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LANDSCAPE HERITAGE BETWEEN AREAL PRESERVATION AND AREAL DEVELOPMENT – THE CASE OF CZECHIA

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Abstract: In line with recent developments, landscape is not only the object of scientific studies, but is also being included in planning policy and practice. In association with this, a strong sense of landscape as heritage emerges, though the precise meaning of this heritage is always contested. To address this problem, the work described here used the example of the relationship between designated landscape values and recently adopted development areas and axes to show and discuss the way in which landscape heritage is polarized in terms of its value in today's Czechia, as well as what that means for landscape protection.

Keywords: landscape heritage, areal preservation, landscape management, areal development, spatial planning, Czechia

INTRODUCTION

Today, landscape is attracting a great deal of attention, not only in scientific research, but also in physical, spatial, regional or landscape planning policy and practice (Sklenička 2003; Selman 2006). It is also now common for landscape to be looked upon as a specific type of heritage (see European Landscape Convention; World Heritage Convention; Lowenthal 1999; Phillips 1998; compare with Chromý, Jeleček 2005). However, this notion of landscape as heritage brings with it a number of questions that are still not always readily answerable. What do we mean by landscape heritage? Is it worth of recognizing at all? Should it be protected only in selected areas or should it be preserved as a

whole? What is the difference between landscapes in delimited protected areas and landscapes anywhere else?

Many other questions may also arise, especially when it comes to discussing the aims, means and practice of landscape heritage protection and management (see Daugstad, Grytli 1999; Farmer 1995; Howard 2003; Lowenthal 1975, 1978, 1985; Lynch 1972, 2004; Negussie 2004). How should landscape heritage be protected, since its nature is complex and multi-historical (Daugstad, Grytli 1999; Hampl 2000; Löw, Míchal 2003)?

This article has thus concerned itself with landscape heritage protection and management, as represented by areal preservation practice in particular, and its connection with landscape-change management and areal de-

velopment. The meaning of landscape heritage is always contested. Moreover, it is mostly at national level that determinations are made regarding the landscapes to be, or not to be protected. With this in mind, we have sought to use the example of the relationship between designated landscape values and development areas and axes recently identified under the Spatial Development Policy of the Czech Republic (*Politika územního rozvoje České republiky*) in order to show and discuss how landscape heritage is polarized in terms of its values in contemporary Czechia, and what that means for its protection.

LANDSCAPE AS HERITAGE: A SHORT DISCUSSION

We are always able to find something from the past that survives, something we have to cope with, whether it remains a minority feature or not. Inevitably some past to shape our future will be present (Antrop 1997; Marcucci 2000; Třeštík 2003), though it is not always recognised and so may have to be created or discovered (Lowenthal 1975, 1985), by way of a highly selective process (Wishart 1997). It is also through this process that what we term heritage comes into existence.

Heritage includes “everything that people want to save, from clean air to morris dancing, including material culture and nature” (Howard 2003:1; for further discussion of the concept compare for example with Lowenthal 1985, 1998). However it is not stable, it changes through time and “moves through discovery or formation, inventory, designation, protection, renovation, commodification and, sometimes, destruction” (Howard 2003:186). Here, destruction should not only be taken to mean loss of existence by means of violence (for example when a favourite cup is broken), but also the changing of heritage, or a beginning of the appreciation of new things at the expense of previous ones, which are left behind (for an example of shifting attitudes towards the preservation of certain elements, see Negussie 2004). In just the same way, the disfavoured past is mostly

condemned to vanish from our memories (Lowenthal 1993).

Our heritage is inseparable from our past, and deeply rooted therein. It is our heritage, whether good or bad, through which our past directs our future steps (Lowenthal 1985, 1998). Thus our identity, which can also be defined geographically (Chromý 2003; Kuldová 2005; Paasi 1986), is so very much founded on our heritage, that without the latter we would have no stable points around which to form the former. If there were indeed no such points, then the surrounding world would appear to us an ever-changing and unapproachable fuzziness unsuitable for living in. “We preserve signals of the past or control the present to satisfy our images of the future” (Lynch 1972). And it is in recognition of this need for stable points in space and time that we feel moved to protect something that we can constitute an identity around. The landscape we live in may be one such feature.

It now proves possible to distinguish several definitions of and approaches to “landscape” (see for example Anschuetz, Wilshusen, Scheick 2001; Muir 1999; Wylie 2007). Nevertheless, because landscape is all-embracing, unavoidable (Lowenthal 2007) and constantly changing (Schein 1997), the approaches to and opinions about it are so diverse that we may also concede that the content and meaning of landscape is sometimes more likely to be felt than capable of strict definition. Let us take some examples.

Landscape is a whole (Naveh 2000), which is functioning and changing through time (in the view of landscape developed widely by historical geographers and landscape historians and archaeologists, see Darby 1953; Butlin 1993; Baker 2003; Gojda 2000; Bičík, Jeleček, Štěpánek 2001; Muir 2003; Williams 1989; and later also as discussed within landscape ecology and planning, see Antrop 1998; Bürgi, Hersperger, Schneeberger 2004; Lipský 1995; Niewójt 2007; Wood, Handley 2001). Landscape has material substance, and it is directly and indirectly involved in the shaping of our decisions as regards future actions, at times

restricting them, at times making extra opportunities available for them (Hägerstrand 1970, 1989; Pred 1984).

Landscape is as much a part of objective reality as it is a subjective concept. In terms of objectivity, landscape is often defined simply as “the visual expression of the sum of objects and processes in a given locality at a given time” (Emmelin 1996:16) or territory, system, ecosystem or geosystem (as approaches widely accepted in the so-called discipline of landscape ecology; among others Demek 1974; Forman, Godron 1993; Lipský 1998; Míchal 1994; Sklenička 2003) or the complex geographical system (Hampl 2000). In turn, landscape as defined subjectively often comes down to a perceived scenery or symbol shaping our identity (Cosgrove 1985, 1998; Robertson, Richards 2003). Daniels and Cosgrove (1988:1 cited in Ingold 1993:154) argued that landscape is nothing more than “a cultural image, a pictorial way of representing or symbolising surroundings”.

However, landscape is not merely scenery, or “something separate from us” (von Haaren 2002:73; as in the approach that has mostly been developed by architects and planners, among others see Krause 2001; Steinitz 2001). Nor is it only culture, or merely similar to nature (Ingold 1993). For Olwig (1996:630–631), it is neither territory nor scenery, but “can also be conceived as a nexus of community, justice, nature, and environmental equity, a contested territory” (compare this to the concept of the taskscape from Ingold 1993; see also Hägerstrand 1970, 1989 and 1995; Pred 1984). Landscape is an inseparable element of our everyday environment, in which we have to act and live (Hägerstrand 1995; Ingold 1993; Žák 1947). “And through living in it, the landscape becomes a part of us, just as we are a part of it” (Ingold 1993:154).

However diverse the approaches to landscape may be, the aforementioned observations sustain the conclusion that landscape is a perceived entity within which and with which we interact through our everyday practice. It is a perceived and dynamic

whole (Antrop 2000) whose meaning is not confined to the scenerical (Cosgrove 1985, 1998), but also extends to the territorial (Olwig 1996, 2002). It has its form, function and value (Selman 2006), and we are an inseparable part of it, but we are also simultaneously able to distinguish ourselves from it (Tress, Tress 2001). And since landscape is mainly perceived visually, and thus becomes a more or less favourable part of our heritage if recognised, it is something important to and/or for at least some of us. It is in turn for that reason that landscape - through its connection with quality of life - needs protection, management and planning (the European Landscape Convention).

AREAL PRESERVATION AND LANDSCAPE HERITAGE IN ITS TRADITIONAL MEANING

Areal preservation is perhaps one of the most significant forms of landscape protection. In its traditional meaning it may be defined as a more or less successful management of certain characteristics or elements in particular areas selected and delimited for its protection, and these areas may be divided into several categories in line with the purpose of designation (e.g. natural or cultural, large or small, devoted to the protection of overall character or individual elements). The areas in question are usually defined by particular laws. In the case of Czechia these are in particular the law on the protection of cultural heritage (Zákon č. 20/1987 Sb.), in the case of cultural heritage areas; and the law on the protection of nature and landscape (Zákon č. 114/1992 Sb.) in the case of natural heritage areas.

Since protected areas mainly provided for in the aforementioned laws, in the case of Czechia, are believed to be of exceptional heritage value worthy of protection, areal preservation is usually then thought of as a range of activities proposed and guaranteed by special institutions created to guarantee that the objectives of protected area designation are achieved. This in turn accounts for

such protection sometimes being perceived as posing unnecessary restrictions on areal development (though some argue that this must not always be the case, see for example Pelc 2001).

In Czechia the protection of the landscape as such is mainly connected historically with the protection of nature (see for example Voženílek a kol. 2002; Němec, Pojer, eds. 2007). This explains why the concept and meaning of landscape is often confused with that of nature, and even finds expression in the existing legislation. For example, the direct protection of the character of the landscape under the law on the protection of nature and landscape (Zákon č. 114/1992) also implies that, in the protection, management and planning of the landscape, the idea of nature is more important than that of culture. On the other hand, this law is the only one in Czechia to deal with the issue of the landscape explicitly, defining it as a “part of the earth’s surface with characteristic relief, and the collection of functionally interconnected ecosystems”. By virtue of this law, the protection of the landscape and its character is also one of the main purposes of the designation of some, especially large scale, natural protected areas (such as National Parks, Landscape Protected Areas or Natural Parks). In the other laws the issue of landscape is treated only implicitly, the word landscape as such never being used (see also Kučová 2006).

Special aspects of landscape planning and management, and the protection within the wider landscape of a significant part or ensemble (i.e. a complex entity composed of different elements and forming a whole recognisable structure or unit [with] complex composition [and] a meaningful structure”, Antrop 1997:112) are treated by many other laws, such as the law on the protection of cultural heritage (Zákon č. 20/1987 Sb.). The decision was even taken to recognise the category of landscape cultural heritage zone (of which there are 19 to date), the aim here being to protect landscape units of significant cultural value. However, no obligatory principles as to how to manage these zones have yet been drawn up (Kučová 2006). Overall

then, notwithstanding the growing need for disciplinary and institutional boundaries to be overcome when it is the landscape that is being dealt with (in line with the European Landscape Convention approach; see also Selman 2006), the Czech landscape still has to be regarded as more of a particular sectoral interest, than the subject of interdisciplinary discussion. Inevitably, it is the environmental and ecological dimensions that are more often discussed and highlighted than any of the others.

CREATING A TYPOLOGY OF AREAS ACCORDING TO THEIR LANDSCAPE VALUE

Nevertheless, given the societal importance of protected areas in the representation of landscape values, the data about existing protected areas may be used as an indicator for the delimitation of the most valuable landscapes on the national level. Likewise, the investigation of its distributions in relation to other areas like development areas and axes may have something to say about the way we currently understand the terms landscape protection, management and planning. It was to this end that a simple typology of Czech territory in line with the importance of areal preservation was first created. The way in which this was done, and the results it yielded, are presented below, while the results are discussed in detail in the next chapter.

It is our contention that the typology referred to may reveal the locations of the most valuable landscapes at national level in Czechia. However, two major problems had to be overcome to achieve this goal. First, the most valuable landscapes, and the protected areas representative of them are different spatial units from the development areas and axes, and do not necessarily have similar boundaries. Since just such a comparison of spatial distributions was required, it was necessary to base further work around to some kind of reference units. Second, the two major groups of protected areas are each devoted to the protection of very different kinds

of heritage, i.e. natural and cultural (notwithstanding the at-times similar attributes of these types of heritage, see Lowenthal 2007). Furthermore, each group has several types of area with specific aims of protection.

The above are the reasons for the significant degree of generalization that had to be applied as the typology was created. This is clear from the discussion of the proposed solutions to each of the said problems set out below.

For the purposes of our typology, and its further comparison with the development areas and axes, it was districts of municipalities with extended competences (hereinafter referred to as municipalities) that were used as the spatial reference units. Fig. 1 presents these units, along with major regional boundaries and the locations of cities. However crude and arbitrary this solution may seem, there are several important reasons for applying it. It was after all these units that the Czech government used recently in delimit-

ing Czechia's development areas and axes. Furthermore, these areas have gained detailed definition and description in the Spatial Development Policy of the Czech Republic (*Politika územního rozvoje České republiky*), the discussion of which will occupy the next chapter. It is thus to the districts of municipalities with extended competences that we need to turn in seeking to compare delimitation of the most valuable landscapes with that of the development areas and axes (see below). In accordance with the new law on physical planning (*Zákon č. 183/2006 Sb.*) municipalities also play an important role in the process whereby local physical plans are drawn up and implemented. These units are thus not merely particular administrative territories, but also powerful policy bodies when it comes to the shaping of local landscape. Last of all, the units in question also identify most readily with the separately determined natural socio-geographical regions (Burda 2003; Hampl 2005).

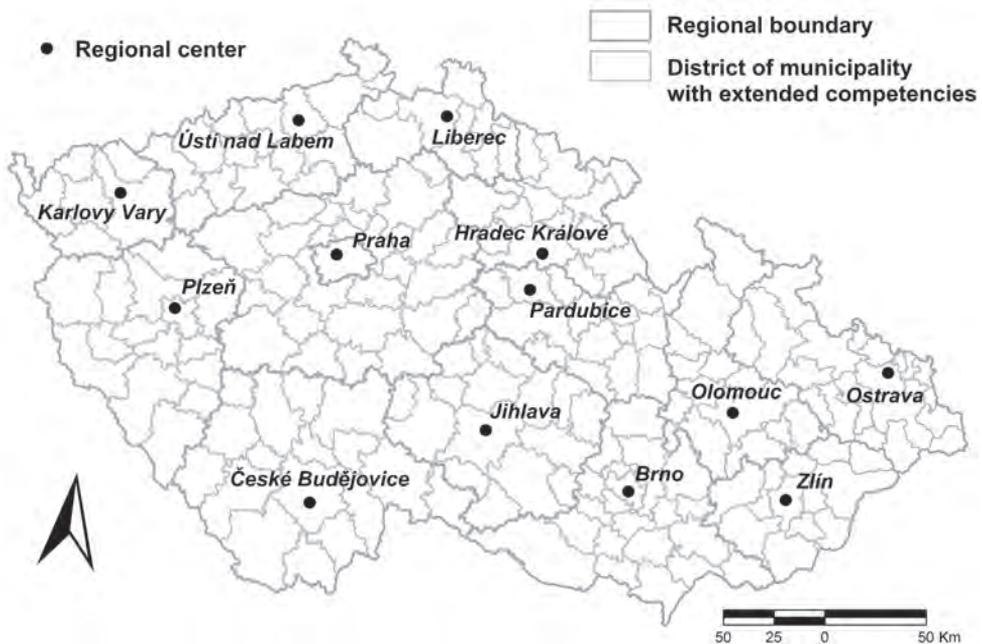


Figure 1. Municipalities with extended competences, major regions and their centres, Czechia, 2003. Source: Based on data from the ARC ČR 500 database.



Figure 2. Protected areas selected as indicators of designated landscape value.

Source: Authors' elaboration, after Zákon č. 20/1987 Sb., Zákon č. 114/1992 Sb. and data provided by the Agency for Nature Conservation and Landscape Protection of the CR and the National Monument Institute.

As mentioned, the proposed typology regarding the importance of areal preservation is based on data about selected areas protecting both natural and cultural heritage. Its main presumption is that landscape is most valuable there, where it is most intensively protected. Thus, the larger the share of a municipality's area that is taken by protected areas of different categories, and the larger the number of such areas, the more valuable the landscapes involved can be considered to be. For the purpose of our study, data on the spatial distributions of the several types of protected areas defined by above-mentioned law (on the protection of cultural heritage, *Zákon č. 20/1987 Sb.*; and on the protection of nature and the landscape, *Zákon č. 114/1992 Sb.*) were used to indicate designated landscape value. The selected areas as well as their relationships are as listed in Fig. 2. As is clear from this picture, a current lack of data on natural heritage areas designated within the *Natura 2000* network

unfortunately made their incorporation in the study impossible. In practice, however, this should not distort the results of our typology too much, since there is significant overlap between the said areas and special protected areas of other types. The spatial distribution of selected protected areas - excluding the ones too small to be displayed clearly - is as in Fig. 3. Due to a lack of data, cultural heritage zones and reservations had to be displayed using point data, even though these are in fact territorial units.

In the next step, the above data were used to calculate the importance of areal preservation in each municipality, for natural and cultural heritage separately. In the latter case, the value derives from the density of the selected protected areas, while in the former the basis is the sum of percentage shares for different protected areas within the total area of the given municipality. Put more precisely, the importance of cultural heritage protection was calculated as

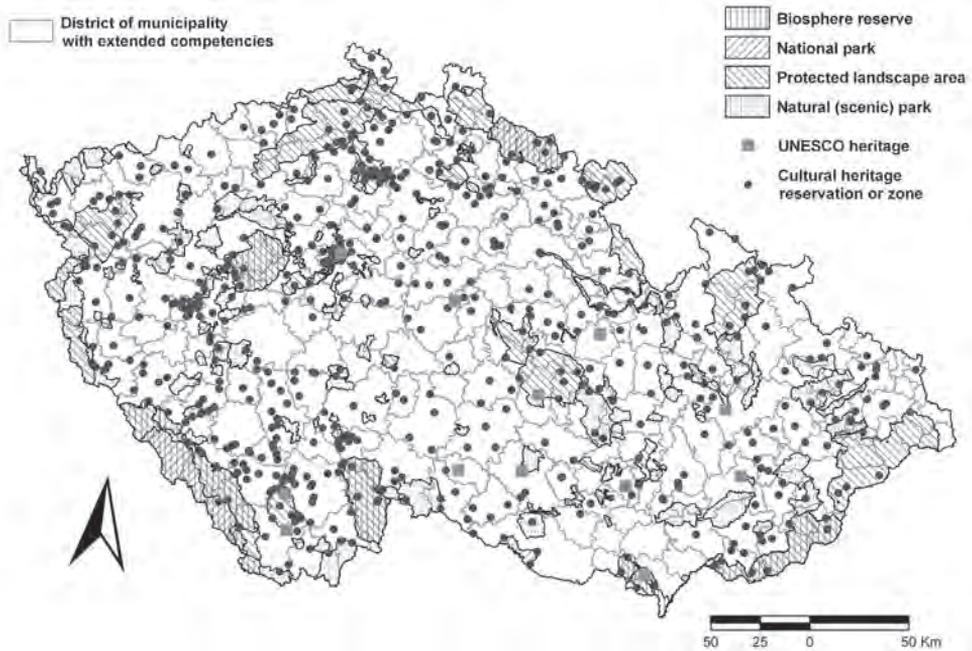


Figure 3. Protected areas selected for the creation of the typology, Czechia, 2007.

Source: Authors' elaboration, using the ARC ČR 500 database and data provided by the Agency for Nature Conservation and Landscape Protection of the CR and the National Monument Institute.

$$ICH = (NCHA/AREA) * 100$$

where ICH is the importance of the areal preservation of cultural heritage in a particular municipality, NCHA the total number of cultural heritage reservations, zones and UNESCO World Heritage Sites and AREA the total area of a particular municipality in square kilometres.

The importance of natural heritage was in turn calculated as:

$$INH = \%BR + \%NP + \%PLA + \%NSP + \%SSPA$$

where INH is the importance of the areal preservation of natural heritage in a particular municipality, %BR the percentage share of the whole given municipality falling within Biosphere Reserves, %NP the percentage share of the municipality area falling within National Parks, %PLA the percentage share of the municipality falling within Protected

Landscape Areas, %NSP the percentage share of a municipality falling within Natural (scenic) Parks and %SSPA the percentage share of a municipality's area falling within small special protected areas.

The above procedures supplied two separate sets of discrete values representing the importance of cultural or natural heritage preservation in each municipality. However, the fact that values for each of the sets were calculated using different methodologies necessitated standardization for the purposes of comparison. This was achieved using the formula:

$$SV = (NV/HV) * 200$$

where SV is the standardized value of either ICH or INH, NV the value of ICH or INH calculated using the above methodology and HV the highest value of ICH or INH in its set. Following this transformation, values for the importance of the areal preservation of cultural or natural heritage were rendered

comparable for each municipality district, the range of values being 0 to 200. Using these standardized values, the overall importance of areal preservation (as the sum of standardized ICH and INH) could be gauged for each municipality district, and comparisons of the importances of natural and cultural heritage preservation made, in terms of the difference between standardized INH and ICH. Finally, for the purposes of further comparison, each of these sets of standardized values was further divided into three main categories (the spatial distributions being shown in Figs. 4 and 5; see also Tables 1 and 2).

PROTECTED AREAS REPRESENTING VALUABLE LANDSCAPES

The results obtained with the typology described above, presented in Figs. 4 and 5, were the subject of further observations.

Landscapes of high value tend to be located either in the borderland, where there is a very strong tradition of protecting natural heritage (as in all four of Czechia's National Parks of České Švýcarsko, Krkonoše, Podyjí and Šumava; and also most of the country's Protected Landscape Areas), or else in areas with significant intersection of valuable natural and cultural features (as at Kokofínsko and Třeboňsko) (see Fig 5). Of specific importance is the area of the capital city, Prague, with its exceptional concentration of cultural heritage. On the other hand, districts of moderate or limited importance when it comes to areal preservation are mainly found in the country's interior, which consists of either intensively-used agricultural or urbanised areas (as in lowlands along the Labe and Morava), or else traditional peripheral rural areas (like the middle Bohemian upland south of Prague). In these areas the position of areal preservation as defined above is rath-

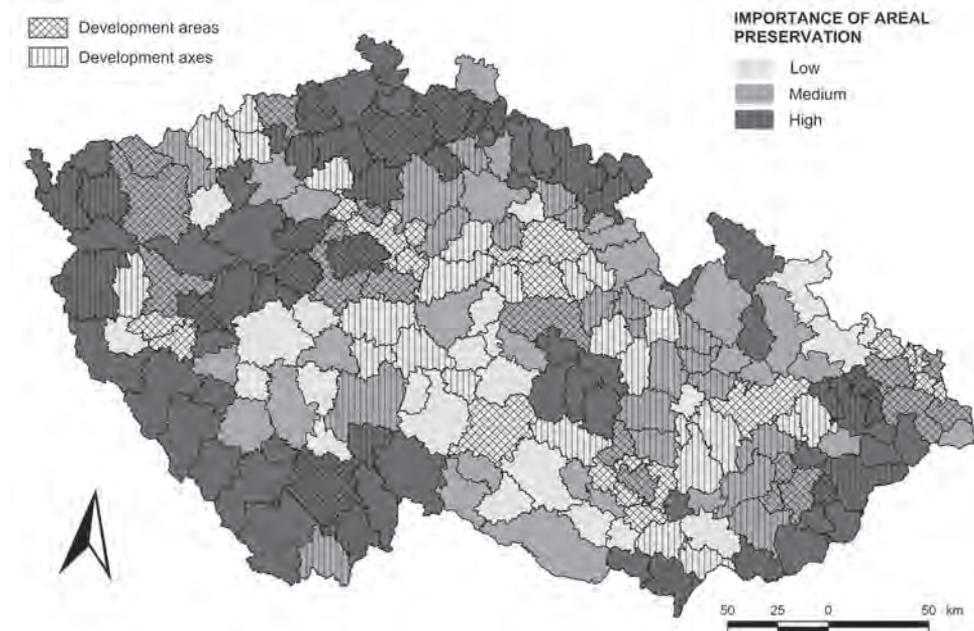


Figure 4. Overall importance of areal preservation compared to development areas and axes, districts of municipalities with extended competences, Czechia, 2007.

Note: For a description of the way in which the displayed types were constructed, see text.

Source: Authors' elaboration, using the ARC ČR 500 database and data provided by the Agency for Nature Conservation and Landscape Protection of the CR and the National Monument Institute.

Table 1.

Overall importance of areal preservation as compared to development areas and axes, districts of municipalities with extended competences, Czechia, 2007

| | Number of municipalities | | | |
|------------------------------|--------------------------|--------|------|-------|
| | Low | Medium | High | Total |
| Development area or axis | 43 | 38 | 32 | 113 |
| Non-development area or axis | 22 | 28 | 43 | 93 |
| Total | 65 | 66 | 75 | 206 |

| | Percentage share (%) of municipalities | | | |
|------------------------------|--|--------|-------|--------|
| | Low | Medium | High | Total |
| Development area or axis | 20.87 | 18.45 | 15.53 | 54.85 |
| Non-development area or axis | 10.69 | 13.59 | 20.87 | 45.15 |
| Total | 31.55 | 32.04 | 36.41 | 100.00 |

Note: For a description of the way in which the displayed types were constructed, see text.
Source: Authors' elaboration.

Table 2.

Difference in the importance of the preservation of natural and cultural heritage as set against development areas and axes, districts of municipalities with extended competences, Czechia, 2007

| | Number of municipalities | | | |
|------------------------------|----------------------------|-----------------------|---------------------------|-------|
| | Cultural heritage prevails | Importance is similar | Natural heritage prevails | Total |
| Development area or axis | 28 | 62 | 23 | 113 |
| Non-development area or axis | 17 | 38 | 38 | 93 |
| Total | 45 | 100 | 61 | 206 |

| | Percentage share (%) of municipalities | | | |
|------------------------------|--|-----------------------|---------------------------|--------|
| | Cultural heritage prevails | Importance is similar | Natural heritage prevails | Total |
| Development area or axis | 13.59 | 30.10 | 11.16 | 54.85 |
| Non-development area or axis | 8.25 | 18.45 | 18.45 | 45.15 |
| Total | 21.84 | 48.54 | 29.62 | 100.00 |

Note: For a description of the way in which the displayed types were constructed, see text.
Source: Authors' elaboration.

er weak (see Fig. 4), notwithstanding the fact that these are actually the most common and typical landscapes in Czechia.

There are nevertheless several reasons why the results of our typology should be interpreted with care. The protected areas studied are very heterogeneous in their actual significances and purposes. Moreover, we are

combining the preservation of natural and cultural heritage, in spite of the fact that the aims and goals of protecting these may be very different (see, for example, Lowenthal 2005). Mention should also be made of the very uneven distribution of protected areas. First, most protected areas are either in the cores of towns and villages or around the borders of adminis-

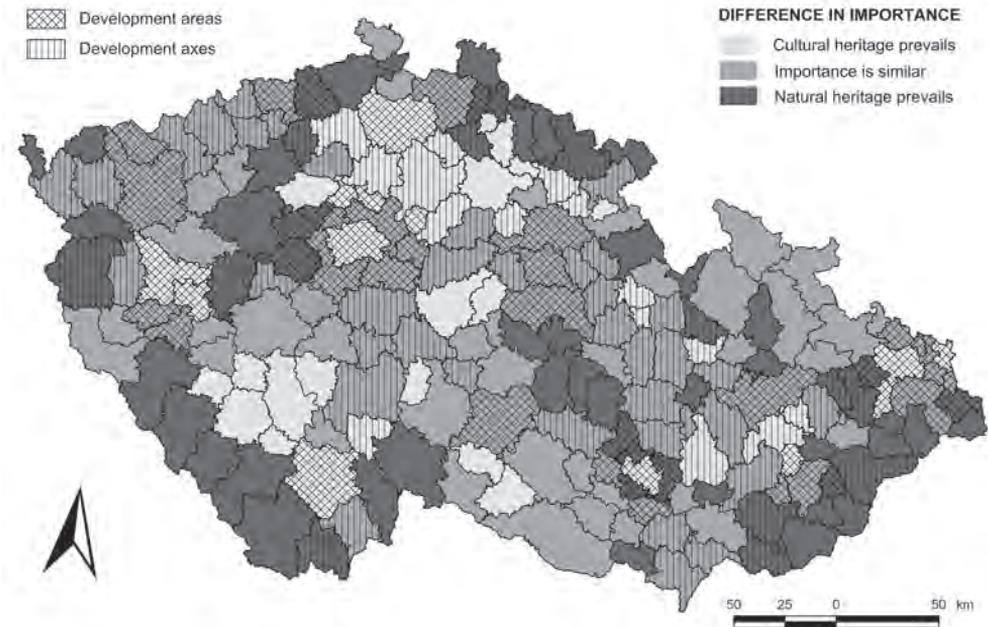


Figure 5. Differences in the importance of the preservation of natural and cultural heritage as compared with development areas and axes, districts of municipalities with extended competences, Czechia, 2007. Note: For a description of the way in which the displayed types were constructed, see text. Source: Authors' elaboration, using the ARC ČR 500 database and data provided by the Agency for Nature Conservation and Landscape Protection of the CR and the National Monument Institute.

trative units. The most intensive protection has thus been extended to areas shaped directly by human action or in peripheral or marginal locations which were little affected by human action. Second (and even more importantly for our discussion), there are very few areas in Czechia with significant overlap between areas designated to protect cultural heritage on the one hand and natural heritage on the other. This statement should be supported by Figs. 6 and 7, showing the share of cultural heritage protected areas located within large-scale natural heritage protected areas (i.e. Biosphere Reserves, National Parks, Protected Landscape Areas and Natural Parks) within the different municipalities with extended competences (cf. Fig. 1). Our typology's classification of many units as areas of high value (see also Table 1) should thus be interpreted cautiously. The typology shows only the general values ascribable to particular areas. Taking all these comments into consideration, we

may conclude that, while our investigation is successful in showing general gradients to the importance of areal preservation in Czechia, it says very little about the importance of particular landscapes at regional, to say nothing of local, level.

Moreover, while our typology is adequate in revealing the locations of exceptionally valuable landscapes, it has nothing to say about the value of these or any other landscapes as perceived through everyday experience. In other words, it says more about how these landscapes are perceived nationally (from the perspective prescribed by an admiration for certain valuable features), than it does about "real" appearance and the problems which may actually be experienced directly by those living in or near them.

On the other hand, it remains debatable just how important everyday landscapes are to the common discourse about contemporary landscape values and to the forming of

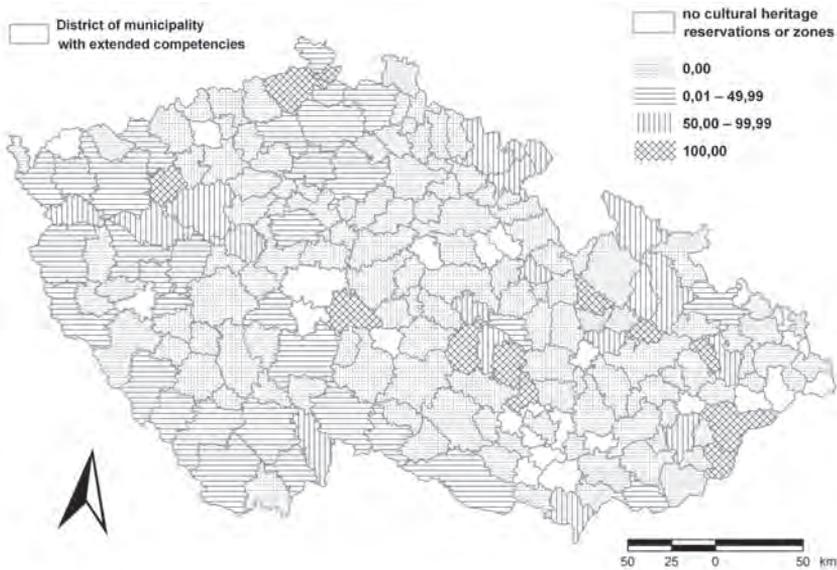


Figure 6. Percentage share of cultural heritage protected areas located within large scale natural heritage protected areas from the total number in a particular district of a municipality with extended competencies, Czechia, 2007. Source: Authors' elaboration, using the ARC ČR 500 database and data provided by the Agency for Nature Conservation and Landscape Protection of the CR and the National Monument Institute.

