Multi-locational Work and the Region

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Abstract: Multi-locational work, supported by information and communication technologies (ICTs), represents one key element of the current shift in the organisation of the labour process. Work which takes place at non-traditional work settings, and being enabled by increasingly mobile ICTs, is becoming more and more commonplace across Europe, according to results of representative surveys (e.g. SIBIS 2002/03). Does this mean that the spatial distribution of work is developing towards more decentralised patterns, as the logic behind concentrating labour in agglomerations becomes obsolete?
In order to shed some light on this question, the paper mainly builds on findings from three research projects supported by the European Commission's IST Programme, namely FLEXWORK, SIBIS and BISER. The authors use regional break-downs of representative population surveys to explore how telework is distributed across EU, and how these patterns can be explained. Conclusions about effects of telework on settlement patterns can also be drawn from an assessment of key characteristics of multi-locational work as it is being practised in the EU today.
The evidence from this analysis suggests that the spread of multi-locational work (which includes "telework" as it is understood most widely) is not leading to the spatial distribution of work becoming more decentralised, apart from suburbanisation which continues inside of agglomerations. However, there are some interesting exceptions to this general rule which merit further investigation.

1. Introduction

The spread of information and communication technologies (ICTs) and common understandings of the Information Society (IS) concept are frequently expected to lead to more dispersed spatial patterns of job growth and economic wealth. The distance-bridging capabilities of ICTs ("time-space convergence") are indisputable. By means of the Internet and other computer networks, it should now be technically possible for even the most remote regions to participate in the global economy, selling goods and, in particular, digital services to clients located hundreds or even thousands of kilometres away, all by the click of a mouse.

However, in spite of the tremendous potential for electronic communication which the Internet has brought, face-to-face interaction has not lost in importance [3]. This applies, in particular, to those involved in the process of innovation and co-operation – which is, as research has shown, today more than ever the very basis for sustainable economic development in a region. There is plenty of empirical evidence that the death of distance which is arguably being enabled by ICTs [4] refers only to the potential of ICTs, not to the way it is actually being used. There seem to be huge disparities between, on the one hand, peripheral and disadvantaged regions and, on the other hand, central and well-positioned regions when it comes not only to the diffusion of ICT applications, but even more to the actual use being made of them [10]. Obviously, a number of factors keep the large majority of peripheral and structurally disadvantaged regions from taking full advantage of ICT's potentials. Among these factors, the most relevant seems to be the missing proneness of companies in such regions to use ICTs in a way that increases their competitiveness on increasingly globalised markets for products and services.

For these reasons, there exists a general consensus that the observation of regional disparities will continue to be highly important since ICTs will not automatically reduce the differentials between prosperous and structurally disadvantaged or remote regions. IS statistics at regional level are, however, scarcely available. Too little is known about to what extent companies, government and private households in regions have access to ICTs, and apply them for their specific needs.

BISER (Benchmarking the Information Society: E-Europe Indicators for European Regions) www.biser-eu.com, a research project supported by the European Commission’s IST Programme, is contributing to filling this gap, by developing and piloting indicators for measuring IS developments at the regional level. In the following, an outline of the project is given (section 2) and the process of indicator development is described (section 3), before we focus more specifically on ICT-related developments in the area of work and labour markets in regions, and how they can be captured using mostly survey-derived statistical measures (sections 4). A conclusion and outlook can be found in section 5.

2. Outline of the project

The aim of BISER is to develop, define and pilot statistical indicators for measuring and benchmarking the position of Europe's regions in the Knowledge Economy. Each region's economy and society is to be examined in the context of the underlying structural foundations of the IS.

The principal aim is not a traditional ranking, nor is it intended to crown “winners” or stigmatise “losers”, but to highlight differences in the structural foundations of regional European economies and societies and to focus attention on policy targets which can promote cohesion in economic and societal development in the IS.

The rationale for the project is the scarcity of available data and indicators which are adapted to the regional level of analysis. Currently available data must be supplemented, and in some cases even substantially replaced, by a fresh approach delivering the required statistics. Such indicators constitute a major part of the benchmarking framework necessary to follow up the e-Europe Initiative.

