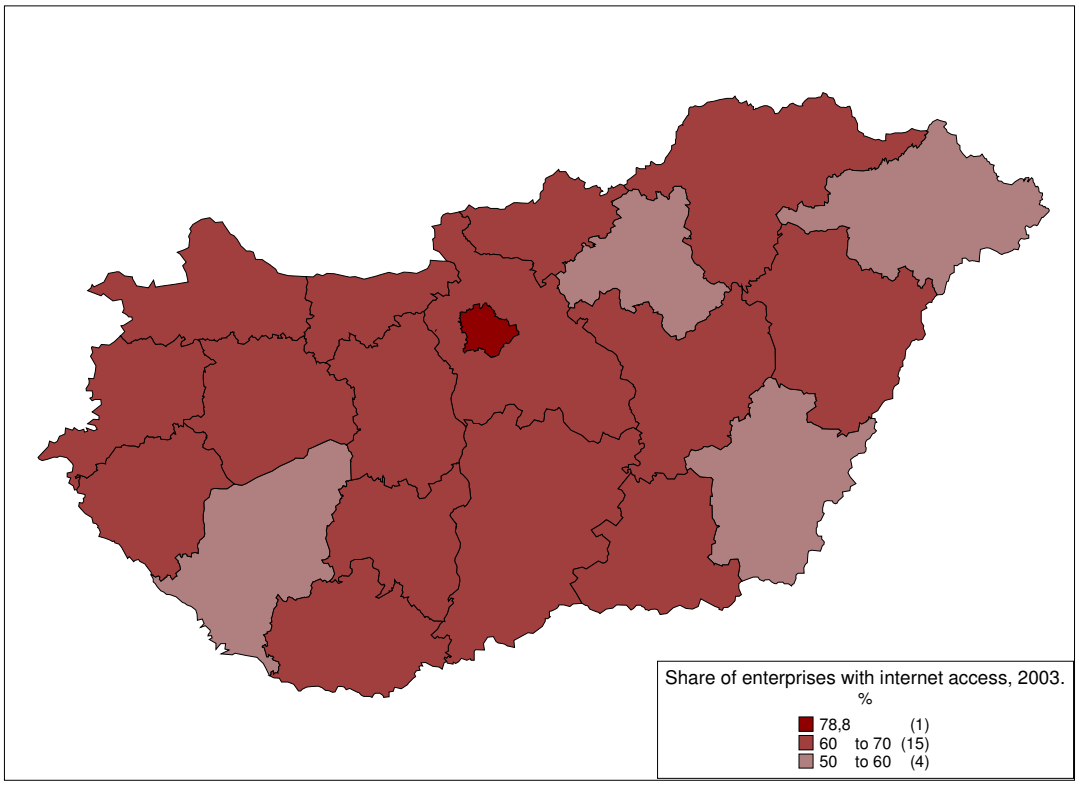
It is also possible to measure the rate of enterprises with more than 10 employees which use computer, Internet and have their own web sites. Using computers for work has become a general phenomenon: in 2003 the national average was 85% in this respect. The regional differences are negligible, only the undertakings of the capital city stand markedly out from among the other regions. In the use of Internet the deviation in the regional data is more considerable. Between 2002-2003 a significant leap forward could be experienced in this regard. In the last year two-thirds of the enterprises used Internet regularly in their work. Our Figures indicate a steady development: using identical legends for both dates every county and region managed to get one category higher (Figure 5. and 6.).

Figure 5 Share of enterprises with internet access, 2002.



Source of data: Információs és kommunikációs eszközök állománya és felhasználása a gazdasági szervezeteknél, 2003. Hungarian Central Statistical Office. Budapest. 2005. p. 27.

Figure 6 Share of enterprises with internet access, 2003.

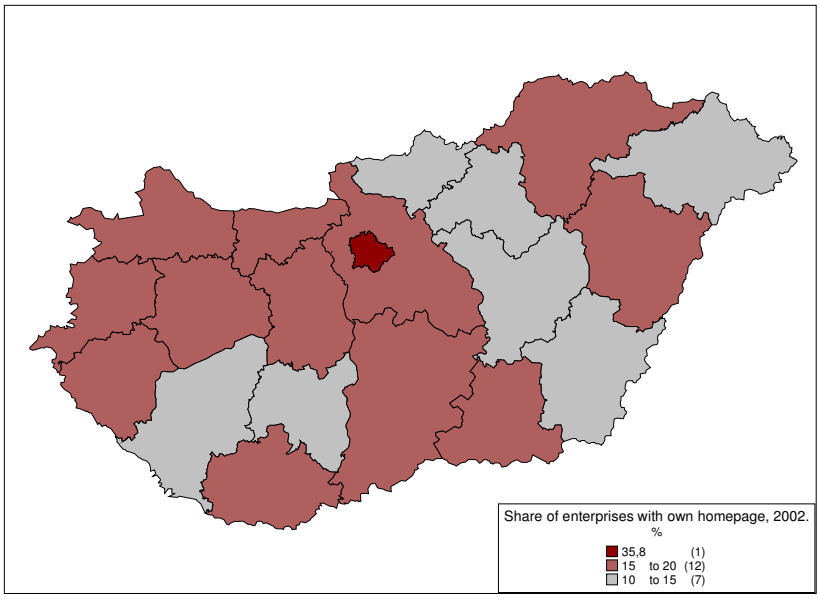


Source of data: Információs és kommunikációs eszközök állománya és felhasználása a gazdasági szervezeteknél, 2003. Hungarian Central Statistical Office. Budapest. 2005. p. 27.

The relationship between the regional distribution if internet use by enterprises and the regional pattern of development is also obvious here, although the capital city – in Hungarian relation – in this case also has a significantly good position.

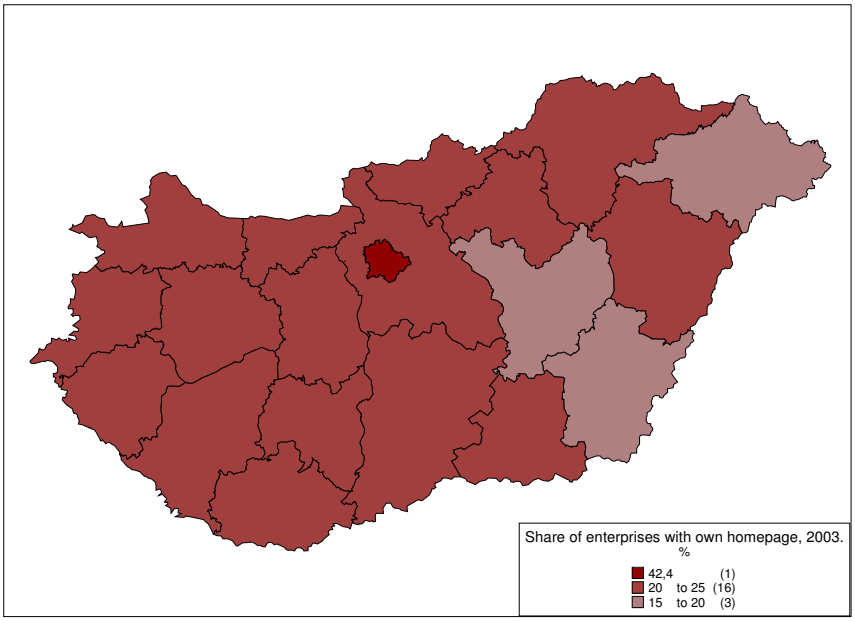
Considerable development occurred in launching company web sites between 2002 and 2003: the rate of enterprises with their own web site was nearly 30% in the last year. The companies of Budapest are in a completely different dimension from what can be experienced in the other counties. Within the country (without Budapest) there are no marked differences, very modest regional disparities can be measured. Only few counties of the Great Plain in peripheral situation lag behind a bit from the national trend (Figure 7. and 8.).

Figure 7 Share of enterprises with own homepage, 2002.



Source of data: Információs és kommunikációs eszközök állománya és felhasználása a gazdasági szervezeteknél, 2003. Hungarian Central Statistical Office. Budapest. 2005. p. 27.

Figure 8 Share of enterprises with own homepage, 2003.



Source of data: Információs és kommunikációs eszközök állománya és felhasználása a gazdasági szervezeteknél, 2003. Hungarian Central Statistical Office. Budapest. 2005. p. 27.

Table 3	The computer-supply of households			Access of households to Internet		Computer users		Internet users		With a web site of their own	
	2003. (%)			2003. (%)		rate of enterprises with more than 10 employees (%)					
	0	1	more	yes	no	2002	2003	2002	2003	2002	2003
Budapest	57,3	34,7	8,0	23,7	76,3	85,9	90,1	70,8	78,8	35,8	42,4
Baranya	71,0	25,1	3,9	10,4	89,6	82,3	84,1	53,1	63,1	16,3	23,2
Bács-Kiskun	75,5	21,6	2,9	7,2	92,8	82,5	84,5	52,6	61,9	16,6	22,2
Békés	79,6	17,1	3,3	5,9	94,1	80,5	82,4	50,4	58,6	11,5	18,1
Borsod-Abaúj-Zemplén	72,7	24,2	3,1	8,0	92,0	81,8	82,9	53,4	61,1	16,2	22,0
Csongrád	74,4	23,0	2,6	7,9	92,1	80,8	83,6	53,7	62,6	17,4	24,1
Fejér	64,9	30,6	4,5	8,2	91,8	82,3	83,2	55,3	62,4	17,8	23,7
Győr-Moson-Sopron	59,8	36,0	4,2	15,9	84,1	81,2	83,8	54,4	63,3	17,9	24,7
Hajdú-Bihar	78,7	19,1	2,2	4,2	95,8	82,3	84,4	51,2	61,0	15,3	21,2
Heves	72,1	22,6	5,3	8,2	91,8	80,5	82,2	51,3	59,8	13,3	20,2
Komárom-Esztergom	71,0	26,3	2,7	11,4	88,6	85,6	84,8	58,0	64,3	18,6	24,9
Nógrád	74,9	22,7	2,4	6,5	93,5	83,6	83,1	54,7	63,1	13,3	21,3
Pest	61,8	32,0	6,2	17,1	82,9	80,4	84,0	54,7	63,4	18,2	23,6
Somogy	69,2	28,0	2,8	8,8	91,2	78,9	83,2	47,4	59,3	14,9	21,9
Szabolcs-Szatmár-Bereg	78,4	19,8	1,8	6,6	93,4	80,6	83,4	49,3	59,1	13,1	19,4
Jász-Nagykun-Szolnok	74,9	24,0	1,1	4,8	95,2	81,1	85,1	51,2	63,0	14,1	19,9
Tolna	75,2	23,1	1,7	6,1	93,9	83,0	83,8	49,3	61,6	10,2	20,0
Vas	69,4	26,8	3,8	10,3	89,7	81,3	83,4	53,4	62,9	15,2	21,8
Veszprém	59,2	36,4	4,4	13,6	86,4	80,0	83,3	52,9	62,4	17,2	24,6
Zala	66,4	31,5	2,1	9,0	91,0	83,4	84,3	53,9	63,0	16,5	22,3
Central-Hungarian Region	58,5	34,0	7,5	21,9	78,1	84,5	88,6	66,8	47,2	31,4	33,6
Central-Transdanubian Region	65,4	30,8	3,8	10,9	89,1	82,4	83,7	55,2	34,6	17,8	20,4
Western-Transdanubian Region	64,5	31,9	3,6	12,5	87,5	81,9	83,8	54,0	34,5	16,8	19,5
Southern-Transdanubian Region	71,4	25,4	3,1	9,1	90,9	81,4	83,7	50,3	31,6	14,3	18,4
North-Hungarian Region	73,1	23,5	3,4	7,7	92,3	81,7	82,7	53,0	33,2	14,8	17,7
North-Plain Region	77,6	20,7	1,8	5,2	94,8	81,4	84,3	50,6	30,2	14,2	17,1
South-Plain Region	76,3	20,8	2,9	7,1	92,9	81,4	83,7	52,4	32,6	15,5	18,2

1.3 State and trends related to IS economical definition.

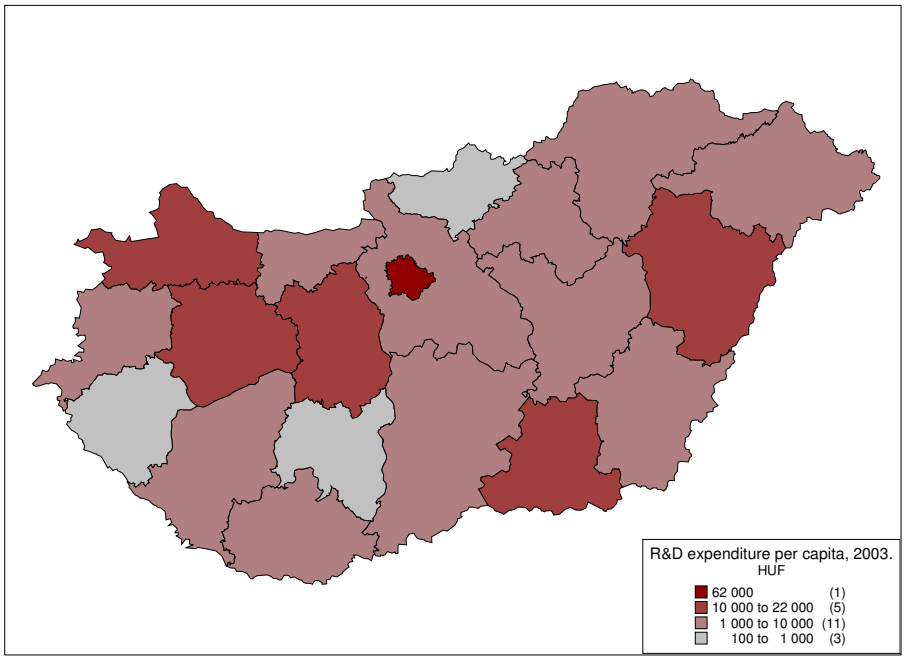
ICT sector employment, % of total (as defined by OECD)
ICT sector value added, % of total (as defined by OECD)
R&D expenditure
Private R&D expenditure
R&D personnel and researchers, % of work force
Number of patents
Proportion of population with completed secondary education
Proportion of population with completed tertiary education

In this research field we managed to compile a wide regional data base about the role of the ICT sector in the structure of employment, the magnitude of R&D, the number of inventions and patents, furthermore about the educational level of the population. The ICT sector comprises two branches: high technology manufacturing and knowledge-intensive high-technology services. In both respects the Central Hungarian Region has the leading position in the country. This region is characterised with the highest representation of companies and capital investments connected to high technology manufacturing, furthermore one third of the employees involved in the branch can be found in this region.