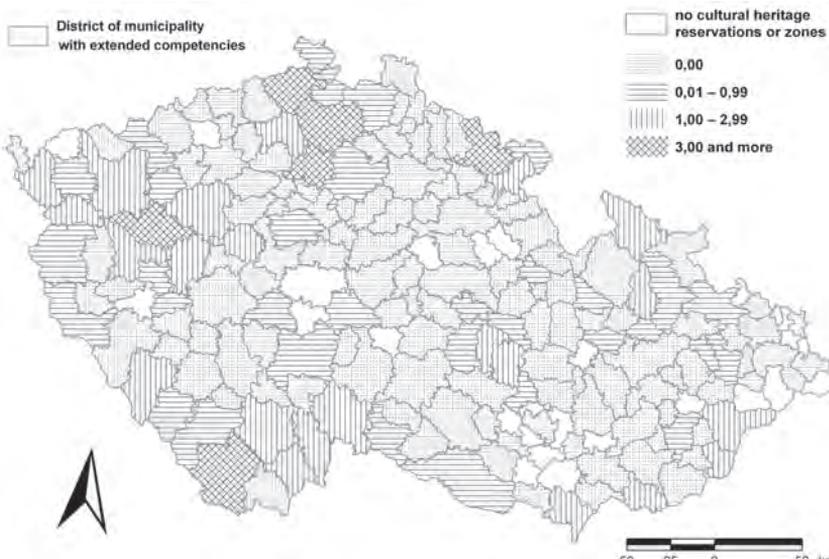


Figure 7. Percentage share of cultural heritage protected areas out of the total number of cultural heritage protected areas located in large-scale natural heritage protected areas in Czechia, districts of municipalities with extended competencies, 2007. Source: Authors' elaboration, using the ARC ČR 500 database and data provided by the Agency for Nature Conservation and Landscape Protection of the CR and the National Monument Institute.

collective taste as regards landscape. Consider, for example, the recent publication on Czech landscape (Němec, Pojer, eds. 2007) published with the support of the Ministry of the Environment of the Czech Republic, which again implies that the best landscapes are those under some kind of protection. The value of common landscapes is scarcely mentioned. How to bring common landscapes to the fore is thus an issue open to future discussion (this being, not merely a Czech problem, but also a wider theme discussed across Europe; see for example Gallent, Andersson, Bianconi 2006; Jones 2007; Selman 2006).

In concluding with this part, one has to recall that, for all the above-mentioned reasons (and probably others too), the typology detailed is to be treated as a means rather than the result of our research. Certainly it requires further discussion – as will be made possible by future research in selected case-study areas.

DEVELOPMENT AREAS AND AXES, LANDSCAPE VALUES

It is usually as set against protected areas that development areas and axes are distinguished. In the case of Czechia, these were recently proposed and defined by the government in the so-called Spatial Development Policy of the Czech Republic (*Politika územního rozvoje České republiky*). The main purpose of this document is to set priorities for spatial planning at national level. In accordance with it, the territory of Czechia is divided into four types of area at the level of districts of municipalities with extended competencies, i.e.: 1) development areas, 2) development axes, 3) specific areas and 4) other areas (see Fig. 8).

The delimitation of areas of types 1 and 2 is very much dependent on the spatial distribution of the major regional centres and most important transport corridors. Specific areas (3) are in turn territories with a significant problem especially connected with their location, in practice mostly peripheral or near some urban agglomeration. The other areas

(4) are simply those that do not fall into any other category.

However, what concerns us here is not the definition and delimitation of these areas, but the fact that the development areas and axes in particular were defined as territories in which activities of national and international importance might be concentrated, in order that the character and value of other areas might be maintained. Might that mean that landscape in such development areas and axes is expendable or worthless? Is it appropriate for the landscape here to become “lost” (after Arnesen 1998), even if it comprises 53 % of the total area of Czechia, and holds 73 % of its inhabitants?

In seeking an answer to this question, the typology of municipalities based on the importance of areal preservation was compared with the delimitation of development areas and axes as explained above. The results of this comparison are as shown in Figs. 4 and 5 and Tables 1 and 2.

The data presented in these tables yield two general trends. Whereas landscapes of low ascribed value are more often found in development areas or axes, those of high value rather tend to be located in non-development areas (see Table 1). There are of course development areas and axes in which areal preservation is very important, alongside those in which it is not (see Fig. 4), but, while cultural heritage is more important in development areas and axes, it is natural heritage that prevails elsewhere (see Table 2; cf. Fig. 5). This finding recalls the above comment that protected areas are located more peripherally. Equally, where sites are in core areas, they are more often representative of cultural than of natural heritage, or else the importance of the two types of preservation is similar (see Table 2 and Fig. 5). Of course, there are some protected areas of natural heritage located in core areas, but these are frequently small-scale, embracing only selected landscape features. Thus, taking account of the fact that natural protected areas may involve whole landscapes (as in Biosphere Reserves, National Parks and Protected Landscape Areas) while cultural heritage areas are

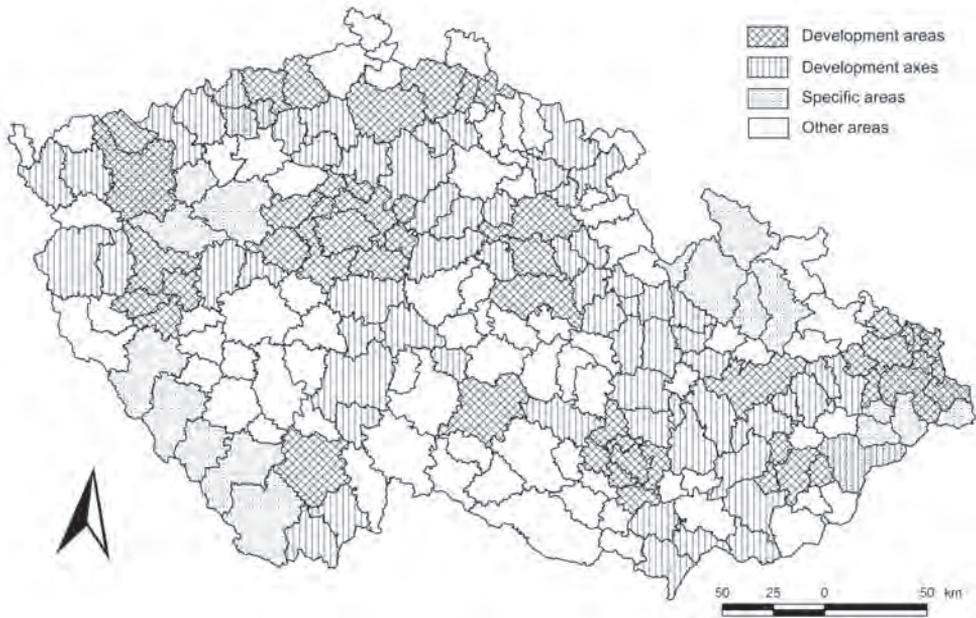


Figure 8. Types of area proposed by the Spatial Development Policy of the Czech Republic, districts of municipalities with extended competences, Czechia, 2007.

Note: For a definition of the areas displayed, see the text.

Source: the authors' elaboration, using the ARC ČR 500 database, with delimitation of development areas and axes and specific areas after *Politika územního rozvoje České republiky* [The Spatial Development Policy of the Czech Republic].

comparatively very small, we may say that landscapes outside densely-populated areas tend to be protected as a whole. We may also conclude that, unlike in some areas around them, landscape in core areas is only directly protected through management of significant elements, or comparatively very small areas.

As we have tried to show, the landscape of Czechia is polarized in terms of how it is perceived at national level, being recognized and having particular values attached to it. The regulation of development activities to protect the most valuable landscapes is of course a worthy goal, but the definition of that goal must not lead to an implicit assumption that remaining landscapes are valueless, as the above mentioned definition of development areas and axes adopted in the Spatial Development Policy of the Czech Republic would seem to do. This is critical because the landscapes in question are the ones in which

most people spend most of their lives. We should not forget that the designation and management of protected areas is rather one particular form of areal preservation. The next chapter therefore addresses what the definition of areal preservation should in our opinion be.

AREAL PRESERVATION – PLACE FOR AN ALTERNATIVE DEFINITION?

In the light of the above statements, we advocate another view of areal preservation. While of course imposing restrictions on selected activities in particular areas, areal preservation should be also seen as an instrument with which to prevent over-intensive environmental change. In this way it contributes to areal development by facilitating the successful adaptation of the organisms,

including humans, living in an area to new circumstances. Recently, it has also been argued that any landscape has some (heritage) value and may be worthy of protection (see for example the European Landscape Convention), thus areal preservation should not be connected only with selected protected areas (Selman 2006). Instead it should be regarded as an inherent part of the management and regulation of changes in the landscape as a whole, being directly applied through protected areas designation (Powell, Selman, Wragg 2002; Selman 2006) and indirectly through other tools used in (spatial, physical, regional or landscape or any way it may be termed; see Hall 1992) planning policy and practice. Whereas direct tools, the designated protected areas itself, are used in protecting a particular part or parts or else the character of landscape(s) guaranteed by the state, indirect tools are taken to mean all other instruments not primarily created for the purpose of protection. Although being defined for different purposes (to the extent that they are applied separately via own institutions and modes of application in Czechia), these tools are or should be used together in practice.

Understood thus, areal preservation embraces, not only particular activities or tools, but also attitudes towards our everyday environment, the landscape we live in (see for example *Chromý* 2003). The definition thus arrived at is not far removed from the concept of “environmental humility” suggested by Relph (1981), or the opinion of Michal (2001), who stressed the need for a definite change of attitude from conservation to management in areal preservation, for expansion of the protection of nature and the landscape into “growing nature” and, most importantly, for simultaneous care for the natural and cultural values of landscape as the human environment.

Needless to say, the application of areal preservation in the manner defined above faces its fair share of obstacles. The first is the tension between conservation and planning as two separate approaches to areal preservation. Although this distinction may

seem arbitrary - since conservation can also be seen as planned activity - the conservation approach in our meaning is one that allows no change, trying to maintain objects or things in some ideal state or character. Yet landscape, even in protected areas, changes continually through time, as do human needs and preferences as regards particular landscapes. This fact renders conservation on the landscape scale neither useful, nor even achievable in the long term. That is why it is not successfully applicable to large areas or even landscapes (Farmer 1995). In fact, being highly selective, it has usually been applied to particular landscape elements only. Planning also regulates changes, but while conservation regulates them absolutely, planning allows for them and is not so selective, determining only general conditions for development. Neither of these approaches is good or bad, better or worse, so they should deliberately be applied in combination.

The second obstruction is the difference between natural and cultural heritage (e.g. as these terms are defined in The World Heritage Convention). Both are present in the wider concept of landscape heritage (as, for example, in the European Landscape Convention; *Michal* 2001). But what is remarkable about these two types of heritage is that they are usually protected and managed separately, under their own institutions and modes of application. This means that they are treated as disconnected in significance, policy and practice, the connections obviously existing between them thus mostly going undiscussed and unrecognised. We contend that, notwithstanding the clear differences, natural and cultural heritage also share many similarities. This is not to say that they will not arouse different expectations ultimately (as *Lowenthal* 2005 showed). Should landscape heritage really be treated as a simple combination of natural and cultural heritage (see also the European Landscape Convention, stating that: “landscape (...) is a basic component of the European natural and cultural heritage”). Or is landscape heritage in fact something special, peculiar and original?

CONCLUSION

Landscape heritage is to some degree a synthesis of natural and cultural heritage (Lów, Míchal 2003; Míchal 2001). And areal preservation is one of the main tools by which we manage that landscape heritage, as well as changes in the landscape. Indeed, the focus should not merely be on conservation (of the character, characteristics or elements in some area, for example), but should rather be a tool for – and an inherent part of – areal development. There needs to be an attitude adopted towards the management of the landscape as a whole, since landscape is important in areas not exposed to certain kinds of development, as well as in those that are.

However, despite some recent discussions and developments, the above definition of areal preservation is far from being fully adopted in Czechia. This is not least because (as we have tried to show in this article), the Czech landscape is polarized, not only in terms of core and periphery (Havlíček, Chromý, Jančák, Marada 2005; Musil, Müller 2008), but also as regards value attached at the national level. Landscapes least affected by contemporary human action are believed to be the most invaluable, and are therefore recognized more often and protected the most intensively. This is largely done in relation to natural heritage, though in many cases these are human-induced and thus cultural landscapes. The trend is sustained by the definition of development areas and axes given recently by the government, in the Spatial Development Policy of the Czech Republic. We read there that development areas and axes are devoted to the concentration of activities of national and international importance, with a view to the character and value of other areas being maintained (*Politika územního rozvoje České republiky*). This definition implies that development areas and axes cannot have such valuable features in them as do areas around them, and it overlooks the fact that, since most people live within the said areas and axes, it is their landscapes that are the everyday ones for a large part of the population. If every land-

scape has its value (as the European Landscape Convention provides), then these landscapes too should concern us, not merely the ones present in protected areas.

But, as our case also shows, the delimiting of valuable landscapes is always a political act (Fall 2002). And given the fact that there will hardly ever be sufficient general rules for distinguishing valuable landscapes (Lowenthal 1978), the ways to bring about landscape protection in practice will always be subject to discussion (Daugstad, Grytli 1999; Farmer 1995; Phillips 1998; Palang, Kaur, Alumäe, Jürimäe 1999; Selman 2006). If we recognize landscape as an important part of our environment, we should not forget to question whether landscape heritage is the combination of cultural and natural heritage or something specific. We should also ponder for whom and for what landscape heritage is important.

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TYOLOGIES OF EUROPEAN URBAN – RURAL REGIONS: A REVIEW AND ASSESSMENT*

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Abstract: The existing typologies of rural-urban regions can be divided into three categories, based on different criteria that refer to alternative concepts of the region and of urban–rural relations. The first category is represented by studies in which the hierarchical structure of rural–urban regions is exposed, as determined by the functional profile as well as the range of functions performed, the population potential, and the political and administrative status of the main urban centre. The second category comprises typologies based on criteria related to level of urbanization, i.e. the extent to which a given area has an urban vs. rural character. These typologies also tend to include criteria related to spatial forms – the morphology of settlement, as well as the density and redistribution of population. Typological studies in the third category focus on the interdependence of, and interaction between the urban, peri-urban, and rural zones of rural–urban regions. Studies of the latter kind are rather rare, owing to their exacting requirements as regards data, in particular with respect to flow data.

Key words: urban-rural regions, regional typologies, functional urban regions, peri-urban areas.

URBAN AND RURAL-URBAN REGIONS: BASIC CONCEPTS

A review and assessment of regional typologies has to be preceded by a reflection on the underlying concepts of the region. Specifically, it is important to position the particular notions, as mirrored by individual typologies, within the spectrum of regional concepts, with their mutually-overlapping definitions.

The *region* – originally a natural science concept, coexisted until the middle of the 20th century with the notion of *landscape*

(*Landschaft*). Its earlier interpretation in terms of an objective entity was challenged by Alfred Hettner (1927) and Richard Hartshorne (1939). A distinction between natural (formal) and functional regions, introduced by the latter author, was elaborated by Darwent Whittlesey (1954) who proposed an alternative dichotomy – between uniform and nodal regions. While the former are homogeneous, the nodal regions display an internally differentiated structure consisting of a focus, or foci, and an adjacent area connected with the focus by lines of circulation. Similarly, Rob-

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ert Dickinson (1947), who identified functional regions with city regions, listed focality, interconnection and spatial discontinuity among their main attributes.

One of characteristic features of clusters of regions, and of groupings of functional regions (city regions) in particular, is their prevailing hierarchical pattern. Hence, Walter Christaller's (1933) model of central places, with the surrounding market areas, represents a hierarchical system of functional (city) regions. The hierarchy is depicted here in its strict sense, as centers of a given rank, in addition to their specific functions, also perform all the functions of the lower-order centers. Since they are typically composed of both urbanized and non-urbanized territory, the functional (city) regions, including Christaller's market areas, may be interpreted as *urban-rural regions*. Conversely, the classical model of agricultural land use by Heinrich von Thünen (1826) is a prototype of the *rural-urban* region, with its urban component represented by the centrally-located market place.

Similar conclusions apply to a number of specific concepts of urban and metropolitan regions that have developed in response to analytical, as well as planning and statistical, needs. In such concepts, the basic limitations of the classical theory of urban networks are addressed: its static character, a point-like representation of urban areas, the inability to interpret the presence of clusters of urban-industrial centres, and the failure to explain the phenomena of suburbanization and peri-urbanization, including spatial decentralization of tertiary and quaternary functions.

Studies of human settlement patterns have long been revealing, not only regular configurations, but also transitions from one spatial structure to another, following social and economic development. This was the essence of the concept of the metropolitan community formulated by R. D. McKenzie (1933), and based on earlier work by R. Blanchard (1911), N. S. B. Gras (1922) and P. Geddes (1915). It was the latter author who noted that urban growth results not only in economic dominance of smaller towns by

metropolitan centers, but also in the physical integration of large urban areas, and the formation of conurbations. McKenzie's contribution was to demonstrate the interrelations between the growth of a city as an economic organism and its territorial expansion and internal rearrangement of functions, leading to the state in which a metropolis becomes identified with the former hinterland of the principal urban centre, while the population occupying the whole territory becomes functionally integrated to form one metropolitan community.

The rapid development of transportation during the 20th century, and the resulting increase in spatial mobility of people, followed by the growing mobility of institutions were seen as the principal factors behind metropolitan development. Successive waves of suburbanization and exurbanization have generated further intensification and expansion of the spatial range of interactions on an ever-larger scale of *urban fields* (J. Friedmann and J. Miller, 1965), or *daily urban systems*. (B. J. L. Berry, 1973). These assumptions have found an echo in the contemporary concept of the urban region as a "flow-place" from M. Castells (2000). Earlier, the sequence of phases of population concentration and deconcentration in cores and peripheral zones of urban regions was interpreted by L. von den Berg *et al.* (1982) and by P. Hall and P. Hay (1980), in terms of the concept of stages of urban development.

An extension of the idea of metropolitan community onto a national scale led to the hypothesis of metropolitan dominance and to the concept of the *metropolitan region* (D. J. Bogue, 1959; O. D. Duncan *et al.*, 1960). Specifically, it was hypothesized that metropolitan centers tend increasingly to dominate the social and economic organization of technologically-advanced societies. In consequence, national territories can be divided into sets of metropolitan regions in an exhaustive way, while the description of national spatial economies may be based upon an analysis of interdependence among the major metropolitan areas. Such an approach was found congruent with the

more recent theory of national urban systems (L. S. Bourne, J. R. Sinclair and K. Dziewoński, 1984), according to which in all highly-urbanized societies, inter-metropolitan linkages provide the basic framework for the spatial organization of national territory – both the functioning of the economy and the territorial structure of power.

D. L. Jaquinta and A. W. Drescher (2000) have proposed an extended definition of the peri-urban component of the urban–rural region, or of the rural–peri-urban–urban system. They assume that, in terms of migration in particular, the peri-urban environments play a mediating role between rural and urban areas. Such environments are places of dynamic social change. Using this perspective, the authors have developed a conceptual typology of peri-urban areas, consisting of the following forms:

- *Village peri-urban,*
- *Diffuse peri-urban,*
- *Chain peri-urban,*
- *In-place peri-urban,*
- *Absorbed peri-urban.*

EARLY TYPOLOGIES OF EUROPEAN CITIES AND URBAN REGIONS

During the 1970s there was growing interest in international comparative research on cities and urbanization processes. The notion of the European Urban System which at that time was already present in the professional literature (P. Hall and P. Hay, 1980), was initially used as an anticipatory concept, a counterpart to the concept of the American Urban System (B. J. L. Berry, 1973). At that relatively early stage of European integration there was only limited justification for the study of inter-urban linkages and interaction across national boundaries, and of the international hierarchy of cities. Therefore, such studies were rare and of rather restricted territorial extent (a notable exception was the study by G. Tornquist, 1984, on spatial accessibility patterns). The bulk of research on urban settlement dealt with a regional and, in particular a national, scale.

The study referred to earlier (L. S. Bourne, R. Sinclair and K. Dziewoński, 1984), carried out within the framework of the International Geographical Union, introduced a typology of national settlement systems based on their differentiation along several axes measuring the level of economic development, the role of planning and control, and the overall density of population and land-use intensity. Historical origins of the systems were also taken into account. While settlement systems characterized by high land-use intensity were found to display a strong hierarchical component, the systems of sparsely inhabited countries tend to be founded upon networks of urban centers situated at brake-in-transportation points. Historical transformations of settlement systems owing to shifts in political power represent another explanation of their present patterns. The existing national systems have emerged either through integration of older, regional and local systems, or owing to disintegration of antecedent systems. In the former case, the outcome is pronounced polycentricity and a balanced hierarchical structure; in the latter a dominance of the main urban centre, i.e. high city primacy tends to be observed.

Two other major international comparative urban research projects conducted in the late 1970s were based upon data for large sets of European cities, yielding their classifications and typologies. Reference is made here to the CURB project – on Costs of Urban Growth, sponsored by the Vienna Centre for Social Studies, and to the FUR (Functional Urban Regions) project, carried out at the International Institute for Applied Systems Analysis. In the former project, which involved research teams from a number of countries, cities and urban regions in Europe were *i.a.* analyzed within the framework of the concept of stages to urban development (L. van den Berg *et al.*, 1982), ranging from absolute, and then relative centralization (the phases of urbanization), to relative and then absolute decentralization (suburbanization), leading to desurbanization, and, subsequently, to reurbanization. This approach was later extended by H. S. Gayer and T. M. Kontuly (1993) into the concept of dif-

ferential urbanization, pertaining to the inter-regional and national scales.

The second project was based on the concept presented by P. Hall (1973). It consisted of an extended comparative study of several densely-populated and highly-urbanized world regions, sometimes referred to as megalopolises. The study was expected to focus on the changing distribution of people and jobs (especially in terms of their concentration and deconcentration), occupational structure, the journey-to-work and land-occupancy patterns, and to lead to generalized social indexes for urban areas, as well as indicators measuring the efficiency of the use of resources, particularly land. The identification of comparable spatial units of reference was seen as an essential first stage in the analysis.

Subsequently, a working definition of Functional Urban Regions was formulated and the range of the study extended to cover all the countries with IASA national member organizations, and also the remaining European countries. The regions were defined as consisting of urban cores, basically corresponding to cities of 50,000 inhabitants and over, and their spatially contiguous hinterlands, delineated so as to ensure a high degree of closure of employment and residence within the regions. The criteria adopted allowed the substitution of alternative measures of spatial integration, such as central-place linkages, for the missing commuting data. At a later stage of the study the FUR definition was modified, in that core cities were combined with their commuting fields to form functional urban cores, while hinterlands were delineated on the basis of commodity, migration, and information flows and/or administrative criteria. When such a definition did not yield an exhaustive division of the national territory, the balance was considered to be the rural area. It was maintained that the establishment and use of the comparative spatial framework should provide a better understanding of the impacts of public policies in the fields of population distribution and economic development. However, owing to the paucity of spatially disaggregate data on employment, income

and production, the scope of comparative analysis was restricted to a study of inter-regional and intraregional population shifts (P. Korcelli, 1982).

From what was initially a study of population redistribution between cores and rings of metropolitan areas, the focus of comparative studies of European urban regions shifted towards an analysis of their economic structure and performance. For a set of West European cities, P. Cheshire and D. Hay (1989) identified a link between population decentralisation and desurbanisation on the one hand, and deinustrialization on the other. They portrayed this as a trend spreading from cities of Northern to cities of Southern Europe during the 1970s and the 1980s. (In the 1990s, it became an even more visible trend, and, in fact, a critical issue in cities and urban regions of Central and Eastern Europe). In the light of the analysis, specialisation in industry was found to correlate positively with poor economic performance, as well as population decline. The successful urban regions have generally been those with strong traditions in the service sector, once this is enhanced by growth in modern, specialized service activities.

The post-1989 political and economic changes in Central and Eastern Europe have led to renewed interest in Europe-wide classifications and typologies of urban regions, as new trade routes have opened up, and plans been drawn up for the extension eastwards of the main European transportation corridors. Hence, some of these classification schemes have been based upon current statistical indicators, while others present projected or even desired future patterns.

Among numerous studies, the contribution by R. Brunet (1989) is perhaps the most frequently referred to. His division of European urban agglomerations into 8 classes is based on synthetic scores derived from 16 indicators giving preference to the international range of functions.

In another well-known study, a map of the European Urban Network (Federal Ministry, 1994) several categories of urban regions are distinguished, including *urban regions*

of potential European importance – mainly the capital cities of the CEECs. A different approach was followed by P. Treuner and M. Foucher (1994) in their book: *Towards a New European Space*. The authors identified there basic categories of urban regions, each divided into sub-categories. The latter correspond to a large extent to anticipated stages in the enlargement of the European Union. The study sought to provide a point of departure for discussions over spatial development targets and the possible allocation of EU structural funding.

THE ESDP AND RELATED STUDIES

The significance of the notion of the *urban-rural partnership* in European spatial policy debates is due to the European Spatial Development Perspective (ESDP 1999), a document adopted by the Informal Council of Ministers responsible for Spatial Planning. The ESDP considers the urban-rural partnership under the heading of the broader topic of polycentric spatial development and a new urban-rural relationship, among the policy aims and options for EU territory. Specific options, particularly relevant in the context of the PLUREL project, include integrating the countryside surrounding large cities into the spatial development strategies for urban regions, aiming at more efficient land-use planning, paying special attention to the quality of life in the urban surroundings, and promoting company networks between small and medium-sized enterprises in the towns and countryside (ibid, pp. 25-26).

While no formal typology of urban–rural regions is provided in the ESDP, the differentiation to urban–rural relationships is emphasized and identified, among other things between high- and low population density regions, as well as along a spatial scale dimension; from the regional to the supraregional, inter-regional and transnational perspective. More insights are provided by what Christer Bengs (1999) calls the research for the ESDP – the contribution made by academia to the ESDP process.

A genuine regional typology oriented towards rural-urban relations has been elaborated in the *Strategic Study Towards a New Rural–Urban Partnership in Europe*, carried out under the Study Programme in European Spatial Planning (CGS, 1999). The main objective of the Study was to identify the major issues underlying the interdependence of urban and rural areas in Europe. The analysis was based on 36 casestudy regions in 14 EU countries (the EU-15 excluding Austria). The types of region defined *a priori*, include:

- *Metropolitan areas*,
- *Polycentric areas*,
- *Urbanised rural areas*,
- *Deep rural areas*
- *Peripheral areas*.

For regions in each category the analysis concentrated upon six aspects to urban-rural relations, i.e.: (a) Settlement structure and accessibility of infrastructure, (b) Diversification of the economy, (c) Territorial impacts of structural change in agriculture, (d) The conservation and enhancement of natural heritage, (e) The role of cultural heritage, and (f) Cooperation between rural and urban authorities at the local administration level.

In the case of *Metropolitan areas*, the main issue concerns urban sprawl, with the conflicts it generates due to competition between urban and rural land uses, as often aggravated by the deficiency of planning and policy regulations. Problems in the *Polycentric areas* are basically similar to those occurring in the *Metropolitan areas*, with additional questions concerning the pressure on infrastructure on the one hand, and competition rather than cooperation between individual centres on the other, the latter reflecting the lack of a common regional identity. In the *Urbanized rural areas*, i.e. regions with rather traditional urban networks, difficulties occur in preserving intense relations between individual small and middle-sized cities, and in modernization of their economic bases. This problem also brings negative effects to the intermediate rural areas. On the positive side is the overall high quality of the natural environment, and of the cultural milieu, of the regions in question. Finally, the *Deep rural*

areas, and the *Peripheral areas* are strongly negatively affected by population ageing and depopulation trends, with consequent shrinkages of local economies, including as regards the provision of services. Assets of such regions pertain to their role in safeguarding the natural and cultural heritage, and in sustaining biodiversity on the European scale.

Similar results, representing another contribution to the Study Programme in European Spatial Planning, are summarized in a report by Denise Pumain (1999). In this case the regional typology was arrived at *ex post*, on the basis of cluster analysis while using several indicators of rural–urban settlement pattern. These measures included: urbanization rate, rural and urban population densities, average spacing of towns with over 10,000 inhabitants, an index of inequality in towns' sizes, a city primacy index, and population size category of the main urban centre. The analysis was carried out for 728 regions at NUTS-3 level, the work resulting in the identification of the following five categories:

- *Regions dominated by a large metropolis*
- *Polycentric regions with high urban and rural population densities*
- *Polycentric regions with high urban population densities*
- *Regions characterized by networks of medium-sized and small towns*
- *Remote rural areas*

It is suggested in the conclusions that such a methodology could also be applied at a lower spatial scale, i.e. the NUTS-5 level.

Functional criteria were used by S. Conti and C. Salone (1999) in their contribution to the study on: *Typologies of cities and rural-urban partnership*. As the authors argue, in the context of multi-centre and network urban structure, functional criteria are more relevant than the physical (morphological) ones, since they make it possible to identify a hierarchy in the urban system. The variables selected to represent the *functional endowment* of individual regions pertain to economic leadership, financial sector, research, education, communication, tourism and culture. Using the case of Italy – a system of labour market

areas covering the whole national territory – they distinguished three main types of urban system (interacting region):

- *polarised (metropolitan and non-metropolitan) systems,*
- *equipotential (balanced) networks of three levels,*
- *hierarchical networks.*

The authors observe that regions characterized by a balanced urban network tend to perform the function of *territorial integrators* between the major metropolitan areas on the one hand, and the predominantly rural areas on the other.

THE ESPON PROGRAMME

The introduction of the hierarchical system of NUTS units and, subsequently, the establishment of the ESPON (European Spatial Planning Observation Network) Programme have opened up a new stage, by multiplying the effort and increasing general interest in international comparative urban and rural-urban studies. Questions pertaining to regional typology have been present in a number of individual ESPON projects. The most relevant results, from the perspective of the present contribution, are found in ESPON 1.1.1. *The role, specific situation and potentials of urban areas as nodes in a polycentric development*, in ESPON 1.4.3: *The study on urban functions*, and in ESPON 1.1.2. *Urban–rural relations in Europe*.

The ESPON 1.1.1. project identified and delineated spatial units of: the *Functional Urban Areas* (FUA), the *Metropolitan European Growth Areas* (MEGA), the *Potential Urban Strategic Horizons* (PUSH), and the *Potential Integration Areas* (PIA).

Functional Urban Areas (FUA) were defined in the following terms: “For countries with more than 10 million inhabitants, a FUA is defined as having an urban core of at least 15,000 inhabitants and over 50,000 in total population. For smaller countries, an FUA should have an urban core of at least 15,000 inhabitants and more than 0.5 percent of the national population, as well as having

functions of national or regional importance. In total, 1588 FUAs with more than 20,000 inhabitants have been identified in Europe” (ESPON 1.1.1., Final Report, 2004, p. 24).