The BISER process consists of the following steps. The project is:

- assessing existing conceptual approaches relating to the emergence of the IS and the Net Economy to build a framework for analysing ICT's impact on regional development;
- defining a theoretically founded and transparent set of statistical variables, the "e-Europe Regions Indicators" to accurately track development of Europe's regions in the IS;
- analysing current and forthcoming statistical measures from official supranational and national statistical agencies, commercial research firms and other sources and developing by the way of rapid prototyping adequate operationalisations of component variables for which fresh data collection is required;
- designing and conducting regional surveys of the general population as well as of key decision-makers in selected regions across all Member States of the EU and use the results to point up developments in subgroups of the economy;
- identifying patterns of development offering opportunities to accelerate development through regional collaboration and/or targeted policies.

In all project stages, BISER is seeking close co-operation with relevant organisations engaged in the production of statistical data on issues relevant to the IS.

3. Indicator development and piloting via dedicated surveys

Indicator development, which constitutes the core task of the project, was carried out initially through desk research by the BISER project consortium in co-operation with an advisory group of external experts, for each of the following 10 domains: Government and Public Administration; Regional Identity; Transport and the Environment; Health and Care; Business Enterprise; Innovation and R&D; Work and Labour Market; Education, Training and Skills; Social Cohesion; ICT Infrastructure. These domains have been identified as being of special relevance as determinants of regional development in the IS. A list of about 100 indicators structured along the domains, the so-called BISER e-Indicators, was published in autumn 2002 in order to kick off a discussion with the project target audience. This is comprised of organisations representing regions at EU level; representatives from the regions themselves; members of the European Statistical System such as national and regional Statistical Institutes, and Eurostat; regional policy research institutes; academic researchers; and the EU Commission. The discussion led to a revised list of indicators which was then examined for feasibility for data collection via representative surveys.

BISER e-Indicators were then piloted in a *Regional Population Survey* (RPS) and an establishment survey (*Regional Decision Maker Survey* – RDMS). The former covered people's access and use of basic ICT equipment and the Internet, uses of ICT in the context of work, education and training, health, travelling, interaction with authorities and government, and usage for explicitly "regional" purposes, as well as demographic and other background variables. The establishment survey contained questions on business demography and background statistics as well as establishments' usage of ICT, the Internet and e-business solutions in general and core business contexts, and ICT usage in R&D, human resources management and interaction with public authorities.

Between February and April 2003, 19,900 interviews were conducted in 28 selected regions throughout Europe in 14 Member States. This selection was necessary since, with 211 European regions at the NUTS 2 (Nomenclature des unités territoriales statistiques) level, clearly a project like BISER can not carry out surveys in each of these regions since accuracy of the resulting metrics requires a minimum number of observations. Within the limits of budget, it was decided to select 28.

Regions which are surveyed are: Salzburg (Austria), Liége (Belgium), Fyns Amt (Denmark), Väli-Suomi (Finland), Ile de France, Provence-Alpes-Cote D'Azur, Nord-Pas-De-Calais, Languedoc-Roussillon (all France), Darmstadt, Stuttgart, Braunschweig, Magdeburg, Mecklenburg-Vorpommern (all Germany), Kentriki Makedonia (Greece), Border, Midland & Western (Ireland), Sicilia, Lazio, Toscana, Lombardia (all Italy), Friesland (Netherlands), Lisboa & Vale do Tejo (Portugal), Castilla- Leon, Cataluna (both Spain), Smaaland Med Oerna (Sweden), Berkshire, Buckinghamshire and Oxfordshire, Leicestershire, Greater Manchester, and Tees Valley and Durhams (all U.K.).

These regions cover the range of patterns of sectoral structure ("agricultural", "manufacturing" and "services", depending on the share of employment in each of the sectors) and economic power (as GDP per head) as well as countries according to the distribution of population.