The location of the knowledge-intensive high-technology services is even more concentrated: two-thirds of the companies, 90% of the capital and the employees of the branch is condensed in Budapest and Pest county, with the dominance of the capital city even within the Central Hungarian Region. Besides the high degree of concentration the other six regions show a relatively balanced internal structure with a little better position of the regions with universities of arts and sciences.

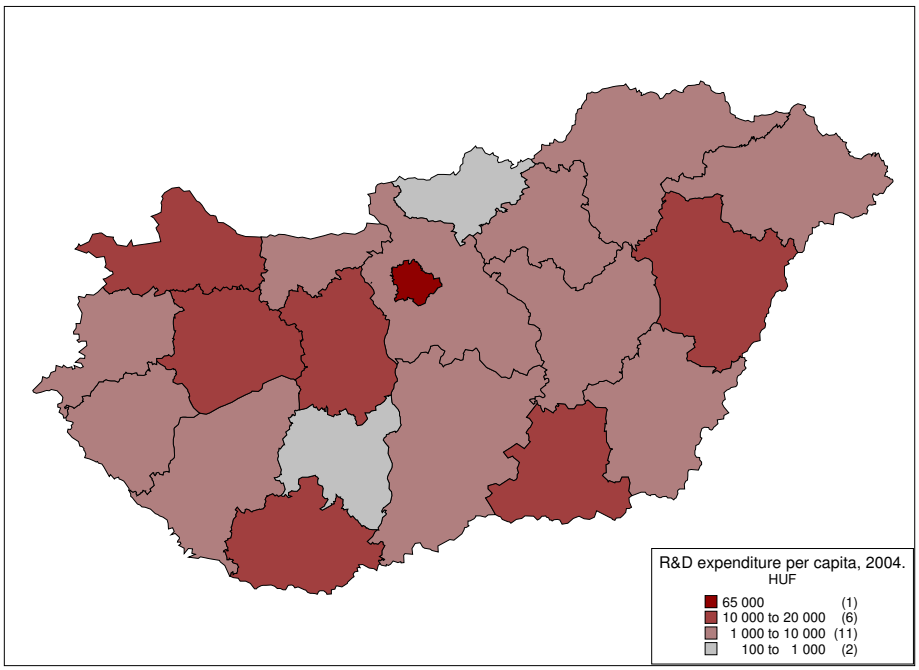
The regional disparities regarding R&D expenditures can be described through two basic characteristics. The most striking is the prime position of the capital city. In both 2003 and 2004 the R&D expenditures realised in the 19 counties reached only 58% what was used by the sector in Budapest. To put it in another way: in both examined years 63% of the total R&D expenditures in Hungary was realised in the capital city. The regional differences within the country (without Budapest) are minimal and their relationship with the regional development pattern is totally insignificant (Figure 9. and 10.).

Figure 9 R&D expenditure per capita, 2003.



Source of data: Research and development 2003. Hungarian Central Statistical Office. Budapest. 2004. p. 110.

Figure 10 R&D expenditure per capita, 2004.



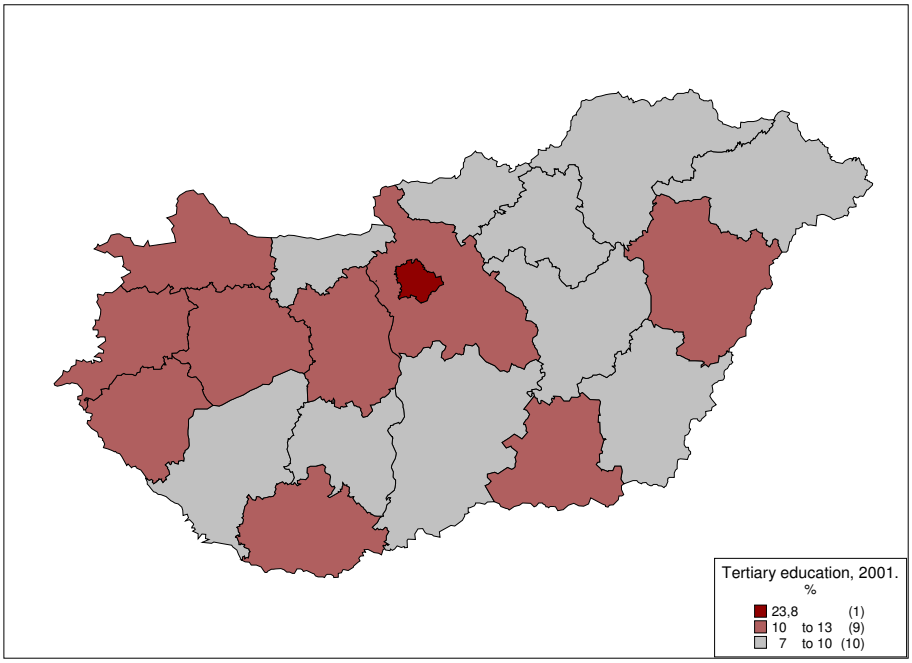
Source of data: Research and development 2004. Hungarian Central Statistical Office. Budapest. 2005. p. 109.

Concerning the country without the capital city the general experience is that those counties have a relatively stronger R&D sector, which have a university of sciences. That is why Baranya, Csongrád and Hajdú-Bihar

counties are in relatively better position, with the universities of Pécs, Szeged and Debrecen respectively. Due to the synergy of the universities these county centres boast a number of research institutes too. Another group of counties also in relatively favourable position is located in the Central and Western Transdanubian Region. These counties also have two larger universities, a number of collages and research institutes furthermore they serve as scenes of such economic activities that finance R&D. In close connection with the spatial distribution of universities the inventions and patents show similar regional arrangement.

Regarding the regional disparities in the education level of people it is essential to see that the spatial structure is fairly stabile: the value of the linear correlation coefficient between 1990 and 2001 (the years of last two enumerations) calculated for the uneducated (the rate of people having completed 0 grades from among the population over the age of 10) it is 0.84. The same indicator for the people with higher educational diploma is 96 (!), which means an even more moderate shift. The regional pattern of these two factors differ from each other greatly. While the uneducated are concentrated in South-Transdanubia as well as the eastern and the north-eastern parts of the country, the situation is much more favourable in this regard in the northern and western parts of Transdanubia and in certain parts in the south of the Great Plain. By contrast, the high and low rate of people with higher educational diploma do not show such regional regularities (Figure 11.).

Figure 11 Proportion of population with completed tertiary education, 2001.

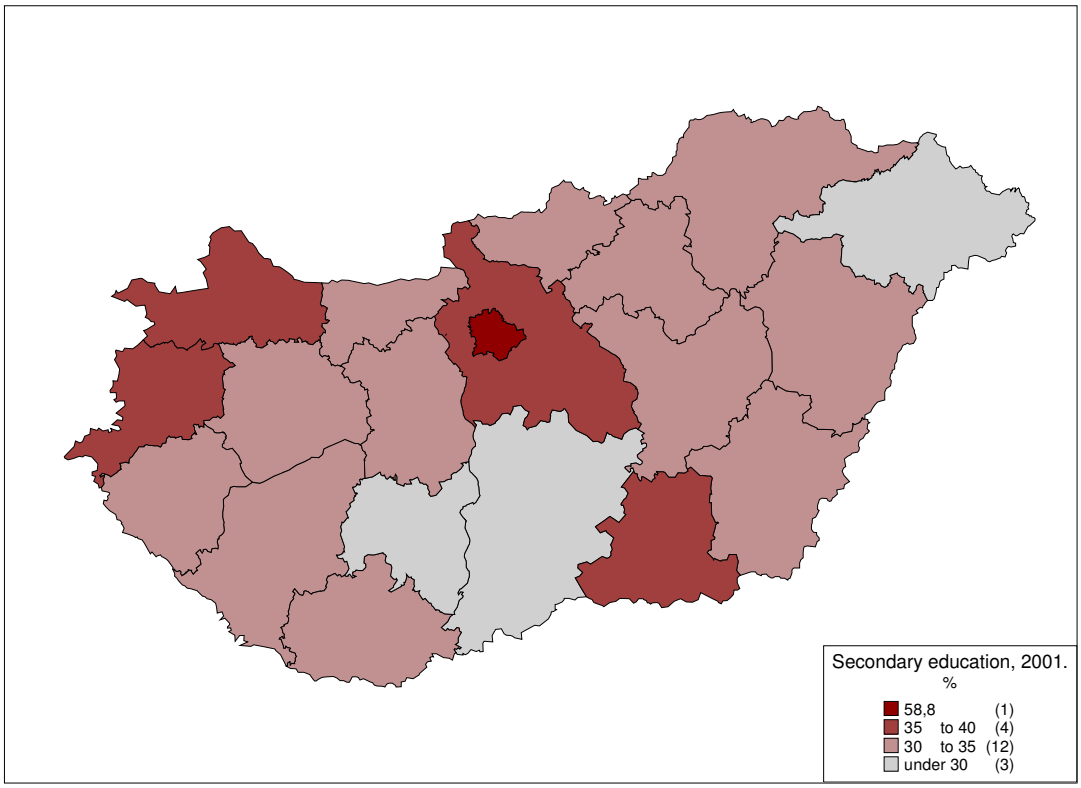


Source of data: Census 2001. Demography. Hungarian Central Statistical Office. Budapest. 2004.

The value of this indicator is connected to the degree of urbanization. Accordingly strong correlation is found with the presence of universities sciences and also with the standard of economic development and certain cultural traditions.

The regional frequency of secondary educational degree follows the frequency of higher educational diplomas, but the standard deviation is considerably lower. Inequalities are detectable in the country (without Budapest) but they are negligible (Figure 12.).

Figure 12 Proportion of population with completed secondary education, 2001.



Source of data: Census 2001. Demography. Hungarian Central Statistical Office. Budapest. 2004.