A Functional Urban Area, as defined by ESPON 1.1.1, consists of a core municipality (or a cluster of municipalities forming an urban agglomeration), and commuting area – typically an aggregation of NUTS-5 units¹. For most countries, these areas were delineated according to specific, national definitions. For 11 countries in which data on travel to work are not available, delimitations were carried out by individual country experts on the basis of their knowledge of spatial functional relations. These definitions varied, and the authors of the report have admitted that the selection and boundaries of FUAs were not totally comparable across Europe. As to the number of Functional Urban Areas identified, the differences among the countries covered in the analysis (in the ESPON space, i.e. in 27 EU members plus Norway and Switzerland) do not necessarily reflect variations in the structural characteristics of urban settlement. This is an important issue, since the FUAs comprised the basic units on which most of the further analysis conducted within the project, for example the measurement of polycentricity, was performed.

The identification of MEGAs (Metropolitan European Growth Areas) was based on the typology of Functional Urban Areas. The criteria used were: population size (the lower boundary was set – with exceptions – at 500,000 inhabitants) and high-rank functions in the domain of transportation, manufacturing, higher education and decisionmaking in both the public and private sectors. National capitals were all included by definition. A total of 76 MEGAs, i.e. FUAs with the highest total scores, have been identified, and, based upon more specific criteria related to the importance of their functions, divided further into five categories. Although these results have often been questioned (for example as regards

the inclusion of Turku, but not of Thessaloniki or Hannover), the list of MEGAs originating from the ESPON 1.1.1. project has become a standard reference in both urban research and spatial policy analysis across Europe.

The two remaining categories of urban regions, i.e. the *Potential Urban Strategic Horizons* (PUSH) and *Potential Polycentric Integration Areas* (PIA) were designated with a view to the identification of areas characterized by a high density of urban settlement, in which integration of neighbouring FUAs could generate a further concentration of population and economic activity. The first step in the analysis was the delineation of PUSH areas including all municipalities (normally NUTS-5 units) in which at least 10 percent of the area can be reached within 45 minutes from an FUA centre by car. The number of PUSH areas is the same as the number of Functional Urban Areas, but PUSH areas of neighbouring FUAs can overlap. In the second step, Potential Polycentric Integration Areas (PIA) were identified and delineated by merging the PUSH areas of neighbouring urban centres in those cases in which a smaller centre shared at least one-third of its PUSH area with the larger one. Each PUSH area belongs to one PIA only, and multiple tiers of integration can occur within a single PIA. Neighbouring PIAs can overlap (ESPON 1.1.1. Final Report, p. 24).

The settlement pattern for each PUSH area was analysed (on the basis of Corinne Land Cover data) from the point of view of spatial concentration. The four types of PUSH area distinguished (see Fig. 1) were:

- *monocentric*,
- *polycentric*,
- *sprawl*,
- *sparsely populated (rural)*.

Each PUSH area was allocated to one of these categories. No correlation was found between the degree of polycentricity or monocentricity of urban areas and their capacity to integrate at the PIA level.

Unlike in the case of FUA and MEGA, the PUSH and PIA systems have attracted relatively little attention in both research and planning. This is due to disputable aspects of their definitions. First of all, it

¹ A more detailed definition of European Functional Urban Areas (EFUA) was developed within the framework of the Study Programme in European Spatial Planning (D. Pumain, 1999).

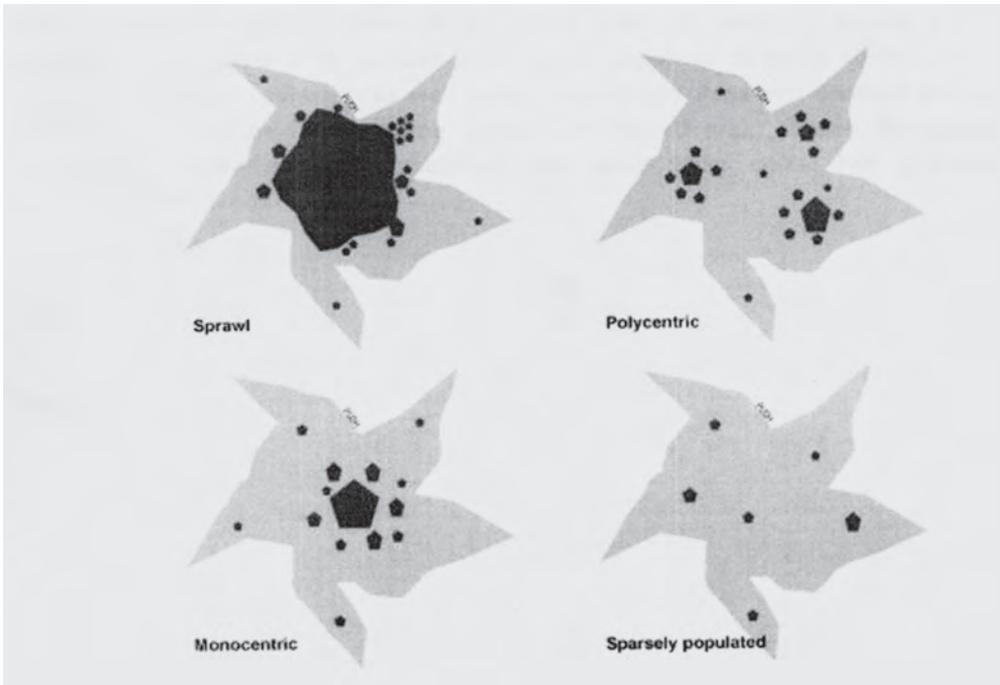


Figure 1. Different types of settlement morphology.
Source: ESPON 1.1.1 (2004), Final Report, Fig. 5.4, p. 151.

was not realistic to assume that all FUA centres, including the smallest ones, can extend their zones of influence over the whole area situated within the 45-minute travel time isochrone. If clusters of PUSH and PIA areas were to form magnets for further concentration of economic and demographic potential, they would have to be based upon the network of large cities offering real attracting power in terms of the labour market and the range of specialized services. Secondly, the identification and typology of the PIA areas (276 in total) has produced a number of contestable outcomes. As a consequence of the adoption of specific delineation rules, some *de facto* middle-sized cities have emerged as main cores of huge urban regions with several million inhabitants in total. Thirdly, the European patterns in PUSH and PIA areas mainly reflect variations in the overall density of urban settlement. Countries with high population densities are almost com-

pletely covered by the PUSH and PIA regions. This says little about the structure of the urban system – the hierarchy and actual range of influence of urban centers over urbanized as well as non-urbanized territory.

The main goal of the ESPON 1.1.1 project was to identify areas of high urban, economic and population concentration in the European Union, which could in future develop into the so-called Global Integration Zones – potential counterweights to the dominant European core region – the Pentagon. This goal followed on from assumptions and postulates formulated in the European Spatial Development Perspective (ESDP, 1999). Hence, spatial structure, with the emphasis on the question of polycentricity, was mostly considered under the project at national and macroregional levels, rather than on the mesoregional (urban-rural region) or local (city) scales (see: Fig. 2). Nevertheless, the materials accumulated in the project as well as its results have proven very important for

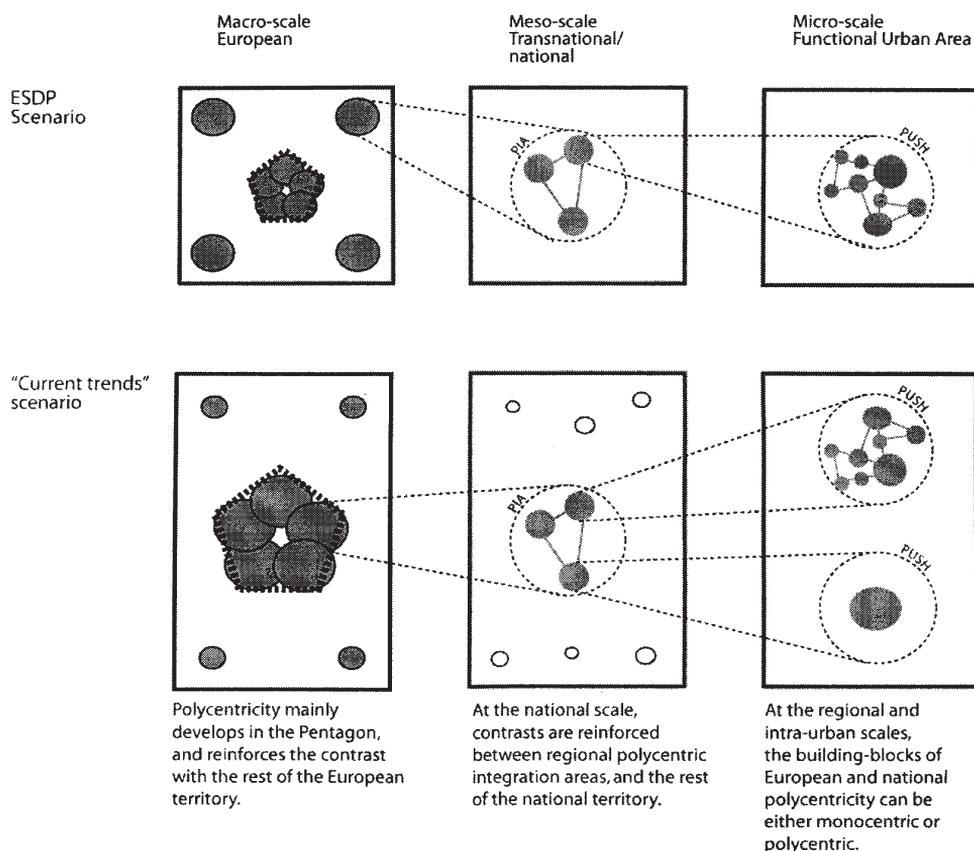


Figure 2. Scenarios concerning polycentricity development at various spatial scales. Source: ESPON 1.1.1 (2004), Final Report, Fig. 9.1, p. 240.

any subsequent research on the distribution, structure and typology of urban and rural-urban regions in Europe.

Such a subsequent effort was undertaken under the ESPON 1.4.3 (2007) project on: *The study on urban functions*, this attempting to modify and further develop the concepts and indicators elaborated within the framework of the ESPON 1.1.1 project.

One of these developments² concerned the internal structure of the Functional Ur-

ban Areas. While sustaining the general idea of the FUA as a city (or cities) together with its/their labour-commuting shed, the ESPON 1.4.3 study introduced an alternative definition, and a measure of the FUA core area, i.e. the *Morphological Urban Area* (MUA). Unlike in the previous project, where FUA cores are identified with cities, or clusters of cities (urban agglomerations), here they are defined as continuously urbanized areas – clusters of contiguous communities, irrespectively of their administrative status, characterized by high population density. Such a definition, it is claimed, is important from the point of view of FUA typology. In the case of FUAs of the same population size, the one having

² Work in the ESPON 1.4.3 project also focused on indicators and the evaluation of polycentricity, the identification of cross-border FUAs, as well as of functional criteria to be used while distinguishing the MEGAs (Metropolitan European Growth Areas) from among the total set of FUAs.

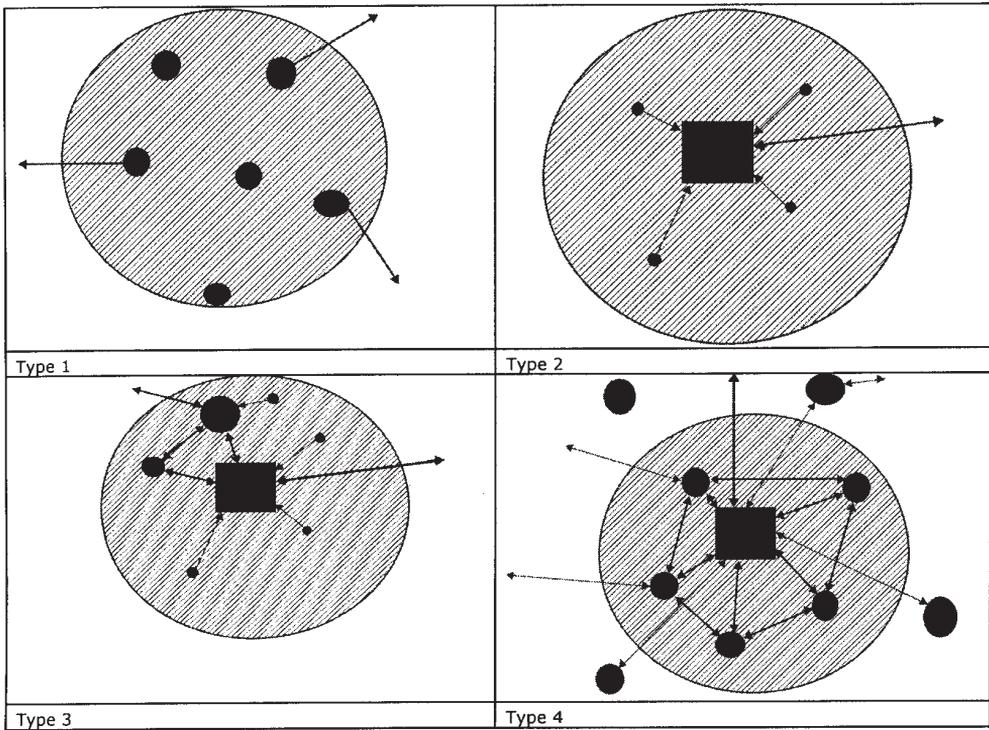


Figure 3. Four types of spatial structure of large rural–urban regions. Source: ESPON 1.4.3, (2006). The study on urban functions. Draft Final Report, p. 156.

a stronger MUA at its core, especially when characterized by a high quality of historical and cultural heritage, has clear ascendancy. In large, densely-populated, highly-urbanized regions, the rule of spatial continuity of the MUA cannot be retained. Hence secondary MUAs are distinguished, with their own commuting sheds, but still forming parts of a major FUA. Four types of such urban regions have been recognized by the authors (Fig. 3), as illustrated by a hypothetical urban cluster situated in a large coal basin area (Type 1), the Ile-de-France region, with new towns quite dependent upon Paris (Type 2), the Belgian central metropolitan region with Brussels, and Antwerp as a major secondary centre (Type 3), and the London metropolitan area with the belt of important, functionally specialized centres (including Cambridge and Oxford), and a second belt of urban cen-

tres situated at the fringe of the London FUA (Type 4).

Still another regional typology, and one explicitly pertaining to urban-rural interdependence, has been constructed within the framework of ESPON 1.1.2 project on: *Urban-Rural relations in Europe* (2004). This relationship is registered along two axes that measure the level of urban influence upon rural areas, and the intensity of human intervention. The six types of region identified have rural areas scaled from the ones characterized by a marked urban influence and high level of human intervention (typically, though not exclusively, the areas around large cities), to those featuring limited urban influence and a low level of human intervention (typically – peripheral and mountainous regions). The typology is based on indicators of population density, the ranking of Functional Urban Ar-

eas, and land cover data. Individual types of urban- rural regions are characterized by:

- *marked urban influence, large-scale human footprint*
- *marked urban influence, medium-scale human footprint*
- *marked urban influence, small-scale human footprint*
- *limited urban influence, large-scale human footprint*
- *limited urban influence, medium-scale human footprint*
- *limited urban influence, small-scale human footprint*

OTHER SELECTED PROJECTS RELATED TO TYPOLOGIES OF URBAN-RURAL REGIONS

As a rule, international studies on urban and urban-rural regions involve attempts to identify comparable spatial reference units. In the GEMACA project focusing on the international competitiveness of 14 metropolitan areas in North-Western Europe, such units (Functional Urban Regions) were defined as consisting of an economic core, with employment density of more than 7 jobs per ha, and neighbouring municipalities in which more than 10% of the active population commute to work to the core. Types of urban regions were related to their functional profile (P. Cheshire and G. Gornostaeva, 2002).

Changing functional and spatial relations (business decentralization, service network flows) in urban regions have also been studied under the POLYNET project, within the framework of the Interreg III B programme. It focuses on eight European Mega-City regions: South East England, Belgian Central region, Rhine-Ruhr, Rhine-Main, Northern Switzerland Metropolitan Region, the Paris region and Greater Dublin. These areas are again defined as Functional Urban Regions (FUR) that are neither administrative nor morphological units (P. Hall, 2004), but have been delineated on the basis of daily commuting flows.

Two major projects under the EU 5th Framework Programme, namely SCATTER (M. Batty, N. Chin and E. Besussi, 2002) and URBS-PANDENS (Ch. Couch, L. Leontidou and G. Petschel-Held, 2007) focused on urban sprawl, a phenomenon which has received extensive coverage in the literature. Urban sprawl has a considerable impact on both settlement forms and functions. It is among the most characteristic contemporary features of the peri-urban and rural zones of urban regions. Materials collected, methods of analysis used, and generalizations arrived at by the two project teams have to be referred to in any attempt at the typology of rural-urban regions and the study of urban-rural interaction. One such generalization is the identification of four types or profiles to urban sprawl:

- *Sprawl as an emergent polycentric region,*
- *Sprawl as scattered suburbs,*
- *Sprawl of peripheral fringes,*
- *Sprawl forms of commercial strips and business centres.*

Six case-study regions were analysed: Brussels, Rennes, Helsinki, Milan, Stuttgart and Bristol, each subdivided into a number of territorial units (from 135 in the case of Brussels to 489 in the Helsinki region). These were in turn aggregated into three main zones: of the urban centre, outer urban ring, and hinterland (G. Haag, J. Binder, 2002)³.

PLUREL TYPES OF URBAN RURAL REGIONS

In PLUREL, a 6th Framework Project on *Peri-urban land-use relationships – strategies and sustainability assessment tools for urban-rural linkages*, regional typologies are constructed on an *a priori* basis, and serve as a reference in subsequent analyses of the interdependence between land use and socio-economic change. An early attempt involved

³ In yet another study on *urban sprawl* in Europe, carried out by the European Environmental Agency, Urban Morphological Zones were defined as clusters of built-up areas situated not more than 200 meters apart (EEA, 2006).

a typology of regions focusing on large cities with at least 400,000 inhabitants within administrative boundaries (P. Korcelli, E. Kozubek, 2007). A total of 121 such regions were identified in the 29 states, some containing two or more large urban centres. Region delineation followed that of FUAs (Functional Urban Areas), defined for the purposes of the ESPON 1.1.1. Project (2004), i.e. the regions largely corresponded to commuting fields of the urban centers in question. The typological criteria were related to settlement morphology and population change. The functional profile was not considered at this stage of analysis. Three types of settlement pattern were distinguished, i.e. the concentric, sectoral and multinuclear, following the classical models of urban development. They were further subdivided into simple, compound, and multiple compound classes, referring to the concept of K. Dziewoński (1962). The allocation of individual regions to the specific land-use categories was carried out on the basis of an inspection of cartographic sources, as well as Corinne Land Cover data.

In the assessment of spatial population dynamics, reference was made to the concept of city life cycles (P. Hall, P. Hay, 1980). Three basic situations were identified: population growth in a region's core, as well as in the whole region; population concentration - a growth in the core accompanied by a decrease on the regional level; population decline both in the core and in the region as a whole. Available data for a recent five-year period were used for this purpose.

This typological scheme, in the form of a simple, three-dimensional matrix, has proved to be reasonably effective, with only 3 out of 27 classes (cells) remaining empty. Regions with compound spatial structure of settlement - dominated by sectoral and concentric patterns, and characterized by overall population growth - were found to account for the largest subsets - 27 and 17, respectively.

In a study parallel to the one discussed above, W. Loibl, M. Köstl and K. Steinnocher (2008) developed a regional typology covering the whole territory of the EU-27. The regions identified correspond to indi-

vidual NUTS-3 units, or, more frequently, to aggregates thereof. This, the so-called RUR (rural-urban regions) typology is also based upon criteria related to settlement morphology, while emphasizing the population size and urban vs rural character of settlement.

At an initial step of analysis, urban centers that serve as RUR nuclei were distinguished. These are morphological urbanized areas, delineated on the basis of detailed land cover and population data. Settlement areas containing more than 10,000 inhabitants were defined as urban centres, and those with above 100,000 inhabitants as core cities. All NUTS-3 units containing a core city were defined as RUR centre regions, and the surrounding units, with prevailing commuting and recreational functions, as RUR ring zones. In total, about 900 rural-urban regions were identified, these then being subdivided into categories:

- 1.0 *monocentric very large (metropolitan)*
- 1.1 *monocentric large*
- 1.2 *monocentric medium*
- 2 *urban polycentric*
- 3 *dispersed polycentric*
- 4 *rural*

This typology is relatively similar to the one presented in a paper by D. Pumain (1999), and cited in an earlier section of the present article. Types 1 and 2 represent the urban regions, type 3 regions with a traditional structure of the settlement network, with middle-sized and small towns, and type 4 with predominantly rural, but above all sparsely-populated peripheral areas. The latter category is represented by numerous Spanish and Scandinavian regions, but none of Poland's NUTS-3 regions, for example.

Such results suggest a need to introduce some differentiation of typological criteria and allocation thresholds, in accordance with major observed variations in spatial patterns for settlement and land use in Europe. In a pilot study for Poland (E. Kozubek and P. Korcelli, 2008), the set of criteria used included population size of the main urban centre, percentage of urban land use, and population density. This resulted in the identification of five categories of NUTS-3 unit, i.e.:

- *metropolitan*
- *peri-metropolitan*
- *urban*
- *urban-rural*
- *rural*

In may be argued that other characteristics related to settlement patterns, in particular mono-versus polycentricity, should still be considered among the typological criteria, as these are particularly relevant to spatial policy-oriented studies.

TOWARDS A GENERIC TYPOLOGY OF URBAN-RURAL REGIONS

Regional typologies are developed for both analytical and policy-related purposes. As Denise Pumain (1999) put it aptly, a good knowledge of regional variations in types of rural and urban settlement is required for the implementation of spatial policies: to be efficient, the policies should be adapted to specific local conditions. This is especially so when such policies are designed and applied at an international level, in this case that of the European Union, with its highly-differentiated patterns of human territorial occupancy, and varying spatial economy.

Construction of a regional typology requires a comparability of spatial units of reference. This is achieved by aggregating and disaggregating the territorial units for which statistical data are normally collected.

Attempts to identify common sets of spatial units - basic building blocks used in the analysis of urbanization patterns and urbanization processes in Europe, go back to the 1970s.⁴ Typical difficulties encountered in such projects stem from: (a) differences among national definitions and criteria of identification of cities and urbanized areas, (b) heterogeneity of urban settlement pat-

terns, related to variations in overall population density, urbanization level, historically developed settlement forms, (c) non-uniform availability of data. These problems and limitations pertain to typological studies as well, and have only been partly ameliorated by the establishment of the NUTS system and the accumulation of data for these spatial units. Since total comparability at an international scale would not be a realistic objective, the question remains whether the comparability level actually achieved in a given study is satisfactory from the point of view of its specific research goals. In the case of typological studies at least, the existing data gaps, such as non-availability of commuting-to-work data for a number of countries, is seen as a more major problem than the imperfect standardization of spatial units of reference.

Another question pertains to concepts of the region that stand behind individual regional typologies. These concepts have much in common, but they also differ in some respects that are rather crucial from the perspective of the individual research project. One of these differences relates to the spatial extent of the region, usually identified with the range of the commuting zone. While it generally includes the suburban (peri-urban) belt, it may, or may not, extend into the exurban (i.e. rural) settlements, from which commuting tends to be less intense. The farthest-reaching in this respect is the concept of the *metropolitan region*, according to which zones of influence of metropolitan centres cover whole national territories. These centres correspond in fact to central places of the highest order in Christaller's theory, wherein the rule of exhaustive territorial coverage by the respective market areas also applies. Most of the concepts, however, including ESPON's Functional Urban Areas, depict urban regions as "islands", with rural, and less intensely urbanized areas situated in between. Still another model approach - followed by the US Bureau of Census - involves a dichotomous division of the territory into metropolitan and non-metropolitan areas.

Interdependent with this question is the problem of functional linkages between

⁴ Definitions of urban regions as statistical and/or planning units have a longer history. Metropolitan districts were used for the first time in the US Population Census of 1910, and data on Conurbations were collected by the General Register Office in Great Britain as early as in the 1930s. At an international scale, comparative statistical data for the world's metropolitan areas were published by Kingsley Davis in 1959.

the constituent parts (zones) of urban and urban-rural regions. In their simplified forms (such as the FUA), the urban core is presented as the locus for workplaces and services, the rest of the region as a mainly residential and labour-providing area. Conversely, the concepts of *metropolitan community* and *urban field* represented early attempts to include such dimensions of interdependence as common identity and interests on the one hand, and multilateral circulation patterns on the other. More recently, however, large urban centres have been shown to be increasingly involved in global and continental networks of interaction (P. J. Taylor, 2003), at the cost of a weakening of their ties with their surrounding regions. Here we may stress the role of the PLUREL project in analysing the interdependence between various forms of land use in urban-rural regions, and in forecasting their future patterns.

The existing typologies of urban and urban-rural regions are based primarily on functional criteria, since functional profile and specialization are the main factors determining the role and position of individual cities and their surrounding areas within respective national and international urban systems. Integrated with the functional criteria is a measure of mass, or overall potential, conventionally measured in terms of population size, but also by the GDP volume, as well as the political and administrative functions performed. Among other measures of functional competitiveness, the aggregate spatial accessibility within the given territorial system comes to the fore.

The second category of typological criteria relate to the morphology of settlements. Their roots are found in historical studies of spatial patterns - shapes of rural villages (A. Meitzen, 1895, H. Szulc, 2002), in town planning studies (P. Abercrombie, 1933; K. Dziewoński, 1962), and in urban social ecology (R. E. Park, E. W. Burgess and R. D. McKenzie, 1925). These traditions have never been integrated into a comprehensive concept of spatial morphology of rural-urban regions, even though they

refer to common topological notions such as linearity, density, polycentricity etc⁵. A general interdependence between morphology and economic performance among cities and regions has never been proven, but it is typical to observe straightforward relations between spatial patterns of settlement and such indicators as energy efficiency, or the share of public transportation in the total volume of traffic.

Still-another approach to the typology of urban-rural regions refers, though usually implicitly, to the concept of rural-urban dichotomy and the rural-urban continuum (L. Wirth, 1938; R. E. Pahl, 1965). Here individual settlements (in this case regions) are placed on the scale from the purely rural to totally urban (or large urban), with mixed, or transitional forms in between. The typological criteria applied refer to such variables as density of urban and rural populations, population change, the size and distribution (spacing) of towns and the dominance of the main urban centre. All these forms and their indicators, however, are subject to change, as the integration of urban and rural settlement progresses, along with the growing integration of the urban and rural economies. This points towards a generally neglected dimension to urban and rural typologies, i.e. their prevalingly static character.

Regional typologies that focus on interactions between constituent parts of rural-urban regions, i.e. the urban, peri-urban and rural zones, are generally underrepresented. This is true, even though some earlier studies (L. van den Berg *et al.*, 1982) attempted classifications based upon patterns of intraregional population redistribution, referring to the concept of stages of urban development. One should agree with D. Pumain (1999) again, in that - for a proper assessment of the rural-urban partnership - it is necessary to rely on information concerning flows of goods, persons, capital and information (not just travel to work, but also residential mobility, consumption of urban services, utili-

⁵ A detailed, comprehensive review of urban spatial patterns, of the relevant terminology and the literature was elaborated by S. Marshall (2005).

Table 1. Typologies of urban and rural–urban regions

| Underlying concepts | Typological criteria | Classes of typology |
|---|---|---|
| City–regions; urban systems | Functional profile, rank in urban and regional systems | Hierarchical structure of Functional Urban Regions (Functional Urban Areas) |
| Socioecological models of urban spatial structure; Morphological area | Settlement forms: monocentric, sectoral, polycentric patterns | Metropolitan - urban-rural regions |
| Rural-urban dichotomy rural-urban continuum | Urbanization level, population density, size structure of settlement | |
| Stages of urban development | Differential patterns of interregional population redistribution | Patterns of intraregional specialization and inter-dependence |
| Urban–rural partnership | Functional linkages (flows) between rural, peri-urban and urban zones | |

Source: Authors' elaboration.

zation of recreational areas, etc.). Yet, such data on rural–urban relationships are scarce, and usually have to be generated within the framework of especially designed research projects.

In an attempt at a synthesis, one can distinguish several categories of typological criteria based on different concepts of rural–urban regions. These sets of criteria, some of them in combination, lead to alternative classes of rural–urban typologies (see Table 1).

At this point the question to be posed concerns prospects for the development of a comprehensive typology of rural–urban regions. Such an outcome in fact looks unlikely. Individual classes of regional typologies stem from various concepts of urban and rural–urban regions. They also relate to different spatial scales from the transnational and national through to the interregional and intraregional and in consequence to different levels and goals of spatial policy.

CONCLUSIONS

Distinguishable among the existing typologies of urban-rural regions are the following categories:

(I) Typologies of regions in which the rural, and often also the peri-urban, zones are identified with the commuting shed of the main urban centre (or centres, in the case of polycentric regions), while their role is interpreted in terms of endogenous residential and recreational functions. The typological criteria adopted are primarily related to functional profile, with inclusion of measures of population size and political and administrative status. The structure of such typologies tends to be hierarchical, with links to the urban-systems hierarchy at national and international levels. This category of typological studies involving urban-rural regions is the one most frequently represented in the literature.

(II) Regional typologies based on criteria of urbanization level, i.e. the degree to which the character of a given area is urban vs. rural. The scale adopted extends from the metropolitan through to the rural or deep rural areas. Hence, the regions identified are in a sense homogeneous, as they do not represent the typical structure of an urban-rural region, composed of the urban core, the peri-urban and rural zones. In addition to the level of urbanization, such typologies tend to include criteria related to morphology of settlement and to patterns of spatial redistribution of population. They may be outlined at an introductory phase of research, in order to select case-study regions, or to evaluate the distribution of the case studies that have been identified on an *a priori* basis.

(III) Typological studies of rural-urban regions which focus on the interdependence of, and interaction between, the urban, peri-urban and rural parts of the region. Since this interaction is a complex phenomenon, attention may focus on its specific aspects, such as migration, land-use change, redistribution of economic activity, institutional linkages related to planning and policy, etc. Typologies of this kind are rather rare, owing to the exacting data requirements, in particular with regard to flow data. They tend to be developed at a later stage of a research project, rather than in its initial phase.

The scope of research on regional typologies is quite broad, as different typological approaches correspond to alternative concepts of rural-urban regions, as well as to varied research needs and objectives. Hence, the elaboration of a comprehensive, all-purpose typology of European rural-urban regions would not be a realistic goal. At the same time, the usefulness of regional typologies, as both analytical and spatial policy tools can be emphasized.

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EXPLORING THE ROLE OF STICKY PLACES IN ATTRACTING THE SOFTWARE INDUSTRY TO POLAND

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Abstract: The research reported on here has concerned the emergence of the software industry in Poland and its uneven spatial distribution. The emergence of foreign software companies in Poland is shown to have been underpinned by five main factors, i.e. cost, accessibility to highly skilled graduates, the return migration of expats, the cultural milieu of certain cities and proximity to customers. Due to the bounded rationality of the founders, the main factor behind localised growth in Poland is relationship with previous place of residence, study and/or work.