Within each region the sample was set up as a random probability sample which provides a representative picture of the resident population (aged 15+) and of the region's business establishments. The business sample was to include establishments (and thus cover also branch offices and not only autonomous enterprises) from different industries across all economic activities but to exclude establishments with less than 5 employees. The population survey provided a person sample (rather than a household sample) and was based on random dialling methods predominantly. Interviews were carried out using Computer Aided Telephone Interviewing (CATI).

4. Work organisation and labour markets in the regional Information Society

Labour markets are at the very heart of the well-being of regions; they are at the same time determinants and outcomes of the process of regional development. For this reason, labour market indicators such as unemployment rates play a hugely important role for the evaluation of regional disparities (see e.g. the Periodic Reports on the Social and Economic Situation and Development of the Regions of the EU) as well as for regional policy-making. In BISER, the development of indicators about regional labour market-related issues takes a central role.

The structure of labour markets traditionally differs significantly across the regions of a country, and this to an extent exceeds disparities between EU Member States [7]. The basic reasons for regional disparities of this type have been explained by researchers using a number of theories. As far as central-periphery disparities are concerned, most explanations focus on the existence of economies of scale, transport costs, and a number of (technological and pecuniary) externalities which are subsumed under the expression "agglomeration effects" [12]. As opposed to the neoclassical labour market theory in which regional disparities do not exist, the concept of agglomeration effects explains why certain economic functions (and the respective subgroups of labour markets) tend to concentrate instead of spreading evenly across regions. The most widely discussed agglomeration effects are (compare [8])

- localisation and urbanisation economies, i.e. positive externalities achieved by businesses of the same sector or different sectors, respectively, locating in proximity to each other
- contact advantages possible by the proximity of decision makers in economy, society and politics, often involving the transfer of non-codified knowledge by face-to-face communication
- external economies provided by the infrastructure being provided centrally by the public sector or private market players, e.g. transport or telecommunications infrastructure
- access to a labour market that offers a large variety of qualifications and workers seeking various types of work relationships.

The existence of agglomeration effects rest mainly on the fact that transaction costs (i.e. the costs of executing economic transactions either inside organisations or on markets) are determined in part by geographical distance.

However, the application of ICTs has changed (and will continue to do so in the future) the nature and structure of transaction costs [25]. In many cases, transaction costs resulting from geographical distance have fallen dramatically.

This makes it necessary to observe in which ways ICT-related segments of the labour market and ICT-based working methods are developing in EU regions. Based on an extensive survey of the state-of-the-art in regional research and regional development practice, BISER is suggesting a number of indicators to this end which have been operationalised and are being piloted for eventual inclusion in the BISER e-Europe Regions Indicators database. In the following, we briefly introduce and discuss these.

4.1 Labour markets

ICTs have played a significant role in the well-discussed development from the Fordist model, which depended on large shares being employed in the manufacturing sector, towards the post-industrial society first proclaimed by Daniel Bell [2]. The post-Fordist model is characterised by production technologies and associated labour systems that allow for shorter product and innovation cycles, thereby making possible a more flexible response to fluctuations in market demand or changes in the regulatory environment [1]. In addition (but not as a replacement to, as it is often assumed, see [23]) to economies of scale which have been at the centre of the Fordist model, today's production systems seek for economies of scope. Without resorting into technological determinism it is safe to say that economies of scope to the extent that they are being achieved today would have been completely impossible without ICTs.

For analytical and practical reasons it is, however, necessary to disentangle the influence of ICTs as a Kondratiev type base technology [21] that indirectly impact upon all parts of the economy, from the direct effects of ICT applications, which should be the immediate subject of indicator development in this area. The two main subjects of analysis with regard to the structure of the labour market are:

- the sectoral structure of employment - Sectoral structures can be analysed with regard to the share of employment that is working in ICT sectors;
- the occupational structure of employment - Differentiating the labour force into non-information and (different types of) information jobs/occupations using an adequate definition, preferably based on ISCO [24][5].