Table 4 High technology manufacturing

	Number of enterprises				Capital				Number of people employed				Percentage of total employment		
	2000	2001	2002	2003	2000	2001	2002	2003	2000	2001	2002	2003	2002	2003	2004
Budapest	806	842	981	1050	43518426	40152489	33757330	39365569	17093	17415	16092	14789			
Baranya	44	46	49	53	2128585	1891626	1806269	1995440	3202	2619	2438	3117			
Bács-Kiskun	47	51	56	54	1951052	1275156	1619939	895220	2007	1831	1644	1413			
Békés	18	21	23	21	82815	30000	821911	974967	282	313	423	423			
Borsod-Abaúj-Zemplén	45	52	62	69	10175894	8899318	7772949	7684057	2034	1856	1504	2195			
Csongrád	57	64	66	70	568100	344220	279491	455718	638	716	569	551			
Fejér	51	61	76	78	19583704	8853953	12168417	21954509	13268	14633	13487	11841			
Győr-Moson-Sopron	63	74	75	77	1252145	1071955	1908661	2406475	1199	1522	1373	1609			
Hajdú-Bihar	49	61	80	87	2073108	565483	684993	2165294	1698	1827	2085	1998			
Heves	30	38	43	48	2372280	2210550	2158916	2740238	1245	1663	2233	2344			
Komárom-Esztergom	33	39	51	57	33947267	35108282	34356714	36004921	3471	4120	3287	4221			
Nógrád	12	13	16	28	3558500	3294522	3269949	3585136	1051	1088	805	754			
Pest	205	243	308	357	26531573	23923590	26794823	59423078	6919	7734	8305	9064			
Somogy	18	22	27	30	648981	531432	605526	710012	9779	9363	9465	11107			
Szabolcs-Szatmár-Bereg	31	35	43	48	2846604	1965897	2463785	2874484	1890	1945	1964	1866			
Jász-Nagykun-Szolnok	29	38	40	41	404990	672238	30179	399008	260	385	192	194			
Tolna	16	18	22	24	759090	901	7562	753358	338	340	267	255			
Vas	28	29	38	46	256407	213736	404737	2499630	3150	2532	2045	2976			
Veszprém	33	39	42	41	418318	279035	272593	241710	1011	1190	1243	934			
Zala	30	28	45	45	376008	342030	913132	891439	474	478	822	530			
Central-Hungarian Region	1011	1085	1289	1407	70049999	64076079	60552153	98788647	24012	25149	24397	23853	1,96	2,10	1,82
Central-Transdanubian Region	117	139	169	176	53949289	44241270	46797724	58201140	17750	19943	18017	16996	6,18	4,68	5,34
Western-Transdanubian Region	121	131	158	168	1884560	1627721	3226530	5797544	4823	4532	4240	5115	3,95	4,14	4,30
Southern-Transdanubian Region	78	86	98	107	3536656	2423959	2419357	3458810	13319	12322	12170	14479	2,82	2,38	1,98
North-Hungarian Region	87	103	121	145	16106674	14404390	13201814	14009431	4330	4607	4542	5293	2,68	2,36	3,44
North-Plain Region	109	134	163	176	5324702	3203618	3178957	5438786	3848	4157	4241	4058	1,48	1,84	2,06
South-Plain Region	122	136	145	145	2601967	1649376	2721341	2325905	2927	2860	2636	2387	0,66	0,90	0,85

Table 5 Knowledge-intensive high-technology services

	Number of enterprises				Capital				Number of people employed				Percentage of total employment		
	2000	2001	2002	2003	2000	2001	2002	2003	2000	2001	2002	2003	2002	2003	2004
Budapest	3537	4610	6622	7821	283714811	235659477	199972608	327654438	85239	86705	87243	83273			
Baranya	149	208	336	413	537312	49934	156598	800079	522	605	755	760			
Bács-Kiskun	135	172	260	322	433251	50047	70652	652773	478	546	665	695			
Békés	53	74	110	141	186984	43868	22778	221417	156	179	199	230			
Borsod-Abaúj-Zemplén	162	210	334	409	809880	214478	229721	868747	664	695	766	1023			
Csongrád	166	215	321	389	4305383	831422	764917	4356121	1493	1082	1151	1136			
Fejér	132	196	325	408	2406215	1720390	180820	904271	861	937	1009	981			
Győr-Moson-Sopron	132	192	289	369	1547426	210385	122578	630718	470	526	542	537			
Hajdú-Bihar	153	216	330	401	825552	231423	260825	849924	628	608	734	764			
Heves	62	91	137	167	248947	167001	91286	242032	136	149	165	176			
Komárom-Esztergom	81	119	190	250	4574666	4288611	164187	555671	373	355	298	309			
Nógrád	30	40	63	80	1351857	1293483	63407	94194	237	252	129	119			
Pest	700	986	1599	1991	48104153	48245989	49957010	52105692	4134	4976	5690	5781			
Somogy	80	103	137	168	554371	37525	107609	505080	342	351	551	540			
Szabolcs-Szatmár-Bereg	77	121	196	237	984090	768067	784919	426190	799	364	431	436			
Jász-Nagykun-Szolnok	67	93	147	176	2818874	13389	47731	597936	304	226	299	256			
Tolna	46	78	128	147	140090	49123	47989	198363	133	172	207	204			
Vas	63	102	157	182	1164028	1021227	27020	257033	174	220	240	235			
Veszprém	74	99	173	218	1641360	1459702	89099	487894	451	476	294	322			
Zala	54	98	146	170	243669	152838	107362	400072	307	382	402	428			
Central-Hungarian Region	4237	5596	8221	9812	331818964	283905466	249929618	379760130	89373	91681	92933	89054	5,20	5,53	5,35
Central-Transdanubian Region	287	414	688	876	8622241	7468703	434106	1947836	1685	1768	1601	1612	1,80	2,07	1,72
Western-Transdanubian Region	249	392	592	721	2955123	1384450	256960	1287823	951	1128	1184	1200	2,01	2,28	1,71
Southern-Transdanubian Region	275	389	601	728	1231773	136582	312196	1503522	997	1128	1513	1504	2,25	2,70	2,17
North-Hungarian Region	254	341	534	656	2410684	1674962	384414	1204973	1037	1096	1060	1318	2,62	2,24	2,38
North-Plain Region	297	430	673	814	4628516	1012879	1093475	1874050	1731	1198	1464	1456	2,04	1,81	1,78
South-Plain Region	354	461	691	852	4925618	925337	858347	5230311	2127	1807	2015	2061	1,97	1,66	1,63

Table 6

	R&D expenditure by regions (Millions of HUF)						Total intramural R&D expenditure (GERD) by sectors of performance and regions				Total R&D personnel by sectors of performance and regions	
	R&D costs		Investment		Expenditure		All sectors; Millions of euro		Business enterprise sector; Millions of euro		All sectors; Percentage of total employment	
	2003	2004	2003	2004	2003	2004	2002	2003	2002	2003	2002	2003
Budapest	88923	95411	16556	13933	105479	109344						
Baranya	3418	3978	481	285	3899	4263						
Bács-Kiskun	2351	2514	165	132	2516	2646						
Békés	1117	632	416	227	1533	859						
Borsod-Abaúj-Zemplén	2594	2941	316	373	2910	3314						
Csongrád	7419	7711	1676	680	9095	8391						
Fejér	3850	4166	956	442	4805	4608						
Győr-Moson-Sopron	4258	4155	673	2286	4931	6441						
Hajdú-Bihar	9389	9227	1278	1761	10667	10988						
Heves	1026	1240	96	138	1122	1378						
Komárom-Esztergom	889	778	562	53	1451	831						
Nógrád	75	32	14	5	89	37						
Pest	6690	6734	2947	614	9637	7348						
Somogy	1124	1166	87	149	1211	1315						
Szabolcs-Szatmár-Bereg	879	1535	121	142	1000	1677						
Jász-Nagykun-Szolnok	864	1206	443	890	1307	2096						
Tolna	42	194	5	1	47	195						
Vas	631	668	43	16	674	684						
Veszprém	2840	2631	1266	3020	4107	5381						
Zala	144	1059	5	41	149	1100						
Central-Hungarian Region	95613	102145	19503	14547	115116	116692	459,709	453,892	187,809	191,259	2,35	2,28
Central-Transdanubian Region	7579	7575	2784	3515	10363	10820	44,118	40,86	19,625	15,504	0,57	0,57
Western-Transdanubian Region	5033	5882	721	2343	5754	8225	21,263	22,688	9,8	10,386	0,53	0,54
Southern-Transdanubian Region	4584	5338	573	435	5157	5773	24,926	20,334	2,375	3,123	0,90	0,91
North-Hungarian Region	3695	4213	426	516	4121	4729	14,566	16,249	4,705	4,787	0,56	0,54
North-Plain Region	11132	11968	1842	2793	12974	14761	45,691	51,155	16,003	18,697	0,85	0,88
South-Plain Region	10887	10857	2257	1039	13144	11896	49,469	51,826	10,047	10,823	1,20	1,21

Table 7	Patent applications to the EPO by priority year				Proportion of population with completed secondary education	Proportion of population with completed tertiary education
	Total number		Per million inhabitants		%	%
	2002	2003	2002	2003	2001	2001
Budapest					58,7	23,8
Baranya					34,9	11,2
Bács-Kiskun					28,9	9,0
Békés					30,1	8,1
Borsod-Abaúj-Zemplén					34,0	9,5
Csongrád					38,6	12,4
Fejér					34,7	10,8
Győr-Moson-Sopron					38,1	11,7
Hajdú-Bihar					34,0	10,8
Heves					33,4	9,9
Komárom-Esztergom					34,4	9,7
Nógrád					30,1	7,8
Pest					37,5	11,7
Somogy					30,5	9,4
Szabolcs-Szatmár-Bereg					28,3	8,3
Jász-Nagykun-Szolnok					30,5	8,9
Tolna					29,2	9,0
Vas					35,8	10,6
Veszprém					33,6	10,6
Zala					33,6	10,2
Central-Hungarian Region	131,7608	60,0791	46,5743	21,2688		
Central-Transdanubian Region	8,0614	2,202	7,1938	1,9773		
Western-Transdanubian Region	4,1938	6,3214	4,1814	6,2942		
Southern-Transdanubian Region	7,4175	3,7175	7,4662	3,7573		
North-Hungarian Region	6,0653	2,5118	4,6782	1,9487		
North-Plain Region	13,823	8,5011	8,8662	5,4699		
South-Plain Region	21,5993	5,1804	15,7293	3,7895		

1.4 State and trends related to IS social definition.

Indicators used:

Percentage of population using the Internet for interacting with public authorities
Percentage of population having used the Internet in relation to training and educational purposes
Percentage of population using Internet to seek health information whether for themselves or others
Percentage of population having ordered/bought goods or services for private use over the Internet in the last three months

In this topic there are no data available for Hungary on the regional level. Though there have been some research projects – based on a relatively large samples – which produced estimations about the differences among settlement categories. These examinations suggested the markedly better position of Budapest and the larger urban settlements compared to the smaller towns and villages (Table.3).

Table 8 ICT indicators by settlement type

	communities	towns	county towns	Budapest
Percentage of population having used the Internet in relation to training and educational purposes	13	16	22	21
Percentage of population having ordered/bought goods or services for private use over the Internet in the last three months	1	1	1	2

1.5 Conclusions

The overall conclusion of our research is that the phenomena connected to the development of information society are detectably present in the socio-economic processes of Hungary. On the national level the signs of development are undeniable. The indicators considered have an increasingly greater impact on the regional processes, however the Central Hungarian Region is still dominant on the national scale.

The capital city and its environs act as a water head of the country in various respects, and there is doubt, that they form the focal point and major scene of modernisation. Beside this region, there are three distinguishable territorial types. The first type includes the regional units centred around universities, which by their intellectual potentials stand

out from their surroundings as they give impetus to the development of information society. The second type is connected to the west of the county, a region characterised with favourable economic position and the new image of modernity. Both the working culture of people and the structural characteristics of the economy guarantee further dynamic growth.

The third kind of area means the rest of the country, where development is late in all respects and where the local economy and the social capital is relatively weak.

Development-dependency of the indicators is detectable even if we treat Budapest separately and remove it from the analyses. Strong correlation can be discovered between the listed indicators describing information society and the GDP, rate of unemployment, entrepreneurial activity, the per capita indicator of capital investments.

Table 9 ICT indicators on NUTS0 level

	2000	2001	2002	2003	2004	2005
Number of mobile (cellular) phones subscriptions per 100 inh.	30,76	49,67	68,86	79,45	87,27	
Number of cable modem subscriptions per 100 inh.		2,65190	3,27480	3,55874	2,84376	
Number of xDSL subscriptions per 100 inh.			0,32054	1,14813	2,35969	
Proportion of households with broadband internet access at home					6	11
Share of enterprises receiving orders over Internet					6	4
ICT manufacturing sector value added, % of total (as defined by OECD)	11	11	11			
ICT services sector value added, % of total (as defined by OECD)	12	12	12			
Percentage of population using Internet to seek health information whether for themselves or others				2%		
Percentage of population using the Internet for interacting with public authorities					14,9	15,1

References

BAJMÓCY P., 2000. A kistérségek népességváltozási tendenciái Magyarországon az 1990-es években. Megjelent: Határok és régiók, konferenciakötet, SZTE, Szeged, 367–371. o.

BELUSZKY P., 1999. Magyarország településhálózata. Dialóg Campus, Budapest–Pécs.

CSÉFALVAY Z., 1993. Die Transition des Arbeitsmarktes in Ungarn – Konsequenzen für sozialräumliche Entwicklung. Petermans Geographische Mitteilungen, No. 1. 33–44. o.

DALL'ERBA, SANDY–KAMARIANAKIS, YIANNIS–LE GALLO, JULIE–PLOTNIKOVA, MARIA, 2003. Regional productivity differentials in Poland, Hungary and the Czech Republic. Real Discussion Papers, No. 26. University of Illinois.