Key words: software industry, software development centres, IT industry, sticky place, location factors, localised growth, Kraków, Poland.

INTRODUCTION

The fact that a software industry has emerged in Poland entails decisions whose rationale and consequences are worth investigating. All the more so, since the industry in question has grown rapidly and steadily in Poland in recent years, as may be attested to by a 40% increase in the number of IT companies in just the years 2000–2004, as well as a doubling in the level of employment between 1995 and 2003. Questions could concern the factors behind the rapid pace of growth, as well as its spatial dimension. Advocates of globalisation argue that we are moving towards a unified world in which geographical differentiation is being hampered. So can companies in new industries be located anywhere? Is the software industry completely footloose?

In fact, this paper contends that the local milieu determines the geographical concen-

tration of the software industry. It thus contributes to a growing body of research within economic geography that explains, not only why some locations are more competitive or dynamic than others, but also why these dynamic effects tend to be “sticky”, rather than transferrable, across geographical distances. In studying the phenomenon, I sought to explore both the reasons for, and the consequences of, the localised emergence of Poland’s software industry. However, as an understanding of location factors on a local scale requires deep insight into the reasons behind companies’ emergence in particular countries, I have also sought to address the reasons behind relocations of software development in Poland¹. Specifically, I have studied four important dimensions to the soft-

¹ Relocation is here understood *sensu largo*, as both the subcontracting out of some activities and foreign direct investment in Poland.

ware industry, i.e. its geographical scale (local/global), ownership (a dichotomy between indigenous and foreign companies), stickiness of localities (ability to keep/attract) and causation mechanisms (reasons/consequences). These matters were addressed by reference to the case study of the city of Kraków.

DEFINITIONS AND METHODS

This paper adopts a fairly broad definition of the software industry, the understanding thereof following on from O’Gorman (1997, p. 2) and Crone (2003, p. 39), and hence including companies engaged in:

- the development of software products/systems for subsequent sale to end users;
- the development of systems software or software development tools for sale to vendors;
- services directly related to the design and/or development of software systems;
- the localisation of either an organisation’s products or third-party products;
- the development of programmes or systems for subsequent incorporation into hardware;
- technical training in the area of systems analysis, design and programming;
- the provision of “hot-site”/disaster recovery facilities.

This definition does not extend to indigenous companies based in overseas offices, to software development by in-house IT departments and to sales of hardware or third-party software packages. Generally, this means that a majority of companies attributed to the software industry are classified under NACE 72. This NACE division is often perceived as an appropriate set for firms providing computer services.

A foreign software development centre is here represented as the subsidiary of a foreign software company whose main activity is the development of both software solutions and the modules for them. Hence, this wide definition includes both enterprises offering final products and those providing simple code writing. Software development centres undertake work of varying degrees of

sophistication, but typically employ a much higher percentage of computer science graduates and software engineers than companies carrying out the localisation, manufacturing and distribution of software packages², which were excluded from the analysis.

The results presented in this paper are based on interviews carried out as part of the PhD project *Factors and mechanisms behind geographical agglomeration of the IT industry in Poland*, as well as the MOVE project (*Moving Frontier: The Changing Geography of Production in Labour-Intensive Industries in Europe*), financed under the EU’s Sixth Framework Programme. The latter research included 190 in-depth interviews in companies involved in any type of internationalisation: foreign enterprises, firms involved in subcontracting to/from foreign entities and indigenous companies having subsidiaries abroad. The interviews were carried out in five (both host and home) countries, i.e. the United Kingdom, Greece, Poland, Estonia and Bulgaria. Additional information (especially about the consequences of software industry growth) was provided during 27 interviews with key informants. The first project consisted of 102 interviews with entrepreneurs, scientists and public authorities in four selected localities in southern Poland (in Kraków, the Katowice conurbation, Bielsko-Biała and Mielec). Location factors were studied in both projects: in the latter project on a global scale, in the former only on the local.

This paper consists of eight core sections. After an introduction and description of definitions and methods, the first section ponders the main concepts usually accounting for the geographical concentration of new industries in highly-developed economies. In the next two sections, the factors behind and consequences of the geographical concentration of the software industry are presented, on global and local scales. Spatial patterns of the IT industry are then described briefly, before the next two sections go on to provide an analysis of the identified mechanisms behind the spatial agglomeration of foreign and indigenous software companies in Poland and some

² See discussion in M. Crone (2002).

Polish cities. The seventh section covers the consequences of localised growth, while the results are discussed in the final section.

THEORETICAL BACKGROUND

There is a surprisingly large number of explanatory approaches seeking to analyse the reasons behind the localised growth of companies in new industries. Starting from agglomeration economies to the recent concepts of sticky places and windows of locational opportunity, one can ask whether it is possible to apply one concept to different regions. For instance, studies by Pinch and Henry (1999) and Keeble and Nachum (2002) have shown that a pure, cost-based agglomeration economy approach is of limited utility in accounting for the clustering of certain knowledge-intensive industries. Knowledge dissemination results in a collective learning process (Keeble and Nachum 2002) and may influence entrepreneurial activities. Krugman (1991) argues that knowledge spillovers are limited to a few high-technology agglomerations and seem to be national or international, rather than regional or local, in scope (Pinch and Henry, 1999). Some authors have noted that, when it comes to explaining the clustering of knowledge-intensive services, spillovers of knowledge are, contrary to Krugman's assertions, likely to be particularly important (Swann and Prevezer 1996; Malmberg and Maskell 2002).

Some objections may be voiced as regards other concepts. The path-dependence concept seems to work for an established geographical cluster and can not simply be used for an industry which is in an infant stage of development. In nascent industries, there are still so many turning points (the entrance of major foreign players into different cities) which are capable of changing the positions of particular localities and regions greatly.

The infant stage of cluster development constitutes an obstacle to the use of other paradigms. The "window of locational opportunity" model combines the possibility of chance events at the start of the industry with subsequent agglomeration economies leading to

further concentration in one or a few dynamic regions (Scott and Storper 1987). In the initial phase of the new industry, chance events and the creative ability of new firms are enough to ensure that an industry might locate to all types of regions. There may therefore be a multiplicity of potential spatial outcomes (Arthur 1994). This phase is followed by the closing of windows of locational opportunity around dynamic regions, due to agglomeration economies. In Poland we are currently experiencing the beginning of the phase by which windows of locational opportunity for the software industry begin to close. However, it is too early to use this concept to explain localised growth in many new Polish industries.

The catch phrase "sticky place" has recently become popular in industrial geography. Markusen (1996), cited by Dicken (2003, p. 22), asks 'why do geographical concentrations of economic activity not only still exist, but are also the normal state of affairs? Why do sticky places continue to exist in "slippery space"? The concept of a sticky place refers to the 'geographic consequences of inertial forces which prevent hyper-mobility (in an increasingly "slippery production space") from completely obliterating production assemblies in space' (Markusen, 1999, p. 98). Stickiness connotes the ability to both attract and keep industries and people in both new and established regions (Markusen, 1996). This means that two important dimensions to stickiness may be evaluated: the ability to attract and the ability to keep an industry within a given locality. This has led me to study both the reasons (illustrating the ability to attract) and consequences (indirectly mirroring the ability to keep) behind the emergence of the software industry. Thus, another important question arises: can consequences reinforce existing geographical concentrations and enhance their stickiness? May mechanisms from Myrdal's cumulative causation be used to elucidate the circular growth of the software industry in a given region or country?

The stickiness of a region implies a sustained interregional specialisation of economic activity (Zander 2004). This concept presents somewhat of a paradox in the light

of improved communications and the globalisation of markets and industries, and it consequently brings about ominous slogans concerning the “end of distance” (Cairncross 1997) and the death of “the tyranny of geography” (Gillespie and Robins 1989). Operating across geographical distances is associated with certain cost and response-time disadvantages (Porter 1990; Sölvell *et al.* 1991). Interaction with geographically-distant suppliers and customers increases the costs of knowledge exchange, and creates problems with maintaining the necessary level of communication in innovation and problem-solving activities (Malmberg *et al.* 1996). Some have argued that individual activities can not be separated from their information-processing context without losing some of their value (Malmberg *et al.* 1996; Maskell and Malmberg 1999). The relevant flow of information and tacit knowledge may be denied to outsiders or newcomers.

UNDERPINNING FACTORS: THE GLOBAL PERSPECTIVE

Gentle and Howells (1994) recognise five specific structural factors causing the erosion of the traditional national orientation of IT markets, and thereby increasing the potential for internationalisation. Lifted restrictions on the activities of foreign firms, declining language barriers, and national computing standards being superseded by international standards with the move towards highly compatible systems are among the most important factors behind the internationalisation of the software industry.

There are a number of location factors to be seen from a national perspective. A favourable tax regime was one of the main such factors in the 1980s, for example, but nowadays low costs of labour inputs and the availability of skilled staff³ are among the reasons listed

³ The abundance of academics leads to the emergence of software spin-outs from universities: this phenomenon has been widely analysed by many authors (Ó Riain 1997; Crone 2003; Klofsten *et al.* 2000; Jacob *et al.* 2002; Autio *et al.* 2004; Micek 2006b).

most often. Other factors include: low set-up costs, infrastructural investments (often made by the public sector), and significant prior investment in educational services. A strong external effect associated with a large outward shift in demand for education, resulting in the entry of private educational providers, may also enhance the range and scope of IT skills. Organisational changes and internal restructuring may lead to outsource IT-related non-core activities (Coe 1997). However, the software industry is a clear example of an industry in which the flow of ideas has been as important as the flow of physical capital (Commander 2004; Crone 2003). This in turn ensures that role of contingent, chance events after Krugman (1991) may be significant in attracting foreign investment.

Many papers support the view that the most important motive for the offshore outsourcing of foreign direct investment is lower labour costs (e.g. Ali-Yrkkö and Jain 2005; Girma and Görg 2002; Carmel and Agarwar 2000). However, additional costs, such as management and communication costs, clearly make the cost difference smaller than the wage difference. In the case of turnkey assignments (those involving all stages from analysis to installation), cost is less important, while management skills, quality, proven expertise and access to technology all become much more important (Heeks 1998). Relative to US costs, typical cost savings from offshoring fall between 20% and 40% depending on the type of work (Trends 2004). Labour cost and benefits in software development account for between 51% (Canada) and 80% (Japan) of total costs (Competitive 2004).

THE FACTORS BEHIND AND CONSEQUENCES OF LOCALISED GROWTH

Local-scale location factors for European ICT companies were studied under various projects focusing mainly on The Netherlands (Koerhuis and Cnossen 1982; Drenth 1990; Atzema 2001; Verlinde and van Oort 2002; Weterings 2003), Denmark (Illeris and Jakobsen 1991)

and the UK (Coe 1998). In socialist Poland, pioneering research into spatial concentrations of the “industry of information means” (hardware manufacturing and low-level computer services) was conducted by Werner (1985). He distinguished three groups of location factors: accessibility to a labour force, linkages with markets, and agglomeration economies. By analysing the location factors of high tech companies in Poland, Gurbala (2005) has recently found that a majority of small Polish companies were set up in a locality that was the birth place and/or place of residence of the founder. Medium sized firms were co-located due to “access to skilled human capital”, whereas agglomeration economies turned out to be the most important factor for large companies.

The most often cited location factor is easy access to the workplace by private transport, as well as to ICT infrastructure and services. Localised labour markets are one of the prerequisites for the geographical concentration of IT companies on various spatial scales (Illeris and Jakobsen 1991; O’Gorman *et al.* 1997; Wojan 1997; Sivitanidou 1999; Crone 2002). Labour cost plays an important role in the choosing of distant locations, something that works in favour of non-capital regions. Some authors argue that companies which depend on accessibility of skilled labour choose locations that may be attractive for future employees (Lambooy *et al.* 2000; van Oort *et al.* 2005). The high attractiveness of a working environment with modern residential and recreational amenities are additional features a company may offer to its potential employees (Koerhuis and Cnossen 1982; Verlinde and van Oort 2002; Haug 1991). In some research into American companies this factor is stated to be the most important in attracting companies and employees (Haug 1991). What does this attractiveness consist of? White-collar employees choose attractive places for living in terms of the natural environment and social and cultural opportunities. However, Dutch research conducted in companies and among their employees (Verlinde and van Oort 2002; Weterings 2002, both cited in Weterings 2003) shows that the

role of an attractive environment in canvassing employees is overestimated. From this perspective, assumptions as to the important role of attractive places for living are partly naïve (Verlinde and van Oort 2002; Weterings 2002, both cited in Weterings 2003). There are simply significant differences in residential preferences among employees. Some of them enjoy living far away from their workplace in an attractive environment, accepting the attendant commuting to work as inevitable. A pleasant natural landscape would attract 70% of the employees of IT companies (Weterings 2002, in: Weterings 2003) to live there. In the United States, the most experienced staff have aspirations to live in a quiet suburban environment, rather than in large cities (Kotkin 2002). European research reveals different preferences. For almost 65% of Dutch white-collar workers employed in IT companies, residence in the city centres is in fact a fashionable option. This can be explained in terms of the higher accessibility of social and cultural services in the core of the city (Weterings 2002, in: Weterings 2003). Tsang (2002) likewise argues that the atmosphere of London’s pubs and restaurants attracts well-paid software engineers.

The historical background of an entrepreneur may significantly influence location decisions (Haug 1991). Coe (1998) found that, depending on the selected county, from 58% to 76% of firms were set up in areas in which firms’ original founders had resided previously. Bounded rationality is important, since entrepreneurs can not gather all the information necessary to evaluate all possible locations: they will therefore choose a location they already have a relatively large amount of information on. This is usually their home region, or a location in which they used to work (Weterings 2003). A strong demand from governmental institutions has laid the foundations for the spatial clustering of IT companies in Silicon Valley, New Brunswick and Ireland (Saxenian 1994; Crone 2003; Davis and Schafer 2003). It must be stressed that the multi-factor dimension to location choice in the software industry seems obvi-

ous. The synergy of several factors, such as the co-existence of good universities, talented staff and a high standard of living, to list but a few, makes clustering easier (Nås *et al.* 2003).

The consequences of software industry growth for the local milieu have not been widely discussed, and the number of scientific papers on this issue is fairly limited. The development of IT companies seems to be detrimental to local economies for several reasons listed by Coe (1998). The most obvious reason is that the growth of the industry brings direct and indirect employment effects. Secondly, by exporting, it can contribute to the economic base of the locality or region, enhancing its exogenous base. Thirdly, "brain circulation" may generate the presence of network effects (Saxenian 1994) confirming the significance of temporary mobility. Through the movements of key individuals, new foreign companies may emerge in a host country (Crone 2003). Accompanied by the entry of foreign companies, this may lead to a software cluster emerging (Crone 2003; Larosse *et al.* 2001). Fourthly, the presence of a local supply of computer services is essential in enhancing the competitiveness of local small and medium-sized companies. It may also be argued that, when a high level of competition and sophisticated clients exist, higher-quality services are provided. Additionally, software companies are crucial for developing the name of a city.

THE UNEVEN SPATIAL DISTRIBUTION OF THE SOFTWARE INDUSTRY IN POLAND

There is a widespread analysis to the effect that the software industry is very sensitive to spatial conditions (Falk and Abler 1980; Gorman 2001). Therefore, an uneven spatial pattern for this economic activity is only to be expected. In 2002, the Polish IT industry would probably have been among the top 5–6 most concentrated industries in Poland⁴,

⁴ The position depends on the index calculated (Gini or Herfindal-Hirshmann) and the variables used (population or area).

overtaking, for example, the automotive industry⁵ and IT-related activities (NACE 32 and 33 – manufacture of radio, television, communication equipment and medical, precision and optical instruments). Among the small number of industries, only the natural resource-oriented ones like mining and the tobacco industry are more clustered than the IT industry on a regional scale.

Changes in the regional spatial layout of the IT industry seem to be positive. Between 1998 and 2004, the significance of the Warsaw (capital-city) region decreased – as indicated by a decline in its contribution to overall domestic revenues from sales from 50%+ to 43% (Fig. 1). Companies from three other voivodships (province-regions) generated similar revenues and jointly produced over 25% of total revenues from sales (excluding distribution). The greatest growth was observed in Dolnośląskie (Lower Silesia) voivodship. The role of Wielkopolskie (Greater Poland) voivodship increased; however, its position in the IT industry in comparison with the regional economic potential is still quite low. In the examined period the shares taken by Małopolskie (Lesser Poland) and Pomorskie (Pomeranian) voivodships fell by a couple percentage points. Away from Warmińsko-Mazurskie (Warmian-Masurian) voivodship, the shares accounted for by the poorly-developed province-regions grew. The most spectacular increases are those displayed by Lubelskie (Lublin) voivodship, as well as those of Podlaskie (Podlasie) in the north-east and Lubuskie (Lubusz) in the west.

In recent years, there have been some signals attesting to a process of the spatial deconcentration of IT activities in Poland. This is exemplified by a decrease in the Gini coefficient ratio from 0.53 to 0.42, and a drop in the shares of two major regions (Mazowsze and Małopolska – i.e. Mazowieckie (Masovian) and Małopolskie (Lesser Poland) voivodships with respect to revenues, combined with an increase in the sig-

⁵ This is no longer true, because the automotive industry has been strongly clustering in a few Polish regions (Dolnośląskie and Śląskie) in the past 2-3 years (Domański *et al.* 2005).

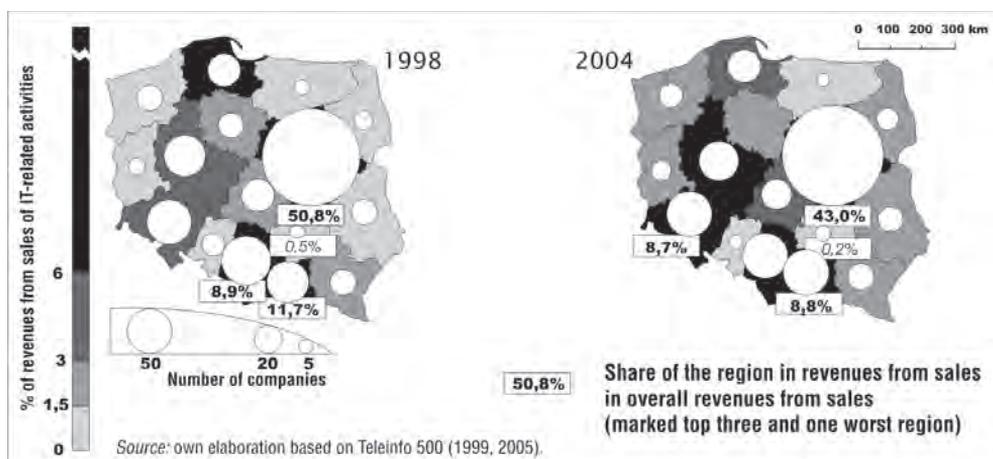


Figure. 1. Geographical concentration of IT industry on the national scale (1998, 2004).

Source: Author's own elaboration based on *Teleinfo 500* (1999, 2005).

nificance of other province-regions (excluding Pomorskie). A certain loss of importance on the part of the capital-city region (i.e. Mazowieckie (Masovian) voivodship) results from the fact that the revenues of companies located beyond its boundaries increased more rapidly between 1998 and 2004 than did those within (principally in Warsaw itself, or the immediate vicinity).

The research conducted by Micek (2006a) confirms the thesis formulated in Western European studies (Coe 1998; Sheridan, Sterne 1999; Atzema 2001) that a high concentration of IT services takes place in large cities. Over 57% of the total number of enterprises operate in the capitals of the voivodships, while 75% of people employed in the Polish IT industry work there. As much as 89% of total revenue from the sales of the largest IT companies are generated there. The location of IT companies seem not to be footloose. The fact that cases of IT companies being located outside large and medium-sized cities remain rare in Poland is intriguing. In the group of 500 largest IT companies as of 2004 (with respect to revenue), there were only four further than 30 km from large cities.

Centres for software development have been operating in Poland for almost ten years now, e.g. Oracle in Warsaw, Siemens in Wrocław, Motorola and IBM in Kraków,

and Lufthansa System (former Lido Technology) in Gdańsk. On the basis of the estimates of the author plus calculations by W. Sielski (2005), over 50% of the employment in these centres can be said to have been concentrated in southern Poland as of 2004, including over 1/3 in Kraków.

Overall it proved possible to identify three larger districts, i.e. Warsaw, the Tri-City (Gdańsk-Gdynia-Sopot) and Górny Śląsk (Upper Silesia), as well as 22 centres, of IT industry concentration (Fig. 2). These spatial agglomerations concentrate 67% of all enterprises and 90% of IT industry employees. Warsaw district has a monocentric character, though local suburban centres are slowly starting to grow (e.g. at Piaseczno, Pruszków and Otwock). Gdynia and Gdańsk, which do not have any extensive experience as regards the development of IT activity, are growing dynamically and have a similar number of employees. In the second district with respect to the number of companies and employees – the polycentric Górny Śląsk (Upper Silesia) – IT activity is concentrated in Katowice and Gliwice. Among the largest concentration centres of the IT industry in Poland it is also necessary to include Wrocław, Kraków, Poznań and Rzeszów. An interesting phenomenon is the more

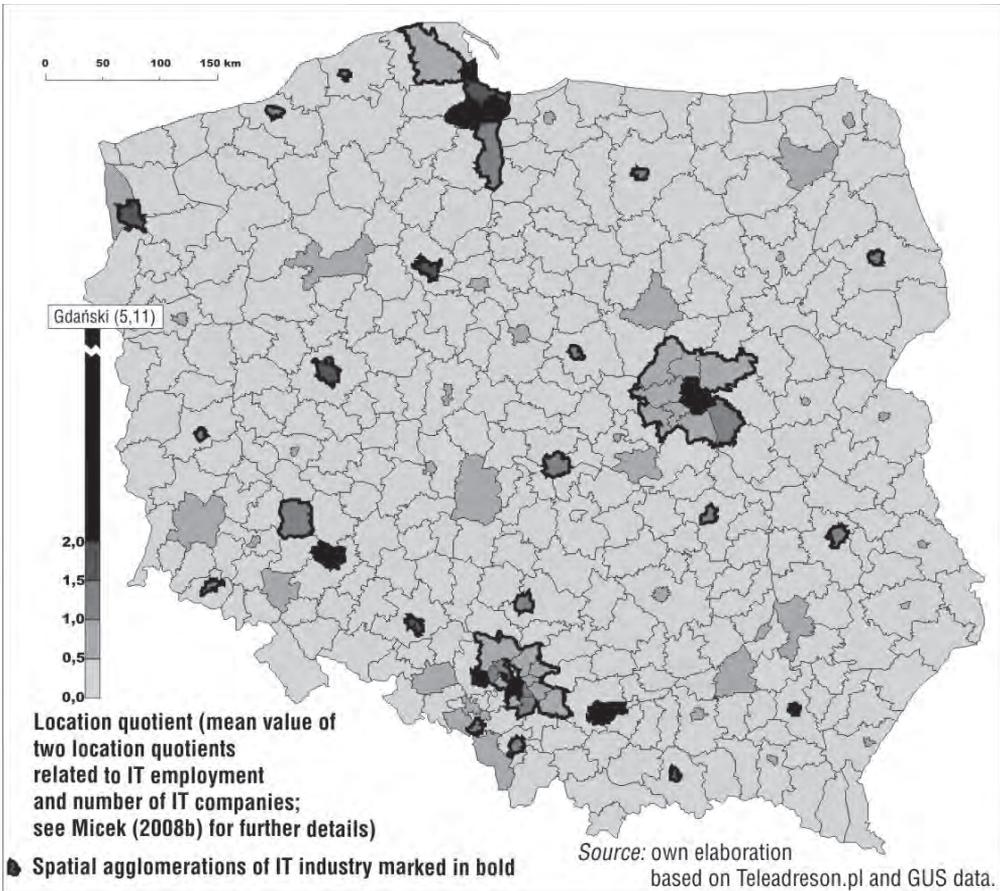


Figure 2. Geographical concentration of IT industry on the local scale.

Source: Author's own elaboration based on Teledreson.pl and GUS data.

and more frequent locating of companies in the metropolitan areas of large cities, mainly Warsaw (small companies in the Otwock, Pruszków and Piaseczno poviats) and the Tri-City (large and medium-sized companies to the south of Gdańsk), as well as in the metropolitan areas of Wrocław, Kraków and Poznań. Concentration of companies in the vicinity of large municipal centres does not result from deglomeration of IT activities outside large cities.

In highly-developed countries it is possible to observe a strong spatial concentration of IT companies in metropolitan areas, whose major cities are national capitals.

Providers of information for the Internet are concentrated in several metropolitan areas. For example, both London and New York's Manhattan have more registered Internet domains than the whole of Africa (Zook 2001). In 1981, London along with South-East England had 56% of the people employed in computer services in Great Britain and in 1993 – 59% (Table 1). Increasing concentration of IT companies in the entire region was visible, along with a tendency for deglomeration of companies from London (Coe 1998; Crone 2002). In 1998, the degree of concentration of people employed in software companies in Dublin reached

Table 1. Geographical concentration of the software industry in metropolitan regions

| Region/city | Share in: | | Year (empl./no. of comp.) | Industry | Source |
|-----------------------------------|------------|------------------|---------------------------|--|----------------------------|
| | employment | no. of companies | | | |
| Great Dublin | 83% | 76% | 1998/1998 | Software industry | Sheridan and Sterne (1999) |
| South-East England (incl. London) | 59% | • | 1993/– | Computer services | Coe (1998) |
| | 56% | • | 1981/– | | Coe (1998) |
| Amsterdam | 16% | 16% | 2000/2000 | Software industry | Atzema and Visser (2002) |
| Randstad Holland | • | 63% | –/1981 | IT industry (excl. hardware manufacturing) | Drenth (1990) |
| | • | 60% | –/1986 | | Drenth (1990) |
| 26 ICT clusters in Holland | 79% | 67% | 1998/1998 | ICT industry | Atzema (2001) |
| Warsaw | 32% | 17% | 2002/2004 | | |
| Warsaw metropolitan area | 34% | 20% | 2002/2004 | IT industry | Micek (2006a) |
| Mazowieckie voivodship | 35% | 22% | 2002/2004 | | |

Source: Micek (2008b), on the basis of the sources listed.

83% of total employment in IT companies in Ireland (Sheridan, Sterne 1999). In comparison, the spatial concentration of IT companies in Warsaw and Mazowieckie (Masovian) voivodship that includes it is relatively low. In 2002, only 35% of the employees of IT companies registered in Poland were in this province-region (in terms of real work place). The figure was 46.5% in the case of employment assigned to headquarters of the 721 largest IT companies – *Teleinfo 500* 2003.

On the scale of the entire country, the phenomenon of the gradual spatial dispersion of IT activity is now present. After the

period of concentration of the IT industry in Warsaw (1995–2003), recent years have seen the emergence of symptoms of a process of spatial deconcentration. The revenue share of companies from Warsaw is falling, while the significances of Dolny Śląsk (Lower Silesia) and Wielkopolska (Greater Poland) regions are growing. Podkarpackie (Subcarpathian) voivodship will likewise gain a significant share of the domestic IT market as a result of the recent merger of Asseco Poland and Prokom. Also noteworthy – alongside the high positions of the large cities (other than Łódź), is the surprisingly high placing of

centres located in medium-sized cities, like Sopot, Rzeszów and Bielsko-Biała.

IDENTIFIED MECHANISMS BEHIND THE EMERGENCE OF FOREIGN COMPANIES ON A GLOBAL AND LOCAL SCALE

Guzik and Micek (2008) studied the reasons behind the emergence of foreign software companies in post-communist countries. On the basis of interviews conducted, these academics argued that it is largely thanks to the local pool of expertise that foreign companies invest in Central and Eastern Europe. They treat low labour and operating costs as (only) the fourth most important factor, after the aforesaid expertise, plus reliability and appropriate technology. Guzik and Micek went on to contend that foreign companies have a smaller number of subcontracting partners than indigenous firms, and are thus statistically more often dependent on one partner (usually their parent company).

In Poland, Bulgaria and Estonia, foreign direct investment in the software industry is manifested in two types of enterprise (Guzik and Micek 2008), i.e. the young companies reporting the highest levels of exports and a large involvement in subcontracting, plus the relatively-old firms focused on the internal market, with a low level of exports and subcontracting in. The location of companies of the latter type is demand-oriented. Concerning the narrower category of foreign software development centres, three main classes were identified in the countries analysed (using the variables of size of company, level of exports and strategy). The first type (23% of interviewed firms) consists of small and medium-sized enterprises that base their competitive advantage around lower wages. Relatively the largest group of enterprises (47% of those studied) offer specialised solutions and seize the opportunity to make use of highly-skilled labour. A third type of centre (accounting for 35% of firms) is that opened by global players, which offer salaries higher than average in the region. Their position in the value chain is improving significantly, as they are

gradually coming to take on more sophisticated tasks. After a few years in operation, several centres have opened system-design, marketing and sales departments. The typology of software development centres shows that cost-related reasons behind foreign investments are slightly less important than the scramble for highly-qualified professionals and, to some extent, the search for new markets for software products.

The reasons behind FDI are strictly connected with a company's need for expansion in order to secure growth. In the CEECs, both skills and costs are very important, and those countries are also themselves market opportunities. Foreign companies deal with competition less often by reducing costs and more often by improving quality. Obviously, pure cost also matters in some companies. It is typical for some large American software enterprises to engage in labour-intensive software development and testing in CEECs. These are usually cost-based locations. Cost considerations mean that some of these companies save money and want to pay as little as possible. On the other hand, the Polish managers of some other foreign enterprises try to find ways to become more independent from their mother-companies.

Five main factors were identified behind the emergence of foreign software development on a local scale in Poland: cost-related reasons, the availability of highly-skilled graduates, the return migration of ex-pats, the cultural milieu of some cities and proximity to customers. Labour costs differ between various Polish cities. There is a substantial gap in salary levels between Warsaw and other cities, for example. The difference in salaries in the IT industry between the capital and other cities in fact varied between 22% (for Kraków) and 115% (for Łódź) in 2004 (Dubis 2005). The role of highly-qualified potential employees is a crucial factor. For instance, this is the reason listed by all interviewed managers of foreign companies operating in Kraków. What was clearly stated during the interviews was that qualified staff make companies more embedded in the given city and enhance the latter's stickiness, in

'The most important factor is access to potential workforce: who will come to work in the desert. He will do it maybe when the company will pay a lot of money for commuting. Then, we may develop the company in the desert.'
CEO, medium Silesian company

'The most positive side of making business in Krakow is following: Krakow is the appropriate place to find people to work.'
Director, medium foreign company, Krakow

'There is many very good young people in Krakow (...), there is still many specialists. Many foreign employers, but also Polish companies pay well.'
Foreign owner, several high tech companies, Krakow

Source: own research.

Figure 3. Access to skilled workforce.
Source: own research.

terms of both its ability to keep and its ability to attract new investors (Fig. 3).