These two factors are important determinants (but by now means sufficient conditions) for regional labour productivity. Jensen-Butler [15] speaks, in this context, of place productivity. EU data for these indicators are collected regularly through the Community Labour Force Survey (CLFS) and available from Eurostat at the NUTS 2 level. The classifications which are used are, however, not optimally suited for the purpose of identifying ICT sectors and occupations (see [13]) – a situation which will only improve when the upcoming NACE revision (NACE 2007) has been put into practice.

A third indicator to be mentioned here concerns the degree to which organisations (employers) announce vacancies on the Internet. In general, geographical mobility of workers in the EU is low [20]. This imperfection of the EU labour market with regard to its ability to equalise imbalances is partly caused by the lack of knowledge about job opportunities and candidates in other regions [12]. Against this background, the move towards electronic labour market matching [9] presents the possibility to improve the matching function of labour markets by easing the transfer of labour market data between recruiters and job-searchers. It must be assumed that regions whose companies as well as workers make more use of electronic labour markets will in the future be better placed to meet the skill requirements of their economy, and the demand for adequate jobs.

4.2 Work organisation

ICTs are one of the main driving forces behind the profound changes that have affected the organisation of work over the last two decades. These changes have given rise to a new geography of work (see e.g. [11][16][18]) at every level of analysis - intra-firm, intra-regional, national, global. The ability of individual regions to shape and/or adapt to these changes appears to largely determine their success in securing a continuous regional development. This focus on adaptability is reflected by the widespread acceptance of increasing flexibility of labour markets as a policy objective. In this context, flexibility has two different connotations: It can either mean worker-centred flexibility, i.e. adapting regulatory frameworks and work organisation in order to give workers more choice; or company-centred flexibility, i.e. forcing or enabling workers to adapt to changing requirements of companies. Both, of course, are interrelated, and can arguably only be increased in a socially sustainable way if they go hand-in-hand.

For all of these challenges, applications of ICTs offer considerable potential. The profound changes labour markets have experienced are also reflected by new types of work organisation at the workplace level. Many of the so-called "new ways of working" involve applications of ICTs that have made possible totally new models of how to organise the work process in space and time, as well as new contractual employment forms and changes to the basic work content. Home-based telework, mobile work, e-lancing, ICT-based outsourcing and tele-cooperation (incl. group-ware applications and teleconferencing) are all able to give workers and/or companies additional flexibility to meet their needs, and are diffusing in Europe with considerable (albeit highly uneven) speed [22]. From the point of view of regional development it is of special significance that ICTs increase the ‘spatial flexibility’ of companies as well as workers: Technically it becomes possible to choose locations for work processes more freely. This makes companies more adaptable to changes in their environment. One practical example are the many different types of telework. At another level, increased spatial flexibility allows companies to spread their activities over space which may be regions, whole countries or even the whole world.

The BISER indicators on work organisation are the following:

- *Spread of multi-locational work (telework), intensity (hours spent away from main place of work) and use of ICTs*

  Telework implies a relocation of the workplace, for part or (seldomly) all of the working time, from the traditional site of work to the home of the worker, or an other location (which might be mobile or stationary). It implies, in most cases, more flexibility with regard to time and content of work. There is growing evidence that e.g. mobile and (alternating) home-based telework lead to increases of productivity deriving, in particular, from an increase in employee morale, but also reductions of cost e.g. for office space. Proper statistical coverage of multi-locational and telework requires a survey instrument which adequately captures respondents’ working locations, times of work, and technologies used.
- *Use of information and communication technologies for co-operation with working partners at other locations (tele-cooperation)*

  While teleworking means changing the location of work, ICTs can also considerably change ways of working without a change of place. Through ICTs it has become possible that teams of workers can co-operate in real time regardless of the geographical distance which lies between them. Tele-cooperation means that ICTs such as e-mail, the Internet, audio and video conferencing, or groupware systems are used to coordinate work processes between these remote workers. It is operationalised here by asking workers how often they use e-mail, the Internet and electronic data transfer for communicating with external business contacts (suppliers, customers, etc).
- *Share of organisations which grant staff access to a) e-mail b) Internet browsing c) Intranet d) mobile phones*

  In addition to the sectoral and occupational approach towards measuring the degree to which a regional economy makes use of ICTs (see above), it is worthwhile to take a micro-view at companies and the extent to which they equip workplaces with access to ICTs. Much of the evidence available shows that people that got in contact with ICTs at the workplace are more inclined to use them for private purposes as well, thereby leading to a virtuous circle of skills improvement. For older persons confrontation with computers and the Internet at the workplace is certainly the main way towards overcoming the generation gap in computer user know-how. BISER is piloting a question which asked IT decision makers in establishments whether the majority of their office workers can access e-mail, the Intranet (if existent) and the Internet.