DEÁK SZABOLCS–LENGYEL I., 2003. Some Aspects of Regional Development in Hungary. Megjelent: *Lengyel Imre* (szerk.): Knowledge Transfer, Small and Medium-Size Enterprise, and Regional Development in Hungary, JATEPress, Szeged, 145–160. o.

DUNFORD, MICK–SMITH, ADRIAN, 1998. Trajectories of change in Europe's regions: cohesion, divergence and regional performance. SEI Working Paper, No. 26.

ENYEDI G., 1996. Regionális folyamatok Magyarországon az átmenet időszakában. Hilscher Rezső Szociálpolitikai Egyesület, Budapest.

FALUVÉGI A., 2000. A magyar kistérségek fejlettségi különbségei. Területi Statisztika, 4. sz. 319–346. o.

FALUVÉGI A., 2004. Kistérségeink helyzete az EU küszöbén. Területi Statisztika, 5. sz. 434–458. o.

FORRAY R. K., 1993. Az iskolázás regionális különbségei és a fejlődés lehetőségei a kilencvenes években. Megjelent: *Enyedi György* (szerk.): Társadalmi-területi egyenlőtlenségek Magyarországon. Közgazdasági és Jogi Könyvkiadó, Budapest, 257–273. o.

FORRAY R., KATALIN–HÍVES T., 2003. A leszakadás regionális dimenziói. Kutatás közben sorozat, Oktatáskutató Intézet, Budapest, 240. sz.

G.FEKETE É., 2004. Az Észak-magyarországi régió kistérségeinek abszorpciós képessége és helyzetük Magyarország más kistérségeivel összehasonlítva. Észak-Magyarországi Stratégiai Füzetek. 1. sz. 40–97. o.

JAKOBI Á., 2002. Traditional and New Factors of Regional Inequalities in Hungary. Emerging Market Economies and European Economic Integration. Konferencia-előadás, Eksjö, 2002. June.

KISS J., 1998. Az ágazati gazdaságszerkezet szerepe a regionális differenciálódásban Magyarországon. Tér és Társadalom, 1–2. sz. 138–162. o.

KOVÁCS Z., 2000. Hungary at the thereshold of the New Millennium: The Human Geography of Transition. Megjelent: *Kovács Zoltán* (szerk.): Hungary towards the 21th century: the Human Geography of Transition. Studies in Geography in Hungary, 31.,Geographical Research Inst. HAS, Budapest, 11–27. o.

LACKENBAUER J., 2004. Catching-Up, Regional Disparities and EU Cohesion Policy: The Case of Hungary. Managing Global Transitions, Vol. 2, No. 2. 123–162. o.

MEUSBURGER, P., 2001*a.* The Role of Knowledge in the Socio-Economic Transformation of Hungary in the 1990s. Megjelent: *Meusburger, P.–Jöns, H*. (szerk.): Transformations in Hungary, Physica-Verlag, Heidelberg, 1–38. o.

MEUSBURGER, P., 2001*b.* A Spatial and Social Disparities of Employment and Income in Hungary in the 1990s. Megjelent: *Meusburger, P.–Jöns, H*. (szerk.): Transformation in Hungary, Physica-Verlag, Heidelberg, 173–206. o.

NEMES NAGY J., 1987. A regionális gazdasági fejlődés összehasonlító vizsgálata, Akadémiai Kiadó, Budapest.

NEMES NAGY J., 1993. Adalékok a térbeliség társadalmi magyarázó erejéhez. Megjelent: *Enyedi György* (szerk.): Társadalmi-területi

egyenlőtlenségek Magyarországon. Közgazdasági és Jogi Könyvkiadó, Budapest, 23–37. o.

NEMES NAGY J., 2001. New Regional Patterns in Hungary. Megjelent: *Meusburger, P.–Jöns, H*. (szerk.): Transformation in Hungary. Physica-Verlag, Heidelberg, 39–64. o.

NEMES NAGY J., 2002. Spatial gravity centres of the dynamics and the crisis in Hungary. Hungarian Statistical Review. 7. különkiadás, 75–85. o.

NEMES NAGY J., 2003. A fekvés és az iskolázottság hatása a területi egyenlőtlenségekre. Megjelent: *Fazekas Károly* (szerk.): Munkaerőpiaci Tükör, 2003. MTA KTK–OFA, Budapest, 133–143. o.

NEMES NAGY J., 2005*a.* Nemzetközi és hazai tendenciák a területi elemzésben. Területi Statisztika. 1. sz. 7-14. o.

NEMES NAGY J., 2005*b.* Fordulatra várva – a regionális egyenlőtlenségek hullámai. In.: Dövényi Zoltán – Schweitzer Ferenc szerk.: A földrajz dimenziói. MTA FKI, Budapest. 141-158. o.

OBÁDOVICS CSILLA–KULCSÁR L. 2003. A vidéki népesség humánindexének alakulása Magyarországon. Területi Statisztika, 4. sz. 303–322. o.

SCHWERTNER J. 1992. A munkanélküliség területi jellemzői. Munkaügyi Szemle, Vol. 37. No. 12. 27–31. o.

SCHWERTNER J. 1994. Parázsló munkaerőpiac. Tér és Társadalom, Vol. 8. No. 1–2. 59–82. o.

TONDL, G.–VUKSIC, G., 2003. What Makes Regions in Eastern Europe Cutching up? IEF Working Paper, No. 51.

TURNOCK, D. (szerk.), 2001. East-Central Europe and the Former Soviet Union. Environment and Society. Arnold, London.

WILLIAMSON, J. G. 1965. Regional Inequality and the Process Of National Development: A Description of the Patterns. Economic Development and Cultural Change, 4. sz.

Hivatalos jelentés. Adatszolgáltatás. Version 2.0. *Magyar Információs Társadalom Stratégia és Monitoring jelentések.* No. 30. 2004.

Az Információs Társadalom helyzete Magyarországon 2003. végén. Version 1.0. *Magyar Információs Társadalom Stratégia és Monitoring jelentések.* No. 33. 2004.

Információs és kommunikációs eszközök állománya és felhasználása a gazdasági szervezeteknél, 2003. Hungarian Central Statistical Office. Budapest. 2005.

Research and development 2003. Hungarian Central Statistical Office. Budapest. 2004.

Research and development 2004. Hungarian Central Statistical Office. Budapest. 2005.

"Mapping the digital future". Hungarian Society and the Internet. ITHAKA-ITTK-TÁRKI. 2004.

Internet activities in the European Union. *Statistics in focus.* European Communities, 2005.

Key Data on Education in Europe 2005. Education and Culture, Eurydice, Eurostat. European Commission.

Key Indicators on the Competitiveness of EU's ICT Iindustry. Enterprise and Industry Directorate-General. European Commission.

Benchmarking Enterprise Policy. Results from the 2004 scoreboard. Enterprise Publications. European Commission. 2004.

Central and Eastern Europe Information Society Benchmarks. Survey Results, Objective 3. Stimulate the use of the Internet. 2004.

ESPON
EUROPEAN SPATIAL PLANNING OBSERVATION NETWORK

ESPON project 1.2.3

Second Interim Report

Appendix IX

Country case study-Poland

(first part)

Institution	Person responsible	e-mail, telephone
EUROREG	Agnieszka Olechnicka (& Maciej Smętkowski & Mikołaj Herbst)	a.olechnicka@uw.edu.pl msmetkowski@uw.edu.pl

Co-financed by the European Community through the Interreg III ESPON Programme

Table of contents

Figures

Tables

1 Description of IS state and trends on regional level

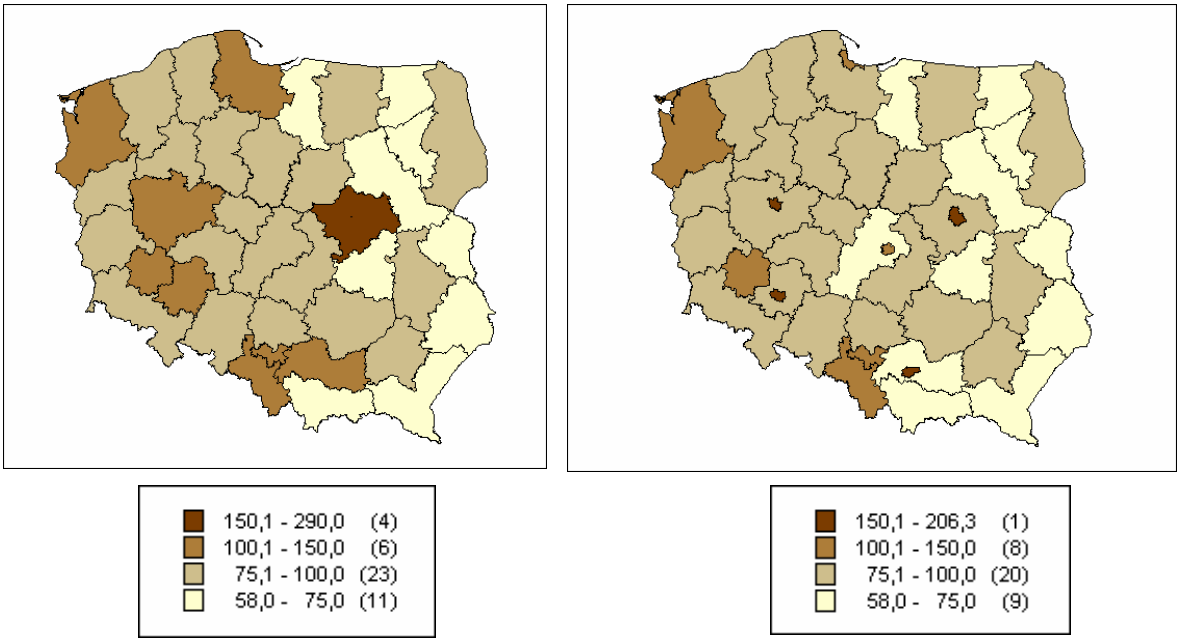
1.1 General information about the regional development

Since 1st of January 1999, Poland has had a three-tier model of public authority, with independent, elected decision- and law-making as well as executive powers at local, regional and national levels. Poland's new territorial make-up combines features of an unitarian state with a decentralized model of public authority. The new territorial composition includes:

- 16 large voivodships (equivalent to regions in NUTS 2),
- 315 counties (powiat) and 65 urban centres with county rights (NUTS IV units),
- 2478 municipalities (gmina), the basic local government units (corresponding to NUTS V)

Since July 2000, the NUTS III statistical level has been singled out, with 44 (later increased to 45) sub-regions covering several county-level units each.

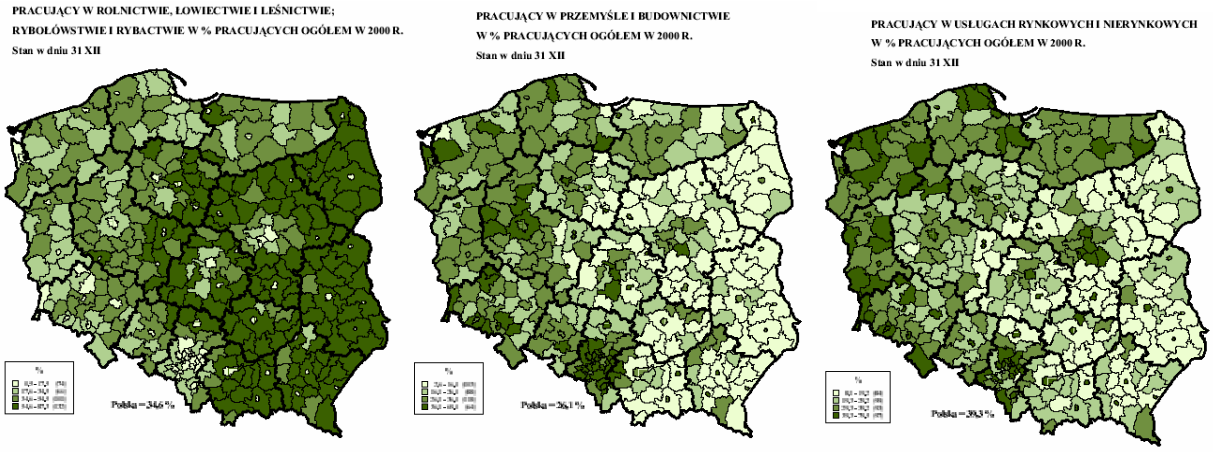
Figure 1 GDP per capita in Polish NUTS 3 in 2002, Poland = 100.



Source: G. Gorzelak, Poland's regional policy and disparities in the polish space, Regional and Local Studies, Special Issue 2006, RSA Polish Section, Warsaw 2006 (in printing).