A significant proportion of foreign greenfield investments have been influenced by the Polish origin of foreign founders or managers. At least one-third of the foreign companies operating in Kraków have been established by entrepreneurs who had previously lived or studied in Poland. Emotional decisions to come back to a country of origin, childhood or studies have laid solid foundations for the localised growth of the software industry in Kraków. This was thus an example of the mechanism of “bounded rationality” in action, inasmuch as that well-known cities are chosen ahead of lesser-known places. According to key informants, the role of ex-pats in foreign investment in Poland will grow over the next few years.

Cultural factors often remain as a residual that could potentially explain differences in concentration of activities and competitiveness between localities or regions (Pilon and de Bresson 2003). They were also used to explain the spatial pattern for the IT industry at the Polish local level, as residual values that cannot be expressed in terms of quantitative indicators (Micek 2006a). After the availability of suitable staff, the cultural attractiveness of the city is the second most important factor behind the choice of Kraków among foreign software companies. *Genius loci* (“the spirit of place”) has been listed by four out of five

managers of large foreign greenfield companies operating in Kraków. The relationship between the cultural and IT industries in the city was studied by Micek (2008a). Concerning the cultural milieu of cities and location of the software industry, there is an observed reinforcing of Myrdal’s mechanism of cumulative causation growth. This is not only a one-way impact (the influence of cultural attractiveness in attracting new companies). Some managers of IT companies run restaurants and pubs, others are involved in musical performances. The vivid cultural life and worldwide distinguished heritage make customers for foreign software more prone to visit Kraków. The stickiness of the Old Town of Kraków relates, not only to the attracting or keeping of new foreign companies, but also to the enticement of their customers (call and financial centres), which invest in the city to a large extent. The director of the one of the most important foreign enterprises in Kraków says: ‘Customers race to come to Kraków. They simply love to come here, because there is the specific atmosphere.’ The cultural attractiveness facilitates “doing business” in Kraków. One of the managers of a medium-sized IT company backs this supposition directly: ‘I’m going with foreign partners to the Old Town, I show them St Mary’s Church. We go to Wieliczka, next to Auschwitz. After visiting the former concentration camp, on the next day when we come to talk about business, my partner is changed, it is another partner – he was moved by what he had seen in Auschwitz. It is a strategy of softening the partner.’ These statements lead to the conclusion that the location decision and development of the company in Kraków is sometimes more heritage-oriented oriented than art-driven.

A moderate growth of the IT industry due to the cultural attractiveness of Kraków has been observed (Micek 2008a). The influence of cultural activities upon IT industries is largely limited to attracting large and medium-sized companies. Direct employment effects can be estimated at several hundred new employees (10% of employees in the IT industry in Kraków). The other question

that is consequently posed is whether foreign companies would come to Kraków if it were less attractive culturally. The answer in the vast majority of these companies is positive, due to the abundance of highly-skilled software developers in Kraków.

Demand-side is also important for software companies located near to customer sites, especially in Warsaw, and to a lesser extent in Katowice and Bielsko-Biała. These clients may be, not only offices of central or regional governments, but also large public and private enterprises. Agglomeration economies are responsible for enhancing the stickiness of these cities. Proximity to customers has not been reported as being so important in the case of firms locating in Kraków, where customers followed their foreign software suppliers. Public support has played a very limited role in foreign direct investment in the IT industry. There was only one company located in the Special Economic Zone – which treated public incentive as moderately important in its location decision.

THE ROLE OF LOCALITIES IN THE GROWTH OF INDIGENOUS COMPANIES

The reason behind the localised growth of the software industry was analysed in the case of Poland. The role of highly-qualified potential employees appeared to be the crucial factor, though it was underestimated by founders of small and medium-sized companies in their location decisions. The provision of highly skilled professionals was taken for granted as for location decisions. However, managers argued that the availability of highly-educated professionals contributes greatly to overall growth of the software industry in the city.

For Polish firms, the cultural milieu was also significantly important in terms of attracting new employees. Polish-owned companies setting up in other Polish cities decided to open a subsidiary in Kraków not only because of the accessibility of human capital, but also because of the city's cultural attractiveness.

The most important factor behind spatial patterns in the software industry in Poland is the relationship between founders and the location of their future companies. Over two-thirds of interviewed companies were established in a place where their managers had previously lived, studied or (less often) worked. It was obvious to founders that they might establish companies in a place they know well, were born in, or have friends or relatives. The best example demonstrating this emotional dimension to stickiness is the opinion of the owner of a medium-sized company from Kraków, who said: 'If someone is infected by Kraków, he/she is completely unwilling to leave it'.

LOCAL CONSEQUENCES OF GLOBAL RELOCATIONS

There are more local consequences of software industry growth to be added to those identified by Coe (1998). The exodus of software developers from small and medium-sized indigenous enterprises to transnational companies may be listed among negative processes. Over 90% of interviewed indigenous companies complain about the scarcity of workforce. The most common complaints included a lack of staff with both computer and sales skills and a shortage of appropriately-trained specialists. The second issue is of "brain drains" to foreign companies, and the direct results of that process.

The level of local embeddedness of software companies still seems relatively low. Except in a few cases, foreign enterprises are supplied by a very limited number of local basic services. Some foreign software development firms do not seem to be establishing links with indigenous firms and, consequently, do little to stimulate indigenous growth. A majority of large foreign firms are parts of international value chains with limited local clustering: this was also shown in the case of Flanders by Larosse *et al.* (2001). Most large IT companies have to align their alliance strategies with headquarters abroad, thus limiting the scope for local cluster development. However, an increasing number of foreign companies are

making themselves more open to local suppliers, leaving the famous concept of “cathedrals in the desert” (Grabher 1993).

Positive consequences of the emergence of the software industry prevail: a new, well-paid, highly skilled, white-collar class in society is arising. This may bring up a question as to the distinction between the reasons for and consequences of localised growth. Managers argue that the emergence of highly skilled professionals is both the consequence of the entrance on to the market of pioneering external companies and the reason behind the location decisions for some new investment. It may therefore be suggested that a mechanism of cumulative causation is in play here. However, not a single company has invested in Kraków following the decision to locate by Motorola (the city’s largest foreign software company): a “follower effect” has not therefore been observed.

The emergence of new companies has led to a higher level of local provisioning in advanced consumer services, and to an increased availability of luxury apartments in many Polish cities. Software companies have improved the image of regions or cities. A city may then be presented as the core of the modern economy, with services supplied by highly-skilled and experienced specialists.

The growth of the industry has direct and indirect employment impacts (multiplier effects). The interviews allowed multiplier effects on the functioning of software development centres to be estimated. The average 100-employee foreign software development centre (located in a non-capital city) indirectly hires from external companies about: 4-6 security people; 3-4 cleaning staff, one translator, 3-4 local companies supplying office equipment, catering and repair services, and computer networking – in total up to 8 employees working indirectly for the foreign software company. A vast majority of (if not all) software solutions and, to a lesser extent, equipment used in the company are provided by their foreign headquarters. Taking minimal measures, employment effects may be estimated at about 15 people.

The presence of a local supply of computer services may enhance the competitiveness of some local small and medium-sized companies. Large and medium-sized Polish softwarehouses (especially those developing ERP solutions) are dominant in their regions in terms of numbers of customers (Micek 2006a). However, the number of companies which supply foreign firms is fairly limited to exceptional cases.

REASONS BEHIND THE LOCALISED GROWTH EMERGENCE OF THE SOFTWARE INDUSTRY

The conducted research confirms the thesis formulated in Western-European studies (Coe 1998; Sheridan, Sterne 1999; Atzema 2001) that a high level of concentration of IT services takes place in large cities. The capitals of Polish provinces generate over 88% of the revenues of the largest IT companies, while 75% of the total number of people employed in the country’s IT industry work in such cities.

An increasing number of Polish metropolitan regions report new investment in the software industry. It may be argued that, in the attracting of companies to Poland, labour costs are only one of several factors behind relocation. On a global scale, the crucial element underpinning the regional success of the software industry is the accessibility of highly skilled individuals (Fig. 4).

For foreign companies in Poland, “the ability to keep” side to stickiness consists of two elements: the availability (in the meaning of both the accessibility and quality) of highly-educated professionals, and the cultural attractiveness of cities. It is the local milieu that determines the geographical concentration of software companies in a number of cities. Due to bounded rationality, managers choose well-known locations. Surprisingly, the managers of foreign firms often have Polish origins, representing the return migration of so-called “ex-pats”.

For a few foreign companies, the level of labour costs was also important in loca-

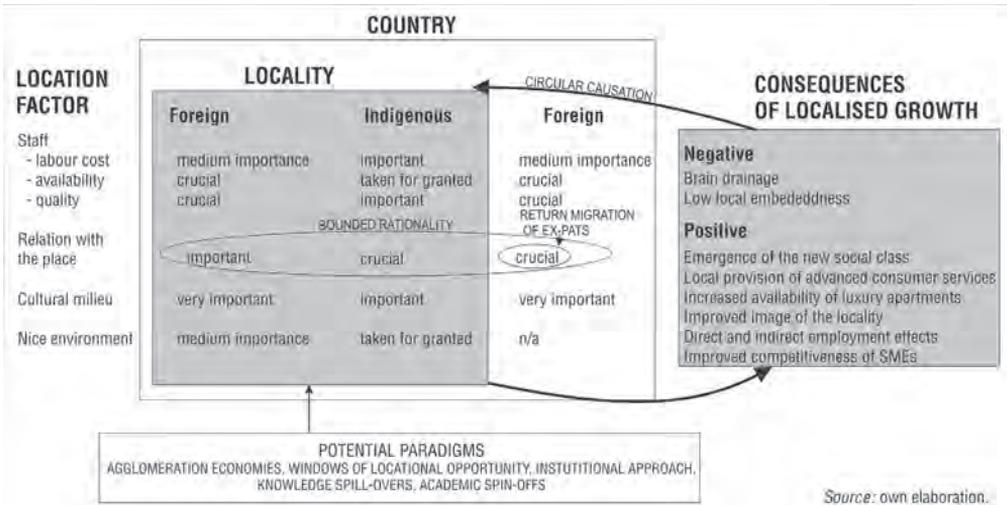


Figure 4. The localised growth of the software industry in a global perspective: reasons and consequences.

Source: Author's own elaboration.

tion decisions favouring non-capital cities. A nice, green environment with modern facilities was not of such great importance as has usually been suggested in the Western subject literature. A few foreign companies took the attractive environment for granted. The majority of enterprises reported that the cultural milieu attracted them to Polish cities. Software companies located in Warsaw and, to a lesser extent, in Katowice listed proximity to customers as the second-tier factor. Only a very limited role of public initiatives was reported. Myrdal's cumulative causation was observed in some cities, in which the consequences of the emergence of the software industry (e.g. the growth of the cultural milieu, the inflow of highly-skilled specialists and the increased number of computer science graduates) became important factors behind the localised growth.

The majority of indigenous companies listed ties with a locality as a previous place of studying, residence or work. These were usually university cities, which provide an attractive and innovative milieu for setting up businesses, and make it easier to find employees. A circular cumulative mechanism has been observed. The development of the skills

of local professionals and improved image of some Polish cities as consequences of the emergence of the software industry have become reasons underpinning localised growth.

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ANALYZING ACCESSIBILITY BY TRANSPORT MODE IN WARSAW, POLAND

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Abstract

While the pre-1989 urban structure in the Polish capital city, Warsaw, was well diagnosed pre-1989, existing spatial structures virtually disintegrated in the wake of adjustments to free-market conditions following the collapse of communism. The work described here has thus sought to investigate how the changes in spatial structure alluded to have affected Warsaw's post-1989 accessibility patterns. Specifically, use has been made of gravity-model-based indicators, disaggregated by commuting mode, in examining the intra-urban differences in job and worker accessibility. Data analysis is based on the 1998 Comprehensive Transport Survey conducted in Warsaw. Results show that residential and employment accessibility for both automobiles and public transport exhibits a concentric though irregular pattern declining in intensity with increasing distance from the central area. Overall, the patterns indicate the dominance of the central area in the urban structure, with variations in accessibility by mode and similar geographical extents of accessibility of both modes.

Key words: accessibility, commuting, journey-to-work, urban spatial structure, Warsaw.

1. INTRODUCTION

In Warsaw, pre-1989 commuting was well diagnosed (see, among others, Ginsbert 1968; Cegielski 1977; Potrykowska 1983; Bergel 1987; Rakowski and Gocał 1989). Statistical records (personnel censuses) became a rich source of information when it came to the volume and structure of the city's journeys to work, determining the proportion of inward commuters at roughly 20% throughout different periods after World War II. Researchers also showed the influence of commuters'

demographic and occupational features upon the direction and distance/duration of travel to work (Potrykowska 1983; Rakowski and Gocał 1989). Furthermore, others suggested that function-oriented processes follow the general trends for urbanization, and that the structure of commuting and intensity of relationships are subject to differentiation within the city complex (Potrykowska 1983).

Post-War Polish settlement patterns and key urban regions were largely determined by growth in output, as dependent on labor supplies under the centralized system of

economic management. As industrialization gathered pace, the demand for labor increased, and travel to work had to make good any shortfalls. In a broader context, commuting is included in the concept of the functional urban region (in Poland see Potrykowska 1985), and is one of the elements to the spatial and economic balance.

Adjustments to free-market conditions following the collapse of communism brought an effective end to existing spatial structures. One, the number of jobs dropped sharply in absolute terms, particularly in the mono-function industrial regions affected by the economic depressions beginning in the 1980s. Two, service-sector employment rose sharply in absolute terms inside the top centers of administration and settlement. Since it has often been shown (for example Potrykowska 1983; Rakowski and Gocał 1989) that travel to work varies with job type, education, age, etc., it can easily be concluded that the prevailing commuting and accessibility patterns broke down under the impact of the transformation.

Given Warsaw's status as capital of the largest Central European country, and taking into account the political and socio-economic transformation since 1989, this paper has sought to identify the *intra-urban* variation in accessibility indicators, as disaggregated by transportation mode. However, the task posed a challenge in the light of the evermore limited opportunities for research in this field post-1989, as a consequence of the lack of comprehensive statistical information regarding travel to work, especially when it comes to the break down in terms of structure, directions, intensity, dynamism and relationships. Such is the scale of the shortfall that procurement of source data is indeed exceptional. Thus far, the data proving both available and credible in regard to Warsaw have derived solely from traffic measurements made in 1998, these thus offering the only avenue by which to study commuting, accessibility and changes in the city's social and spatial structure. Thus, notwithstanding the age of these materials, research remains highly desirable if knowledge is to be ob-

tained, regularities uncovered, and general conclusions as to the structural changes taking place in one of the most important cities in Central and Eastern Europe drawn.

The paper is organized in such a way that the next section provides an overview of Warsaw's post-1989 urban spatial structure (covering pre-transformation characteristics before discussing changes taking place during the transformation period, such as the re-assertion of land and subsequent dominance of the CBD), as well as of demographic and residential processes. Section 3 is in turn an overview of commuting and transportation in Warsaw, as followed by a review of accessibility concepts and an exposition of the methodological framework in section 4. The paper then ends with the empirical results detailed in section 5, as well as a summary and discussion in the last section.

2. WARSAW'S SPATIAL STRUCTURE AFTER 1989

2.1 Main characteristics before the political transformation

Up to 1989, Warsaw was growing along lines dictated for it within the centrally planned economy. Węclawowicz (1996) recorded the main features of its growth by pointing to the supremacy of ideology over the economy, as well as the extensive management policy that had been pursued without regard to land rents, most especially in the central areas. The approach ensured that Warsaw's spatial structure became reminiscent of a mosaic-like pattern, in which primary importance was assigned to residential and production/industrial functions, even in central areas. Housing developments were closely in line with the pace of the country's urbanization, though migration was less intensive than it might have been due to registration restrictions in force until 1984. By 1989, the population of Warsaw had reached 1.6 million. The post-1989 effect of the political, social and economic transformations, combined with EU accession in 2004 and globalization

in general, has been to make Warsaw a major center of foreign trade (Komornicki 2003), as well as an important element in the European urban system (Korcelli-Olejniczak 2005).

2.2 The growing importance of Warsaw's central areas

Seen from the point of view of the capital city's spatial growth, the single most important effect of the end put to central management was the reassertion of market mechanisms in the economy. Most relevant has been the fact that new development projects once again became tied to the rule of market rents, in accordance with urban economic theory. Analytical reports detail the way in which land rents and the locations of new investments in the city's central areas have come back into line with each other (Śleszyński 2004a). In both cases, regressions between investment project intensity and land prices are reflected in exponent or power functions, with R^2 coefficients showing very high values (0.85-0.99). In effect the city's central areas reasserted and increased their role in citywide functions.

2.3 The growth of functions relating to highly specialized services

Warsaw's Central Business District was growing as the city's individual functions were changing. The reassertion of market mechanisms spurred the demand for new businesses, or jump-started weaker ones (Korcelli 1995; Potrykowska 1995; Węclawowicz 2002). By 2005, there were 300,000 family-owned or single-owner businesses that needed space for business (office, service and floor space). The demand caused an investment boom revealed in the two million m^2 of modern office space (of classes A and B+) that were provided in the period 1989-2001 (Śleszyński 2003). The rise of the Central Business District (CBD) is really without precedent (unless one reaches as far back as to the pre-War era). However, in the case of Warsaw, the term "management area" (Śleszyński 2004a) might seem more appropriate, since the Warsaw CBD differs from

its counterparts in Western Europe and North America, as regards dispersion, its diversified functions and the ongoing strong emphasis on housing (as a legacy of central planning). It is suggested that management space implies a set of relationships between centers of decision-making or control, in terms of their relative locations, structure and emergence over time. Decisions made in these control centers, as spatio-temporal objects, account for the greatest measure of influence upon a given level of organization and structure.

In Warsaw, the concentration of control functions may be illustrated by the fact that, among the country's 500 biggest companies, 165 had their main offices in the city, these accounting for 46% of the total income the 500 generated (Śleszyński 2002a). Where the category of annual income exceeding 2.5 million euros was concerned, 1343 such companies were based in Warsaw's central districts of Śródmieście, Mokotów and Wola, their income accounting for 66% of the total. Śleszyński (2004a) in turn shows how companies controlling 20% of the financial sector in Warsaw were occupying a mere 1.4 km^2 area within just the single urban district of Śródmieście Zachodnie (the eastern part of the district of Wola). This is particularly hard to imagine in view of the rundown appearance of that part of Warsaw.

2.4 Succession of functions

While Warsaw's central business district rapidly became the site of intensive office-block construction buildings, the process was always going to be complex, when taking place under the pressure of unresolved ownership issues. In the wake of the land communalization of 1945 (and the lack of any general re-privatization post-1989), the municipal authority remained (and remains) the official owner of land. While the law in force admittedly allows ownership titles to be claimed, the attendant procedure is beset by difficulties arising from the fact that land registers and related documents have gone missing, previous owners are dead, beneficiaries are difficult to locate and court proceedings are

highly protracted. This has made construction projects in what has traditionally been the downtown area of Warsaw a risky business, bearing in mind also that compensation to pre-World War II owners may be payable. In the same area, building development is often held back by administrative road-blocks, such as the lack of physical development plans, conservation requirements and protests on the part of the local community against worsening living conditions.

However, investment reserves were found, post-1989, in the immediate vicinity of the city center (in the aforementioned eastern section of Wola and urban quarter of Śródmieście Zachodnie). This reflected 1991 laws giving some industrial establishments ownership rights over their lands. Since the plants in question were heading for economic hardship brought on by high costs of production, outdated capital- and time intensive technology and the tearing down of tariff barriers, the situation called for the fastest possible sale of land and infrastructure, with a view to more capital being invested, claims satisfied and compensation for staff paid.

Building projects need to have locations ensuring benefits from the land rent. Hence, they achieve highest intensity in the center and, should this not be feasible, other high-yielding venues are then searched for. As far as Warsaw is concerned, its expansion has had a model of succession involving three distinct stages (Śleszyński 2004a):

Stage One: invasion, in the years 1989-1994, with market mechanisms re-applied forcefully and in a disorderly fashion due to the land-rent effect. Interest groups were taking possession of “free” land to satisfy their needs. Infrastructure and human resources adapted to new terms and conditions. Business was in some sense “out of control”, as could be noted in the street trading activities.

Stage Two: expansion, in the years 1995-1999, showing first attempts to control market mechanisms through a series of re-assigned competences to eleven new districts. Foreign building projects, including high-standard apartments, affected the growth in jobs and gentrification. First conflicts relat-

ing to spatial management and interests coincided with re-privatization. Spatial structures decomposed under the impact of high intensity and types of use.

Stage Three: consolidation after 1999, first city-planning studies, business polarization, enhanced spatial conflicts, restriction of residential functions, social and spatial polarization, due to the strict limits imposed on social and residential functions. Efforts made to improve the appearance of local areas.

2.5 De-concentration of central-area functions

The spreading of functions typical of the central area was of crucial importance to for the growth of spatial structures. Given the deregulated state of ownership, some investment projects in the high-level services (finances, company management, etc.), have tended to concentrate away from the city center. Besides the center in the strict sense (including the eastern flank of Wola district), there was heavy concentration in the post-industrial estates of Southern Służewiec – where 200,000 m² of office space came into service between 1990 and 2005 (or nearly 10% of all the office space in Warsaw). Areas supporting other activities were emerging along the major southbound and south-west bound arterials. In general, the city center was coming to assume greater importance in both absolute and relative terms (i.e. numbers and shares going to companies listed on the stock exchange, space occupied for metropolitan functions). However, this concerted push was soon held up, as various other processes began to take hold. Further aspects to the spatial changes included low-level service sector deconcentration (Lisowski and Wilk 2002) and marked deindustrialization (Potrykowska 1995; Misztal 1998).

2.6 Demographic and residential processes

The emergence of spatial structures is certainly affected by demographic and social factors. Warsaw’s demographic and spatial

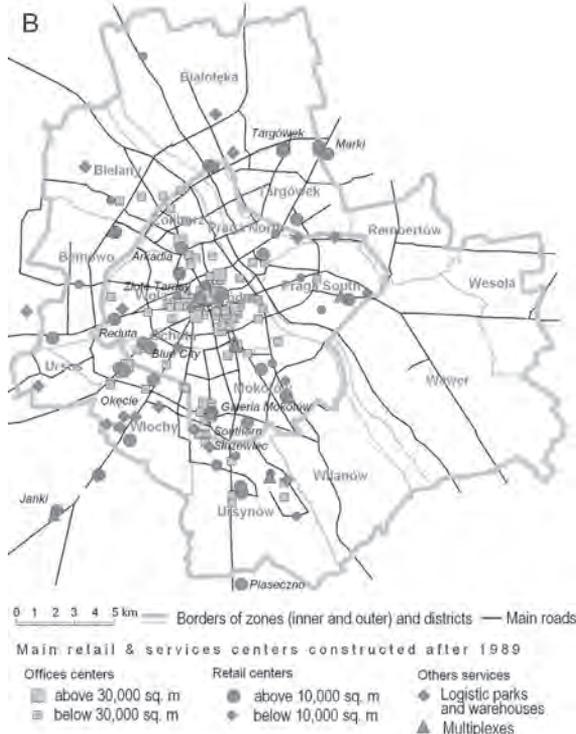
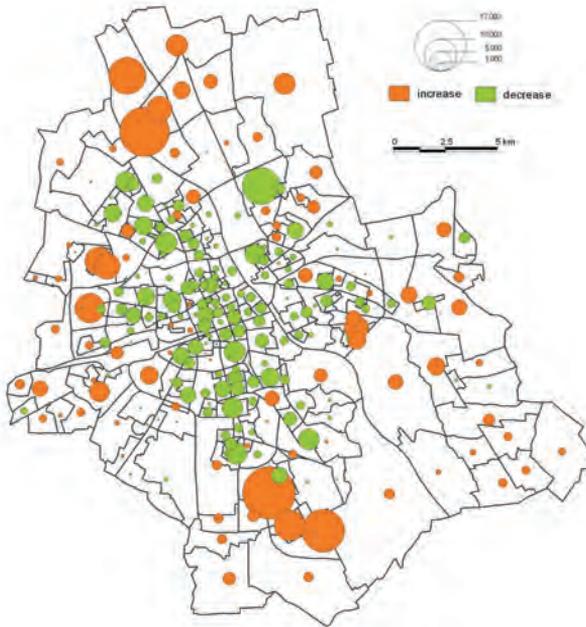


Fig. 1. Selected processes in Warsaw and the Warsaw agglomeration after 1989: A – population deconcentration (1989-2000); B – new investment in retailing and the services sector (1989-2005). Source: The authors' elaboration, as well as all the other figures in the article.

Table 1. Main indicators for Warsaw, 1990–2006

| Specification | 1990 | 1998 | 2006 |
|--|---------------------|------------------------|-------------------|
| Population | 1,656,000 | 1,670,000 ¹ | 1,702,000 |
| Natural increase (per 10,000 head of population) | -2.7 | -4.1 | -0.6 |
| % of population of post-working age | | 18.8 ¹ | 20.0 |
| Inhabited dwellings | 590,000 | 629,200 | 766,200 |
| New dwellings completed | 3100 | 6900 | 13,700 |
| Gross Domestic Product | | | |
| - per capita, PPP, international dollars | x | 23508 | 44923 |
| - per capita, Poland = 100 | x | 262.7 | 301.9 |
| Business entities | 64,900 ² | 226,200 | 304,000 |
| Nos. in employment ³ | 670,000 | 907,000 | 1,050,000 |
| km of day urban transportation lines (km) | | | |
| - trams | 447 | 481 | 406 |
| - buses | 2206 | 2424 | 2546 ⁵ |
| Passenger taxis | 8745 ⁴ | 10,024 | 7962 |
| No. of students | 53,000 ⁶ | 93,200 ⁶ | 278,200 |
| Tourists accommodated | 459,000 | 853,000 | 1,635,000 |

All data at year's end; x – lack of data (Poland – 5480 USD per capita)

¹estimated on basis of balance and census data; ² - 1992; ³ 1990 – according to the CSO, excluding small entities of less than 5 workers (circa 20% of employment), 1998 – according to Gawryszewski *et al.*, 1998, calculation for 1995 and 2006 – according to P. Śleszyński, 2007, calculations for 2005; ⁴ 1993; ⁵ 2003; ⁶ only by day study system.

Other sources: Statistical Office in Warsaw.

growth in recent decades has followed the urban demographic cycles. After World War II, Warsaw entered its first cycle, namely decentralization in the 1960s, followed by relative centralization in the 1970s, and culminating in the relative decentralization of the 1980s (Korcelli 1990; Gawryszewski *et al.* 1998; Lisowski 2005). Post-1989, there were symptoms of transition to absolute decentralization (Potrykowska and Śleszyński 1999). However, the city's attractions pulling in migrants seeking jobs and housing invalidate any conclusions as regards decentralization (Śleszyński, 2006). Warsaw's spatial structure is thus taking on a mosaic-like pattern induced by socio-demographic processes, even if this change in fact began before the transformation (Węclawowicz 1977). It is likely that, due to the "resistance" in the housing structure, social changes are now occurring at a slower pace than was the case with the fast-paced economic transformation of the first decade af-

ter 1989. The major relevant demographic, housing and economic data are characterized in Table 1 and Fig. 1.

3. COMMUTING AND TRANSPORTATION IN WARSAW

The study area is defined by reference to the administrative boundaries of the city of Warsaw, excluding the suburban communities in line with the availability of journey-to-work data (Warsaw districts are shown in Fig. 1). Table 2 presents some basic characteristics regarding commuting and the transportation network. Warsaw is a relatively compact city of 518 km². It has been shown elsewhere that Warsaw commuters travel an average 6.4 km to work (based on mixed travel modes), or about 44% longer than necessary, given the locations of homes and jobs in the city (Niedzielski 2006).

As a legacy of the central planning era, choice of means of transport remains very

Table 2. Characteristics of the study area

| Specification | Warsaw |
|---|--------|
| Land area (km ²) | 517 |
| Number of zones | 260 |
| Motorized means of transportation to work (%) | |
| auto | 33 |
| public transportation | 67 |
| Public transportation fleet | |
| Number of buses | 1261 |
| Number of tram cars | 340 |
| Number of subway trains | 14 |
| Public transportation network | |
| Number of bus routes | 176 |
| Number of tram routes | 35 |
| Number of subway routes | 1 |

Data source: Comprehensive Transport Survey in Warsaw, 1998.

different than that observed in more developed nations in Western Europe and North America. Auto dependency is much lower in Warsaw than is general for European and North American cities. Whereas at least 75% of workers commute by auto in North America (Kawabata and Shen 2006), only approximately one-third of Warsaw workers did so in 1998. In that same year, approximately two-thirds of commuters in Warsaw used public transport. However, as income levels rise, the modal split will shift toward higher auto dependency, as is the case in the U.S. The process has already begun to take shape, albeit slowly, with public transport use down to 60% and private vehicle use up to 40% in 2005 (Suchorzewski 2005).

The very high level of use of public transport in the journey to work is indicative of the high purchase cost of automobiles relative to wages, high participation of female labor in the workforce, as well as the nature of a public transport network comprising buses, trams and a single subway (metro) line. During the rush hour, 1261 buses are traveling along 176 routes, carrying workers from home to work and back and penetrating even remote parts of the city. The tram network is less extensive, but nevertheless con-

nects most of the major housing estates in the city with the CBD, using 340 trams on 35 routes to do so. The subway line connects the extensive housing estates in Ursynów district in the south with the city center. Thus, the extensive public transport network provides the means to access economic opportunities, and workers stand a fair chance of enjoying good accessibility, if not of course at the level of auto accessibility. Limited auto dependency and a well-developed transit network provide for an interesting context in which to differentiate commuting modes in the calculation of accessibility.

4. METHODOLOGY

Accessibility includes the ideas of ease of movement and attractiveness of location (Giuliano 2004). Accessibility for a given location measures the magnitude and character of activities in other locations discounted by distance (Horner and O'Kelly 2003). Accessibility is used in many different forms, depending on the purpose of its use and available data (Harris 2001; Helling 1998; Pooler 1987). Expanding on Luo and Wang's (2003) classification, approaches to the investigation

of accessibility are classified according to three dimensions (revealed versus potential, spatial versus aspatial, and individual versus locational) into eight categories: revealed spatial individual accessibility, revealed spatial locational accessibility, revealed aspatial individual accessibility, revealed aspatial locational accessibility, potential spatial individual accessibility, potential spatial locational accessibility, potential aspatial individual accessibility, and potential aspatial locational accessibility. Differences between the eight categories relate to various combinations of one of the dichotomous dimensions: actual (*revealed*) or probable (*potential*) access, physical (*spatial*) or non-geographic (*aspatial*) barriers to access, and single-person (*individual*) or place-based (*locational*) access. *Potential spatial locational* accessibility has been used to investigate aspects of urban spatial structure in other studies (Fotheringham and O’Kelly 1989; Harris 2001; Horner 2004) and it is used in this research to examine Warsaw’s urban form.