5. Conclusions and outlook

Data from the BISER surveys (see section 3) is not available at the time of writing (June 2003). The analysis will mainly focus firstly on assessing the feasibility and robustness of the indicators, and secondly on finding evidence for the existence or non-existence of relationships between the usage of ICT, traditional determinants of regional development, and economic as well as social outcomes. By this BISER will attempt to contribute towards exploring to what extent ICTs are being applied to diminish, or strengthen, disparities between regions and types of regions across the EU territory.

We want to conclude this paper with some hypotheses derived from the research literature, which will form the backdrop against which BISER will analyse the data.

Empirical research until now has confirmed that real-life applications of ICTs have not yet diminished regional disparities in labour market structure and performance. Rather, the opposite is the case: These new technologies seem to have heightened the gap between economic well-being of the best and the worst performing regions (see e.g. [10][19]). This is, first of all, because neither enterprises in the ICT or multimedia sector (as defined above) nor workplaces which rely heavily on the application of ICTs ("information services"), are equally distributed over space [10]. In line with general observations about the geography of diffusion of innovations [8:126], supply as well as demand for ICT-based innovations tend to originate in the cores of large agglomerations, leading to very large spatial differences in use in the first stage of diffusion, and only then distribute to the hinterland and periphery. As opposed to other key innovations in recent decades and centuries, however, the pace of technological progress in ICTs is so fast that a phase of maturity is unlikely to be reached in the near future, meaning that the centre will go on to enjoy an advantage against the periphery in being at the forefront of technological and organisational innovation.

According to the little empirical evidence that is available, the spread of ICT-enabled innovative ways of working is highly uneven across space, with urban agglomerations accounting for a very high share of "new workers", while rural and peripheral regions are lagging behind [6][17].

The second, and more important reason why ICTs tend to strengthen regional disparities is because of their effect on spatial segmentation of labour markets. Via the application of ICTs in order to make possible new vertical divisions of labour, companies have been able to exploit spatial differences (e.g. in labour supply, wage levels, tax systems, attractiveness and quality of life for high-qualified workers) to an extent that was unthinkable only a few years ago. This leads to an increasing differentiation of space which often strengthens polarisation between advantaged and disadvantaged regions, rather than leading to equalisation of regional imbalances [10].

In addition, it does not seem until now that ICT-enabled increases in geographical mobility of workers (e.g. by the use of electronic labour markets, see [9]) will contribute to faster equalisation of spatial differentials between regions. Available evidence indicates that the already well-off, highly qualified labour force is most likely to exploit the potential of electronic labour markets. Migration of high-qualified is, as has been stated above, believed to contribute to rather than attenuate polarisation between central and peripheral regions.

There are, however, examples of regions that formerly have been disadvantaged by their peripherality, but managed to catch up by benefiting from the possibilities opened up by ICTs. ICT-related new ways of working such as telework, tele-cooperation and multi-locational work seem to play an important role here [16].

At the nation state level, there is also growing evidence that ICTs play an important role in the convergence of levels of economic wealth, for example between EU Member States and the Central European candidate countries. [14] found evidence that countries such as the Czech Republic, Hungary and Poland make above-average use of what they term e-Outsourcing and the provision of e-Services. [22] found that Estonia, in particular, sports a share of teleworkers which is roughly the same as the EU average, and much higher than to be expected given its relative economic wealth.

At the regional level, however, evidence of this kind (i.e. not being based on case studies) is still missing. BISER is an attempt to move forward in this direction.

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