Poland is a country with wide **regional disparities** (Figure 1). The ratio of disparities in the GDP per capita, which is a summary measure for assessing the level of economic development, is higher than 1 to 4 among 44 territorial units created for statistical purposes (NTS3) – in the case of the relation between Warsaw and the Chełm and Zamość subregion. After inclusion of six cities which represent the NTS 3 level into the subregions which surround them, the scale of these disparities falls to approximately 3.6 to 1 – the relation between Warsaw and the Warsaw subregion to the Chełm and Zamość subregion. Considerable disparities can also be observed within individual regions, especially those with large cities. For instance, in 2001 in the Mazowieckie voivodship (province – the uppermost tier in the country's administrative division), the span between Warsaw and the Radom region was 3.9 to 1, while in the Małopolskie voivodship the ratio of the extreme GDP values per capita was 2.5 to 1, and in Wielkopolskie – 2.6 to 1. It should be observed at this point that in 2001 the extent of these disparities decreased, which should be explained by the lower GDP increase in large cities than in their surroundings – a phenomenon that apparently should not be attributed to a change in the methodology of GDP calculation in territorial systems, introduced in 2001 (G. Gorzelak, Poland's regional policy and disparities in the polish space, Regional and Local Studies, Special Issue 2006, RSA Polish Section, Warsaw 2006 -in printing).

Figure 2 Shares of employment in different sectors of national economy in total employment, 2000



Source: G. Gorzelak, Poland's regional policy and disparities in the polish space, Regional and Local Studies, Special Issue 2006, RSA Polish Section, Warsaw 2006 (in printing).

Eastern and central voivodships as well as non-metropolitan areas have significantly higher shares of employment in the first sector than western voivodships and large cities (Figure 2). In 2000, the share of employment in agriculture, forestry and fishery in total employment was the following (in selected voivodships): Śląskie – 12.2 per cent, Zachodniopomorskie – 15.5 per cent; Pomorskie – 15.5 per cent; Mazowieckie – 24.8 per cent; Lubelskie – 52 per cent; Świętokrzyskie – 49.0 per cent; Podkarpackie – 47.3 per cent; Podlaskie – 46.5 per cent.

1.2 State and trends related to IS technical definition

Indicators used (regional breakdown):
Proportion of households with a computer
Proportion of households with internet access at home
Share of enterprises with internet access
Share of enterprises with own homepage
Share of enterprises purchasing goods and services over Internet

Broadband connections via xDSL (1,9 subscriber lines per 100 inhabitants in 2004) are much more frequent than cable modem connections (0,5 subscriber lines per 100 inhabitants in 2004) in Poland. There is no regional data available.

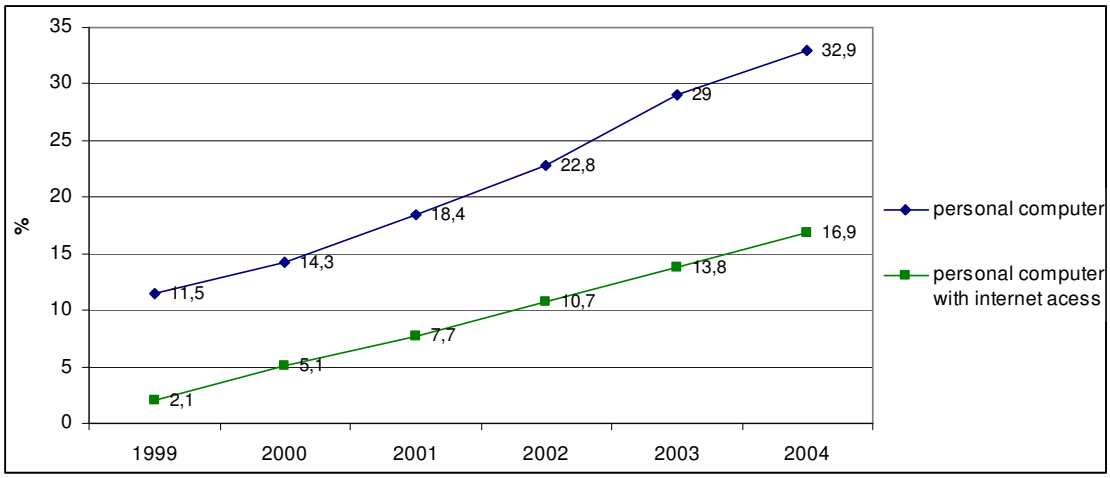
From 2001 to 2005 the number of mobile subscriptions has more than doubled in Poland (from 25% to 62%). Data with regional breakdown is not available.

ICT in households

The share of households with a computer in Poland is lower than in most other EU countries and than European average, although the spread of personal computers in Polish households is continuing. In 2004 the share of households furnished with a PC was 33 per cent and it was three times more than in 1999 (in 2004 the indicator reached the level 40 per cent, no regional breakdown; Wykorzystanie technologii informacyjno-telekomunikacyjnych w 2005 r., www.stat.gov.pl), and the share of households furnished with a PC with internet access was 17% - which is eight times more than in 1999 (Figure 3).

The use of computers in households is becoming more popular but at a slower pace in comparison with industry. Additionally, the share of households with a computer connected to the internet was rising more slowly (14,8 per cent points) than the share of households with a PC in general (21,4 per cent points) in 1999-2004. Broadband internet access is essential for the IS development, but in Poland only 8 per cent of households had this kind of access in 2004.

Figure 3 Share of households furnished with a computer in Poland in the years 2000-2004



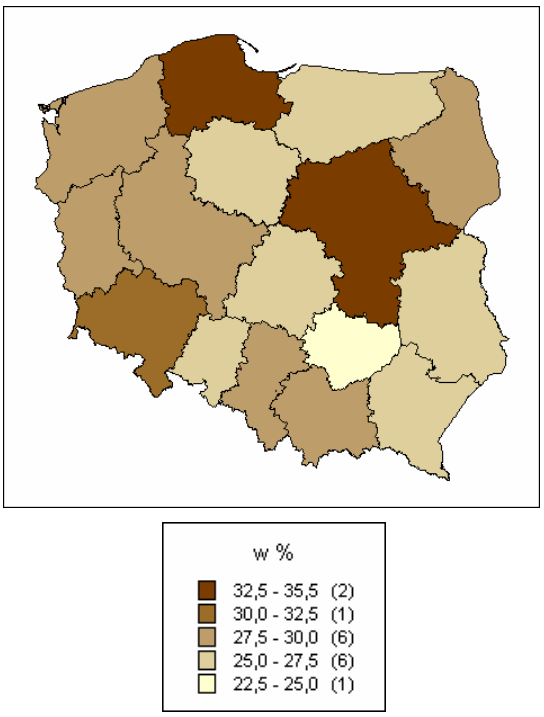
Source: compiled by authors based on CSO data; www.stat.gov.pl

According to the research conducted by CSO having a computer is definitely more common in big cities than in the rest of the country and it depends on the level of a given family's income. Presence of children in households is an important factor in favour of having a computer and having access to the internet. The most important barriers to internet access at home in Poland are: high equipment and access costs, lack of computer skills, lack of interest (Wykorzystanie technologii informacyjno-telekomunikacyjnych w 2005 r., www.stat.gov.pl; Indicators for the Information Society in the Baltic Region 2005. Nordic Council of Ministries, www.norden.org).

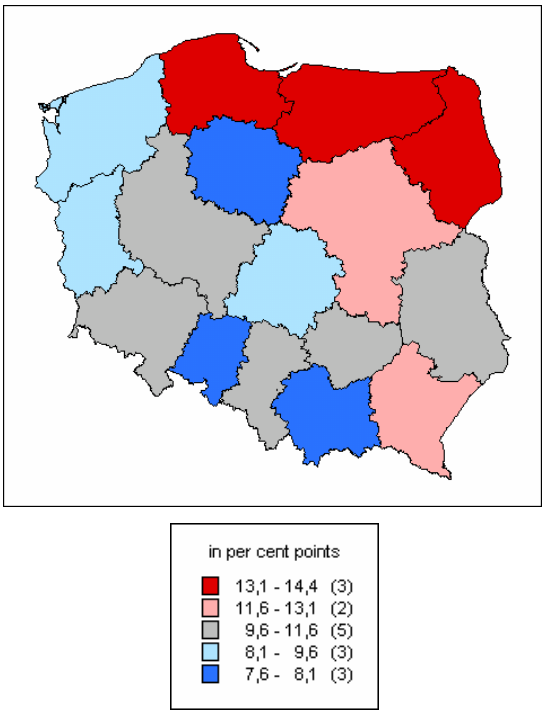
The proportion of households with a computer in 2003 (the latest data by voivodship available) varies among voivodships. There were only three NUTS 3 regions where the proportion of households with a computer was higher than 29 per cent (average for Poland): Mazowieckie, Pomorskie and Dolnoslaskie (Figure 4). The lowest share was observed in the Swietokrzyskie Voivodship. Western regions generally have reached higher saturation (with the exception of Opolskie) than eastern and central ones (with the exception of Mazowieckie due to Warsaw and, surprisingly, Podlaskie voivodship).

Figure 4 Households with a computer by voivodship in Poland

Share of households with a computer in 2003 (average =29 per cent)



Change of a share of households with a computer in 2001-2003 years (average= 10,6 percentage points)



Source: compiled by authors based on CSO data; www.stat.gov.pl

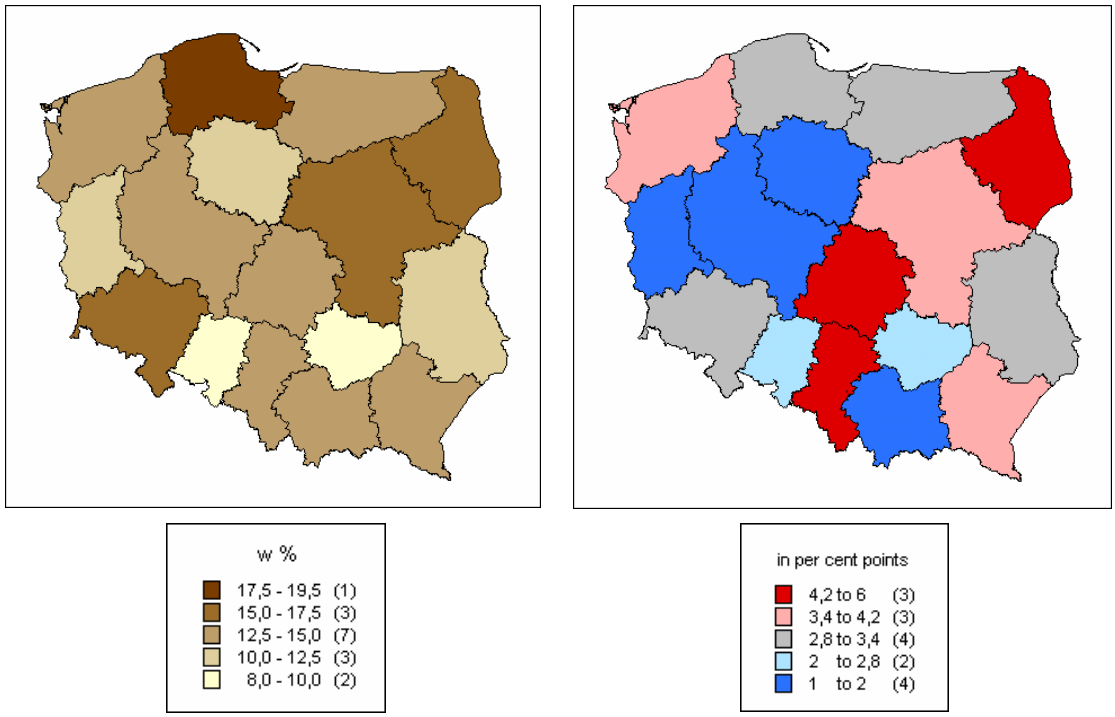
The fastest growth in the saturation of personal computers in the years 2001-2003 was observed in the north-east part of Poland (Pomorskie, Warminsko-Mazurskie and Podlaskie). The change was also evident in Mazowieckie and Podkarpackie voivodships. At the same time some southern and western areas were characterised by an average growth that was slower than the national average, i.e.: Kujawsko-Pomorskie, Opolskie, Malopolskie and Zachodniopomorskie, Lubuskie, Lodzkie (Figure 4).

As regards the share of households with internet access there was no evident east-west divide in 2003. The highest values were noticed in Pomorskie voivodship, as well as in Mazowieckie, Dolnoslaskie and Podlaskie. On the other side - in Opolskie, Swietokrzyskie - the lowest values were observed. The change in the share of households with internet access in 2002-2003 was the fastest in Slaskie, Lodzkie (two old industrial regions) and Podlaskie voivodship (a backward rural region) (Figure 5).