By assessing *potential spatial locational* accessibility, we intend to gauge the probable attraction of a location relative to other places within the urban system discounted by the physical distance separating them. Thus, in this study we measure both residence-based, demand-adjusted job accessibility (how accessible jobs are for residents) and employment-based, supply-adjusted worker accessibility (how accessible the labor force is for employers). The purpose is to encapsulate simultaneously the effects of both residential (supply-side) and employment (demand-side) accessibility, thus incorporating spatial competition between workers for jobs, and between employers for workers (Horner 2004; Kirby 1970). Today’s more complex accessibility measures have as their origin the simple formulation provided by Harris (1954) and Hansen (1959), which estimates the accessibility (X_i) of zone i by including the attraction component (D_j) and the impedance term $f(c_{ij})$:

$$X_i = \sum_{j=1}^n D_j f(c_j) \tag{1}$$

The major limitation of this original accessibility formulation is that it captures only the attraction or demand (D_j) of places within the urban structure. More recently, new formulations have been proposed to take account of the spatial distribution of supply (workers) and demand (jobs), by including competition intensity (Shen 1998; Shen 2001; Wang 2003; Wang and Minor 2002). For example, residence-based, demand-adjusted job accessibility is expressed as follows:

$$X_i = \frac{\sum_{j=1}^n D_j f(c_j)}{\sum_{i=1}^m O_i f(c_j)} \tag{2}$$

where O_i is the production in the i th zone, and the other variables are the same as in equation (1). While this modified job accessibility measure incorporates both supply and demand effects, it does not take explicit account of the interaction between residences and workplaces (Horner 2004). Since the number of jobs (D_j), the number of workers (O_i), and the interaction between zones i and j are known on the basis of the observed data, it is appropriate to use the doubly constrained spatial interaction model. Zones in a partitioned urban area both produce and attract trips, and the doubly constrained gravity model guarantees that any journey-to-work predictions satisfy the observed data. Furthermore, gravity model-based accessibility indicators have the advantage of incorporating interaction with all zones. The calculation of job and worker accessibility in this study uses modified versions of formulae from Horner (2004), to take modes of transportation into account. These modified formulae are:

$$T_{ijk} = A_k O_k B_k D_k \exp(-\beta_k c_{ijk}) \tag{3}$$

$$A_k = \left(\sum_{j=1}^m \sum_{k=1}^2 B_k D_k \exp(-\beta_k c_{ijk}) \right)^{-1} \tag{4}$$

$$B_k = \left(\sum_{i=1}^n \sum_{k=1}^2 A_k O_k \exp(-\beta_k c_{ijk}) \right)^{-1} \tag{5}$$

$$\sum_{i=1}^n T_{ijk} = D_k \forall j, k \quad (6)$$

$$\sum_{j=1}^m T_{ijk} = O_k \forall i, k \quad (7)$$

$$\sum_{i=1}^n \sum_{k=1}^2 T_{ijk} = D_j \forall j \quad (8)$$

$$\sum_{j=1}^m \sum_k T_{ijk} = O_i \forall i \quad (9)$$

where

i = index of residential zones
 j = index of employment zones

k = index of transportation modes (1 = private automobile, 2 = public transport)

T_{ijk} = interaction between zones i and j using transport mode k

O_{ik} = number of workers in zone i using transport mode k

D_{jk} = number of jobs in zone j using transport mode k

A_{ik} , B_{jk} = row and column balancing factors

$\exp(-\beta_k c_{ijk})$ = exponential function applied to distance matrix

The general form of the doubly constrained spatial interaction model is presented in equation (3). The row and column balancing factor formulations are given in equations (4) and (5), and equations (6) and (7) ensure that predicted T_{ijk} row and column sums match the observed zonal totals from the mode-specific interaction matrices. Equations (8) and (9) maintain equality between the residential and employment totals from the predicted T_{ijk} , and the observed zonal totals from the mixed-mode interaction matrix. The inverse relationship between distance and travel potential is captured by the exponential function in equation (3). A_{i1} and

A_{i2} are measures of job accessibility for workers living in zone i who travel by car and public transport, respectively. B_{j1} and B_{j2} are measures of worker accessibility for jobs located in zone j using automobiles and public transit, respectively.

The row and column balancing factors are indices of locational accessibility (Kirby 1970; Horner 2004) and are the result of calibration of the spatial interaction model. This involves using the components (O_{ik} , D_{jk} , c_{ijk}) in equations (3)-(9), as calculated from the available data, as well as finding the β_k value that forces equality between the predicted (T_{ijk}^*) and the observed (T_{ijk}) trip lengths, i.e.:

$$\sum_{i=1}^n \sum_{j=1}^m T_{ijk}^* c_{ijk} = \sum_{i=1}^n \sum_{j=1}^m T_{ijk} c_{ijk} \forall k \quad (10)$$

The balancing factors, A_{ik} and B_{jk} , are thought of as inverse Hansen-type accessibility measures, in the sense that lower values correspond with greater accessibility (Horner 2004). The normalizing factors, A_{ik} and B_{jk} , respectively capture the ability of an origin to produce - and a destination to attract - trips, after controlling for the deterrent effect of distance using either private automobiles or public transit. However, due to their function of reproducing O_{ik} and D_{jk} , the balancing factors provide only a general representation of the urban structure. To counter the smoothing effect, A_{ik} and B_{jk} are weighted by O_{ik} and D_{jk} to produce indicators of relative emissiveness (U_{ik}) and attractiveness (V_{jk}), respectively, as follows (Cesario 1974; Horner 2004; Thomas 1977):

$$U_{ik} = A_{ik} O_{ik} \quad \forall i, k \quad (11)$$

$$V_{jk} = B_{jk} D_{jk} \quad \forall j, k \quad (12)$$

U_{ik} (V_{jk}) measures the propensity for trip production (attraction) by transport mode, relative to other zones. Emissiveness (attractiveness) indicators are useful because they delineate residential (employment) sub-areas within the urban system (Horner

2004; Thomas 1997). Large emissiveness (attractiveness) values track more accessible zones with large numbers of jobs (workers) and less accessible zones with large numbers of jobs (workers). Conversely, small values indicate areas with few jobs (workers) with high and low access. The ability to track two dimensions of high (low) accessibility scenarios is a major advantage of the U_{ik} and V_{jk} indicators.

5. ANALYSIS

5.1 Data and procedure

The journey-to-work data needed for the completion of this analysis are available from the 1998 *Comprehensive Transport Survey in Warsaw* (Biuro Planowania Rozwoju Warszawy 1998), the most recent year for which all necessary data were available at the time of this study. This work travel data encompass the origins and destinations and trips to work between the two characterising Warsaw, and in this way resemble the U.S. Census Transportation Planning Package (CTPP) Part 3, Journey-to-work flow data. Data are only available for a 24-hour period and are disaggregated by transport mode. The residential (O_{ik}) and employment (D_{jk}) totals disaggregated by mode are extracted from the commuting trips (T_{ijk}) at the transportation zone (TZ) level (similar to the CTPP Traffic Analysis Zones). Work travel impedances, c_{ijk} , are taken to be network distances between TZ centroids. The private automobile (c_{ij1}) travel costs are calculated using the road network, and the public transit (c_{ij2}) distances are based on the actual transit network. We use network distance because the data are for a 24-hour period, which makes it difficult to use congested travel times because congestion effects vary with the time of day.

The accessibility analysis for Warsaw begins by calibrating the doubly-constrained spatial interaction model for the two transportation modes. The calibration procedure is performed using an algorithm (see Fotheringham and O'Kelly 1989, p. 53) to find

the exact value of the beta parameters, β_k . In Warsaw, β_1 is equal to -0.147231 and β_2 to -0.232165. A by-product of the use of the calibration algorithm coded in C++ is the ability to extract the balancing factors, A_{i1} , A_{i2} , B_{j1} , and B_{j2} .

5.2 Transport mode-specific balancing-factor visualization

We first examine accessibility to jobs from the home perspective (i.e. residence-based accessibility) for private vehicles (Fig. 2) and public transport (Fig. 3). The figures show clearly that the highest level of accessibility characterises the central area of the city, while there are decreases in different directions toward the periphery. While monocentric accessibility patterns are exhibited, there are also noticeable differences. For both commuting modes, the areas of greatest accessibility tend to focus on major thoroughfares increasingly distant from the CBD. The most striking difference is the emphasis on areas accessible by car in the south and general accessibility in all directions by public transport. This difference becomes more apparent when the focus shifts to the two most accessible classes (the darkest

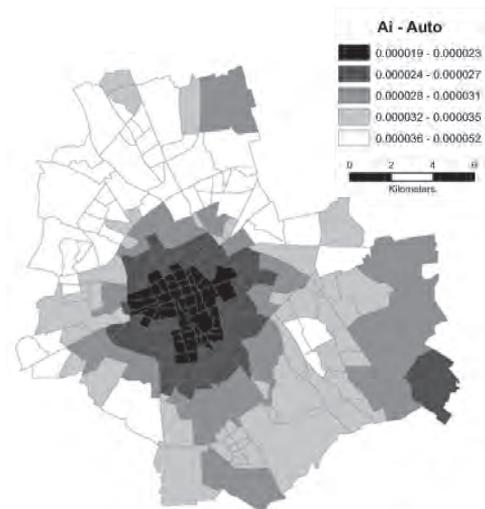


Figure 2. Accessibility to jobs for residents using private vehicles (A_{i1}) in Warsaw.

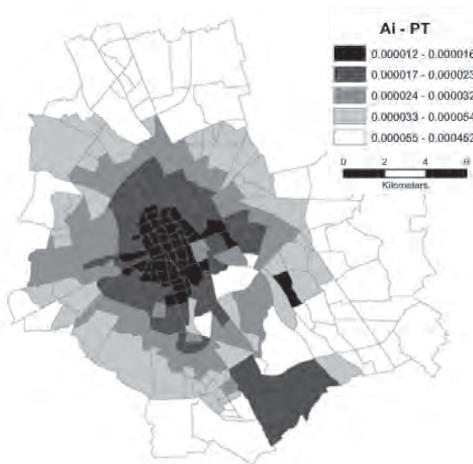


Figure 3. Accessibility to jobs for residents using public transport (A_{12}) in Warsaw.

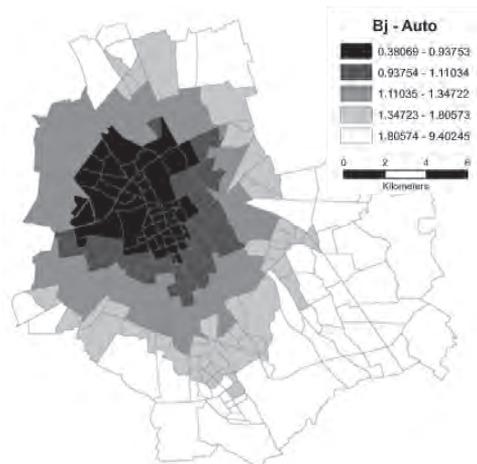


Figure 4. Accessibility to residents for employers using private vehicles (B_{11}) in Warsaw.

shaded areas). The emphasis on areas in the west (eastern Wola) and south (Mokotów) of the CBD anecdotally mirrors the spillover of higher-level CBD functions in these areas. The preference white-collar workers show for private automobiles may explain the difference between the auto and transit patterns. For public transport, the accessibility pattern is much more centered and decreasing in all directions, most likely due to the more spatially ubiquitous distributions characterizing the jobs held by transit-using workers.

Private-vehicle and public-transport employment-based balancing factors are shown in Figs. 4 and 5, respectively. The accessibility patterns suggest that the greatest accessibility is centralized for public transport, without a skew in any direction. The pattern is less concentric and more double-axis oriented. There are clearly two axes of public-transport-mediated worker accessibility: north-south extending from southern Bielany into northern Mokotów and east-west from eastern Wola into Praga Północ. For cars, however, the accessibility pattern has a northern focus. While the Śródmieście district remains among the most accessible areas, it has been joined by zones in northern Bemowo, Żoliborz and southeastern Bielany and northern Praga Północ districts, at the

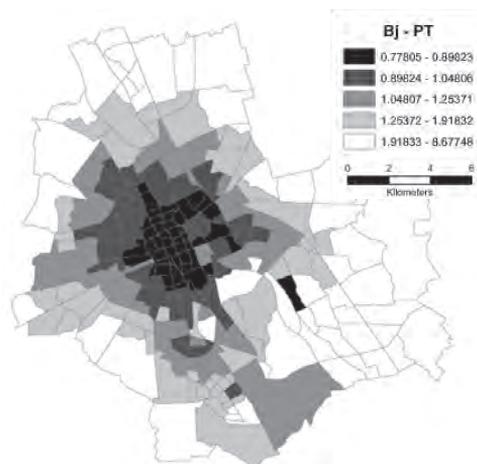


Figure 5. Accessibility to residents for employers using public transport (B_{22}) in Warsaw.

expense of zones in Mokotów district. Most likely the respective transport networks make a key difference. These heightened areas of auto-accessibility to labor pools correspond to the location of the major arterial (*Trasa Toruńska*, part of the second inner ring road) running from Wola district through Bemowo and Bielany to northern Praga Północ and northern Targówek. The more-developed road network in these parts provides short-

cuts that are less prominent on the opposite side of the CBD. On the other hand, the transit network is more balanced, and its radial nature ensures similar levels of access in most directions.

5.3 Visualization of transport mode-specific emissiveness and attractiveness

The emissiveness and attractiveness indices are valuable as tools assessing urban structure since they also identify “outliers” in the urban accessibility hierarchy, to use the terminology from Horner (2004). We begin by discussing the U_{i1} and U_{i2} values mapped in Figs. 6 and 7. Though similar in overall pattern, the two commute modes are characterised by distinct differences in emissiveness values. In both maps, the districts producing a large number of trips are Bemowo, Bielany, Praga Północ, Targówek, Ursus and

Ursynów. Even though we use network distance, the advantage of public transport in providing shortcuts to employment opportunities versus the road network is clear. In areas such as Bemowo, Bielany, Targówek and Ursynów, where public transport does not provide linear advantage over the road network, the U_{i2} values are lower than U_{i1} . However, U_{i2} values are higher than U_{i1} in the Ursus, Rembertów and Wawer districts because the rail line provides a commuting advantage, and hence improved accessibility. The rail lines cutting through these three districts provide direct linear access to the CBD, and the transit emissiveness values identify this locational advantage over the road network which provides more convoluted access to the CBD.

Figs. 8 and 9 display the values of V_{j1} and V_{j2} . The general pattern not only shows that the CBD attracts the most work trips, but also indicates other (smaller) concentra-

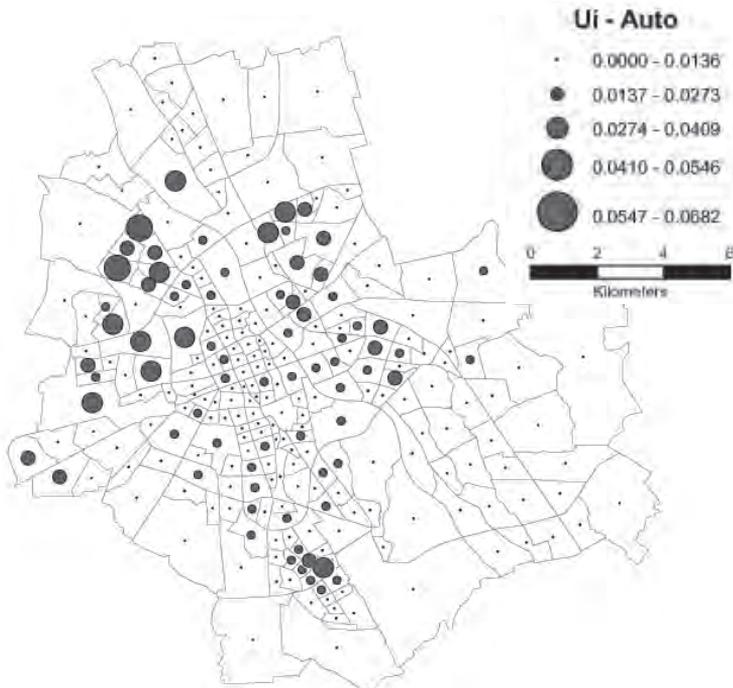


Figure 6. Emissiveness for private vehicles (U_{i1}) in Warsaw.

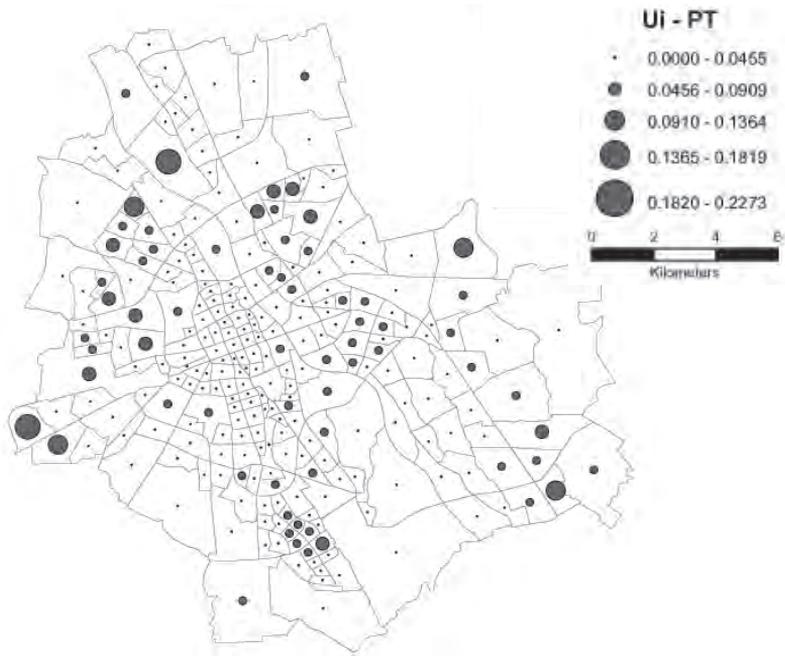


Figure 7. Emissiveness for public transport (U_{ij}) in Warsaw.

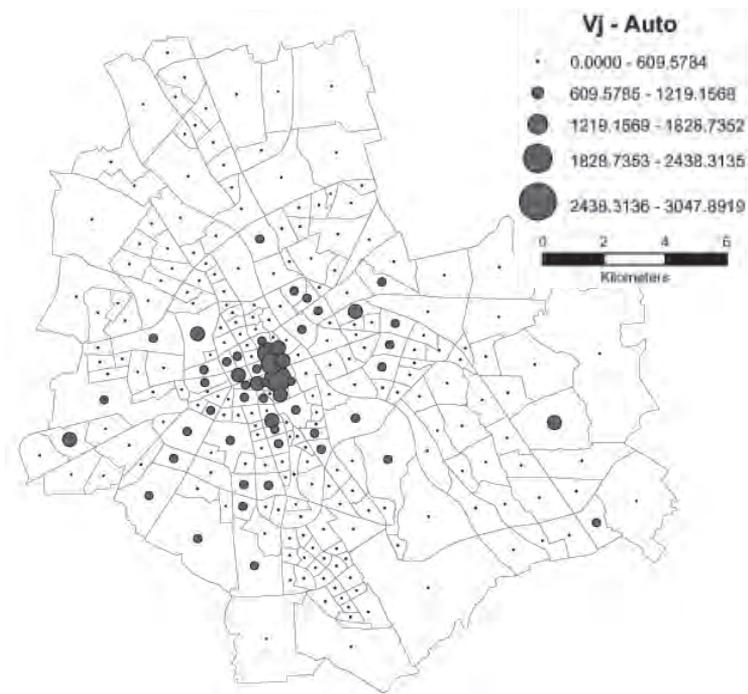


Figure 8. Attractiveness for private vehicles (V_{ji}) in Warsaw.

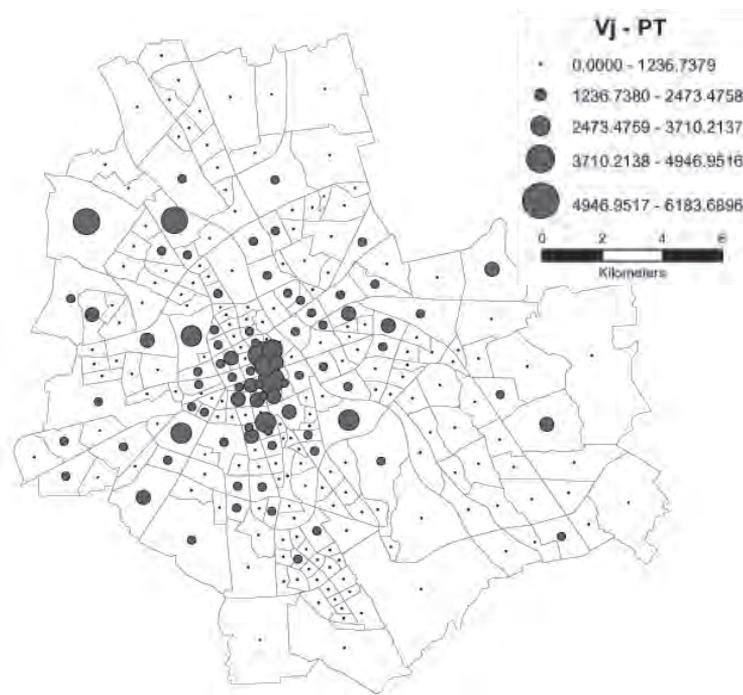


Figure 9. Attractiveness for public transport (V_{j_2}) in Warsaw.

tions of jobs in the city. Importantly, there are distinct differences between modes. Similar attraction patterns for both modes persist in several areas, such as along the arterial toward the southwest cutting through the Ochota and Okęcie districts, or at the edge of southern Mokotów and northwestern Ursynów districts. In other parts of the city the differences are quite stark. It is noteworthy that high auto attraction values are mostly concentrated in and around the CBD, with a few medium-value exceptions as noted previously. The medium and high transit attraction values, however, also appear in the districts of Ursus, Bielany, Rembertów and central Ursynów. These outliers may be explained by the transit network and types of work trip attracted to these areas. In the case of Ursus and Rembertów, the linear advantage that the rail lines offer makes jobs in these districts very attractive. The most likely explanation behind the two other outliers (Bielany and central Ursynów) is that major employers

such as two universities and a steel mill are located in these zones, attracting a lot of trips made by transit-dependent students/faculty and blue-collar workers.

6. DISCUSSION AND CONCLUSION

The accessibility analysis performed for this study has allowed several conclusions regarding Warsaw's spatial structure in 1998 to be formulated. The most general and synthetic conclusion concerns the monocentric pattern of accessibility in Warsaw. Specifically, accessibility to jobs and workers for both modes tends to decrease with increasing distance from the central urban area. For auto and public transit commuters, the highest accessibility zones are centered on the CBD, though it is also clear that the center of highest accessibility varies by mode. The accessibility patterns for cars and transit are somewhat similar in geographical extent, and this

is different from the findings of Kawabata and Shen (2006) depicting larger ranges for auto users. The difference is most likely due to the very well-developed transit network in Warsaw. Further analysis based on the emissiveness and attractiveness indices helps to underscore the effect of transport mode on accessibility patterns embedded within the spatial distribution of homes and jobs of urban spatial structure. Comparison between U_{i1} and U_{i2} , and similarly between V_{j1} and V_{j2} , suggests that it is more advantageous to use public transit in certain areas of Warsaw than others. Thus, identifying these gaps between auto and public transport accessibility is important in developing sustainable urban and transportation plans, and it challenges policy-makers to promote socially equitable policies.

This research finds that the residential and employment balancing factors follow a monocentric accessibility pattern, generally speaking, though with certain "outliers" as already noted. The exhibited monocentricity clearly points to the dominant position of the CBD in the urban structure, and to the lack of competing concentrations of employment. It also explains growing congestion problems in Warsaw's central area. Though slightly irregular, the concentric character of accessibility is consistent with the workings of land rent in accordance with basic economic theory; an important observation given the cities' past development. Larger emissiveness values correspond to the largest housing estates (Bielany, Bemowo, Ursynów, northern Targówek, and Praga Południe districts) and to relatively inaccessible medium-sized or smaller residential complexes (Ursus and Rembertów districts). More intense attractiveness values are attained in the central area of the city, and it is noticeable how large values extend toward the west-southwest, south and east-southeast (generally following major arterials). In consequence, the interaction between residential and employment locations leads to transportation problems, as large numbers of commuters travel relatively long distances, mostly in one direction (inward to the CBD).

The spatial extensions in job accessibility point to aspects of decentralization after 1989, yet in relation to the dominant position of the central area they remain marginal in character. Questions remain in regard to future developments in Warsaw's spatial structure. Continued strengthening of job concentration in the central area will have an adverse effect on existing poor transportation conditions. It will be interesting to see if the transportation infrastructure improvements that are planned for the region, which include the final completion of the first and second inner ring roads and the construction of the A2 limited access motorway, will put in place the conditions necessary for decentralization and the development of policentricity.

This research has significant practical value for urban, especially transport, policy in Warsaw. This is shown by the variation in accessibility patterns by transport mode. The differences in emissiveness/attractiveness values by mode indicate areas in which investments in public transport need to be made if equal opportunity in employment attainment is to be provided. This does not mean, however, that public transport is inherently ineffective, but rather that the locational and directional effectiveness of public transport is different from that for private vehicles. This might be a consequence of planning of the public transport network not keeping pace with the fast socio-economic changes after 1989. Clearly, transit remains very effective in providing access in established areas of city. In general, strategic planning of transport provision in Warsaw is needed. Important aspects are well known (the lack of a subway system or ring-road), though construction costs are a barrier to their realization. For example, a recent contract (autumn 2007) calls for the construction of 10 km section of the ring-road at a cost of 600 million euros. However, it is estimated that at least 300 km of these types of roads are needed in the Warsaw region.

Future research should explore locational accessibility patterns in a comparative international context. A comparative study of accessibility and urban spatial structure

in former communist Central European countries (now mostly members of the European Union) can help researchers and planners understand differences and similarities in accessibility and spatial structure. Greater depth and precision can be achieved by tracking accessibility over space and time, uncovering the different trajectories during the post-1989 transformation period. A Central European perspective would provide valuable insights into investigations of accessibility and urban form.

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THE IMPACT OF LOW-COST AIRLINES ON THE INTERNATIONAL COACH MARKET BETWEEN POLAND AND THE UK*

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Abstract

This article presents results from a research dissertation aiming to discover the extent to which low-cost airlines have had an impact on coach travel between Poland and the UK. A considerable amount of attention has been paid to the recent growth of passenger traffic between the two countries, this in large part reflecting the withdrawal of UK restrictions on workers from the new Member States following the 2004 EU enlargement. The EU enlargement was at the same time accompanied by liberalisation of the airline market in Poland, a process whose immediate effect was the formation of low-cost airlines making air travel more affordable and attracting many new passengers including Polish jobseekers looking for inexpensive and simple ways to travel. The growing demand for travel was also accommodated by the coach services very popular among Polish travelers even before 2004. However, while coach journeys accounted for over half of the visits to the UK made by Polish residents in 2003, the proportion in question was already lower by the following year, as a result of the rapidly intensifying competition with travel by air. Nevertheless, such is the perceived complexity and discriminatory nature of the airline booking system, and such is the extent of the coach network, that a market for the latter means of travel still exists, and indeed is seen to be popular among Polish passengers. The research presented here has nevertheless revealed how the growth of airline operations has combined with intense competition on the coach-travel market to put smaller coach operators at risk and to necessitate – as a key solution ensuring survival – an expansion of operations to and from smaller towns in Poland and the UK.

Key words: EU enlargement, passenger traffic, low-cost airlines, coach market, Poland, UK

INTRODUCTION

The period since the May 2004 EU enlargement has brought a considerable increase in the number of people travelling between the new and old Member States. The greatest increase in people's mobility has been noted between Poland and the UK, this being greatly contributed to by Polish nationals seeking employment in the UK and

ultimately giving rise to what is now viewed as the largest ever immigration flow into the UK. According to the Home Office, between 1 May 2004 and 30 June 2006, the UK was reached by 264,560 Polish workers, who accounted for some 62% of all workers coming in from the A8 states¹. In fact, though, the number may have been yet greater, since the cited statistics confine themselves to those registered with the Home Office (i.e. by no

* This article is based on a dissertation written at the University of Westminster

¹ The A8 states are the May 2004 EU accession countries, other than Malta and Cyprus.

means all the workers actually present). The large influx of Polish nationals seeking and finding work in the UK reflects a combination of economic and political implications, such as variations in GDP, minimum wages and unemployment rates, as well as the UK government's decision to lift restriction on workers from the new Member States immediately after enlargement.

Equally, even before the EU enlargement, the number of Polish visitors had been growing, in reflection of the fact that a large Polish community was even then living in the UK. This population was pioneered by war veterans, only to be reinforced by migration flows during the early days of Solidarity in the 1980s, as well as in the wake of the 1992 removal of visa requirements for Polish tourists to the UK. These earlier movements resulted in arrivals, not only of would-be settlers in the UK, but also of a large number of seasonal workers opting to work illegally or on the basis of time-fixed work permits, as well as tourists visiting relatives, and students.

The influx in question allowed strong transport links between the UK and Poland to develop. The low incomes many travellers had at their disposal was what stimulated a demand for low-cost travel, the air travel of that time being very expensive, due to international regulations and the attendant lack of competition on the market. Railways were proving an impractical means of transport, since at least two changes were necessitated, while fares were high. In the circumstances, coach travel seemed a more affordable and simple option – so much so, indeed, that a dynamic growth in operations took place in the 1990s.

The rapid expansion of low-cost airlines in Poland followed the deregulation of the airline market, and has become an apparent threat to the stability and success of many coach operators. To such an extent have cheaper fares and the expansion of operations at regional airports made air travel more affordable to Polish tourists, visitors, jobseekers, migrants and students that it seemed important to determine the extent to

which an impact on the international coach services between Poland and the UK has been exerted. With a view to doing this, passenger traffic between the two countries and involving the two means of transport were investigated, and trends on the airline and coach markets analysed. This allowed for the identification of the main reasons for coach passengers' choices, as well as the actions taken by coach operators to maintain their market at a time of stiffer competition.

Since there are only rather limited references to coach transport in the scientific literature, the data referred to in this study has primarily derived from the International Passenger Survey, as supported by coach travel surveys, newspapers, magazines, the Internet and statistical sources.

THE GROWTH OF PASSENGER TRAFFIC

The International Passenger Survey (IPS) of the UK's Office of National Statistics (ONS) provided the valuable data used in this study's analysis of passenger traffic between Poland and the UK. However, the survey affords data on numbers of visits, not visitors. A person entering or leaving the UK more than once in the same period, or indeed repeatedly, is therefore counted each time. At the same time, the data are such as to allow for a distinction to be drawn between UK and Polish residents.