Figure 5 Households with a computer connected to the internet

Share of households with internet access at home in 2003 (average =13,8 per cent)

Change of a share of households with internet access at home in 2002-2003 years (average = 3,1 percentage points)



Source: compiled by authors based on CSO data; www.stat.gov.pl

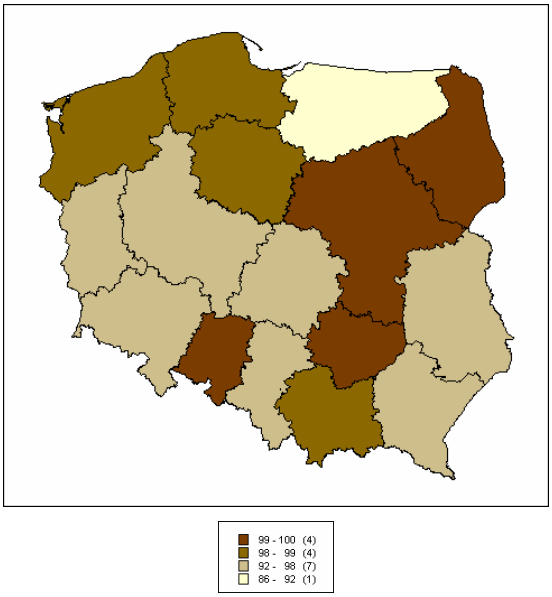
ICT in enterprises

Over the recent period corporate computerization and automatisation of production processes in Polish industry have progressed very fast. According to the CSO research (on the sample of enterprises employing more then 49 persons) the share of enterprises using internet in their activities increased from 17 per cent in 1997 to 74 in 2001 and 96 per cent in 2003 and the share of enterprises with their own homepage rose from 54% in 2001 to 74% in 2004 (Figure 6).

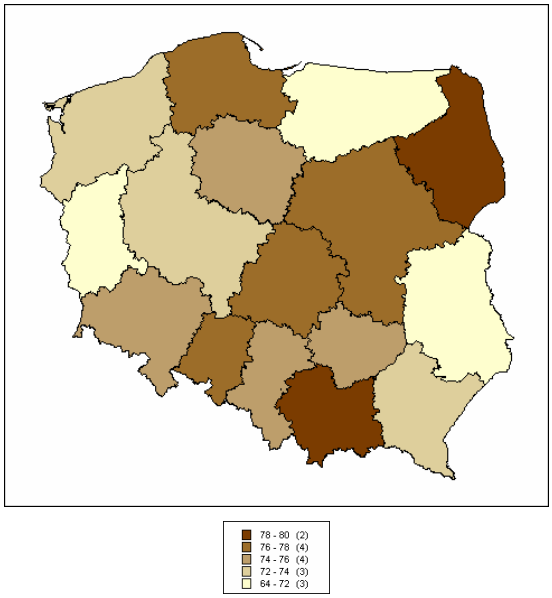
Although the saturation of internet access in Polish enterprises is high, the interregional differences on the NUTS 2 level are visible. The 100% of enterprises have internet access in Opolskie and Podlaskie Voivodship, 99% in Swietokrzyskie and Mazowieckie. Apart from the latter one, these regions are characterized by a low level of GDP per capita. The same set of regions, with the exception of Swietokrzyskie, is in the group of regions with the highest share of enterprises with their own website (77%-80%).

Figure 6 Share of enterprises with internet access and own website in 2003

Share of enterprises with internet access



Share of enterprises with own website



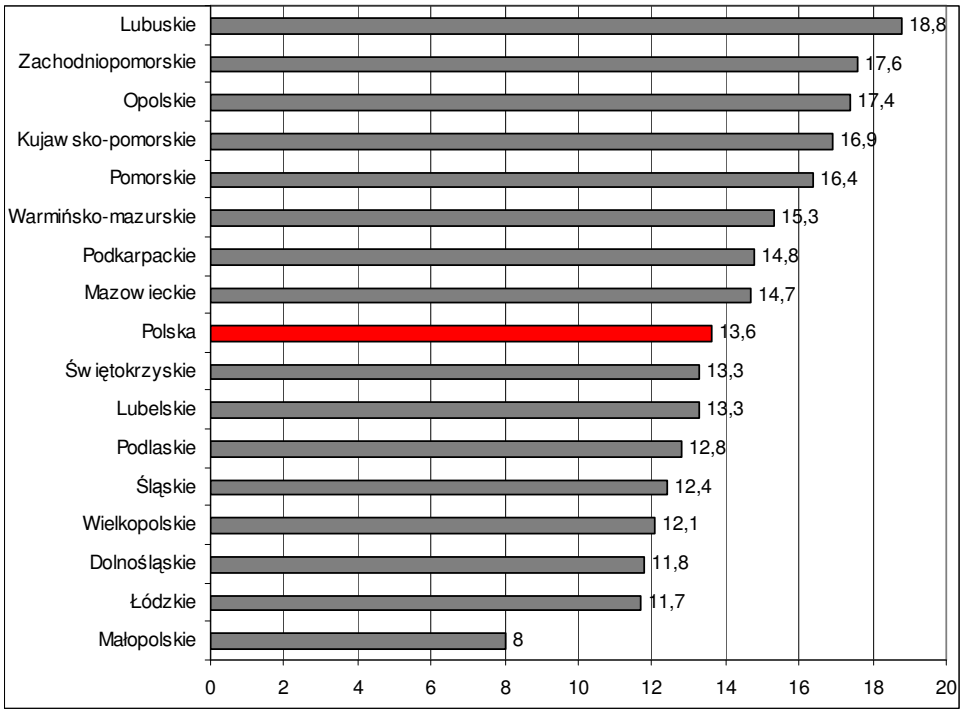
Source: own calculations on the basis of "Nauka i technika w 2001, 2002, 2003 roku", GUS, Warszawa.

On the opposite end of the scale one can list voivodships with the share of enterprises with internet access well below the Polish average: Warminsko-Mazurskie, Lubelskie, Wielkopolskie, Slaskie. The first two of the above-mentioned are peripheral regions characterized as well by the lowest share of enterprises with their own website (64% and 68%), while Wielkopolskie can be characterized as an economically strong region, while Slaskie as a postindustrial one.

The strongest positive trend with regard to the share of enterprises with internet access was observed in Mazowieckie, Lubuskie, Slaskie and Zachodniopomorskie, while with regard to the share of enterprises with their own website in Podlaskie, Slaskie, Mazowieckie. Podkarpackie and Opolskie were characterized by the weakest growth in this respect in the years 2001-2003.

In Poland 13,6 per cent of enterprises were purchasing goods and services over the internet in 2002 (the latest data available on regional level). The highest values were noticed in Lubuskie, Zachodniopomorskie and Opolskie (more than 17 %). This indicator is surprisingly low (only 8% on sample) in Małopolskie voivodship, which is on the above average position with regard to the share of enterprises with internet access and their own web site (Figure 7).

Figure 7 Share of enterprises purchasing goods and services over internet in 2002



Source: "Nauka i technika w 2002 roku", GUS, Warszawa.

1.3 State and trends related to IS economical definition.

Indicators used (regional breakdown):
R&D expenditure
Private R&D expenditure
R&D personnel
Number of patents
Proportion of population with at least secondary education

ICT sector

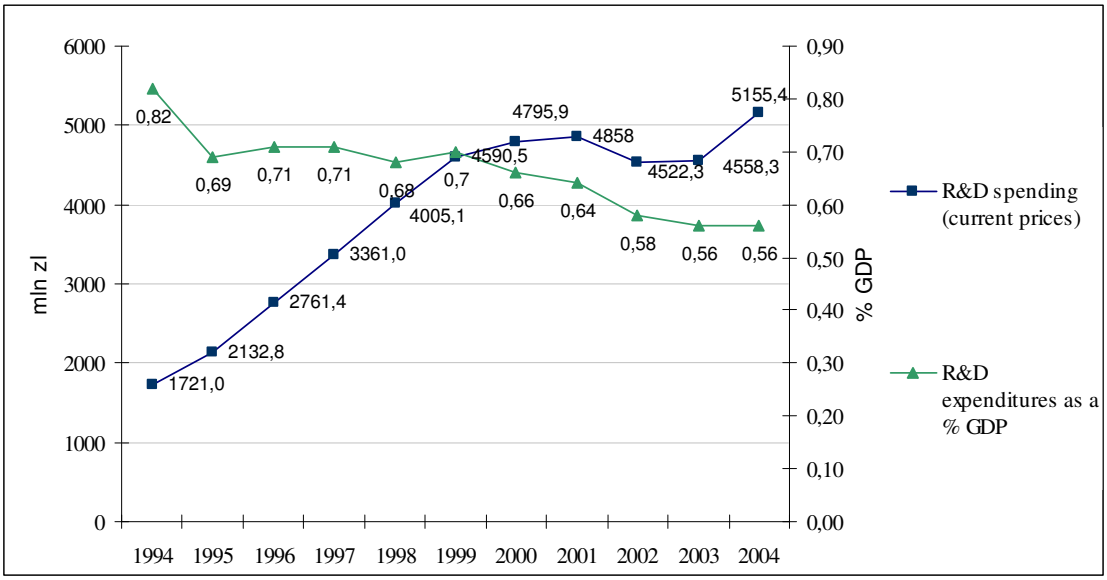
The ICT sector is the main provider of ICT solutions, whether it concerns the production of ICT goods, development and supply by means of ICT infrastructure or software and hardware solutions. Therefore the ICT sector is the backbone in the development of the IS in every country. ICT sector employs in Poland 5 per cent of the total number of persons employed in the private sector in 2004 (the average for EU). Since 2000 the employment in ICT sector in Poland has decreased by 11 per cent (Indicators for the Information Society in the Baltic Region 2005. Nordic Council of Ministries, www.norden.org). The data on regional level in Poland is not available.

Data on ICT value added is available but confidential in the most important sub-sector which is telecommunication, due to the monopolistic position of one enterprise.

R&D expenditure

National R&D financing in Poland is unsatisfactory, because of its low level and worrying trends observed in the last decade. Although in both nominal and real values a rise in R&D spending was observed in the nineties, the year 2000 was the beginning of stagnation. The results for 2004 can be considered as a positive change in this respect (Figure 8)

Figure 8 Trends in the R&D spending in Poland



Source: compiled by authors based on CSO data; www.stat.gov.pl

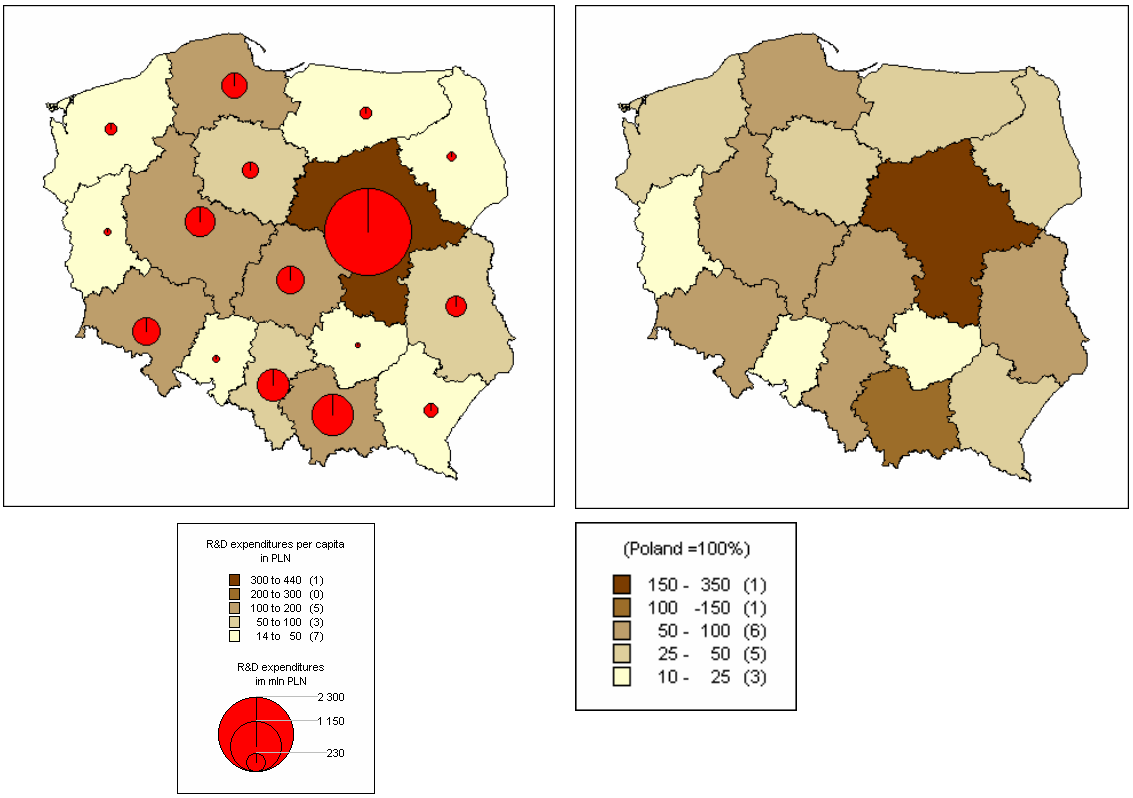
The most objective measure of R&D spending is its ratio to GDP. The low and decreasing level of this indicator is regarded as the main feature of the Polish innovativeness system during the period 1994-2004. Although the National Development Plan 2004-2006 postulates to achieve 1,5 per cent of the GERD/GDP ratio in 2006, in 2003 this indicator remained at the level of 0,56 per cent - thus it is only 30 per cent of the EU average. It is questionable, therefore, whether Poland is able to compete on the more and more technologically advanced European market. If this situation persists for a longer period, we should be aware of the growing gap between Poland and the rest of the EU. It is even more likely if we take into account R&D spending per one inhabitant. The results of this

indicator situate Poland well below the EU average, even though it was on the rise in the period 1994-2004.

There are permanent and significant regional disparities in R&D potential and activities in Poland. The ratio of the voivodship with the highest (Mazowieckie) and the lowest (Swietokrzyskie) indicators equals to nearly 20 to 1 in GERD/GDP ratio in 2003 and 31 to 1 in GERD per capita in 2004. Moreover, this gap increased during the given period, as in 2000 the results were: 14 to 1 and 26 to 1 (--appendix, 0).

Figure 9 R&D spending in 2004

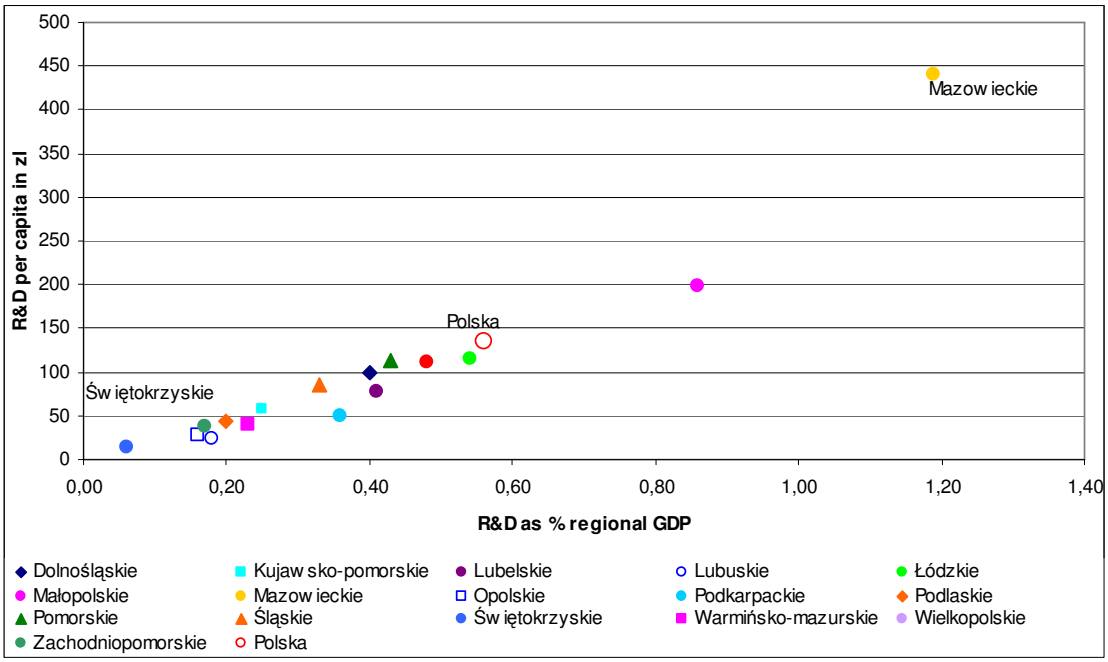
R&D spending per capita and in mln zl **R&D spending per capita (Poland =100%)**



Source: compiled by authors based on CSO data

Besides, traditionally more then 50 per cent of spending on GERD is concentrated in two Polish voivodships: Mazowieckie (Warsaw) and Malopolskie (Krakow), while funding from some other voivodships is negligible (Swietokrzyskie, Podlaskie, Opolskie, Lubuskie, Warminsko-Mazurskie, Zachodniopomorskie). The regional differentiation of R&D financing is highly attributed to the regional differentiation of the GDP in Poland (Figure 10).

Figure 10 R&D indicators in Polish voivodships in 2004



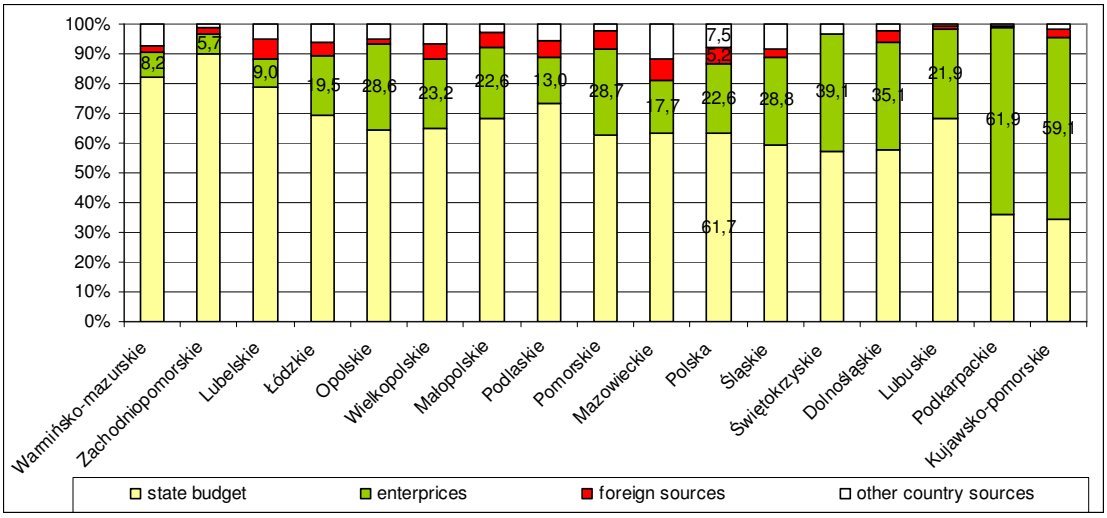
Source: compiled by authors on the basis of "Nauka i technika w 2004 roku", GUS, Warszawa; www.stat.gov.pl

Poland as a member of the EU has to struggle to accomplish the principles of the Lisbon Strategy. The most important one concerns the structure of the R&D financial sources, which is a serious drawback of the Polish innovativeness system as well. The trends observed in this respect in Poland are just the opposite of what the Lisbon Strategy intend and of what is typical in the most developed economies. During the whole last decade the state budget was and still is the main source of financing R&D activities in Poland. It accounts for more than 60 per cent of GERD, which is nearly two times more then the average for the EU countries. Moreover in 2004, the share of the state budget was increasing and at the same time the share of the enterprises was falling down from 24,5% in 2000 to 22,6% ("Nauka i technika w 2000, 2004 roku", GUS, Warszawa; www.stat.gov.pl).

There are several reasons for that. On the one hand the enterprises in Poland do not consider the R&D as an important factor of the development or they do not have enough financial resources for conducting R&D activities. Surveys demonstrate that over 50 per cent of Polish SMEs seek their competitive advantage in lower production costs, and only ca 2 per cent aim at competing on the grounds of innovativeness and technological advancement.

With regard to this indicator the situation varies significantly between regions. The highest share of enterprises' expenditures in total R&D expenditures (more then 60%) was noticed in Kujawsko-Pomorskie and Podkarpackie, and the lowest share (less then 10%) in Warminsko-Mazurskie, Zachodniopomorskie and Lubelskie. As in these two opposite groups there are the poorest Polish voivodships one can notice that there is no clear relation between the level of development and the share of the enterprises in the R&D expenditures (Figure 11).

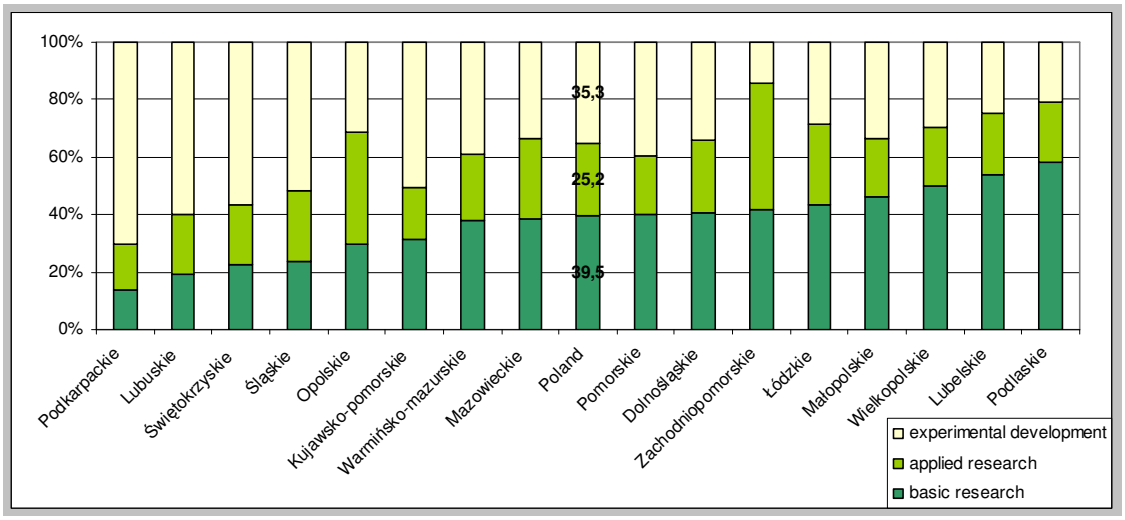
Figure 11 The structure of R&D by source in 2004



Source: compiled by authors on the basis of "Nauka i technika w 2004 roku", GUS, Warszawa; www.stat.gov.pl

Several surveys carried out in Poland proved that a serious barrier for the enterprises that are willing to cooperate in the field of R&D is inability to find a reliable partner. Sometimes the research conducted in Polish scientific institutions does not meet business sphere's expectations. It is mainly due to the structure of R&D spending in Poland, which seems to be inappropriate, especially because of the significant share of the basic research (40%) and at the same time the dropping rate of apply research. Of course this situation varies on NUTS 2 level. In Podlaskie, Lubelskie and Wielkopolskie this share accounts for more than 50% but in Podkarpackie and Lubuskie it is less than 20% (Figure 12).

Figure 12 The structure of R&D by type of activity in 2004



Source: compiled by authors on the basis of "Nauka i technika w 2004 roku", GUS, Warszawa; www.stat.gov.pl

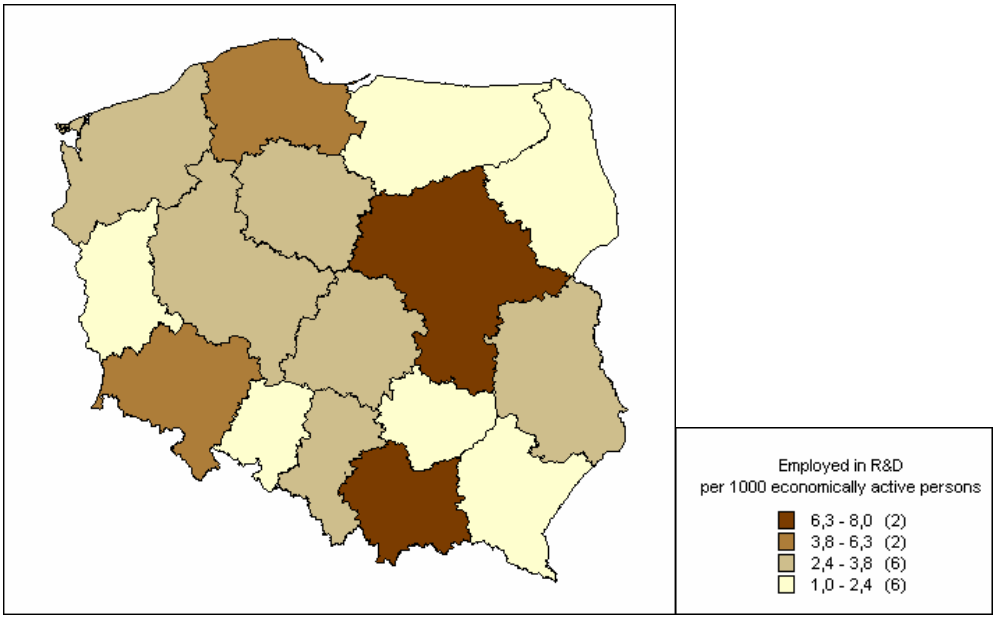
R&D personnel

As regards the number of researchers in absolute terms, Poland is far ahead of all New Member States and more or less at the level of Spain, but referring to the R&D human capital intensity Poland, with the number of researchers per 1000 labour force amounting to 3,6 in 2004, is again below the EU average. Moreover, the decreasing tendency was observed with regard to the indicator mentioned above (from 4,8 in 1999).