As Fig. 1 makes clear, the number of visits Polish residents made to the UK rose steadily between 2002 and 2006, but most of all between 2004 and 2005, clearly as a consequence of EU enlargement (at which time there was a near-doubling). The less-dramatic growth between 2005 and 2006 nevertheless involved a 40% increase. Visits made to Poland by UK residents has also grown steadily in recent years, the number even doubling in 2005 and 2006 – in reflection of increasing numbers of tourists able to use cheaper and more frequent air services from the UK. The group presumably includes a number of Polish nationals resident in the UK, the IPS data referring specifically to residence, rather

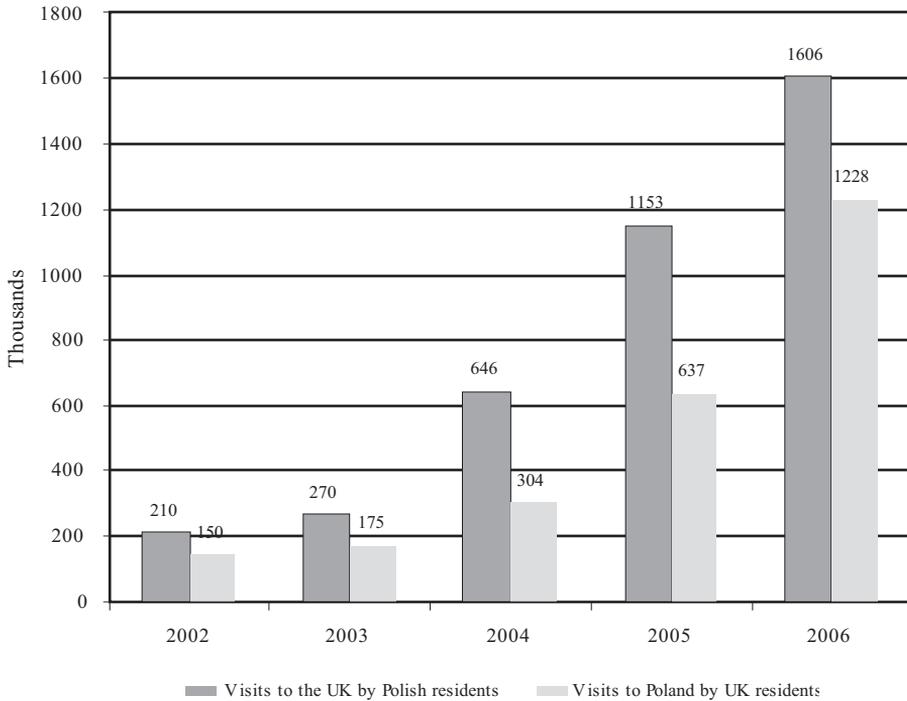


Figure 1. Numbers of visits to the UK and Poland by country of residence, 2002 to 2006.

Source: Compiled from *IPS*.

than nationality. In theory at least, a person living continually in the UK for 12 months or more will be counted as a UK resident.

This finding gains further support in the results of a travel survey carried out on 124 coach passengers in the context of the current research. Of the 123 passengers who were Polish, 31 (25%) claimed to live in the UK. 25 passengers (20%) were going to Poland either to visit friends or relatives, or on holiday, a finding that suggests respondents resident in the UK.

The same survey found that the main aim of journeys was to return from work in the UK (as cited by 42% of respondents), followed by a return after visiting friends and relatives (28%). This all suggests heavy demand for inexpensive travel, since neither jobseekers nor leisure passengers are left unaffected by rising ticket prices (in the way that business travellers might for example be).

It was therefore important for the modal split between visits to Poland and the UK to be investigated. According to *IPS* data, 80% of the visits made to Poland by UK residents in 2005 were by plane, while only 8% were by coach. This kind of situation has now been in place since 2003. In the meanwhile, 57% of the visits Polish residents made to the UK in 2003 involved a coach². Fig. 2 shows that the proportion accounted for by coach travel declined in 2005, primarily in favour of air travel. However, 32% was still the highest proportion noted for coach travel among residents travelling to the UK from the EU-25 states. In absolute terms, only Germans and French people made more visits by coach than Poles. However, the driving distance from France to the Brit-

² As the modal split was based on the number of visits made for not longer than 12 months, migrants are excluded from these data.

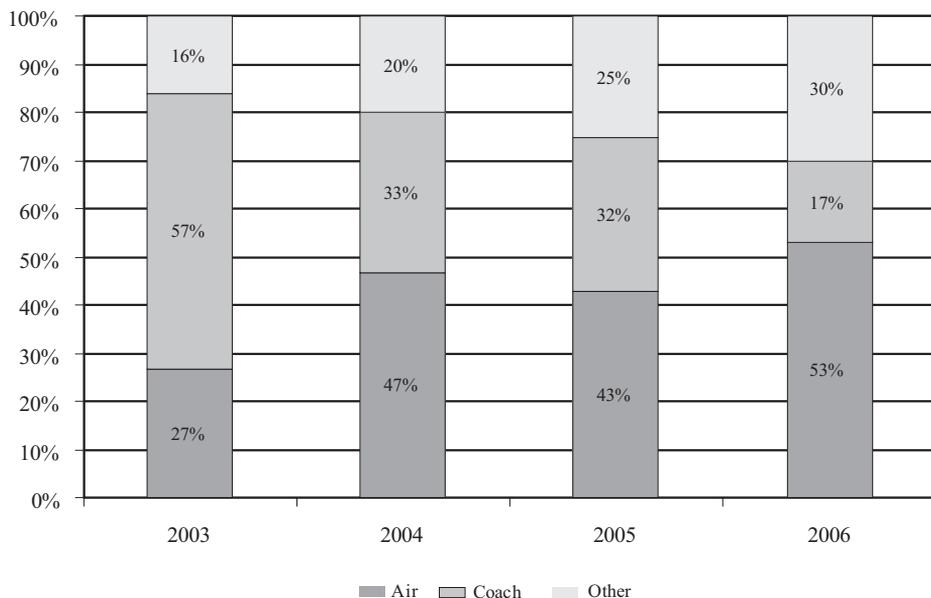


Fig. 2. Modal split based on numbers of visits to the UK by Polish residents, 2003 to 2006.

Source: Compiled from *IPS*.

ish Isles is obviously much shorter, while occasional coach operations such as “closed door tours” are very popular among German residents. This can lead us to the conclusion that the largest numbers of passengers on regular coach operations to the UK originate in Poland.

It is also useful to note that, while the share of visits accounted for by the coach market declined from 57% in 2003 to 32% in 2005, the absolute number of visits almost doubled, from 184,000 to 336,000. This was the effect of the then overall intensive growth in numbers of visits to the UK from Poland. However, as the number of coach visits dropped in 2006, any future growth in coach travel needs to be truly questioned, especially since the overall growth in passenger traffic will not be as dynamic as that noted immediately after Poland’s accession to the EU.

CHANGES ON THE AIRLINE MARKET

The airline industry has been the fastest growing mode of transport in Poland - as a result of the rapid growth in demand for travel and institutional changes on the market allowing for greater competition. This has effected an intensive growth in airline passenger traffic in Poland. In 2006 alone, Poland recorded a 36% increase in passenger numbers on scheduled air services. The growth was even greater between Poland and the UK, the traffic accounting for 24% of all scheduled passengers departing and arriving from/to Poland in 2006. While Fig. 3. shows a continuous increase in numbers of passengers between the two countries post 2002, the most dramatic increase characterised 2004, 2005 and 2006.

The growth in passengers between the two countries is primarily, if not solely, a consequence of the development of low-cost

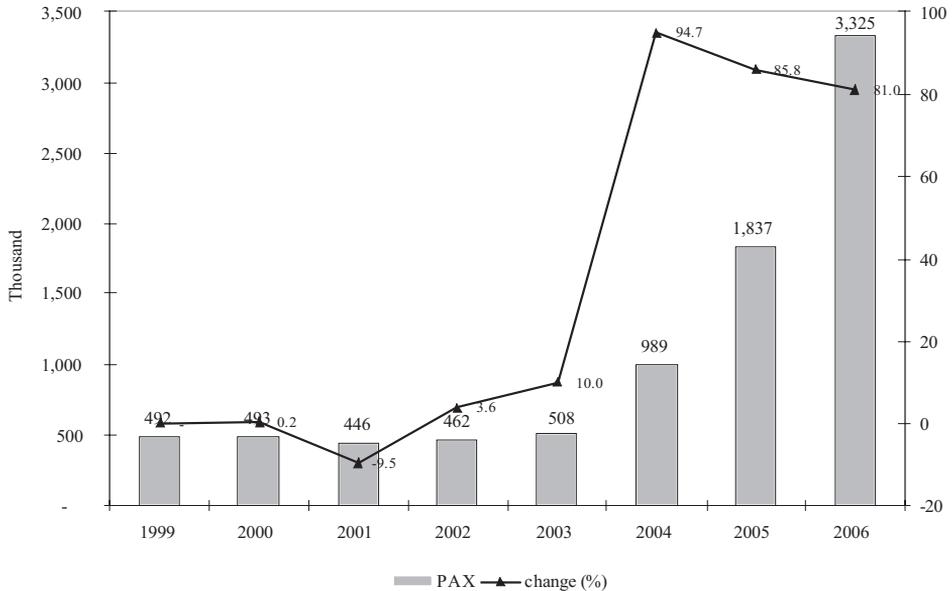


Fig. 3. Passengers on scheduled air services between Poland and the UK, 1999 to 2006.

Source: Compiled from *Civil Aviation Authority (CAA) data*.

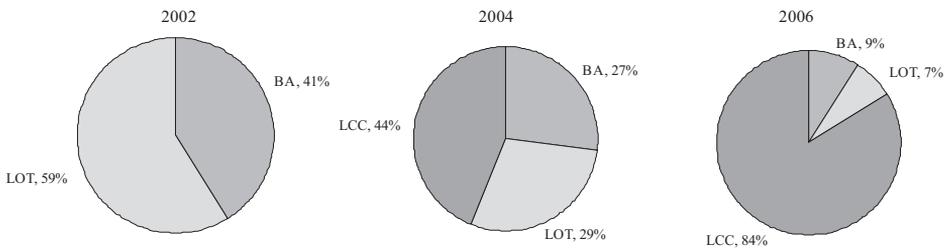


Fig. 4. Proportion of weekly capacity on services from Poland to the UK, 2002 to 2006.

Source: Compiled from the *Official Airline Guide (OAG)*.

carriers. Traditional airlines, i.e. *British Airways* and *LOT* have hardly launched any new services or offered additional capacity over the last few years. Fig. 4. thus illustrates how market share among flag carriers declined, in favour of the low-cost market offering 84% of all capacity on scheduled flights as of 2006.

The development of low-cost airlines became possible following the airline market deregulation taking place gradually in

Europe between 1988 and 1997. The main objective of deregulation was to create a market driven by competitive forces. This was primarily achieved through the removal of entry barriers for new airlines and the abandonment of fare and capacity controls. As a result, a number of new airlines have emerged, not least *Ryanair*, which pioneered low-cost air travel in Europe in the early 1990s. The success of low-cost carriers arises predominantly from their ability

to achieve a low-cost base and reduce fares. Although there is no single low-cost model, *Ryanair* offers a very basic product with no in-flight catering, high-density seating, short turnarounds, no connecting flights, reduced free baggage allowance and direct sales via the Internet. Furthermore, the airline usually operates from regional or secondary airports, or else uses low-cost terminals.

Although Poland did not have to join the single European Aviation Market until the country acceded to the EU, the liberalisation process had started in 2003, when the Polish government called upon all EU countries to sign new bilateral agreements, with the intention of allowing more flexibility as regards frequency, capacity, airline multi-designation and fares. The result was the formation of the first low-cost airline on the Polish market - *Air Polonia*, which launched its first low-cost flight from Warsaw to London Stansted in December 2003. Since the full liberalisation took effect in May 2004, the Poland-UK low-cost market has been joined by new entrants, including *Wizzair* in May 2004, *SkyEurope* and *easyJet* in October 2004. In the meanwhile the airline market has also seen its first business failure - in the cessation of operations by *Air Polonia* as of December 2004, in the wake of financial difficulties brought on by poor management. However, this did not discourage other airlines to join the low-cost market in Poland. In February 2005, the Polish national airline *LOT* set up its own low-cost subsidiary, *Centralwings*. That airline was created in response to the pressure from low-cost competition. A similar approach was adopted by a few other traditional airlines across Europe, such as *British Midlands* setting up *bmibaby* or *Lufthansa*, which acquired *Germanwings*.

Finally, March 2005 brought the entry on to the Polish market of *Ryanair*, whose chief executive Michael O'Leary had previously summed up his interest in the Polish market by saying: "Who wants to go to Gdansk? There ain't a lot there after you've seen the shipyard wall". The airline rather made up for that a year later, when it launched its first service from London Stansted to Wrocław.

In 2006, it became one of the largest airlines on the Polish market, operating out of eight Polish airports and carrying 1.5m passengers (11% of all scheduled passenger traffic in Poland).

There were thus five low-cost airlines on the Poland-UK market in 2006, their development of services to new destinations being an inherent part of the low-cost expansion in both countries. There having been just three routes in 2003, operated exclusively by *British Airways* and *LOT*, there were no fewer than 34 in 2006, 32 of these being in the hands of the low-cost airlines. Fig. 5 shows that the most substantial increase in operations over the last 5 years occurred between regional Polish airports and London airports. Since 2006, every Polish airport that handles international traffic has been served by at least one airline operating to London. In 2002 and 2003, Kraków airport was the only one outside Warsaw to run regular services to the UK.

There has also been a large increase in the number of services between regional airports in Poland and regional airports in the UK - from none in 2004, to 42 flights a week in 2006. In contrast, the growth in operations on routes between Warsaw and London has been much less dramatic. The number of flights a week rose from 42 in 2003 to 79 in 2006. Furthermore, in the latter year the number of flights operated by flag carriers (i.e. between Warsaw and London-Heathrow) remained the same, while other connections were accounted for solely by low-cost airlines.

As a result of the regional expansion, airline services have become much more accessible to passengers, who can also benefit from a wider choice of destinations. As of 2006, there were 10 airports in Poland maintaining direct connections with 11 UK airports. The primary factor for many passengers choosing to fly with low-cost carriers is price. By downgrading their passenger services to the minimum and introducing sophisticated pricing structures, low-cost carriers have been able to offer cheaper fares than traditional airlines. Equally, the pricing freedom and pressure from low-cost travel have also

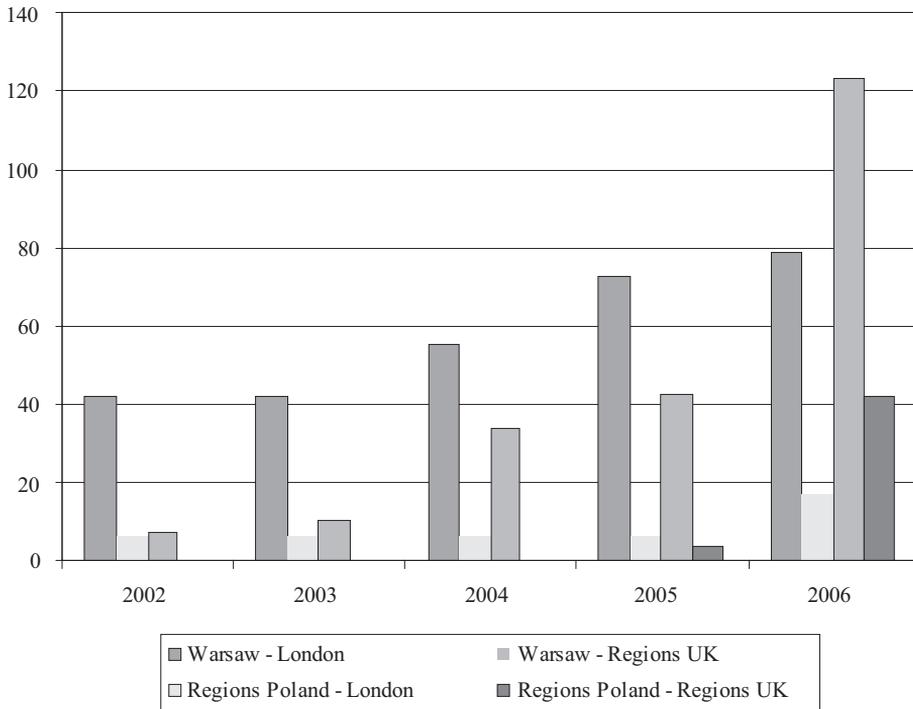


Figure 5. Weekly frequencies of flights between Poland and the UK made by all airlines in the years July 2002 to 2006.

Source: Compiled from *OAG*.

compelled the traditional airlines to reduce their fares to some extent as well – even at times to the point where prices may resemble those offered by *easyJet* or *Wizzair*. Nevertheless, such cheap tickets for *BA* or *LOT* are only available if a return flight is also booked, and not if the return journey takes place on the same day as the outward flight. In addition, the fares for flights during peak business hours have tended to remain very high.

But it is not only the traditional airlines who face a serious competitor in the shape of the aggressively-expanding low-cost airline market. In Europe, the fact that there are reduced air fares and new routes is considered to have had a substantial impact on other modes of transport, as with the decline in the numbers of passengers being shuttled across the English Channel in 2005, or across the Irish Sea in 2006.

In comparison, where the UK-Poland market is concerned, the low-cost airlines have had an impact on the coach operations traditionally very well-developed and popular among Polish travellers. However, the scope of this competition can be quite different. On many European routes, the demand for travel was in fact generated by low-cost airlines themselves, who had made inexpensive travel to many destinations possible, in consequence boosting interest in holidaymaking, city breaks and second home ownership. Meanwhile, in Poland, low-cost airlines have been taking advantage of the travel demand developing with the liberalisation of the UK labour market. Thus, what makes the trend for passenger traffic between Poland and the UK somewhat exceptional is the simultaneous presence of two important reforms, i.e. the withdrawal of restrictions on Polish workers and the liberalisation of the airline

industry causing a reduction in air fares. Investigation of the coach market is thus necessitated if it is to be determined whether the large demand for travel generated over the last few years can be accommodated sustainably by both airlines and coach operators.

CHARACTERISTICS OF THE COACH MARKET

Like aviation, coach transport was subject to certain legislative changes in the run-up to Poland's EU accession. Adoption of the EU's common rules simplified procedures as regards permissions between Poland and existing Member States. Although coach operators still require national authorisation from countries across whose territory they operate, refusal criteria are now limited, while there was a cut in the length of time taken by application procedures. This relaxed legislation combined with the liberalisation of border crossings and passport controls with freedom of movement of people to contribute to the development of new coach services between Poland and the UK. However, the growth of frequencies and routes was not as dramatic as in the case of low-cost airlines, because the coach market had already been well-established by 2004.

According to The Vehicle & Operator Service Agency (VOSA) of the UK Department of Transport, there were 81 lines with 36 operators in May 2004. However, the number of operators running regular services could be lower, since not all companies that have obtained authorisation are actually operating. Likewise, some companies have withdrawn their services but are still registered, while others never even began operations. Four companies were also found to be collaborating together, resulting in a lower number of lines.

To discover how many coach operators run regular services from Poland to the UK, a timetable study was carried out using information available from coach operators. A further aim of this work was the identification of frequencies and routes operated

regularly, something that required thorough calculations for the individual coach lines. Many coach operators have been consolidating their services in line with a hub & spoke model allowing for greater efficiency on the lines operated. However, as this can function in a number of ways, it remains useful to present examples of such connection models, before proceeding to the results of the study.

Orbis Transport provides eight services from Poland, these meeting at the Polish-German border in Słubice, where passengers transfer to one of six services heading to various destinations in the UK (Fig. 6). The fact that six coaches actually arrive in the UK ensured that the total number of lines for the purpose of this study was 6. Furthermore, the number of lines was multiplied by the weekly frequency of journeys on each route. While both services to Bradford are operated on a daily basis, services to Glasgow run six times a week, Swansea services four times a week and Plymouth services just three times a week. There are also two weekly services to Cork in Ireland via Oxford. As a result, *Orbis Transport* is responsible for a total of 29 journeys a week.

Eurolines Polska in turn operates six different routes from Poland to London, usually without additional changes (Fig. 7). Passengers are asked to change at London if they wish to travel to Birmingham, Manchester or Dublin. Many other destinations are served by its UK partner, *National Express*, which also requires a transfer in London. According to the timetable of *Eurolines*, five routes are served daily, one four times a week. Thus, 39 coaches will arrive in the UK on a weekly basis.

Fig. 8 illustrates a network model typical of smaller operators. *Eurotrans* - a member of a larger organisation called *Eurobus*, operates four times a week between Sanok and London. Its mainline is then joined at two locations in Poland by other services called 'antennae'. As a result, only one coach actually arrives into London.

This study was based on summer timetables and assumed that all services ran as scheduled for July 2006. Coach timetables generally allow for more flexibility than air-

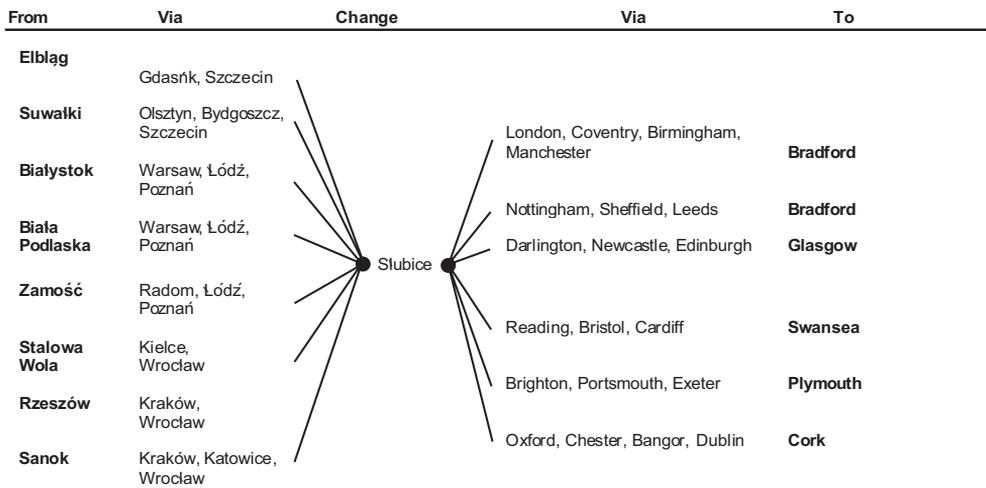


Fig. 6. The network model for *Orbis Transport*.

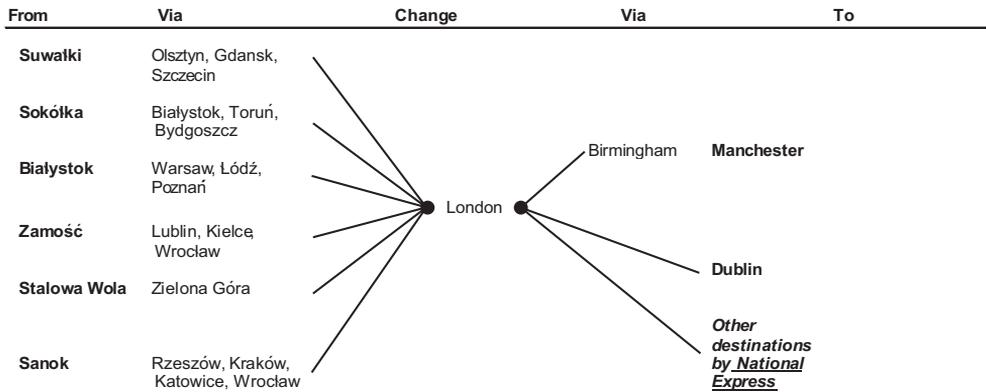


Fig. 7. Network model of *Eurolines Polska*.

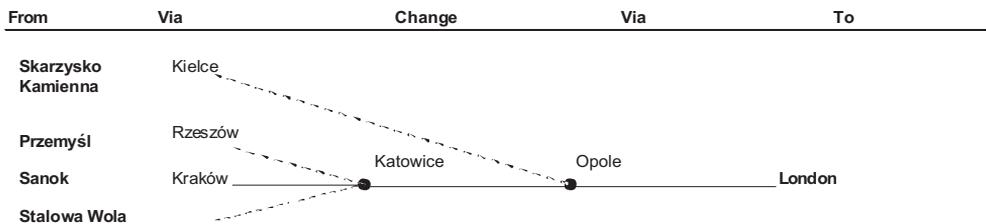


Figure 8. Network model of *Eurotrans (Eurobus)*.

line schedules. For instance, when demand slows, a coach operator can change a route and consolidate more services together, with the result that fewer coaches arrive into the UK. On the other hand, operators can run more coaches along registered lines during peak periods.

The analysis of coach operations allowed 21 coach companies operating regular services between Poland and the UK in the summer of 2006 to be identified. Table 1 shows that *Eurolines Polska* and *Orbis Transport* were significant leaders in terms of frequencies of service. Taken together, the coach companies generated a weekly frequency of 179, meaning that 179 coaches were arriving in the UK

each week. Consequently, there were an average of some 25 regular coaches arriving each day.

Coach services were found to run between 188 locations in Poland and 45 in the UK. Apart from major Polish cities and towns, a number of smaller urban areas with populations down to around 10,000 are served. Once in the UK, coaches stop not only in London and other large cities such as Manchester or Bristol, but also in towns with large Polish communities like Luton, Bradford and Slough.

Table 2 illustrates weekly frequencies between selected pairs of cities served by coach operators. The total is not equal to the sum

Table 1. The Poland – UK coach market as of July 2006

| Operator | Weekly frequencies | | Total destinations served | | Number of lines |
|---------------------------|--------------------|------------------|---------------------------|-----------|-----------------|
| | Total | Market share (%) | Poland | UK | |
| 1 <i>Eurolines Polska</i> | 39 | 21.8 | 66 | 4 | 6 |
| 2 <i>Orbis</i> | 29 | 16.2 | 61 | 30 | 6 |
| 3 <i>Polonia</i> | 20 | 11.2 | 40 | 8 | 4 |
| 4 <i>Sindbad</i> | 19 | 10.6 | 28 | 25 | 4 |
| 5 <i>Europa Express</i> | 14 | 7.8 | 27 | 14 | 2 |
| 6 <i>Eurobus</i> | 8 | 4.5 | 45 | 7 | 2 |
| 7 <i>Omar</i> | 6 | 3.4 | 54 | 10 | 2 |
| 8 <i>Globus</i> | 6 | 3.4 | 42 | 7 | 1 |
| 9 <i>Mak-Agrosil</i> | 6 | 3.4 | 25 | 2 | 2 |
| 10 <i>Soltysik Reisen</i> | 4 | 2.2 | 22 | 1 | 1 |
| 11 <i>Acorn</i> | 4 | 2.2 | 16 | 11 | 1 |
| 12 <i>Atas</i> | 4 | 2.2 | 14 | 9 | 2 |
| 13 <i>Aga-Tur</i> | 4 | 2.2 | 12 | 5 | 1 |
| 14 <i>Agat</i> | 3 | 1.7 | 27 | 14 | 2 |
| 15 <i>Pinior</i> | 3 | 1.7 | 24 | 1 | 1 |
| 16 <i>Wactur</i> | 2 | 1.1 | 33 | 1 | 1 |
| 17 <i>Alga</i> | 2 | 1.1 | 23 | 6 | 1 |
| 18 <i>Visitor</i> | 2 | 1.1 | 18 | 2 | 1 |
| 19 <i>PKS Przemysl</i> | 2 | 1.1 | 14 | 1 | 1 |
| 20 <i>Bermuda</i> | 1 | 0.6 | 22 | 2 | 1 |
| 21 <i>Pok-Tourist</i> | 1 | 0.6 | 10 | 1 | 1 |
| Total | 179 | 100 | 188 | 45 | 43 |

of the individual frequencies because many locations can be captured within the same route. Clearly, London was the top destination in the UK with a weekly frequency of 119. In contrast, at the Polish end, the coach services were in no way dominated by Warsaw, with the highest weekly frequencies instead characterising Katowice, Wrocław and Kraków. Although these are well-populated areas, the high frequency with which these are served is primarily a reflection of their location along one of southern Poland's trunk routes. It is noteworthy that Rzeszów, a city of "just" 164,000 people, is also very well served by coaches. This may result from Rzeszów's being located in south-eastern Poland, where many services continuing westwards through Kraków, Katowice and Wrocław originate.

The timetable study allowed the above frequencies to be set against data in airline schedules obtained from the Official Airline Guide (OAG). In July 2006, there were 261 scheduled flights arriving into the UK from Poland each week. Furthermore, despite the rapid developments characterising many of the routes from and to regional air-

ports, it is Warsaw that remains the top destination, with a weekly frequency of 96. It should nevertheless be noted that over half of the services in question were operated by *BA* and *LOT*. Kraków was the second most served destination in Poland with 60 weekly operations. At the UK end, London was the obvious leader, receiving 202 flights from Poland, or 77% of all the services provided in July 2006. However, this includes all four London airports currently providing scheduled services to/from Poland (i.e. Heathrow, Stansted, Gatwick and Luton). Beyond London, the growing number of regional airports providing services to Poland include those at Edinburgh or Liverpool.

Due to a greater demand for travel to the Irish Republic driven by a growing number of Polish migrants and jobseekers, both airlines and coaches have shown particular interest in the Irish market since the EU enlargement. In fact, before 2004 there were neither direct plane nor coach links between the two countries. Yet, just two years later, 49 services a week were being operated from four Polish airports to Dublin, Cork and Shannon, by *LOT*, *Aer Lingus*, *Centralwings*, *SkyEurope*,

Table 2. Selected pairs of cities served by coaches from Poland to the UK and Ireland in 2006

| | UK | | | | | | | | | Ireland | | | |
|--------------|------------|------------|------------|-----------|------------|-----------|-----------|-----------|-------------|--------------|-----------|----------|-----------|
| | London | Birmingham | Manchester | Liverpool | Nottingham | Bristol | Edinburgh | Glasgow | Total | Dublin | Cork | Total | |
| Warsaw | 67 | 32 | 32 | 6 | 17 | 4 | 6 | 6 | 170 | Warsaw | 11 | 2 | 11 |
| Kraków | 64 | 29 | 29 | 6 | 17 | 4 | 6 | 6 | 161 | Kraków | 11 | 2 | 11 |
| Gdańsk | 60 | 32 | 32 | 7 | 17 | 7 | 6 | 6 | 167 | Gdańsk | 11 | 2 | 11 |
| Katowice | 50 | 29 | 29 | 5 | 17 | 6 | 6 | 6 | 148 | Katowice | 11 | 2 | 11 |
| Wrocław | 40 | 17 | 17 | 2 | 15 | 4 | 6 | 6 | 107 | Wrocław | 11 | 2 | 11 |
| Poznań | 40 | 17 | 17 | 7 | 15 | 4 | 6 | 6 | 112 | Poznań | 11 | 2 | 11 |
| Łódź | 39 | 21 | 21 | 6 | 14 | 4 | 6 | 6 | 117 | Łódź | 11 | 2 | 11 |
| Bydgoszcz | 33 | 18 | 18 | 21 | 14 | 12 | 6 | 6 | 128 | Bydgoszcz | 11 | 2 | 11 |
| Rzeszów | 31 | 17 | 17 | 21 | 15 | 12 | 6 | 6 | 125 | Rzeszów | 11 | 2 | 11 |
| Szczecin | 29 | 13 | 13 | 21 | 11 | 9 | 6 | 6 | 108 | Szczecin | 11 | 2 | 11 |
| Total | 119 | 39 | 39 | 26 | 22 | 12 | 12 | 12 | 1343 | Total | 11 | 2 | 11 |

Table 3. All city pairs served by airlines as of July 2006

| | UK | | | | | | | Ireland | | | | | | |
|--------------|-----------------------|-----------|-----------|---------------------|------------|--------------------------|----------|------------|------------|--------------|-----------|----------|----------|-----------|
| | London (all airports) | Edinburgh | Liverpool | Glasgow - Prestwick | Manchester | Nottingham East Midlands | Bristol | Birmingham | Total | Dublin | Cork | Shannon | Total | |
| Warsaw | 79 | 5 | 4 | 3 | 5 | | | | 96 | Warsaw | 18 | 4 | 4 | 26 |
| Kraków | 41 | 3 | 4 | 3 | 3 | | 4 | 2 | 60 | Kraków | 11 | | | 11 |
| Gdańsk | 18 | 3 | 3 | 3 | | | | | 27 | Gdańsk | 3 | | | 3 |
| Katowice | 14 | 3 | 2 | | | | | | 19 | Katowice | 6 | 3 | | 9 |
| Wrocław | 10 | | | 2 | | 4 | | | 16 | Wrocław | | | | |
| Poznań | 12 | | | | | | | | 12 | Poznań | | | | |
| Łódź | 7 | | | | | 3 | | | 10 | Łódź | | | | |
| Bydgoszcz | 7 | | | | | | | | 7 | Bydgoszcz | | | | |
| Rzeszów | 7 | | | | | | | | 7 | Rzeszów | | | | |
| Szczecin | 7 | | | | | | | | 7 | Szczecin | | | | |
| Total | 202 | 14 | 13 | 11 | 8 | 7 | 4 | 2 | 261 | Total | 38 | 7 | 4 | 49 |

Source: Compiled from *OAG*.

Ryanair and *Wizzair*. Coach operators were coming on to this particular market at just the same time, *Polonia Transport* being the first operator, with its five services to Dublin each week in 2004. This was followed by *Eurolines Polska* in 2005 and *Orbis Transport* in 2006, though *Polonia* remains the only coach operator to run direct services beyond Dublin.

The potential of the Irish market was such as to allow both airlines and coach companies to develop new services. Prospects for coach operators must have existed, since – notwithstanding the low-cost airlines expansion and very long driving hours (between 28 and 54) – they decided to introduce and maintain services to the Irish Republic. Similarly, most services to the English Midlands and North, as well as Scotland and Wales, have also been introduced over the last few years, at just the same time as the expansion of the low-cost airlines.

WHAT MAKES COACH TRAVEL ATTRACTIVE?

There is no chance of coach operators competing with low-cost airlines in terms of journey duration. An average coach journey from the UK to Poland takes 24 hours, which clearly is not comparable with a 2-hour flight. However, advantages of coach travel are found to arise when account is taken of such factors as the extensiveness of the network, the flexible booking conditions, price and the size of the luggage allowance. A survey carried out among 124 coach passengers travelling to Poland helps with the identification of the most important reasons behind their choice (Fig. 9).

The lack of any need to book a ticket in advance appeared to be the leading reason for choosing to travel by coach. This reflects the fact that, unlike airlines, coach operators tend to follow simple pricing structures with constant fare levels. For instance, a return ticket

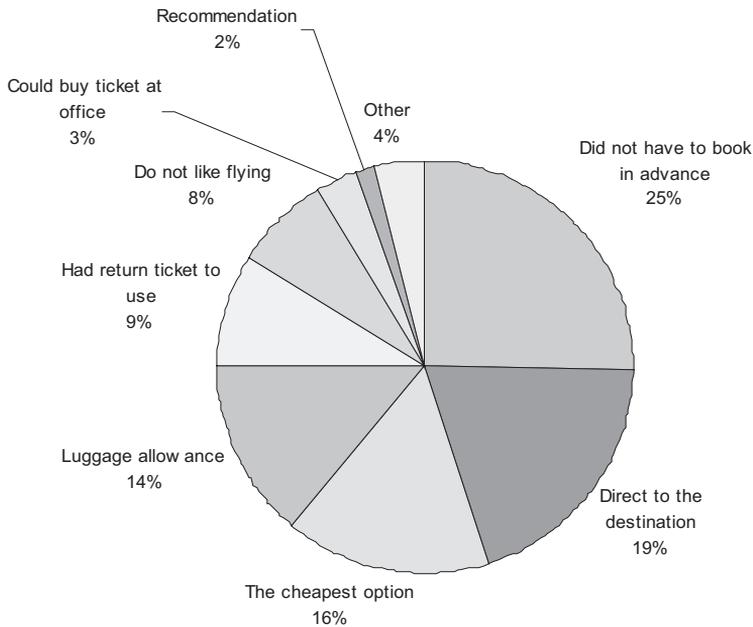


Fig. 9. Reasons for choosing the coach (Coach Survey Results June/July 2006).

with *Eurolines* from London to anywhere in Poland cost £86 in 2006. A passenger could save a further £10 by travelling outside peak periods, such as summer or Christmas. A further £10 off is available to those who buy a ticket 30 days in advance.

In contrast, the low-cost airlines have adopted a sophisticated system determined by time of booking in which differences between lowest and highest prices can be quite substantial. While a return ticket booked on 31st August 2006 for travel on *Ryanair* in three months ahead cost £32.94, a ticket bought on the same day for a flight one week ahead would have cost the passenger £167.34. This even increased to £217.34 in the case of next-day travel. There is no same fare structure for each flight, merely a general rule that the closer to the departure a passenger books, the larger the sum he or she is usually forced to pay.

Coach passengers also benefit from the extensive nature of the coach network. As has been noted, the coach companies taken together were serving 188 destinations in Po-

land and 45 in the UK, as compared with the 10 airports in Poland and 11 in the UK being served by the airlines. This allows coach travellers to choose a convenient boarding and arrival point. Moreover, coaches usually stop in town centres at coach stations or other conveniently located sites. This can prevent passengers from intermodal changes and transfer costs, especially if low-cost carriers choose to operate from such airports situated far from the major agglomerations as London Stansted or Glasgow Prestwick.

Other reasons for choosing a coach as opposed to other modes may include a luggage allowance that is usually more flexible for coach passengers (who can take two pieces of main luggage on board). In contrast, low-cost airlines have very restrictive rules that mostly limit passengers to no more than 20kg of luggage. Indeed, *Ryanair* is the only carrier to make passengers pay for their main luggage irrespective of weight and dimensions.

Coach companies also offer their passengers open return tickets - an attractive option for some travellers. Although leisure passen-

gers may be less interested in purchasing an open ticket, travellers who migrate to the UK for work can surely benefit from such an alternative, since they are less likely to be certain about the date of their return.

Lastly, coach operators have widely developed sale distribution systems. Coach tickets can be purchased at many travel offices across Poland and the UK. Face-to-face customer service can be an advantage, especially as many UK offices provide Polish-speaking assistance. In contrast, the majority of bookings by low-cost airlines are taken over the Internet. Otherwise, passengers can buy their ticket by telephone, or with some carriers through agencies, though this is likely to increase the ticket price.

In summary, many passengers are found to choose coach travel because of the booking conditions, accessibility and luggage allowance. All these factors represent a large proportion of the total cost of travel, indicating that cost would seem to be the most important element for coach passengers, especially where there is an awareness of the additional costs associated with air travel.

THE FUTURE OF THE COACH MARKET

The advantages of coach travel listed in the section above might not be enough to sustain the coach market in the way it exists now. Statistics on visits to the UK in 2006 confirm a fall in coach passenger numbers that might just result from the stabilisation of overall passenger traffic growth. The growth in the numbers of visits made to the UK by Polish residents fell from 78% between 2005 and 2006 to 39% between 2004 and 2005. The potential for coach operators might also be reduced by the fact that more and more passengers are now travelling to the UK on what is not in fact their first visit. Frequent travellers are more likely to familiarise themselves with airline offers, earn more money and plan their journeys better.

It is therefore important to reflect on the steps coach operators are taking to ensure their survival on the very competitive Po-

land-UK market, and to speculate as regards the coach companies most likely to survive.

First of all, despite the development of new air routes, airlines are still concentrated in larger cities. Therefore, coach operators have seen their niche to be as the servicing of small towns in Poland and the UK, where transfer to the nearest airport is often associated with an additional cost. The demand for travel to places beyond London is linked to an increasing number of Polish workers outside the capital. According to the Home Office, there are very large numbers of registered workers in Eastern England, the Midlands, Central and North Eastern England. To meet this demand, some operators opened new routes even as they faced competition from the low-cost airlines. *Orbis Transport* expanded its operations in Wales, Scotland and the Republic of Ireland. *Eurolines* started running independent services to Birmingham, Manchester and Dublin, while *Polonia Transport* launched a new service in the Midlands and the North East. *Sindbad*, a relatively new operator in the UK, expanded across the whole country. In the meanwhile, there are still a number of small operators such as *Piniór*, *Visitor* and *Bermuda* that, although stopping in a selection of Polish towns, do not operate anywhere outside London.

Smaller companies might find it much more difficult to compete, because the development of a new route requires a significant investment and is usually associated with higher running costs. One of the solutions is the formation of a partnership to create so-called platforms. An operator that becomes a shareholder or partner to such a platform can benefit from network and marketing synergies, including a uniform reservation system, regular promotional campaigns and a well-known trademark.

One of the examples here is *Eurolines*, which unites independent coach operators from 25 countries. Normally only one coach operator from each country is allowed to use the *Eurolines* logo. In Poland, *Eurolines Polska* was set up to accommodate the high level of demand for travel to be noted in 2002. The organisation has in fact consolidated seven

Polish coach operators, and it aims to maintain common marketing and service activities. *Eurolines Polska* partners benefit from a larger European network through partnership with other European firms, such as *National Express* in the UK or *Bus Eireann* in Ireland.

Eurobus is a coach platform formed in 2003 that currently brings together 11 companies, three of which are shareholders. Another example is *Sindbad*, which has been one of the key coach operators between Poland and Germany. In order to expand its operations in Britain, the company created its own platform that associates with three smaller operators.

Companies may want to consider a reduction in the duration of journeys along some routes. This can be achieved through the continuous revision and improvement of schedules. Although the 'hub & spokes' system has been proven cost effective in providing passengers with frequent services to a maximum number of destinations, direct operations with no inconvenient changeovers may be an option to attract more passengers.

Since the time the low-cost airlines developed in Poland, coach operators have been working on Internet reservation systems that meet the needs of customers wishing to purchase their ticket in this way. The system has now developed to the point where passengers can buy tickets for almost every coach operator online. However, in order not to upset the travel agents acting as the main ticket distributors, fares offered online are usually not cheaper than those bought at an office. This in turn ensures that Internet sales do not usually account for more than 5% of the total. On the other hand, the Internet shows greater potential when it comes to the updating of existing bookings. Thus, some coach operators have made it possible to book the return part of an open ticket via the Internet. In addition, *Orbis Transport* launched a system (also available abroad), whereby the return part of a journey can be booked by simply sending a text message.

Coach operations will be sustained, not only by innovation, but also through market-

ing. The firms involved have already developed a number of marketing strategies, such as loyalty cards giving regular passengers a free or discounted ride, discounted tickets for those who book in advance or reduced fares on certain days and occasions. Advertising aims to inform potential customers of new routes and offers, and it is usually placed in local newspapers in Poland, as well as in the Polish magazines published in the UK. Clearly, however, none of these means can compete with the vociferous marketing activities of airlines, or else the robust media attention that is paid to low-cost air travel.

However, coach travel can be promoted as an alternative and environmentally-friendly mode of transport. On the basis of fuel consumption calculations for a Boeing 737 and an average coach type such as a Scania or a Mercedes, and bearing in mind that the combustion of one kilogram of fuel yields 3.15 kg of carbon dioxide, it was possible to estimate that coach travel only produces about a tenth as much carbon emission per passenger as does a jet on such routes as from the UK to Poland. This is in line with an independent analysis done by *Eurolines* coaches which reveals an average carbon footprint for coach travel that is 5.58 times lower than the flying. Lower carbon passenger-km emissions can be an important factor for passengers as they choose their mode of travel. In Europe there is now a growing realisation that climate change is a reality, and that the accumulation of greenhouse gases in the atmosphere threatens the stability of the climate. The governments of many EU Member States have been encouraging their citizens to use alternative modes of transport in commuting, business and leisure. For instance in the UK, the promotion of cycling, walking and the use of public transport has been an element inherent to the tackling of the CO₂ emissions generated from transport. The relative environmental benefits of long distance coach travel should also be noted, and included in campaigns to promote sustainable travel in Europe.

The future of coach travel might also be influenced by pressure from the European

Commission that a fuel tax be imposed on intra-EU flights. Although air travel currently accounts for only 3% of global carbon emissions, this is one of the fastest-growing sources of greenhouse gases. It is argued that, while other modes of transport have to pay tax on fuel, aviation does not. Members of the European Parliament and NGOs are pushing for such a tax to be imposed, and for the airline industry to be brought within the EU's emissions trading scheme. In the UK, Air Passenger Duty (APD) has been considered as compensation for the tax exemption. APD was doubled in February 2007 to £10 per passenger flying out of British airports into Europe economy class. However, a doubling of passenger tax might not necessarily encourage the aviation industry to find solutions for cleaner engines. It is therefore anticipated that, in the long run, airlines will have to bear the costs of their environmental impact above and beyond the redress provided by passenger taxes.

The airline industry has also been vulnerable to fluctuations in fuel prices. In the past, some airlines such as *Ryanair* were able to enter into hedging arrangements to lock future fuel purchases at fixed cost. However, this strategy might not now provide enough protection against fuel prices, because fuel costs constitute a substantially higher proportion of the operational expenses of airlines than has been the case in recent years, thanks to sustained high oil prices. This additional cost is usually passed on to customers, who have either to pay more for their tickets, or to bear the cost of more expensive fuel in the form of fuel surcharges introduced by some traditional and low-cost carriers. This raises ticket prices significantly, and might reduce the number of flights. Ultimately, coach companies might benefit from this situation, being seen by potential passengers as a much cheaper alternative to air travel.

CONCLUSIONS

The situation of the low-cost airlines market in Poland is quite exceptional, because

travel demand has been generated by job-seekers travelling mainly to the UK. The phenomenon was made possible by liberalisation of the airline market and the removal of restrictions on workers that took place simultaneously at the time of EU enlargement. Commencement of an unrestricted labour market contributed substantially to the overall growth of passenger traffic. The evidence for this trend was provided by the massive growth in the number of visits made to the UK by Polish residents. However, as is noted above, the traffic between the two countries was heavy even before 2004, the demand for travel to the UK initially being accommodated by coach operations first and foremost (these accounting for 57% of visits to the UK made by Polish residents). Despite a vast increase in airline operations between 2004 and 2005, the market for coach travel to the UK was also able to grow in the same period, in line with the growing demand for inexpensive travel. Inevitably, the ongoing trend for the scale of coach operations to increase could not be sustained indefinitely, but any change has reflected not only a robust expansion of low-cost airlines, but also an overall stabilisation where the number of visits to the UK by Polish residents is concerned. The timetable study showed that, as of 2006, there were 179 weekly coach journeys from 188 towns in Poland to 45 destinations in the UK. *Orbis Transport* and *Eurolines* were shown to lead this market, having already been well-established in advance of the arrival of low-cost airlines, but following EU enlargement and in connection with the development of new routes and the introduction of innovative marketing strategies to attract new customers and – as time passed – compete with low-cost air travel. Bearing in mind the existing attributes of coach travel that give coach operators an advantage over airlines (not least flexible booking and the extensive nature of the network), coach companies should continue to develop new routes to places not served by airlines and look for new marketing ideas to attract passengers. The future of coach operations might see more consolidations and platforms

in order to increase efficiency of operations and make possible the survival on the market of smaller operators. Coach companies will also have an opportunity to promote coach travel as a greener mode of transport than air. In line with the growing awareness of climate change, passengers should be told about the relative environmental benefits of coach travel, and be encouraged to use this mode as an alternative to flying.

ACKNOWLEDGMENTS

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BOOK REVIEW

City and Region. Papers in Honour of Jiri Musil.

Wendelin Strubelt and Grzegorz Gorzelak (eds.). Budrich UniPress

Opladen & Farmington Hill 2008, 367 pp, maps, notes, list of authors.

Reviewed by EWA KORCELLI-OLEJNICZAK

It is most probable, if trivial sounding, that 'the city' and 'the region' are the places and spaces located in the very mainstream of socio-geographic thought. And such is the depth and infinite number of questions arising from contemporary studies of cities and regions that we may allow for no 'end to geography' whatsoever, just as there seems to be no 'end of history'. Indeed, many new beginnings are being offered to urban sociology and urban economics. No method or attitude applicable in the analysis of the processes taking place in cities and regions can be deemed unnecessary. Indeed, on the contrary, interdisciplinary analyses and modern approaches are leading to a fuller comprehension and investigation of space. Following through on this idea, the book under review comprises a composition of attitudes towards a variety of topics relating to the cities and regions of East-Central Europe. The *leitmotiv* of the volume is provided by the scientific ideas of Jiri Musil¹, his contribution to urban sociology and human ecology, and his earlier and more recent writings.

Unlike many volumes in publication currently, this book does not seek to discover or rediscover, or to prove the existence or non-existence of place, space, time,

geography or history. Nor does it undermine any theory concerning the contemporary processes underpinning urban and regional development. What it does, however, show, is that a broad perspective revealing diversity (rather than homogeneity) of the objects studied does not necessarily lead to a loss of cohesion and exactness in the publication as a whole.

At crossroads with the achievements of Jiri Musil we find twenty-one authors of different (though generally Central-European) nationalities, as well as varied scientific backgrounds. What the reader would usually expect is a drift of thought carrying him or her across the whole book, from the beginning through to the end. However, this is difficult to find in a volume consisting of individual, separate articles. Rather, "City and Region" holds its papers in a more or less alphabetical order, so it was obviously the intention of the Editors to dispense with chapter organization – this sometimes looking rather artificial in such contexts in any case. However, the range of topics here is such that the procedure might have offered support in this case. In that way, the whole would have acquired more regular features. The interesting letter to Jiri Musil written by Alfred Schwandt (on p. 341) would have brought the volume to a close, providing a kind of bracket or buckle to enclose the contents along with Wendelin Strubelt's preface.

The above comment notwithstanding, the papers included here - distant from each other in form and subject though they may be - can nevertheless be considered to form a unity. They rarely go further geographically than East-Central Europe, and whether or not with a historical look-back or reasoning, they focus on the consequences of the last European

¹ Professor of Sociology at Charles University (Prague) and the Central European University (Budapest and Warsaw)

transformation from 1989/90 onwards. In relation to the papers' overall content, if not necessarily their exact subject matter, it is possible to vaguely identify five main areas of discussion, which may be presented on the basis of selected examples. One of the features serving to categorise the work concerns whether the analysis is more geographical or more sociological in character. However, I cannot find full justification to artificially put a line between these two groups.

P. Drostal's transparent paper on the dimensions to transactional activity in Czech cities post 1990 (p. 15) reveals the clear primacy of Prague (as derived from the capital-city effect to be noted across East-Central Europe, especially in monocentric national city systems). The paper launches a discussion on the way in which the region's settlement systems have reacted to the parallel impacts of systemic transformation and globalization, as well as demographic change (B. Hamm, p. 121). What is involved here is an era of the metropolitan areas to be replaced by macro-structures such as the megalopolis in the longer term (P. Drostal and M. Hampl, p. 52). The topic continues with G. Gorzelak's fair evaluation of EU cohesion policy and its contribution to regional development (p. 97). At least we can say that history had mercy on the region as it rarely did before - in the face of fierce global competition, the 'generosity' of the European Community is about to come to an end. An interesting and sophisticated issue is the analysis of future path dependencies shaped by structures established during the transformation in the East-Central European countries, which brings to light the nature of transformation as a process of change. The paper by W. Strubelt on the changing relations between town and countryside perfectly combines the first block of topics with the next one. Presenting urbanization patterns in Germany (historically and after reunification), it holds an interesting discussion on the development of city regions and cities in general, discovering a change in the once antagonistic relations between city and countryside into a 'continuum' (p. 266),

in which the city still dominates, even as the psychological distance between the realms melts away.

Several contributions hover around the notions of 'region' and 'urban policy'. The dynamic nature of regions is discussed by reference to the Ruhr Coal District, where regional policy and communication between actors have contributed to development (p. 216). In contrast, there seems to be little awareness of the role of urban policy among Polish politicians and local government, something which leaves a question mark over the maturity of local democracy (p. 193) in Poland. U-J. Walther (p. 219) shows how urban policy functions within transnational networks, the examples in this case being urban regeneration programmes. The preconditions for success are shown to be the awareness and communication abilities of the partners involved.

The third block, which analyses the nature of change within cities, is represented by L. Faltan's essay on the ideology of consumerism in post-socialist cities which "enter radically" their (...) "spatial, social and mental reality". (p. 68). The drift of city primacy returns with B. Jałowicki's paper on the Polish metropolises and their social and functional change, showing Warsaw's domination, but clouding the picture with information on the undesirable phenomena that go hand in hand with success (p. 143). Indeed, success and failure, poverty and affluence find their spatial reflection in the social structure of cities, as presented by S. Szczepański and M. Tazbir with reference to the Silesian conurbation (p. 297). The threat of a "gulf" separating two worlds of wealth and poverty that would arise as one of the most negative consequences of transformation is a topic which returns again and again in most of the current socio-geographic discussions regarding the future of cities in East-Central Europe.

Block four consists of specific discussions not necessarily fixing on Central Europe. There is a paper by K.Z. Sowa on European identity and the future borders of the EU (p. 269), and a very discerning paper on the structural perspective to urban life by

K. Frysztacki (p. 71). It would be very interesting to read more on the topic by that Author.

The point of departure for the last set of papers is provided by the direct scientific interests of Juri Musil. There is, for example, an article on human ecology *versus* urban sociology by J. Friedrichs, who seeks the ideological roots of the former while trying to answer a question as to the discipline's future (p. 83). Will it experience a renaissance? Similarly, there is a highly interesting contribution on 'Pragocentrism' by M. Illner (p. 133), which highlights Musil's lifetime interests, and his position as "the research pragocentrist". Finally E. Kaltenberg-Kwiatkowska presents a comprehensive paper on street naming and renaming as a tool in 'manipulating the city's identity', a topic which belongs to the stream of culture-oriented urban studies, as one of the sub-disciplines of urban sociology. (p. 157).

Leaving aside their differences as regards subject matter, the papers also vary in form

from empirical studies to purely theoretical or even essayistic ones. This varying character of the papers combines with the sheer richness of topics to confer a certain immeasurable quality upon the volume. In a practical sense, it also allows the reader to study this book for many hours at a time without being consumed by weariness.

In fact, there will never be an 'end of social science'², as we can never fully explain the nature of society thanks to ever-present changes in place and time. But we should always try, at least, and here there is certainly a place for "City and Region".

Keywords: city, region, urban sociology, transformation, East-Central Europe

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² Reference to: John Horgan, 1996, *The End of Science: Facing the Limits of Knowledge in the Twilight of the Scientific Age*, Helix Books, Addison Wesley

Imaging the future: Geo-visualisation for participatory spatial planning in Europe, edited by: A. van der Brink, R. van Lammeren, R. van de Velde, S. Dane, Mansholt publication series, vol. 3, Wageningen Academic Publishers, the Netherlands, 2007, 200 pp. + DVD.
Reviewed by ANNA KOWALSKA

According to the authors of the introduction to *Imaging the future...*, 'spatial planning' can be described as a wide range of systematic activities designed to achieve specific spatial goals in environmental protection, urban and infrastructure development, agriculture and water management, as well as tourism, recreation, etc. All these aspects are analysed on the local, regional, national and even European levels. Although spatial planning is not a European competence, interest in regional development and spatial planning within the EU has increased in recent years, in line with various initiatives undertaken by the Union. One of these is the EU-funded programme INTERREG IIIC with its project entitled 'Participatory Spatial Planning in Europe' (PSPE). The book *Imaging the future...* presents the results of this project.

The main objective of the PSPE project was to explore the potential for innovative geo-visualisation techniques in public participation processes for spatial planning. The involvement and support of different groups of participants is regarded as important if planning procedures are to be effective, and plans implemented successfully. Geo-visualisations can be used in the exchange of spatial information in spatial planning processes. These two- or three-dimensional visual representations of data with geographic references allow for the presentation of scenario studies in diverse planning phases, and can be adjusted in line with the knowledge, experience and skills of participants. Within the project framework, case studies researching the effects of geo-visualisation in practice were carried out.

This book has 12 main parts preceded by a foreword and the acknowledgement of contributors to the project. Each of the

case studies is described in a separate chapter, with the remaining chapters concerning themselves with general concepts, research results and reflections on the lessons learned. A DVD accompanying the book contains examples of the geo-visualisations the project has developed.

The first chapter introduces the matter of participatory spatial planning in Europe's e-society, describing the advantages geo-visualisation techniques have to offer. It also presents the objectives of the PSPE project and the structure of the book, thereby ensuring a very useful introduction that facilitates further reading.

The second chapter, *Perspectives on citizen participation in spatial planning in Europe*, deals with current developments in spatial planning, and the adoption of the participatory approach in Europe. It begins by explaining how today's society understands the tasks of spatial planning. The two trends indicated are a growing participatory attitude among members of the public on the one hand, and on the other the growing complexity of planning issues, which should lead to a legal basis for citizen participation, and the adoption of the visualisation technologies allowing people to become involved in the planning process. The authors point out that participation has many different 'faces' in the EU Member-States. Examples from five PSPE cases—The Netherlands, Belgium, Spain, Portugal and Poland—show that different planning cultures influence the possibilities for implementing new approaches to planning practice. Differences in central-local government relations, democratic traditions and approaches to spatial planning, as well as in the legal requirements for participation indicate that the stimulation of interactive participation will require that the accent be put on different aspects in different countries.

Two other theoretical chapters discuss the general concepts of e-interaction (*Geo-visualisation – The e-interaction factor in spatial planning*) and organisational innovation (*Organising innovation: the integration of innovative geo-visualisation techniques*

into *participatory spatial planning*), providing a conceptual background to the PSPE case studies, and at the same time using the results they generate to depict some of the issues described. Chapter 6 explains the idea of e-interaction driven by geo-visualisation, some criteria for visualisation ethics, as well as the innovative tools and techniques that have been devised. The authors indicate the scientific gaps to be filled, *i.a.* by further research on the usability of geo-visualisations, cultural and personal differences in the interpretation and understanding of visualisations, and the absence of perceptual and societal aspects from previous research. They also give some useful approaches to the problem of the constant reluctance to use geo-visualisation tools in planning practice. This issue is reconsidered in Chapter 11, focusing on the level of organisations and the factors that determine the successful integration of geo-visualisation tools and techniques into organisations responsible for participatory spatial planning. Empirical and theoretical examples described in this chapter show that the problem results from a combination of organisational and societal factors, with the former including leadership, vision, communication channels, the organising power of a geographic information community, and sustainable resources; and the latter legal initiatives, developments in internet technology, and the growing awareness among citizens of planning processes. Once more, the authors stress that the differences between EU member-states make it impossible to prepare a general set of recommendations, but still see the potential in every country for public participation in the use of geo-visualisation tools and techniques to take place.

Practical applications of the approach taken are described in the chapters on the PSPE case studies and two additional research reports. These present the specific geo-visualisation tools and methods used to support concrete spatial planning processes in the countries participating in the project. The cases described are at both local and regional levels.

The case study from the University of Girona was meant to raise awareness of the

possibilities for public participation in small-scale urban renewal projects in the Catalan town of Salt. The central question in this case study was ‘why participate?’. Geo-visualisation tools presented to politicians, project managers and citizens served to change their attitudes towards participation itself. This had an educational influence, with visual, innovative and interactive methods of communication stimulating and accelerating the acceptance of participation.

In the Polish case study undertaken by the GRID Environmental Information Centre and IG&SO PAS, an Internet-based Geo-Discussion Panel was developed to support the decision-making process surrounding a new expressway in the Vistula Valley. This modern application was used to collect comments on alternative expressway routes at several public meetings and via the Internet. The authors admit that, although this seems a tool that can stimulate stakeholder participation and have a potentially broad application, the limited availability of the spatial data necessary for geo-visualisation may stand in the way of its increased use.

In Portugal a ‘virtual flight’ over the city of Barreiro enabled schoolchildren and the general public to express their ideas about changes to a local land-use plan proposed by the municipality. The enthusiasm of the people participating shows that the tool came up to expectations—they felt that their opinions could influence local authority decisions. One very important result of this case study was the establishment of a new municipal department, the ‘Department for Participation, Citizenship and Democracy’, which is to deal with issues of citizen participation.

In the Dutch case, the ‘virtual reality viewer’ was used to present changes in the landscape related to the development of a new residential area, in combination with nature restoration, water management and outdoor recreation. The Government Service for Land and Water Management had both experts in various fields and residents assess ideas for a new master plan for the Groningen Lake City. Citizen participation in spatial planning has a long tradition in The Nether-

lands, and although some obstacles to the involvement of 'ordinary' citizens remain, the process is not in need of stimulation. That is why more effort was put into perfecting the viewer itself, with a view to its serving as a more effective tool in the communication of information.

A similar situation was addressed in Belgium, where the relevant study dealt with the development of a website for public participation in the Zondereigen land-consolidation project conducted by the Flemish Land Agency. Despite problems with its 'field-testing', it created a spin-off: the new geo-visualisation techniques have been incorporated into Agency working processes and are now being applied in other projects.

The case-study reports are very usefully supplemented by two additional chapters on the usability, effectiveness and efficiency of different 3D geo-visualisation tools and methods, as tested in research projects undertaken in Germany and Poland. The first project, relating to the extension of Kassel Calden Airport, compared an interactive with a non-interactive 3D geo-visualisation tool. The results show that the various stakeholder groups perceived visualisations differently, in line with age, skills, experience with 3D models and even emotional involvement in the project. The chapter offers helpful hints on quality criteria when it comes to preparing, composing and presenting visualisations. The Polish research also compared two types of 3D geo-visualisation, testing users' spatial orientation in an urban environment. An important lesson from this research is that people may have difficulty understanding and interpreting 3D geo-visualisations, and so should have more opportunities to become familiar with them.

To sum up, the great variety of knowledge institutes and policy-implementation agencies involved in the case studies and research, as well as the impressive variety of tools developed to solve different spatial

problems has resulted in a significant exchange of knowledge and experience that should be of benefit in the future. The last chapter summarises lessons learned from the project. The outcomes show that geo-visualisation acts as a catalyst to new forms of participatory spatial planning. It also has educational value in stimulating dialogue between citizens and decision-makers. The case studies reveal the importance of the content and form of the spatial information needed for a decision to be arrived at. They also point to the considerable input of time and money, as well as organisational change, that the application of geo-visualisation requires. Finally, though geo-visualisations can be used to initiate major changes in planning practice, a lot depends on authorities' positive or negative attitudes towards public participation.

This book is recommended for academics conducting research in geo-visualisation or spatial planning, as well as professionals already working or looking to work with geo-visualisations in participatory spatial planning. It shows a great understanding of the ways geo-visualisation can improve public participation in spatial planning issues, as well as of the need for accessible geo-information in the relevant organisations. The cases reflect the broad scope of the project and provide inspirational ideas for practitioners. The book *Imaging the future: Geo-visualisation for participatory spatial planning in Europe* offers readers a real possibility to look into the future to see how participatory spatial planning ideally ought to be realized.

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