Employment in R&D activities is very much concentrated in the capital city region (Mazowieckie voivodship). The number of personnel devoted to research and development activity per 1000 inhabitants in 2004 was over twice the level in that region than the Polish average. While the total number of personnel devoted to R&D activity in Mazowieckie was two times higher than that of the runner-up region - Malopolskie voivodship (Krakow). The lowest R&D employment per 1000 economically active persons was observed in the voivodships with no strong academic centers: Swietokrzyskie, Podkarpackie, Warminsko-Mazurskie, Podlaskie, Opolskie (Figure 13).

Apart from Lubuskie region all Polish voivodship in the years 1999-2004 were characterized by the decrease in the R&D employment per 1000 economically active persons. The strongest negative trend was noted in Podkarpackie, Mazowieckie, Lodzkie i Slaskie. The main reason for that is most likely the collapse of big state enterprises which used to conduct research and employ R&D personnel.

Figure 13 Employment in R&D per 1000 economically active persons in 2004

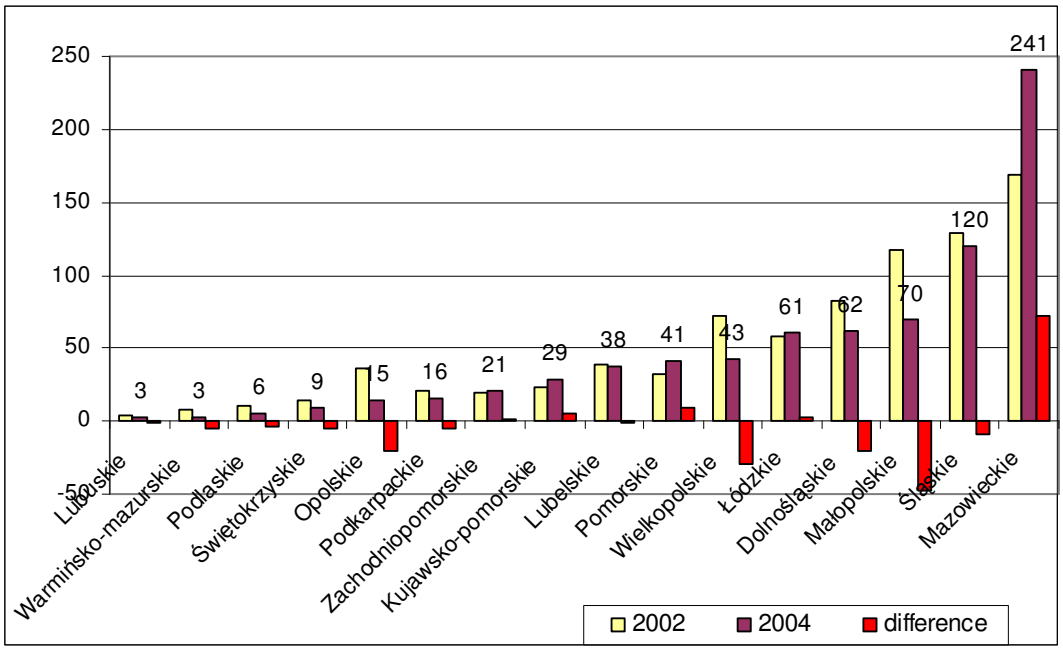


Source: compiled by authors based on CSO data, www.stat.gov.pl

Patents

The output measures of research activity for Poland are not very optimistic either. Since the beginning of the transition period a downward trend in the number of resident patent applications as well as a low level of inventiveness coefficient have been observed. On regional level Mazowieckie voivodship had advantage over other voivodships. It produced 31% of all the patents in Poland in 2004 and it experienced a positive trend in this respect as well (the biggest growth of new patents from 2002 to 2004 among 5 voivodships where the growth in number of patents was observed). Mazowieckie voivodship, together with Slaskie, Malopolskie, Dolnoslaskie, Lodzkie and Wielkopolskie, produced 77% of total patents in Poland in 2004 while the share of the other regions in the total number of patents granted is negligible (less then 5%) (Figure 14).

Figure 14 Number of patents by voivodship



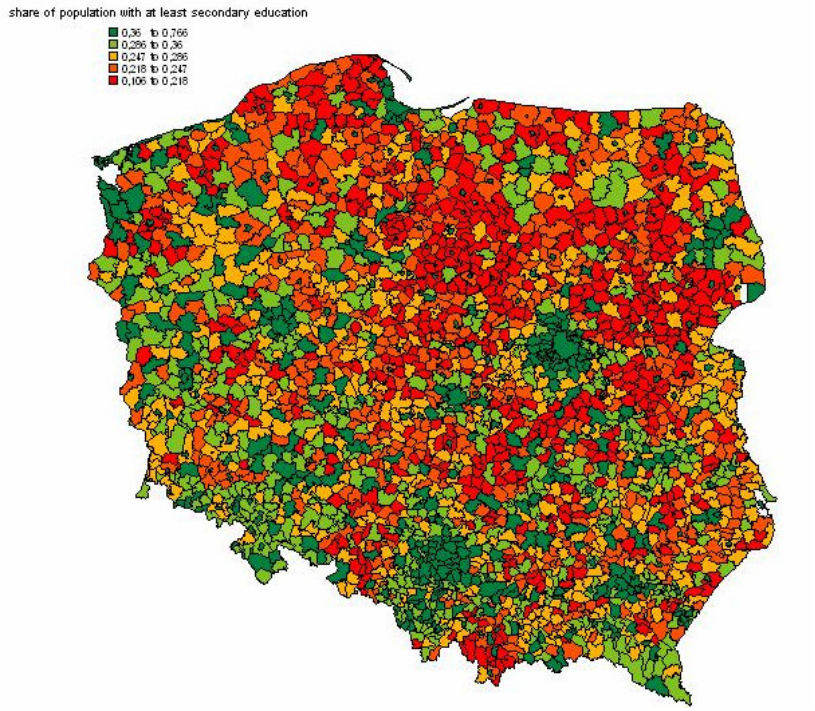
Source: own calculations on the basis of "Nauka i technika w 2001, 2002, 2003, 2004 roku", GUS, Warszawa.

Education

Educational level is a crucial factor in an Information Society development. As many studies has shown, people with secondary and higher education are able to use the ICT in a more advanced way than those with elementary education. Thus, it might be expected that the regions with a higher proportion of well educated population have more chances of dynamic growth in the new knowledge based paradigm.

According to the national census results the share of the population with at least secondary education varies from 10 per cent to 36 per cent on the gmina level (NUTS 5) in Poland. The areas with the highest values are located in the southern and western gminas as well as in the central part of Poland around the capital city. Apart east-north - west-south divide the urban-rural gap is present as well, as the most educated people live in and around big Polish agglomerations (Figure 15).

Figure 15 Population with at least secondary education in 2002



Source: compiled by M. Herbst based on national census data, www.stat.gov.pl

1.4 State and trends related to IS social definition.

Percentage of population using the Internet for interacting with public authorities
Percentage of population having used the Internet in relation to training and educational purposes
Percentage of population using Internet to seek health information whether for themselves or others
Percentage of population having ordered/bought goods or services for private use over the Internet in the last three months

Data concerning IS social dimension is only available on the national level. In Poland only 10 per cent government services can be acceded via the internet, which is well below the EU25 average (41%) in 2004.

Poland is characterised by a very low level of interactions between citizens/enterprises and the public sector. Only 12 per cent of population aged 16-74 were obtaining information from official websites (the average for the EU25 is 21 per cent), 6 per cent were downloading official forms (the average for the EU25 is 10 per cent) and 4 per cent were sending filled in forms (the average for the EU25 is 6 per cent) (Indicators for the Information Society in the Baltic Region 2005. Nordic Council of Ministries, www.norden.org).

In 2004 18 per cent of internet users in Poland were using the internet to seek health information for themselves or others. Very rarely internet users were making an appointment with the doctor's or were looking for health advice on-line (less then 1%) (Mroczek-Kwasizur M., Pudlowski T., Szamanek V., Turek D., 2005. Poziom rozwoju społeczeństwa informacyjnego w Polsce i Europie, „Wiadomosci Statystyczne" no 8).

E-commerce is not very popular in Poland. Books and magazines are the goods which are bought by the biggest share of population, but in 2005 it was still only 3 per cent (Wykorzystanie technologii informacyjno-telekomunikacyjnych w 2005 r., www.stat.gov.pl).

1.5 Conclusions

Although with regard to the results of many Information Society indicators the position of Poland was improving in 2000-2004, overall assessment of the level of Information Society development in Poland is still unsatisfactory. IS in Poland in many aspects (e.g. R&D expenditures *per capita* and as a share in GDD, number of patents per 1mln inhabitants) has reached a level well below the EU15 average and, what is even more alarming, worse than some of the other EU New Member States (Czech Republic, Hungary, Slovakia, Slovenia).

Concerning regional differences some tendencies observed are related to the permanent spatial patterns of the Polish economy. One of the most evident is the dominating position of the Mazowieckie voivodship's (where the capital city is situated) with regard to many indicators (households with a computer, R&D spending and employment, number of patents, level of education), which sometimes play the leading role together with other economically strong voivodships with big science centres. It is important to notice though that the significant IS performance of the Mazowieckie voivodship is mainly due to presence of Warsaw, as that particular region is characterised by the biggest intraregional disparities.

At the same time the East – West divide is not very significant while describing IS state in Poland on the NUTS 2 level and some promising phenomena are occurring as well. Apparently the performance of some less developed regions (for example Podlaskie voivodship) in technological dimension of the IS development is surprisingly well above the Polish average.

According to the research conducted by CSO having a computer is definitely more common in big cities than in the rest of the country and it

depends on the level of a given family's income. Presence of children in households is an important factor in favour of having a computer and having access to the internet. The most important barriers to internet access at home in Poland are: high equipment and access costs, lack of computer skills, lack of interest.

Some of the above stated hypotheses cannot be fully proved because of serious data shortages. The CSO in Poland has been collecting data on R&D also on NUTS 2 level since the beginning of 90, but other data, for example: ICT sector development, broadband access or whole IS social dimension indicators is not available on the regional level. Additionally, the present studies are essentially based on population samples (households and enterprises) and do not measure the total of the population.

References

Gorzelak G., 2006. Poland's regional policy and disparities in the polish space, Regional and Local Studies, Special Issue 2006, RSA Polish Section, Warsaw (in printing).

Indicators for the Information Society in the Baltic Region 2005. Nordic Council of Ministries, www.norden.org.

Kraska M., 2005. Elektroniczna gospodarka w Polsce, Biblioteka Logistyka, Poznan.

Mroczek-Kwasizur M., Pudlowski T., Szamanek V., Turek D., 2005. Poziom rozwoju społeczeństwa informacyjnego w Polsce i Europie, Wiadomosci Statystyczne, no 8.

Nauka i technika w 2000, 2001, 2003, 2004 roku, GUS, Warszawa; www.stat.gov.pl.

Wykorzystanie technologii informacyjno-telekomunikacyjnych w 2004, 2005 r., www.stat.gov.pl.

Appendix

- **Trends in R&D spending by voivodship**

	R&D spending as % of GDP				R&D spending per capita in zl				
	2000	**2001**	**2002**	**2003**	**2000**	**2001**	**2002**	**2003**	**2004**
Dolnośląskie	0,54	0,58	0,45	0,40	105,2	115	95	89	100
Kujawsko-pomorskie	0,35	0,34	0,29	0,25	59,2	62	53	49	58
Lubelskie	0,51	0,47	0,44	0,41	66,2	66	63	63	77
Lubuskie	0,22	0,10	0,14	0,18	37,1	17	25	33	23
Łódzkie	0,65	0,64	0,62	0,54	109,8	113	115	106	116
Małopolskie	0,81	0,84	0,87	0,86	135,6	142	155	160	198
Mazowieckie	1,54	1,38	1,25	*1,19*	426,9	422	391	389	440
Opolskie	0,24	0,22	0,17	0,16	38,9	36	27	27	28
Podkarpackie	0,43	0,34	0,39	0,36	57,7	48	57	55	50
Podlaskie	0,21	0,48	0,20	0,20	29,7	73	32	32	43
Pomorskie	0,50	0,48	0,38	0,43	93,3	92	103	90	113
Śląskie	0,39	0,39	0,32	0,33	80,2	84	73	80	86
Świętokrzyskie	0,11	0,10	0,07	*0,06*	16,1	15	11	10	14
Warmińsko-mazurskie	0,27	0,25	0,26	0,23	38,8	35	40	37	39
Wielkopolskie	0,50	0,49	0,46	0,48	100,3	100	96	107	111
Zachodniopomorskie	0,21	0,19	0,26	0,17	40	37	53	34	38
Poland	**0,66**	**0,64**	**0,58**	**0,56**	**124,1**	**126**	**120**	**119**	**135**

Source: compiled by authors based on CSO data; www.stat.gov.pl